PRIOGEN

PPAs and trading: hedging renewables in a subsidy-free market

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Solar Asset Management Europe '19

RE Trading Summit

What topics will be discussed?

- Subsidy free solar in Europe
- Risks in a subsidy free market
- Shaping factors for solar in West European markets
- Value risks and required credit standing

Priogen is a rapidly growing energy trading company accelerating the energy transition

- Founded in 2009
- 70 employees in NL, DE and USA offices
- Risk taker
 - Trading power and gas in EU and USA
 - PPAs and profile price cap/floor
 - Providing (forecasting) services





Current PPAs in NL+ DE tailored to subsidy system

- As part of a financial closure most asset owners opt for a PPA
- Pricing usually indexed on monthly baseload or subsidy tracker
 - NL: SDE +/- a fixed percentage
 - DE: Market value +/- a fixed fee
- Cover risks such as forecasting and shaping (i.e. profile)

Subsidy free markets go further north

- Start of unsubsidized solar plants in Europe:
 PT, ES, IT
- Recently subsidy free solar in:
 UK, DE, FR
- Subsidy free solar will be the standard soon
 E.g. NL subsidy free offshore wind is already the standard

Asset owner is exposed to market prices directly in a subsidy-free environment

- Forecasting/Balance risk
 - Weather hard to predict
 - Nomination hourly, imbalance market on 15-minute basis
- Shaping risk
 - Deliver intermittent vs. firm power
 - Cannibalization effect
- Forward market/Baseload risk
 - Price risk between forward and spot market
 - Banks require income guarantee up to 10+ years

Forecasting risk: small weather changes can cause extreme high imbalance costs

Forecasting risk: The forecasting errors lead to additional costs, as imbalance costs can be 10* normal prices. This means one bad day of forecasting can cost 10 days of revenues.





Data source: Priogen Wind portfolio NL

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Shaping risk: high wind day \rightarrow lower DA prices

Shaping risk: prices are lower when there is lots of wind (as more supply leads to lower prices).



Data source: Priogen Wind portfolio



Shape factor solar in Europe is a very volatile risk

- Shape factor solar: performance of your park compared to baseload power prices.
- Shaping in BE is a volatile risk
 - Cannibalization effect
 - 2018: breaking the trend or was this a one-off event?



Shape factor solar in Europe is a very volatile risk

- Shape factor solar: performance of your park compared to baseload power prices.
- Shaping in BE is a volatile risk
 - Cannibalization effect
 - 2018: breaking the trend or was this a one-off event?
- Shaping risks Europe



Shape factor solar in Europe is a very volatile risk

- What will the shaping costs be in 2019?
- Or in 2030?



Asset owner exposed to market prices directly in subsidy free environment

OLD • Forecasting/Balance risk

- Weather hard to predict
- Nomination hourly, imbalance market on 15-minute basis

• Shaping risk

- Deliver intermittent vs. firm power
- Cannibalization effect

NEW

- Forward market/Baseload risk
 - Price risk between forward and spot market
 - Banks require income guarantee up to 10+ years



Fixed or floor prices



NL Forward Cal baseload prices retrieved 10/01 of the previous calendar year. * Settlement Spot NL 2019 up and including 10/23/2019.

Shaping and Forward market risks are very expensive

- In case of a baseload price of 50 EUR/MWh
 - Value forecasting/balance risk:
 - 1-3 EUR/MWh
 - Bid-ask spread imbalance market
 - Value shaping risk:
 - 5 10 EUR/MWh
 - Shaping factors between 1.2 and 0.8
 - Value forward market/baseload:
 - 10 30 EUR/MWh
 - Difference between Cal prices and Spot settlement



Required credit standing of risk taker

- Forecasting risk:
 - low credit standing risk taker required
- Shaping risk:
 - medium credit standing risk taker required
- Forward market risk:
 - need of a firm party

Take-home message

- Asset owners get exposed to shaping and baseload risks in subsidy-free environment.
- Need to develop a vision how to mitigate these risks.
- We should start preparing now, as the subsidy-free market is around the corner.



- **Why:** enable the energy revolution
- **How:** analyze, forecast and manage financial value of MW variation by data driven approach
- What: maximize electric flexibility value

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