

## **2021 at EMD – Highlights of some of our activities**

### **Release of windPRO 3.5**

In September we released the new windPRO version with a fully new module: HYBRID. Users can now combine very fluctuating market prices with fluctuating production data from wind, PV, or other productions – we are no longer limited to MWh calculations in our time varying calculations, but can include EUR, US\$ or any other currency. The ideal project sizes with investments interacting with a local demand and/or external grid can be optimized based on new cost functions e.g. for financing, taxes and tariffs. Storages can be included in the module making windPRO ready to handle future hybrid energy project designs and feasibility calculations/documentation.

windPRO 3.5 also includes several other interesting new features such as: Blockage, new Eddy Viscosity with Deep array Correction and grid curtailment in PARK. Free download of GASP resource maps worldwide including siting parameters e.g. turbulence. Evaluation of lifetime extension potential in LOAD RESPONSE module, new AEP calculation methods in the SOLAR PV module including tracking and bifacial and calculation of very large plants now within minutes, before up to days. Better design tool with flexible aligning of panels within PV-areas. A fully new INTEGRATION module for SketchUp which brings windPRO project data to a 3D world with few mouse clicks, enabling impressive visual presentations like SHADOW flicker animations and other VR, AR presentations on any platform (e.g. mobile phones and tablets).

We had the pleasure to present windPRO 3.5 at the Husum Wind 2021 exhibition in September and again at the WindEurope Electric City 2021 conference in Denmark in November. We would like to thank those of you, who visited our booth at these two events.

### **Release of energyPRO 4.8**

In November, we released a new version 4.8. The main new feature in this version is the option of using more fuels on energy conversion units as modelling of PtX projects and industrial plants often requires the use of multiple fuel inputs or outputs.

Spurred by the growing interest to convert large scale wind and solar electricity production to hydrogen, ammonia, or e-fuels, in 2021 we have seen a growing international interest among many of our long time windPRO users to also use our energyPRO software for modelling, analysing and preparing techno-economic studies for these types of complex energy projects.

### **Busy with energyTRADE**

CHP plants in Denmark have traditionally consisted of gas engines, a gas boiler, and a thermal storage, but many of them have now also installed wood and electrical boilers,

heat pumps, solar heating panels and are also participating at different electricity markets (day-ahead, regulating and reserve).

This complex operation requires a dedicated flexible software like energyTRADE for the optimisation of the daily production at scheduled intervals against parameters such as weather forecasts, electricity price forecasts, heat demands and thermal storage content. With interface to the balance responsible party (BRP) the plant can send optimized production plans with bidding prices and quantities and receive updated production schedules upon trade at the different electricity markets.

During 2021 we have been very busy setting up new energyTRADE solutions at numerous CHP plants. The order book for energyTRADE software solutions to be implemented for clients in both Denmark and internationally in 2022 is already large.

### **EMD Consulting - A wide range of services offered**

Again in 2021, our wind energy experts have been working as independent advisors together with our due diligence partners on numerous large wind farm portfolio transfers worldwide. Our wind consulting team has also assisted many wind farm developers and asset owners in the areas of bankable energy studies in the pre-construction phase, post-construction operational energy assessments and life-time extension services.

More and more manufacturing companies are now actively seeking to change their factories and production facilities to pursue carbon-neutrality. During this year, our energy system experts have worked as external advisors for well-known leading international manufacturers to model the present energy consumption at their factories in different countries and to simulate how the energy usage can be substituted by carbon-neutral energy production technologies.

In addition, our energy system experts have also been engaged by numerous clients in the Nordic region to perform early-phase techno-economic studies of their hybrid, storage and PtX project ideas.