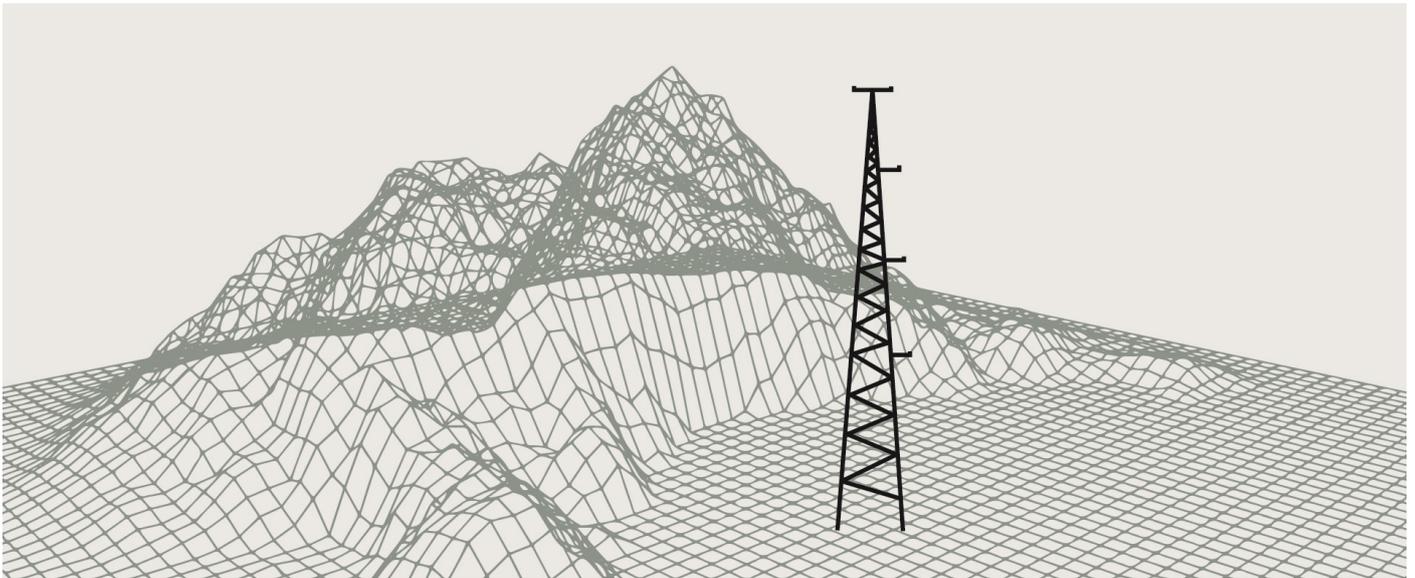


# VIRTUAL MEASUREMENTS



## For a successful project - it's all about the data

RES Virtual measurements (RVM) are a cost effective way to supplement measured data from a mast or remote sensing device. The virtual measurements are provided as a time series pin-pointed to a location on your site where you have a gap in your measured data. Alternatively, the virtual data offers an initial feasibility assessment of a potential wind farm site for a fraction of the cost of a measurement campaign.

## Renewable Energy Systems

Renewable Energy Systems (RES) is one of the world's leading privately-owned renewable energy companies. Drawing on over three decades of experience in the renewables industry, we have the expertise to develop, construct and operate utility-scale energy projects around the world. RES has a global portfolio of over 10GW, with projects including onshore and offshore wind, solar, energy storage, transmission and demand side management.

## RES Measurement Services

Quality data has been of fundamental importance in achieving one of the largest portfolios in the industry. A successful project utilises high quality data to support the decisions required to minimise risk and maximise project value. We now offer affordable and targeted services utilising this expertise to external clients. We recommend using our state of the art virtual measurement wind models to give a complete picture of the wind conditions on your site.



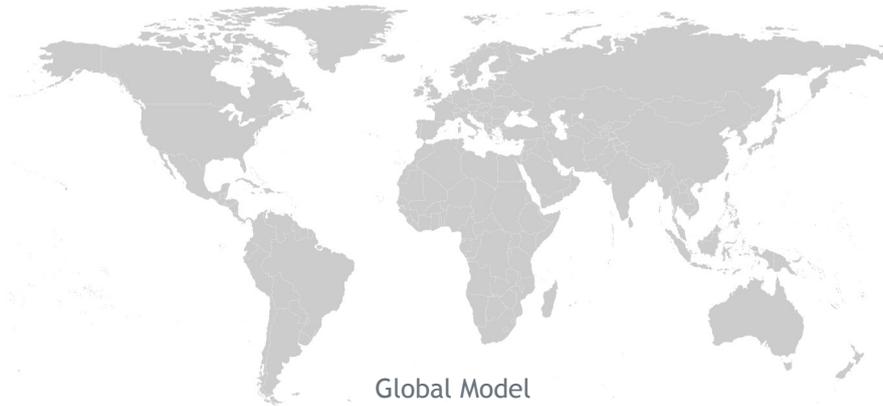
For a first pass at a potential wind energy site, or a fuller understanding of your wind resource, try our virtual measurement service.

OVER 600  
MET MASTS IN  
18 COUNTRIES

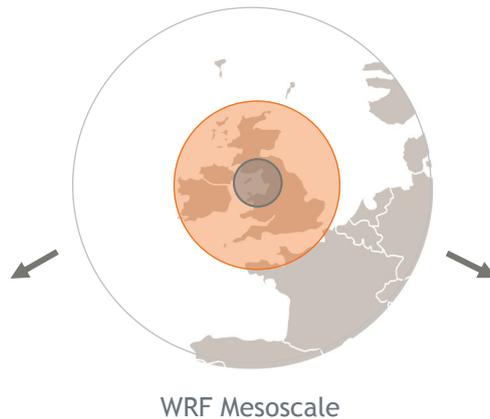


DATA RELIABILITY  
& AVAILABILITY

FLEET MANAGEMENT  
15 REMOTE  
SENSING DEVICES

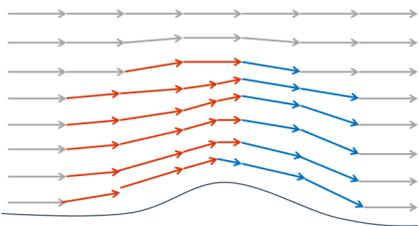


Global Model



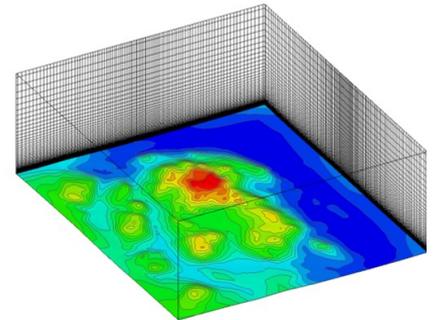
WRF Mesoscale

RVM



MS3DJH Linear

RVM+



Ventos®/M CFD

A 10 year time-series from the WRF numerical weather prediction model is downscaled to 50m resolution using the MS3DJH linear flow model. We correct for model bias, terrain complexity and tree cover to provide an estimate of the mean wind speed and a directional wind rose for your site. The data is then provided as a time series or a frequency distribution

Our advanced virtual measurements also use the WRF model, but downscale using the coupled VENTOS®/M CFD model. We solve the full Reynolds-averaged Navier-Stokes equations and include a canopy model for vegetation changes. A full climatic conditions 1 year time-series is then provided, including predictions of wind shear, turbulence intensity, flow inclination and atmospheric stability.



Renewable Energy Systems Ltd - Measurement Services

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