



PPAs and trading: hedging renewables
in a subsidy free market

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Solar Future NL '19

What topics will be discussed?

- Subsidy free solar in Europe
- Risks in a subsidy free market
- Shaping factors in West European markets
- Role of a risk taker



Priogen: Rapidly growing energy trading company on the back of the energy transition

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



Current PPAs tailored to subsidy system

- As part of a financial close most asset owners opt for a PPA
- Pricing usually indexed on monthly baseload or SDE-tracker
- Cover risks 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
- NL next?



Asset owner **exposed to market prices** directly in subsidy free environment

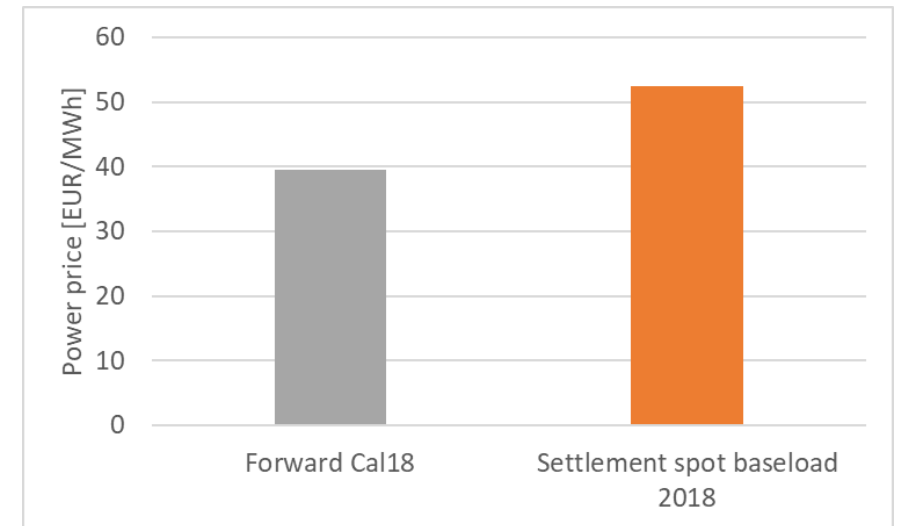
- OLD**
- Forecasting risk
 - Weather hard to predict
 - Nomination hourly, imbalance market on 15-minute basis

- Shaping risk
 - High solar production during cheap hours

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NEW

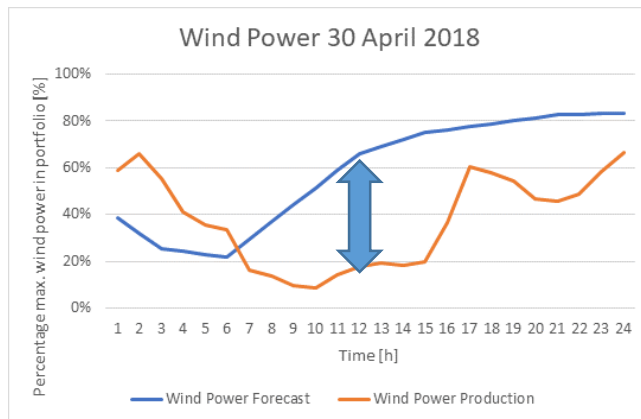
- Baseload risk
 - Volatility between forward and spot market
 - Banks require income guarantee



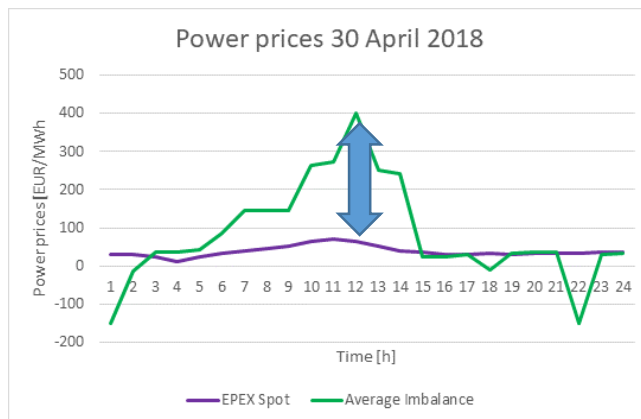
Forecasting & shaping risks

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

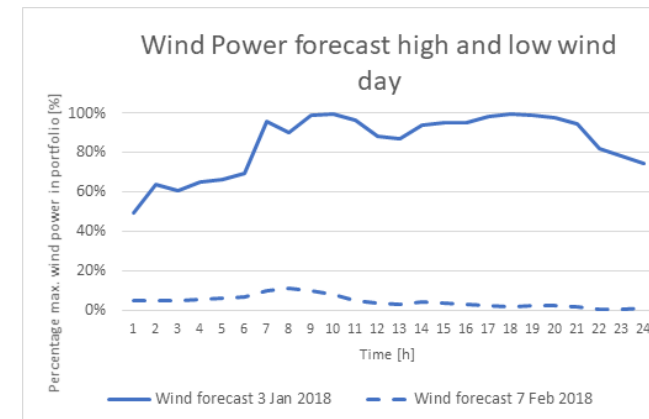
- **Shaping risk:** prices are lower when there is lots of wind (as more supply leads to lower prices)



The gap between the lines is the forecasting error

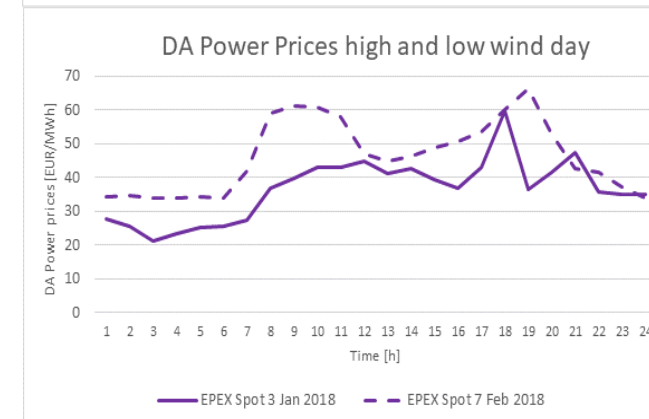


The gap between the lines are the imbalance costs



High wind day

Low wind day

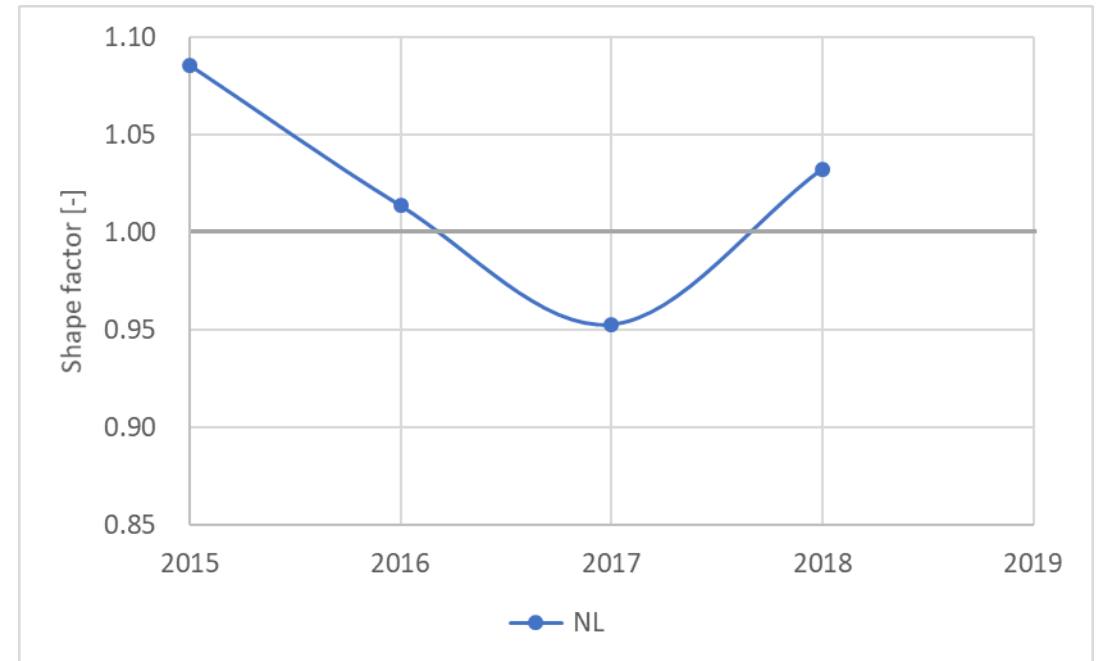


Low wind: higher prices

High wind: lower prices

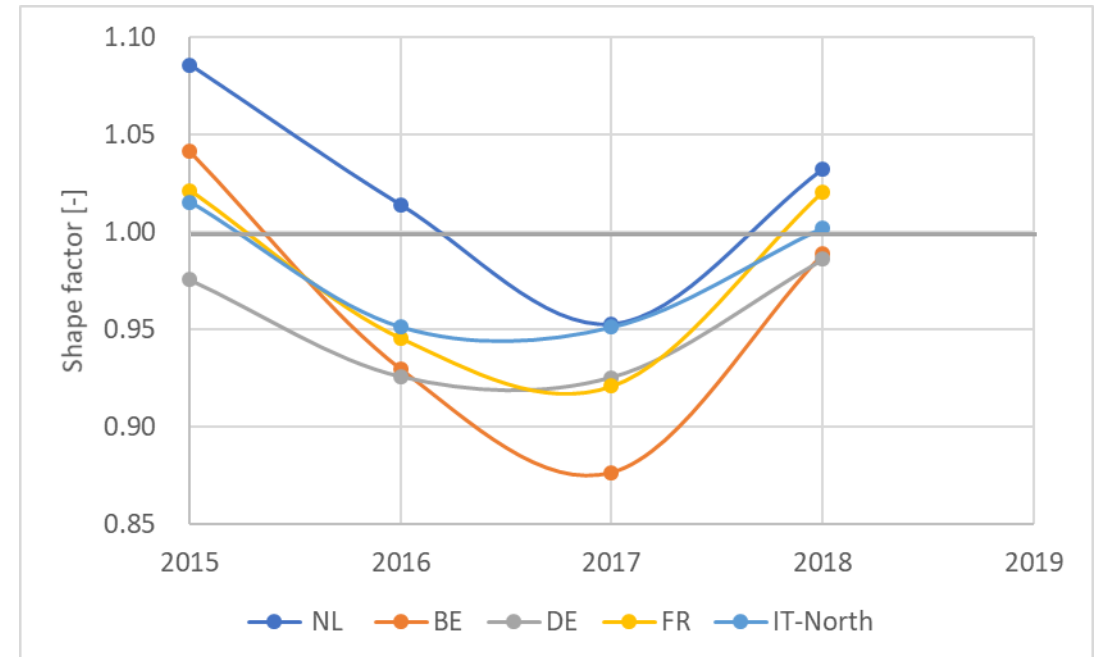
Shape solar in Europe very volatile risk

- Shaping in NL is volatile risk
 - Cannibalization effect
 - 2018: breaking the trend or was this a one-off event?



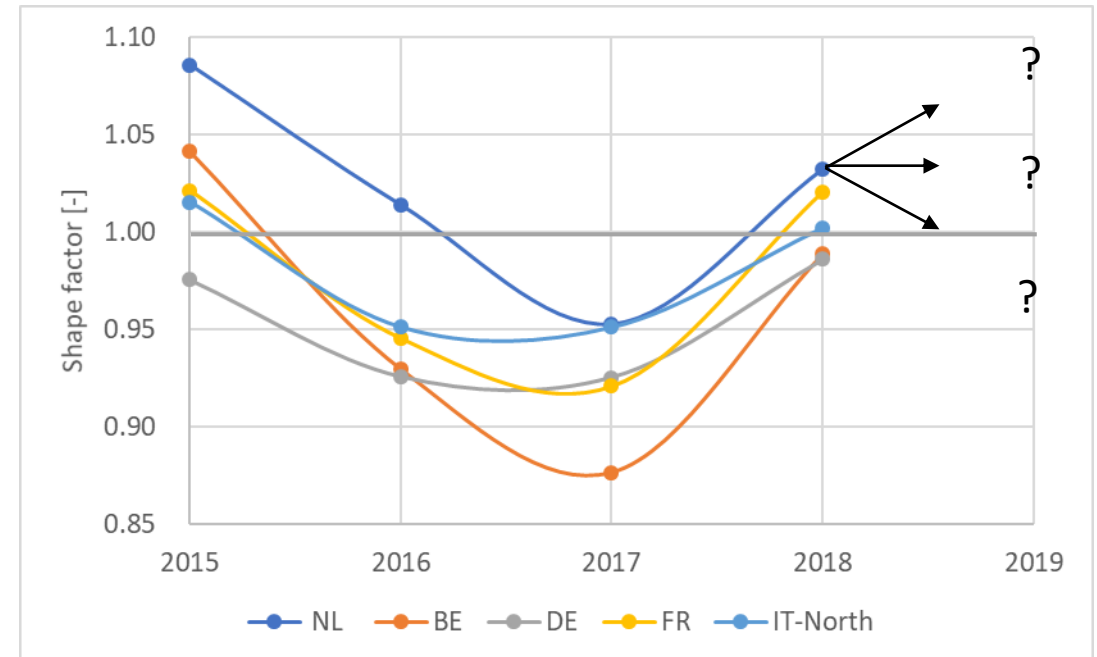
Shape solar in Europe very volatile risk

- Shaping in NL is volatile risk
 - Cannibalization effect
 - trend
- Shaping risks Europe



Shape solar in Europe very volatile risk

- Shaping in NL is volatile risk
 - 2015: good shaping year
 - 2017: bad shaping year
- Shaping risks Europe
- What will the shaping costs be in 2019? Or in 2030?



Need for risk taker

- Need for risk taker to cover risks in subsidy free solar markets
 - Forecasting: meteorological knowledge and machine learning approaches
 - Value: 3 EUR/MWh
 - Shaping: knowledge on historical shaping costs, view on market development and market prices.
 - Value: 10 EUR/MWh
 - Baseload: A-rated counterparty
 - Value: 30 EUR/MWh



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 prepare now, as the subsidy free market is coming up soon.



Priogen



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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