Editorial

Smart4RES presents the second issue of its newsletter. Despite the impact of the Covid19 crisis on project activities, Smart4RES has reached some significant milestones and fortunately delays remain limited so far.

This newsletter brings you an overview of our latest achievements and ongoing work, as well as information about our upcoming events and publications.

Enjoy reading!

Georges Kariniotakis, Project coordinator

Stakeholder survey on forecasting solutions

Don't miss an opportunity to influence the Smart4RES project!

To make sure that Smart4RES development is directed towards end-user needs in the power system industry, we invite you to reply to our short survey 📝 .

The questionnaire is designed to give Smart4RES partners a better idea about how you use forecasts and forecast-based decision-aid tools, including your needs and any obstacles encountered. You will also have a chance to express your opinion on more advanced solutions and innovative use cases that you may have participated in.

Make sure you're needs are heard!

Update on Work Packages activities

Forecasting requirements and innovative use cases (WP1)

Considering the requirements for future power systems with near-100% RES, the activities in Work Package 1 identify new uses for RES forecasting and set the scene for a logical

forecasting model-chain that covers the requirements of current and future power systems and electricity markets. It prepares inputs for the remaining WPs and aims to identify forecasting needs taking into account the different use cases and end-users. A number of well-established use cases already exist for which requirements are well-defined with forecasts already used in business practices. However, several ground-breaking use cases have emerged that now need to be tested in pilot conditions, considering innovative forecast products (for example the forecast of distributed flexibility potential in medium voltage grids, see illustration below).

Smart4RES partners are currently working on the definition of innovative use cases that explain how new RES forecasting products, developed in this project, can be integrated into end-users business processes. The aim is to make the synthesis of forecasting requirements for existing and new use cases, as well as the requirements of national grid codes and EU electricity network codes and guidelines. This deliverable will be made available in September and will also address the expected performance by end-users for each business process and end-users' sensitivity to accuracy. Performance metrics will be defined in this report.

Finally, guidelines described in "8.2 Select Technologies", IEC PAS 62559:2008 were followed. Specific KPIs and a standard calculation procedure has also been developed for each use case, based on a methodology considered in FP7 EU SafeWind project for forecasting skill evaluation and proposing new metrics for supporting the quantification of forecast value beyond traditional accuracy metrics.

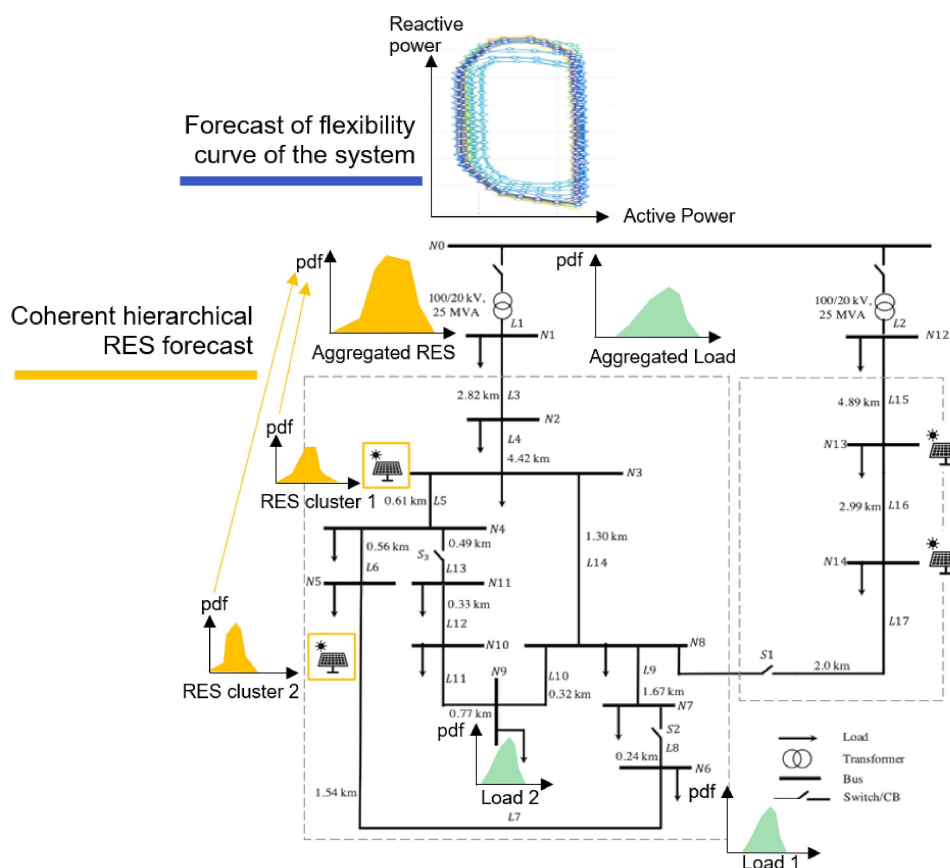Deliverables will be available soon on the Smart4RES Resources Center.

Figure 1. Example of an innovative use case representation: Grid-aware flexibility forecast of distributed resources at

Next Generation of Weather Forecasting Models for RES Purposes (WP2)

The overarching objective of WP2 is to improve the design of Numerical Weather Prediction (NWP) as well as satellite and sky-imager based forecasts and ensure that they correspond to RES forecasting purposes. Focusing on atmospheric parameters, this WP aims at refining the quality and availability of forecasts regarding variables of interest for RES production, which are primarily wind at hub height and solar irradiance characteristics at the surface.

Over the past months Météo-France has focused on the refinement of cloud radiative impact in atmospheric models, to better account for their impact on solar radiation. In that perspective, new cloud optical properties covering a variety of droplet size distributions (DSD) have been implemented, and diagnostics have been added to the standard outputs, such as total cloud fraction, cloud optical thickness, and the spectral distribution of direct and diffuse fluxes. In addition, preliminary studies are ongoing to estimate the added value of using near-real time aerosols instead of monthly climatologies for NWP. The overall objective of this activity is to develop a solar-optimized version of the AROME operational model.

Despite postponement of the activities due to the Covid-19 crisis, in early June Météo-France started work on a set of high-resolution simulations that will enable Smart4RES partners to use NWP predictions from the latest versions of AROME-EPS* and ARPEGE-EPS** models over the totality of their respective domains (central-western Europe for AROME, whole globe for ARPEGE).

Finally, Whiffle has focused on improving the Large-Eddy Simulation (LES)-based weather forecasting model that now integrates more complex orography and the ability to 'control' cloud cover, i.e. specify the cloud cover that should be maintained in line with NWPs from an external supplier.

More information will be delivered by end of 2020.

Applications of Research to Operations at Mesoscale – Ensemble Prediction System

**Action de Recherche Petite Echelle Grande Echelle (Action of Research Small Scale Large Scale) – Ensemble Prediction System*
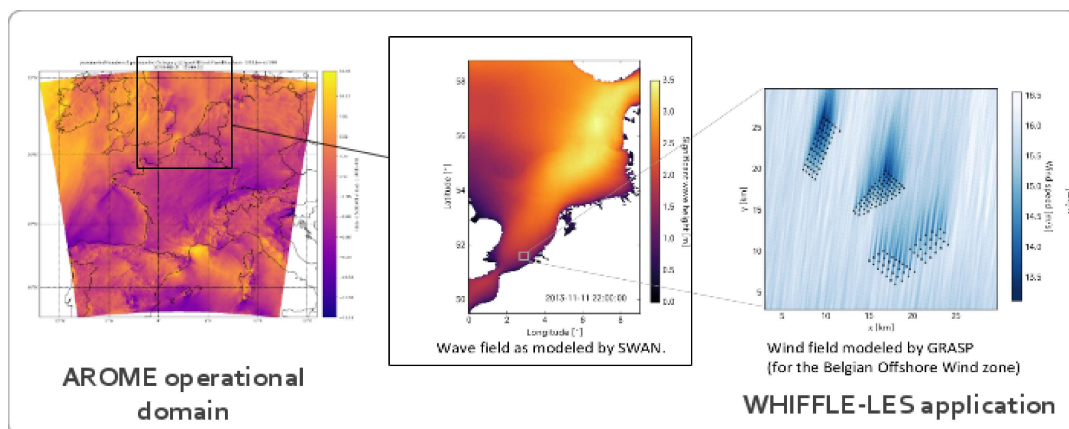

Figure 2. Numerical Weather Prediction: spatial resolution

Other WP updates

Recently, WP3 to WP5 have launched their activities. Short descriptions of these work

packages are available following this link https://www.smart4res.eu/work-structure/.
More information will be delivered by the end of 2020.

Smart4RES nominated for .eu Web Awards!

To help spread the word about the work and mission of Smart4RES, please vote for us on the .eu Web Awards website.

Read more >

Highlights of past events

European Geosciences General Assembly - May 2020

The EGU General Assembly 2020 in its online format 'Sharing Geoscience Online' was an exciting experiment in response to the COVID-19 pandemic and a great success throughout the entire week. On 6 May, Georges Kariniotakis (ARMINES – MINES ParisTech) presented Smart4RES during the Energy Meteorology session, moderated by Gregor Giebel (DTU Wind). Download the session material from the Smart4RES Resource Center.

2nd Smart4RES General Assembly – June 2020

The 2nd Smart4RES General Assembly was held online on 2 and 3 June. Although the partners had been looking forward to meeting physically, this productive meeting was an occasion to follow on work package activities with a special focus on forecasting requirements and the definition of innovative use cases.

Smart4RES first webinar - Data Science for renewable energy prediction

On 5 June, Smart4RES held its first webinar on Data Science for renewable energy prediction.

Presented by Georges Kariniotakis (ARMINES – MINES ParisTech) and Pierre Pinson (DTU Elektro), this first webinar introduced the project and focused on the role of RES forecasting in future power system applications as well as on innovative weather and RES forecasting products to increase performance by 10-20%.

Hosted by ISGAN, this webinar recorded 1,000 registrations, and 550 participants from more than 90 countries connected online during the webinar time-slot.

Did you miss the webinar? The recording is available on YouTube.
The presentation is available on the Smart4RES website.

Innogrid 2020 virtual session - Why power networks innovation is key for bringing the European Green Deal from promise to practice

Despite the pandemic, power network operators are committed to continue working to support the energy transition. As part of this effort, the European Distribution System Operators' Association (E.DSO) and the European Network of Transmission System Operators for Electricity (ENTSO-E) organized two InnoGrid webinars to highlight the latest innovations and feature some of the leading R&D projects in Europe.

With more than 350 participants, the first webinar took place on 18 June and presented thoughts and projects that contribute to making the Green Deal a reality, especially through enabling integration of renewables. Smart4RES was invited to participate in the project panel, together with EU funded projects PROMOTioN, IElectrix and FlexPlan. Moderated by Maximilian Urban, Project Manager at Netz Niederösterreich and E.DSO Projects Committee Member and Norela Constantinescu, Manager of Research & Innovation at ENTSO-E, the discussions illustrated how TSOs and DSOs can help to develop renewable resources and thus make our grids greener.

The presentations delivered at the event are available HERE.

IEA Wind Task 36 meeting - June 2020

On 23 and 24 June the online meeting of the [IEA Wind Task 36](#) took place. This task brings together actors from several countries from the communities of RES forecasters, meteorologists, researchers and forecast users. Smart4RES was represented by Simon Camal (ARMINES MINES ParisTech) and Pierre Pinson (DTU Elektro) who presented the project use cases as well as the list of Smart4RES innovative forecasting products.

This meeting was an opportunity to highlight the results of the winning team in the [EEM20 forecasting competition](#), a fully probabilistic wind energy forecasting competition organized by KTH and Greenlytics. We congratulate Simon Camal, Smart4RES project manager and member of the winning team, with Kévin Bellinguer and Valentin Mahler from ARMINES – MINES ParisTech.

Watch their talk on [YouTube](#).

Publications and conference papers

XXI Power Systems Computation Conference (PSCC 2020) – June /July 2020

Over the past days, the XXI Power Systems Computation Conference took place online. Despite the ongoing global health crisis, fruitful exchanges were made on new approaches and techniques for modelling, analyzing, and controlling power systems.

Smart4RES partners presented two papers on Online Forecast Reconciliation in Wind Power Prediction and on Forecasting Conditional Extreme Quantiles for Wind Energy.

Download the conference papers at https://www.smart4res.eu/document_category/scientific-publications/.

Upcoming activities

PMAPS 2020 – 18-21 August 2020

Don't miss the [keynote speech](#) by Pierre Pinson (DTU Elektro), and the [presentation](#) from Theodoros Konstantinou (NTUA – ICCS) on Post-processing Numerical Weather Prediction for Probabilistic Wind Forecasting at PMAPS 2020, the 16th International Conference on Probabilistic Methods Applied to Power Systems.

The theme of PMAPS 2020 is "Combining data-driven and model-driven approaches for managing risk, reliability, and resilience, in electric power and energy systems". For more information consult the [conference website](#).

Smart4RES webinar series

To facilitate knowledge sharing among the energy system stakeholders, Smart4RES is launching **a webinar series** featuring the following episodes over the coming month:

- **Episode #2 (Fall 2020) -** RES forecasting and data marketplace: a collaborative framework
- **Episode #3 (Winter 2020/2021) -** Optimizing participation of RES generation in electricity markets: new opportunities and the role of forecasting
- **Episode #4 (Spring 2021)-** Advanced weather forecasting for RES applications
- **Episode #5 (Summer 2021) -** Optimizing the value of storage in power systems and electricity markets
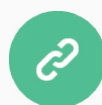- **Episode #6 (Fall 2021) -** Modelling tools for integrating RES forecasting in electrical grids

Stay tuned - Visit the Smart4RES website

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