

# Protection against Wind Resource Volatility

Wind farm operators are at the mercy of fluctuating winds. To protect against loss of income, Swiss Re has developed index-triggered insurance for Wind Resource Volatility.



The gathering pace of renewable energy generation is accompanied by the inherent unpredictability of this power source and the financial risk this poses.

Moreover, this risk not only affects renewable energy producers but also an ever-growing number of stakeholders all along the value chain.

Weather affects the power output of the main renewable energy sectors: wind, solar and hydro. Too much wind or too little of any of the renewable sources can critically impact their power production potential.

Wind power is a mature technology with a successful track-record. As wind farms continue to grow in size, height and installed capacity, so does the financial risk posed by the wind's inherent volatility. This risk affects not only renewable energy producers, but also an ever-increasing number of stakeholders throughout the value chain.

Insurance for Wind Resource Volatility offers a tailor-made innovative mechanism to manage earnings unpredictability and associated financial distress. It uses a simple and transparent structure based on an agreed official wind index. This allows wind farm operators and investors to concentrate on growing their business with a smoother balance sheet.

#### Cover

**Protection of wind farms against loss of income** due to adverse wind conditions (high & low) based on the **individual location, setup and technology** of the wind farm with **easy settlement triggered by official wind statistics** provided by an agreed third party (e.g. NASA).

#### Advantages

- A mechanism to **manage earnings volatility**
- A **protection against financial distress**
- A **simple** and **transparent** structure
- Can be **tailored** to your risk appetite
- Supports **meeting investment targets**



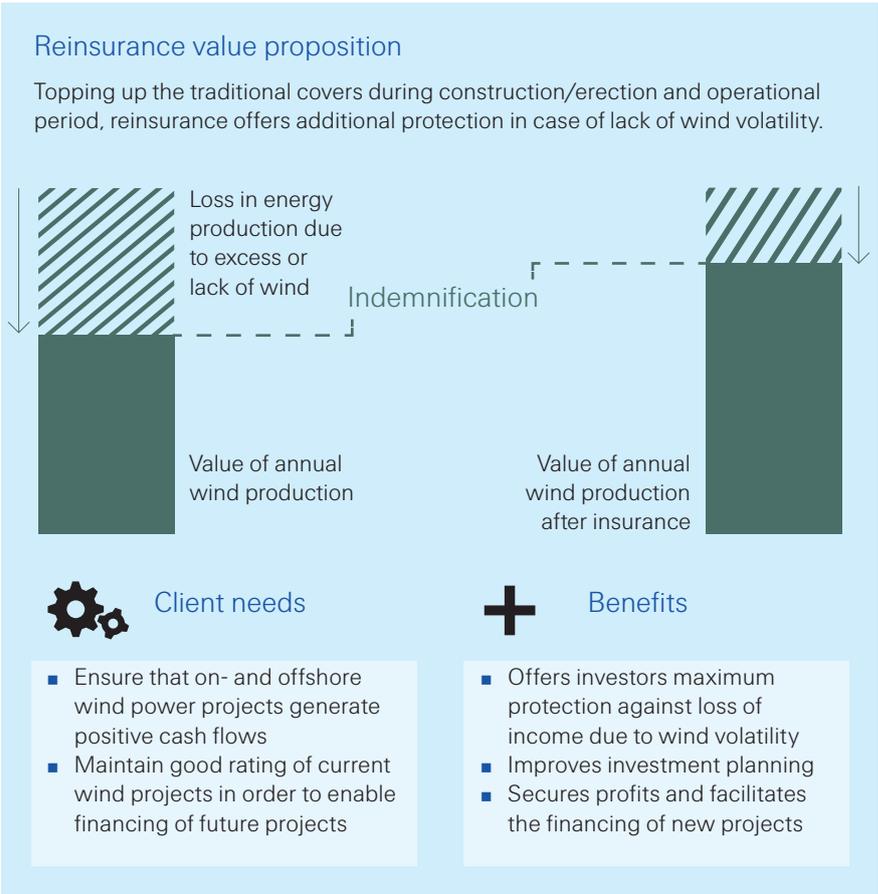


Stakeholders	Impact without cover	Benefits with cover
<b>Wind farm operator</b>	<ul style="list-style-type: none"> <li>■ Hit on operating performance, cash flow fluctuates</li> <li>■ Potential payment difficulties to cover operating costs and investors' compensation</li> <li>■ Declining investors' interest, downgrade of rating</li> </ul>	<ul style="list-style-type: none"> <li>■ Stabilisation of future cash flows, impact of adverse weather conditions on revenue is minimised</li> <li>■ Good rating can be maintained</li> <li>■ Improves investment planning, secures profits</li> <li>■ Enables new project financing through increased investment security</li> </ul>
<b>Developers/ Installers</b>	<ul style="list-style-type: none"> <li>■ Less demand for wind technology if generation becomes volatile</li> </ul>	<ul style="list-style-type: none"> <li>■ Can help secure demand for wind energy-related products</li> </ul>
<b>Government</b>	<ul style="list-style-type: none"> <li>■ Investment in wind energy might be viewed as unpredictable</li> <li>■ Declining public consent to grant financial support for green energy projects</li> </ul>	<ul style="list-style-type: none"> <li>■ Agreed green energy targets can be met in a more predictable way</li> <li>■ Financial incentives for investment in wind market can be more easily justified</li> </ul>
<b>Bank/mutual fund/private investor</b>	<ul style="list-style-type: none"> <li>■ Default of investment cash flows</li> </ul>	<ul style="list-style-type: none"> <li>■ Increased investment security through secured profits and declining project risk</li> </ul>
<b>Primary insurer</b>	<ul style="list-style-type: none"> <li>■ No differentiation to competition</li> <li>■ No insurance solution for the client's needs</li> </ul>	<ul style="list-style-type: none"> <li>■ Additional cross selling opportunities, as product provides a platform to discuss earnings protection products</li> <li>■ Complements the existing insurer's product offering and allows to make a more compelling offer to the client</li> </ul>

# Value proposition

Success of wind energy project relies heavily on the predictability of the revenue stream as well as prudent wind forecasts. Particularly during relatively windless years, wind farm operators might face big losses as operating costs, financial obligations and return targets would still need to be met.

Operators and investors receive steady revenue from wind farms and are consequently able to concentrate on growing their business with a steadier financial result.



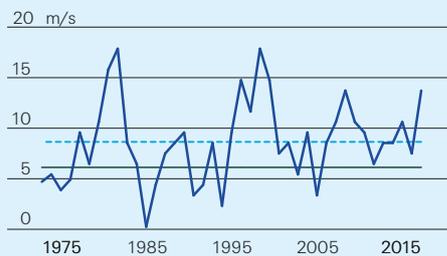
## The index triggered cover

Based on the individual location, setup and technology of the wind farm, the insurance for wind resource volatility promises a tailor-made mechanism to manage earnings volatility and associated financial distress, using a simple and transparent structure based on an agreed wind index (e.g. from NASA).

### Calculation of the modelled turnover



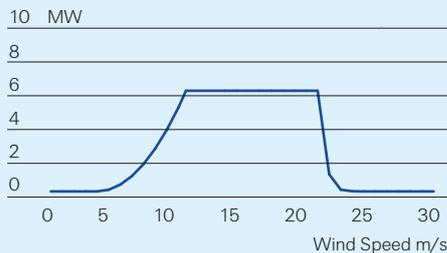
wind data at the location of the wind farm



- Weather data collected by third-party from an agreed source close to the location of the insured's exposure is used to create a suitable index and index trigger.
- The index trigger determines when payment to the insured is due – for example when wind speeds fall below a certain pre-agreed percentage of the calculated long-term average.



the specific turbines' power curves



- Wind-speed readings are translated into energy yield figures (turbine-specific power curves).
- Wind Turbine Generators switch on only when the wind speed reaches a specified threshold value and achieve their full output as the wind speed increases.
- Also: for safety reasons, Wind Turbine Generators might switch off automatically if the wind speed exceeds a specific level.



the wind farm's efficiency and a stipulated price per unit



- The wind farm's modelled annual energy yield is the sum of the hourly energy yield figures.
- Both the number of Wind Turbine Generators and the efficiency of the wind farm are taken into account.

### If the turnover falls short, the cover provides financial protection



- A wind farm's modelled annual turnover (in millions USD) is calculated by multiplying the modelled annual energy yield with a factor reflecting the feed-in tariff or a negotiated price per MWh.
- The two lines indicate the range which would be covered by Wind Resource Volatility Insurance.

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