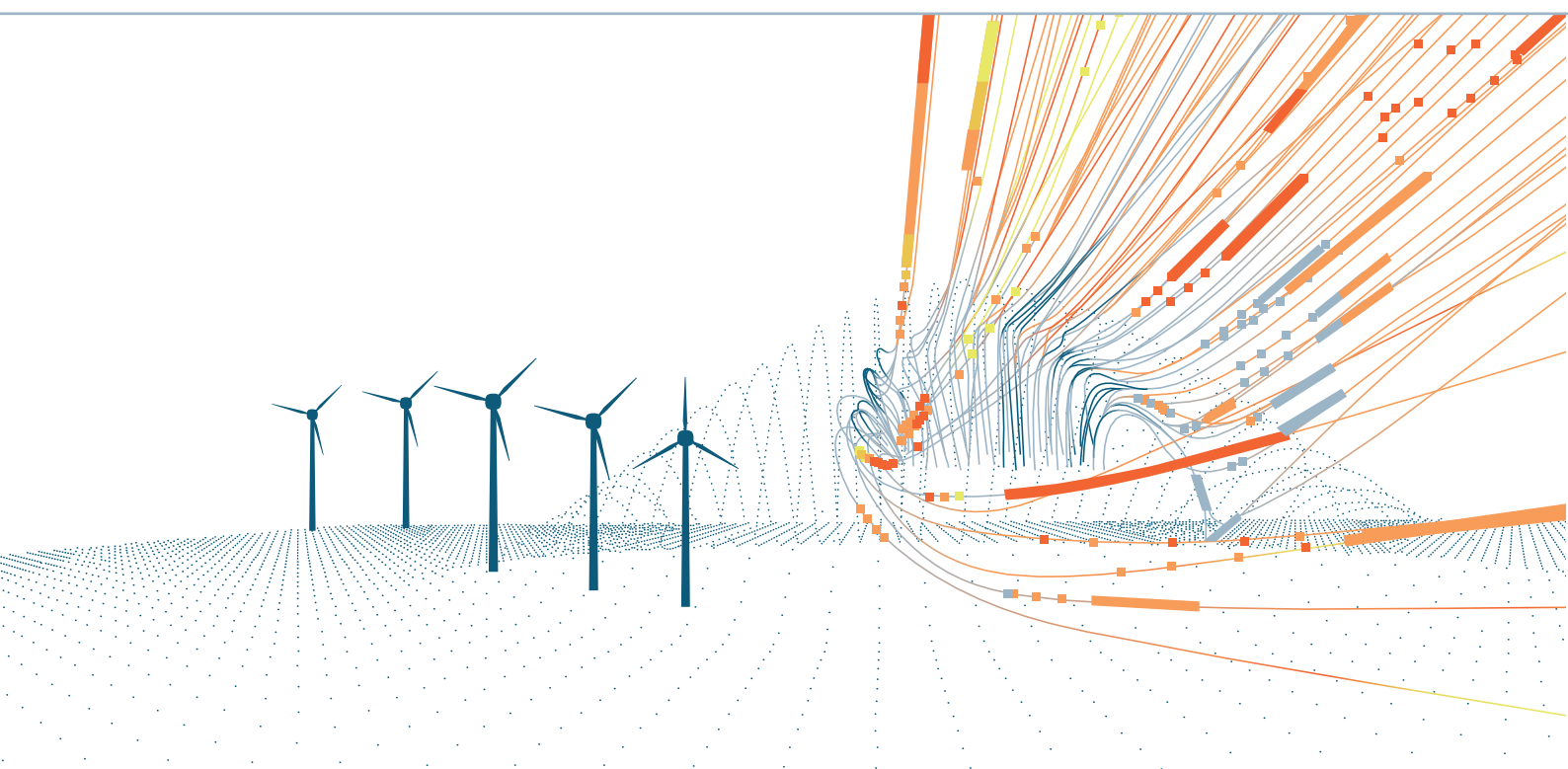# WIND

IS WIND POWER

KNOWLEDGE

POWER FORECASTING

windsim

Software | Consulting | Forecasting

NOT KNOWING HAS A COST

WHY
POWER FORECASTING

One day a wind farm produces its nominal power, next day is doesn't produce anything at all – wind is indeed a variable resource. No matter if you try to sell the electricity with maximum profit or operate your wind farm the most efficient way, an accurate power forecasting gives several benefits:

- Minimized imbalance costs

- Maintenance planning

- Production reports, including track of lost production

- Grid balancing

Sample references

FROM WINDSIM
MANAGEMENT

THE VALUE OF WINDSIM
FOR WIND PROJECTS

WindSim delivers accurate and proven simulation software and consulting services that help the wind energy industry worldwide design and operate more profitable wind farms.
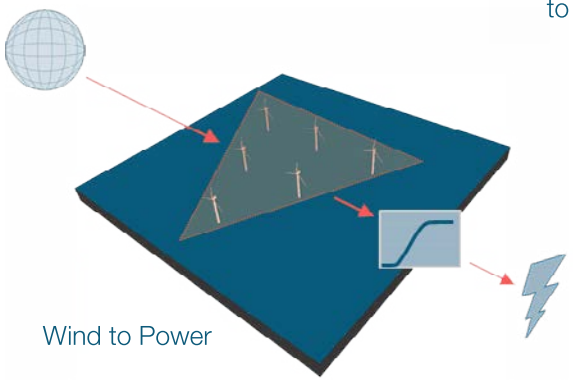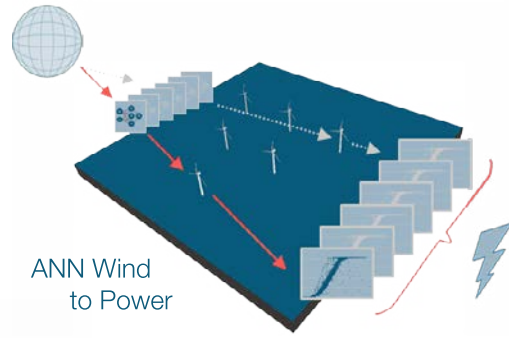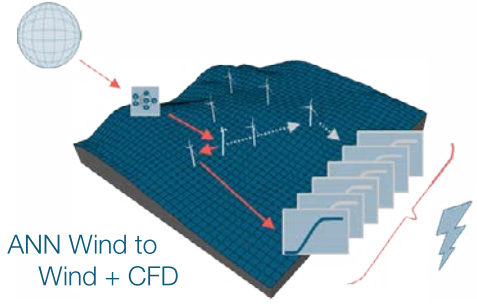
- Maximize production and wind farm performance while minimizing risk, downtime and maintenance cost.

- Using WindSim from early concept evaluation, through engineering to operation, secures overall capital and operating cost effectiveness.

- Successful design and operation of wind farms rely on detailed understanding of the wind field. WindSim provides solutions through accurate modeling of true dynamics.

- Advanced simulations maximizing energy production for every type of terrain, from the simplest to the roughest locations.

ARNE REIDAR GRAVDAHL
CTO & Founder

JOHN OLAF RØMMA
CEO

SUSTAINABILITY – The obvious choice
The idea of sustainability stems from the concept of sustainable development set forth at the World's first Earth Summit in Rio in 1992. Today sustainability is a part of everyone's vocabulary. Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs. We are proud of working towards a sustainable energy supply - The obvious choice for the future.

WE HAVE BEEN WORKING ON
FLEXIBLE POWER FORECASTING

ACCURATE
POWER FORECASTING
STRATEGIES

Depending on available data and requested accuracy level, we will configure a power forecasting service in accordance with your needs:

- Intraday or Day-ahead

- Configurable with respect to weather input data

- Flexible time resolution

- Integration of online data

- Multiple strategies, combinations of statistical and physical models

- Hybrid solutions

ANN Wind to
Wind + CFD

ANN Wind
to Power

Wind to Power

Power Forecasting strategies using various combinations of Artificial Neural Networks (ANN) and Computational Fluid Dynamics (CFD).

We provide customized integrated forecasting solutions, unique to each client.

The power forecasting system couples Numerical Weather Prediction data, Artificial Neural Network and Computational Fluid Dynamics.

The system gives precise predictions of the day ahead and intraday power forecasts. It is configurable with respect to weather input data.

Several forecasting strategies are available – use the strategy that minimizes your imbalance costs.

WindSim pioneered the use of CFD (Computational Fluid Dynamics) technology to optimize wind turbine placement, and offers CFD software, training, independent technical and engineering services to the wind industry. Headquartered in Norway, and with a global presence in over 20 countries, WindSim has for a long time been the thought leader and expert on CFD within the wind industry.
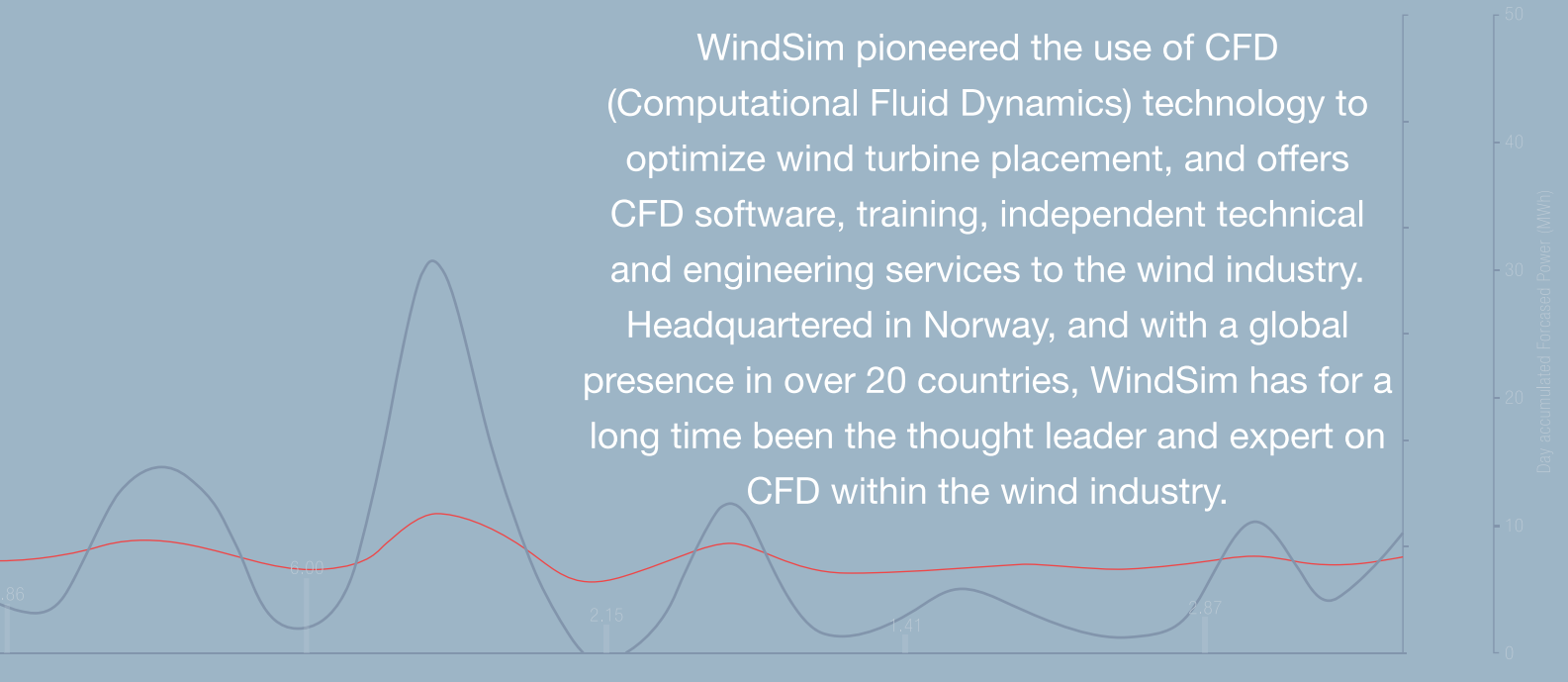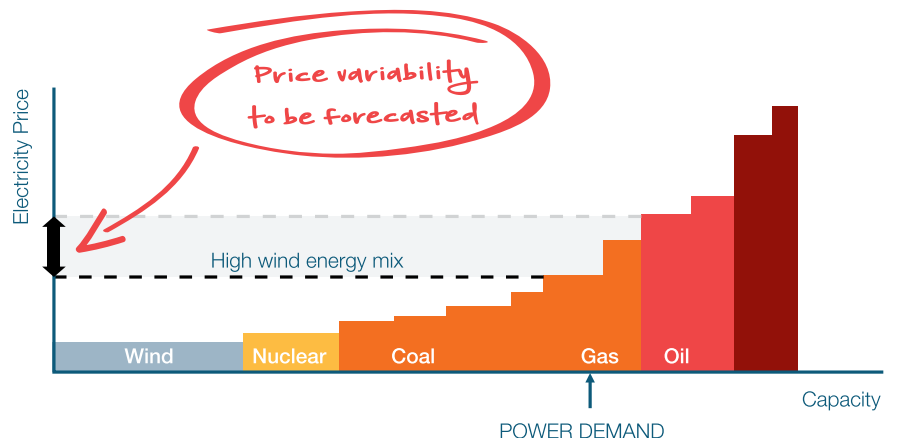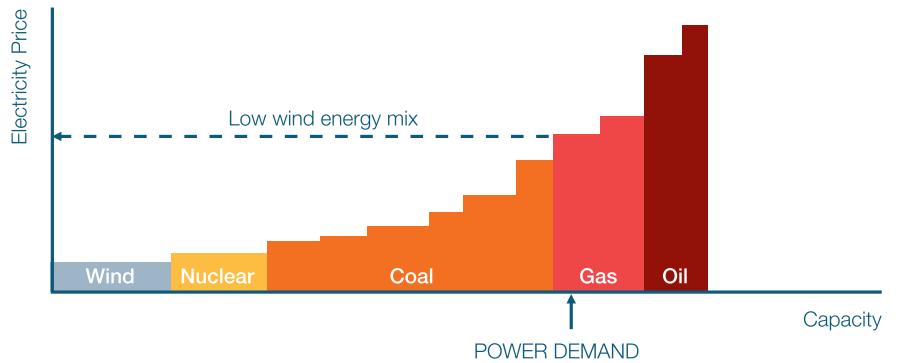
POWER FORECASTING IN
A RENEWABLE ENERGY MIX
MERIT ORDER EFFECT

How do you get your electricity? Most likely it is from a mixture of coal, gas, oil, nuclear and hydro, standing from more than 90% of the worlds electricity production. Times are changing - wind has become part of the mix, and the trend is clear, its contribution will become even more significant in the coming years.

What are the market consequences? The introduction of wind as an additional source in the energy mixture has a profound market impact, explained by the so called "merit order effect". The "merit order effect" describes the mechanism by which the market price of electricity is set.

Wind energy has no fuel costs – the wind is free – and the operational costs are low too. Hence, wind energy is first introduced in the energy mix followed by the more expensive sources until the power demand is met, and thereby the price of electricity is set.

Wind as an intermittent resource will vary day by day. The market price of electricity will vary accordingly, ultimately set by the forecasted wind speed. In this market the added value of accurate power forecasting is obvious.

Electricity Price

Low wind energy mix

Wind | Nuclear | Coal | Gas | Oil

Capacity

POWER DEMAND

Price variability to be forecasted

Electricity Price

High wind energy mix

Wind | Nuclear | Coal | Gas | Oil

Capacity

POWER DEMAND

Argentina | Brazil | Canada | China | Costa Rica | Finland | France | Germany | Greece | India | Iran | Italy | Korea | Mexico | Norway | Serbia | South Africa | Spain | Turkey | USA

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