

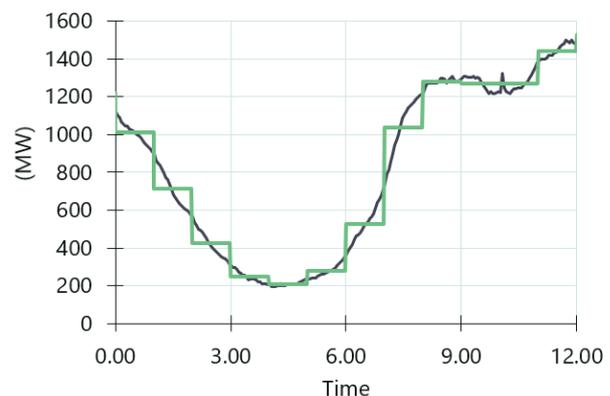
Energy System Design Service (ESDS)

ENABLING INTEGRATION OF RENEWABLE ENERGY SOURCES

The ongoing transition within the energy sector, targeting a reduction of greenhouse gas emissions, is accelerating the deployment of variable renewable energy sources (VRES). Understanding and foreseeing how the energy markets are transforming, and how VRES (e.g. wind and solar) together with conventional power generation interacts with novel technologies such as energy storage, electric vehicles, and Power-to-X solutions, is key to a successful system integration.

Flexens ESDS meets even the most challenging needs across the energy sector. We create **transparent and concrete masterplans** to successfully achieve ambitious energy transition targets by simulating existing and future technology solutions in a real market environment.

*“High-resolution modeling is very important when it comes to understanding flexibility. **The value of storage, power to gas (or X) and batteries are not adequately captured at hourly resolution.** The results showed up to 100 % increase in some battery usage in 5-minute results compared to traditional hourly results. In addition, **the results captured more systems costs: total annual system costs increased by 3 %.** While this may seem small, it represents **about 4.5 B€ in annual costs** for a system like the EU.”¹*



An example of the actual wind power production in a minute (black) and hourly (green) resolution.

Typical system modelling software is capable of only 1-hour resolution. However, our sophisticated system design offers **accuracy down to one second, allowing for significant cost-saving potential.** Flexens ESDS takes large amounts of input data, such as local fossil fuel prices, energy policies, subsidies, taxes, CO₂ emission costs, as well as various characteristics of different technologies, into consideration. Our modelling services provide **highly accurate and reliable** energy market scenarios, **excellent for large scale renewable energy transitions.**

FLEXIBLE ENERGY SYSTEM INTEGRATION

Real-world detail captured in sub-hourly simulations will provide insights into a low-carbon future, as flexible energy systems step in to fill the gaps left behind from intermittency.

LONG-TERM CAPACITY EXPANSION PLANNING

With advanced algorithms, capacity expansion problems can run over the 10- to 30-year planning horizon or any horizon timeline.

INNOVATIVE ENERGY TECHNOLOGIES

Analyse energy technologies (e.g. energy storage, electric vehicles, power-to-X) for both short- and long-term modelling. Compute savings from e.g. production costs, congestion charges and reduction in losses.

TRANSMISSION MODELING

Analyse and plan the impact of transmission operation and congestion costs, considering optimal power flow (OPF) and losses.

¹ Energy Exemplar (2019) High-resolution Modeling Captured 4.5B€ in Costs, Modeling in 5-minute Increments Delivers Greater Accuracy

