MARSH

CAN TURKISH POWER PLAYERS PROTECT THEMSELVES AGAINST ADVERSE WEATHER CONDITIONS?

SOLUTIONS...DEFINED, DESIGNED, AND DELIVERED.

MARSH & McLENNAN COMPANIES

Owners of wind farms, solar farms and hydro assets, experience significant fluctuation in earnings due to price effects and volatility in available resources across Turkey.

Gas distribution companies record reduced earnings due to a decrease in gas consumption during unusually mild winters.

Marsh initiated a working committee to investigate and implement risk transfer solutions for wind, solar and hydro volatility with the collaboration of key reinsurers and Turkish power players.

Volatility in foreign exchange rates, interest rates, electricity prices, gas consumption and resources, (wind, precipitation, solar) are the top earnings drivers for Turkish power players.

Working with you to find a solution to mitigate year over year financial volatility in a transparent and collaborative manner.

Renewable energy generation is accompanied by the inherent unpredictability of this power source and the financial risk this poses.

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

INSURANCE COVER FOR RENEWABLE POWER OPERATORS

Protection of power market players against loss of income due to adverse weather conditions based on the individual location, setup and technology of the power plant with easy settlement triggered by official wind/solar/precipitation statistics provided by an agreed third party.

Lack of wind speed, solar radiation, and precipitation cause low power production, meaning revenue is at risk. Marsh helps clients in managing their revenue risk.

ADVANTAGES

- A mechanism to manage earnings volatility
- Protection against financial distress
- Simple and transparent structure
- Can be tailored to your risk appetite
- Supports meeting investment targets
- No liquidity issue
- Easy settlement

BENEFITS FOR STAKEHOLDERS

STAKEHOLDERS	IMPACT WITHOUT COVER	BENEFITS WITH COVER
Operators	• Affects operating performance: cash flow fluctuates. • Potential payment difficulties to cover operating costs and investor compensation. • Declining investor interest, downgrade of rating.	• Stabilization of future cash flows, impact of adverse weather conditions on revenue is minimized for up to 3 years. • Good rating can be maintained • Improved investment planning and secure profits
Developers/ Installers	• Less demand for renewable technology if generation becomes volatile.	• Can help secure demand for renewable energy-related products.
Government	• Investment in renewable energy might be viewed as unpredictable. • Reduced public funding for green energy projects.	• Agreed green energy targets can be met in a more predictable way. • Financial incentives for investment in renewable market can be more easily justified.
Bank/ mutual fund/ private investor	• Default of investment cash flows.	• Increased investment security through stabilized income and declining project risk.
Primary insurer	• No differentiation to competition. • No insurance solution for the client's need.	• Additional cross selling opportunities, as product provides a platform to discuss earnings protection products. • Complements the existing insurer's product offering and enables a more compelling offer to the client.

VALUE PROPOSITION FOR TURKISH POWER OPERATORS

Weather affects the power output of the main renewable energy sectors: wind, solar, hydro and gas distribution.

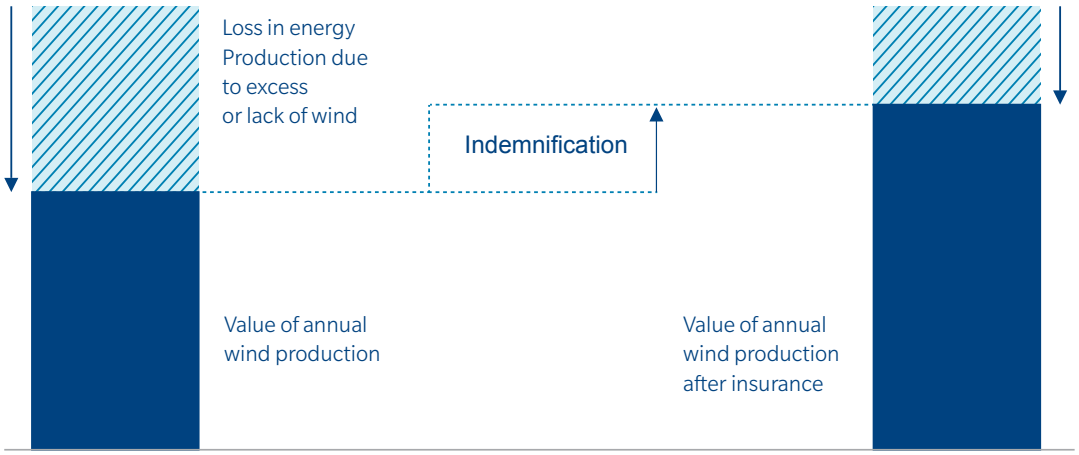
Lack of wind, solar radiation or precipitation can critically impact power production potential and therefore put revenue at risk.

The success of a power project relies heavily on the predictability of the revenue stream, as well as prudent 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 plants and are consequently able to concentrate on growing their business with a steadier financial result.

INSURANCE VALUE PROPOSITION

(WIND AS AN EXAMPLE)



WHAT IS A WEATHER PARAMETRIC COVER?

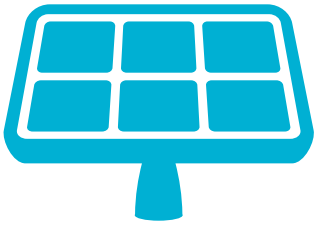
A weather solution is a risk management product that allows a company to protect itself against adverse weather.

Unlike conventional weather insurance where the payout is based on a demonstrated loss ("indemnification"), the payout of a weather parametric insurance is based on a weather index ("parametric").

For example, the index used could be millimeters of precipitation or cumulative temperature using observations from a single weather reference site or a basket of sites.

WHAT ARE THE MOST COMMON WEATHER RISKS COVERED?

- Wind.
- Precipitation.
- Solar radiation.
- Temperature.



HOW DOES THE CONTRACTUAL SIDE AND SETTLEMENT WORK?

With a parametric insurance, it is possible to design a payout to be in proportion to the magnitude of the adverse weather phenomena.

Weather parametric insurance are index-based, ensuring total transparency.

Unlike conventional insurance, there is no loss-adjustment process and settlement is therefore usually quicker.

HOW IS PARAMETRIC INSURANCE PRICED?

Insurers will calculate the hypothetical payoff for a historical time period (normally 10 to 30 years weather data is required).

This would set a minimum price to which a hedge-provider would add a margin to cover risk and administration costs. Recent long-term weather trends are important and will also be taken into account.

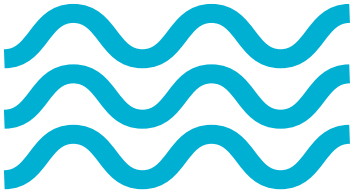
FREQUENTLY ASKED QUESTIONS

MY COMPANY'S EXPOSURE IS COMPLEX. WILL A WEATHER PARAMETRIC INSURANCE SOLUTION WORK FOR ME?

Weather parametric insurances can be tailored to correspond to very complex exposures. The weather market is accustomed to creating a product that fits the client's need exactly.

Weather structures can have multiple triggers (i.e. linked to precipitation and temperature for example), they can cover multiple sites, and last for one or more years.

WHY DON'T I JUST BUY INSURANCE?



Conventional insurance contracts are indemnification based and require a loss to be demonstrated. A weather parametric insurance pays out irrespective of the actual impact of weather on a company, as it is triggered by an index.

With a parametric insurance it is possible to design a payout to be in proportion to the magnitude of the adverse weather phenomena. Weather parametric insurances are index-based, ensuring total transparency.

And remember, unlike conventional insurance, there is no loss-adjustment process and settlement is therefore usually quicker and avoids liquidity issues.

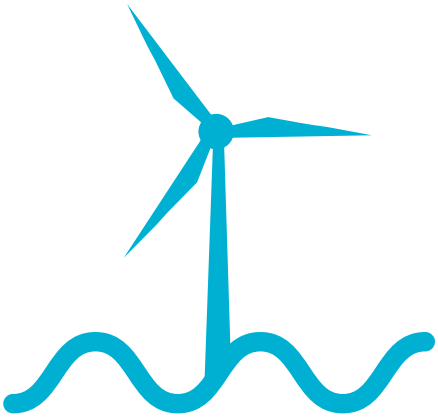
MY COMPANY GETS ACCURATE WEATHER FORECASTS – WHY BOTHER HEDGING?

Knowledge of likely future weather is important, and may assist in planning decisions, but does not necessarily protect against long-range risk. Hedging weather risk allows a component of business risk to be removed and may reduce earnings volatility.

Accurate weather data enables accurate cover.

ARE THESE PRODUCTS JUST FOR LARGE MULTINATIONAL COMPANIES? WOULD THEY COST TOO MUCH FOR A BUSINESS WITH A SMALL TURNOVER?

Not necessarily. Weather parametric insurances can be used by businesses of all sizes. The cost will depend on the size and the probability of the payout. Smaller businesses are often less able to cope with a volatile revenue stream.

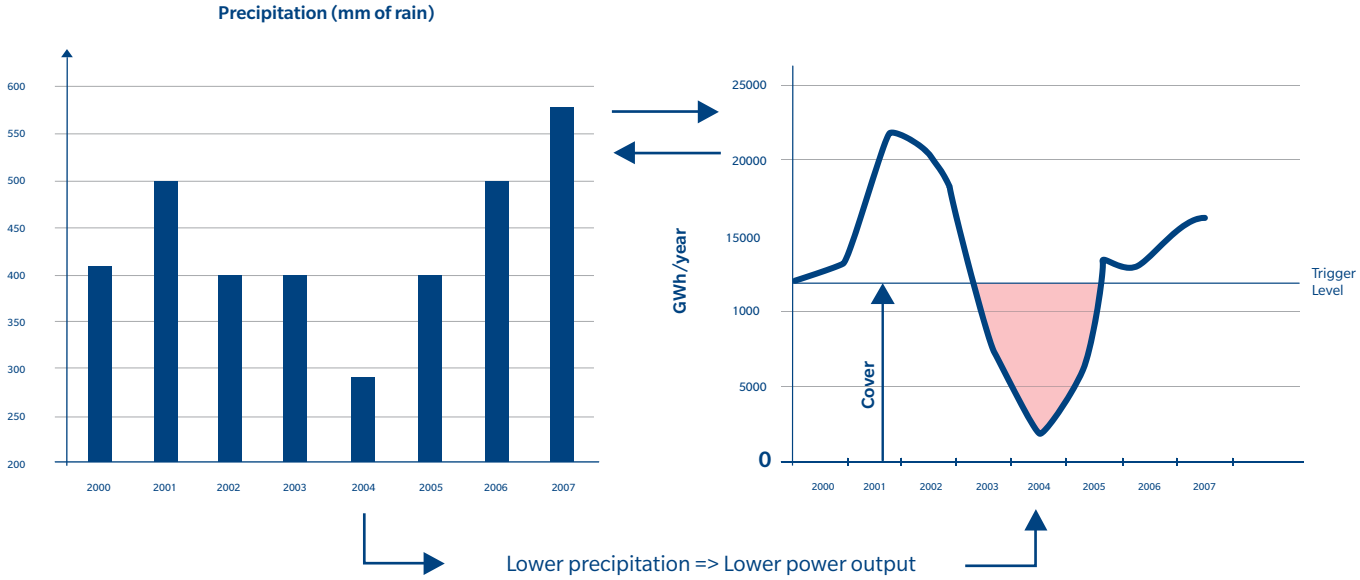


SAMPLE OF A HYDRO ENERGY PRODUCTION COVER STRUCTURE

SAMPLE COVER STRUCTURE

Main risk: Lack of precipitation leads to decrease in water inflow and thus energy production.
Index: Gridded data from various sources .
Location: Area behind the dam.
Risk period: One full year.

Trigger: Precipitation falls below300 mm/year.
Payout: To be defined contractually based on the price per kWh negotiated up front.
Limit: To be agreed.



SAMPLE OF AN EXCESS COST COVER STRUCTURE FOR WIND POWER FARMS

SAMPLE COVER STRUCTURE

Main risk: Lack of wind leads to decrease in energy production.
Index: Modeled hourly wind energy production.
Location: Wind farm.
Risk period: E.g. full year.
Trigger: Yearly production drops by more than 10%.
Payout: To be defined contractually based on the price per kWh negotiated up front.
Limit: To be agreed
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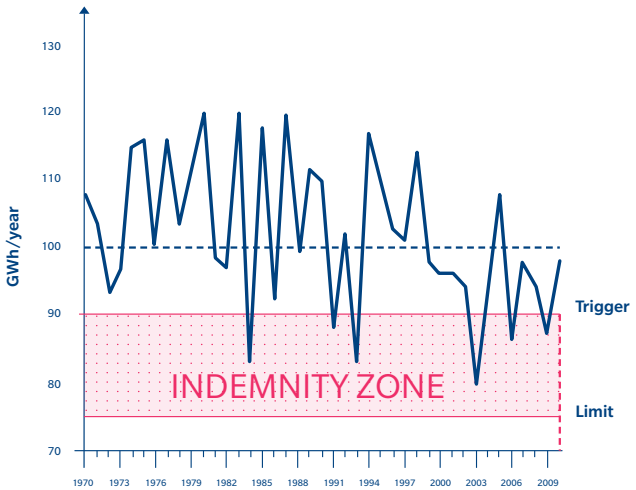

ROADMAP

DEFINITION OF NEEDS

- Risk mapping.
- Risk appetite: E.g. if you are interested in covering a risk of lower electricity production, what period would you like to insure?
  - Full-year electricity production.
  - Shorter periods, e.g. summer/winter electricity production.

DATA COLLECTION AND ANALYTICAL STUDY

- Technical documentation that is usually required to define the correlation between weather index and losses is:
  - Power output expected.
  - Margin/price per KWh produced.
  - Weather records from nearby station.
- Location of the assets; ideally, longitude and latitude coordinates.
- Ascertain your risk tolerance: through analysis of the impact of weather on your power output and revenue stream.

WEATHER INSURANCE PROPOSAL

- Depending on your needs, we will come up with your weather insurance solution.

For further information, please contact your local Marsh office or visit our website at marsh.com

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