

Wind Benchmarks: Europe Regional & National

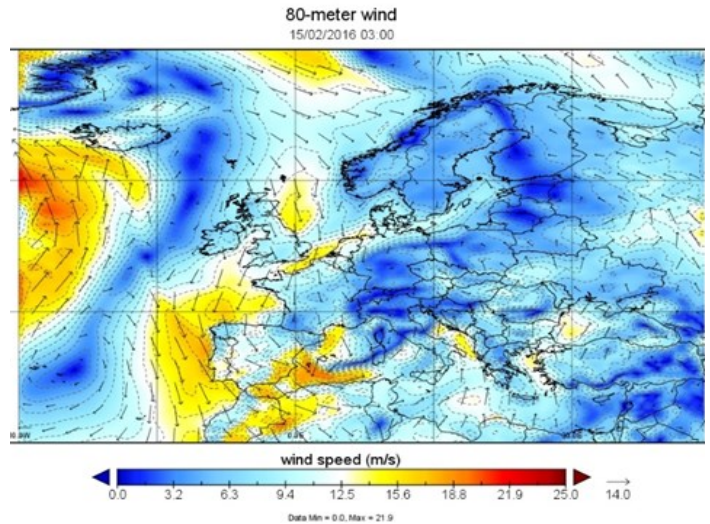
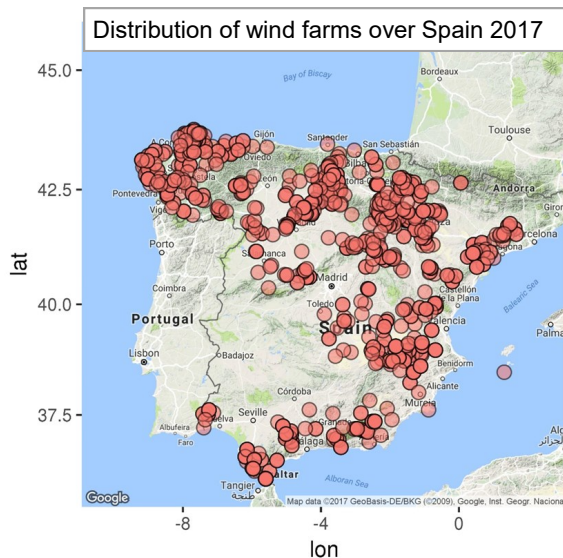
Speedwell offers a range of proprietary national and regional wind production indexes. These have been specifically designed to support weather risk management in the renewables and energy markets. Each index (“Benchmark”) represents daily energy production, denominated in MWh, for a given national or regional geography. Each index is “frozen” based using installed capacity as of a specific date. The Benchmarks can also be presented as a percentage of rated output.

These indices help energy companies manage their wind exposure by providing: (1) a historical time series for historical analysis, (2) forecasts of the indices, and lastly, (3) Settlement Data in order to track and settle open transactions.

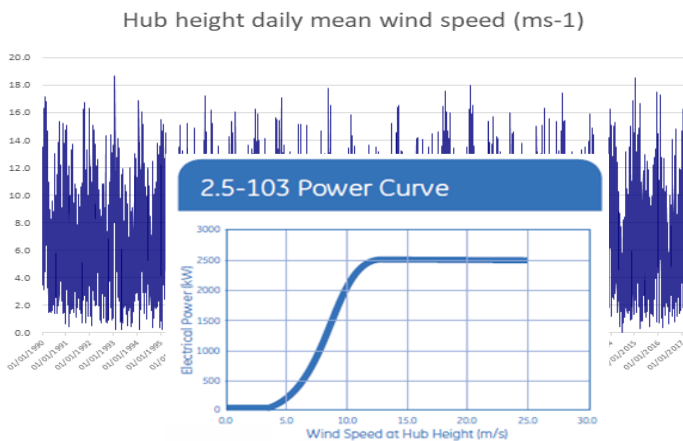
In addition to standard Wind Benchmarks we are able to create Wind Benchmarks to match specific assets. These are designed for weather risk transfer.

Wind Index Creation

- 1 Determine the location and characteristics of wind farms in the region of interest. Required details include the number of turbines, rating, hub height, power curves...
- 2 High-resolution (5km) hub height wind speed grids are generated from the MERRA 2 historical Index series and the GFS Hi-res Operational forecast models (real-time and forward curves)



- 3 Hub height wind speed data is fed in to each wind turbine’s power curve to calculate the daily power production



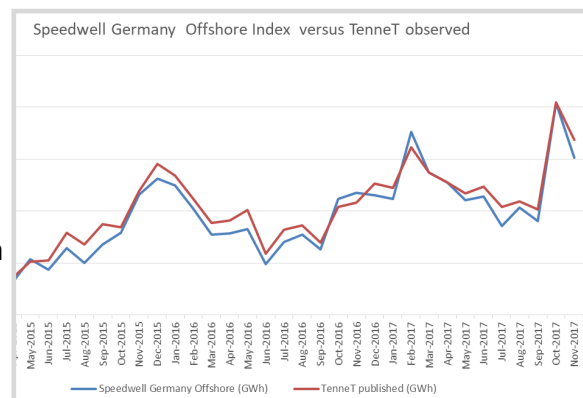
- 4 **Deliverable Components**
Historical data - Synthetic historical daily wind production data based upon the frozen asset-base is calculated using the information from steps 1-3. where the MERRA 2 reanalysis series is the primary input. Data starts in 1980.

Forecast data - Forecasts of the wind Benchmark are generated using a Speedwell proprietary WRF model. These are available as daily or sub-hourly.

Settlement Data - As MERRA 2 reanalysis data are not produced in real-time, we use our WRF model to calculate hub height winds in near real-time in order to provide a continuous series throughout any risk period. Final Settlement Data can be provided once MERRA 2 reanalysis data is available, where the Index data is analysed by Speedwell Settlement Services and published as certified Settlement Data for contract settlement. Speedwell Settlement Services is regulated as a Benchmark Administrator.

Germany

- **Offshore - Wind Production Index 2018** is designed to closely fit the actual production Index as published by TenneT
- **Onshore - Amprion, TransnetBW, 50Hertz, TenneT**
 - The Indices calculate the total daily power production from the installed wind turbines as of November 2017 for those onshore turbines that are connected to the National Grid (high voltage)
- **Germany All Installed Wind Farms (2018)**



Italy

- **All Installed Wind Farms (2018)** - Based on installed capacity frozen as of TERNA data accessed on March 2018 representing capacity as of 30th June 2017 - 9.5 GW



Netherlands

- **All Installed Wind Farms (2018)** - Based on installed capacity frozen as of 30th June 2017 - 4.39 GW
- **Onshore and Offshore - Wind Production Indices** also available

Spain

- The **Spain Wind Production Index 2018** is designed to closely fit the actual production Index as published by Spain's REE
 - The Index calculates the total daily power production from the installed wind turbines as of December 2017 on mainland Spain that are connected to the national grid

Turkey

- The **Turkey Wind Production Index 2018** is defined to fit the actual production index as published by EMRA.

United Kingdom

- The **UK Wind Production Index 2018** combines the turbines on the Balancing Mechanism (BM), those that are part of the Embedded (EM) scheme and also those that are part of the Feed in Tariff (FiT).
 - The index is based on installed capacity frozen as of June 2017
 - Component indices for the three parts i.e. BM, EM and FiT are separately available
 - Excludes Northern Ireland

Coming soon

- **Belgium, Denmark, Norway**

Speedwell Wind Power Indices—International Availability

- Australia - National Electricity Market (NEM)
- Australia - South Australia (SA)
- Australia - New South Wales (NSW)
- Australia - Victoria (VIC)
- Australia - Queensland (QLD)
- Australia - Tasmania (TAS)
- Australia - Wholesale Electricity Market (WEM)
- United States - ERCOT Coastal
- United States - ERCOT North
- United States - ERCOT Panhandle
- United States - ERCOT South
- United States - ERCOT West

Speedwell Wind Power Indices on the weatherXchange® Platform



Speedwell Wind Power Indices are listed on the weatherXchange Platform.

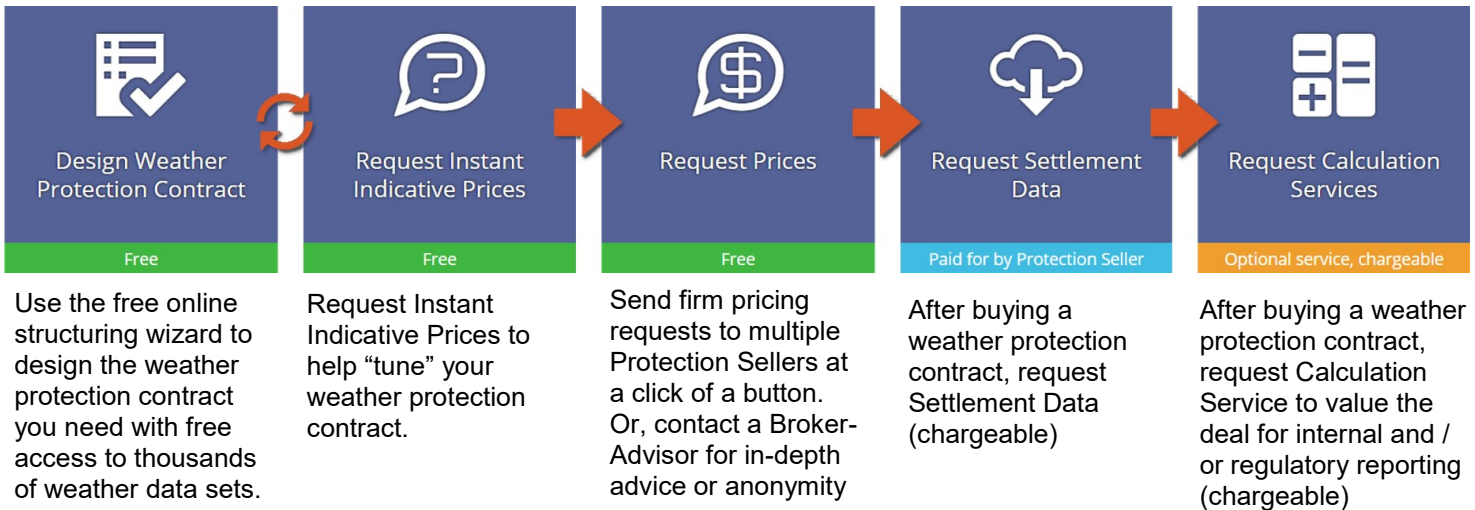
weatherXchange Limited is part of the [Speedwell Weather](#) group of companies which have been involved in the index-based weather risk market since its earliest days in 1999.

The weatherXchange® Platform links Hedgers, Broker-Advisors and Protection Sellers thereby helping businesses with weather risk to more easily access weather risk protection. weatherXchange provides free access to thousands of worldwide quality weather data sets and a user-friendly tool to simplify the design of weather protection contracts. These can then be sent at a click of a button to multiple Protection Sellers for pricing. The weatherXchange Platform also offers post-transaction services necessary to settle a transaction and to monitor the performance of a hedge.

weatherXchange Summary

- weatherXchange provides free-of-charge access to weather data for purposes of structuring a weather hedge.
- weatherXchange provides a free-of-charge structuring wizard that assists with building a weather hedge.
- weatherXchange allows for the instantaneous display of indicative prices from Protection Sellers
- weatherXchange connects hedgers with up to 10 Protection Sellers to obtain competitive prices or with Broker-Advisors for advice
- Upon purchasing a hedge the hedger receives access to Settlement Data and optional Calculation Services (chargeable).

How it works:



Speedwell Weather

Founded in 1999, Speedwell Weather provides quality weather data, weather forecasts, software, and consultancy. From offices in the UK and the USA we serve clients world-wide in sectors including weather-risk management, energy, Insurance, and agriculture. Our data products include SuperPack® which provides unlimited access to our thousands of high quality world-wide weather data sets.

Speedwell Settlement Services

Speedwell Settlement Services is the leading provider of meteorological Settlement Data for parametric weather risk worldwide. For the past decade Speedwell has provided Settlement Data for both OTC weather transactions as well as contracts listed on the Chicago Mercantile Exchange (CME). Our success in this market is linked to our belief that Settlement Data is a form of financial data. The ability to provide accurate, reliable, transparent, timely, and independent data is key for any weather transaction.

Speedwell Settlement Services Ltd is registered as a benchmark administrator under the EU benchmark regulation (Regulation (EU) 2016/1011)