CPPAs in the Nordics

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Agenda

1. About Axpo
2. The Nordic power market
3. PPAs in the Nordics
4. Why corporate PPAs?

Axpo Renewable Customer portfolio

- Axpo manages 14 000 MW
- ~20% is long term PPAs
- Risks vary from country to country
- Development from subsidy to merchant

LT price risk, liquidity, balancing, cannibalisation

Balancing, cannibalisation

The Nordic power market

The Nordic power market

Day-ahead market:

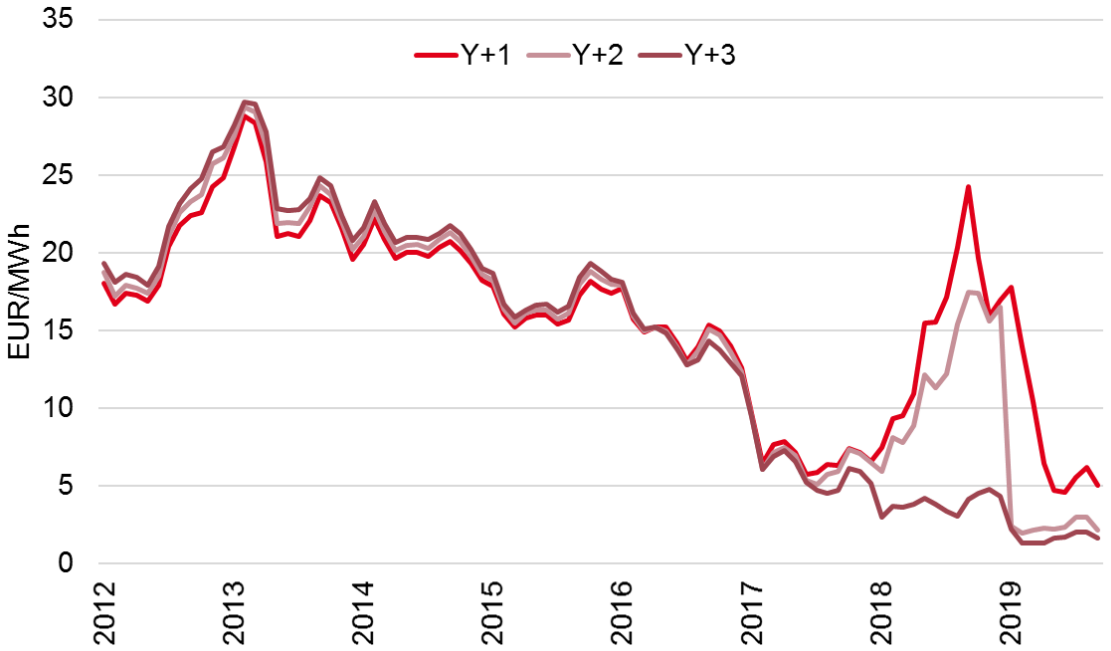
- Nord Pool Spot: physical day ahead-market
- Intraday and regulating market
- Single theoretical/reference spot price (the System price) for the whole Nord Pool area –not taking into account grid constraints
- Spot price for all price areas (5 in NO, 4 in SE, 1 in FI and 2 in DK) taking into account grid restrictions

Financial Market:

- Future contracts for
  - System and area prices (EPADs)
  - Months
  - Quarters
  - Years (10 years ahead)
- Liquidity is very poor for contracts 3 years +

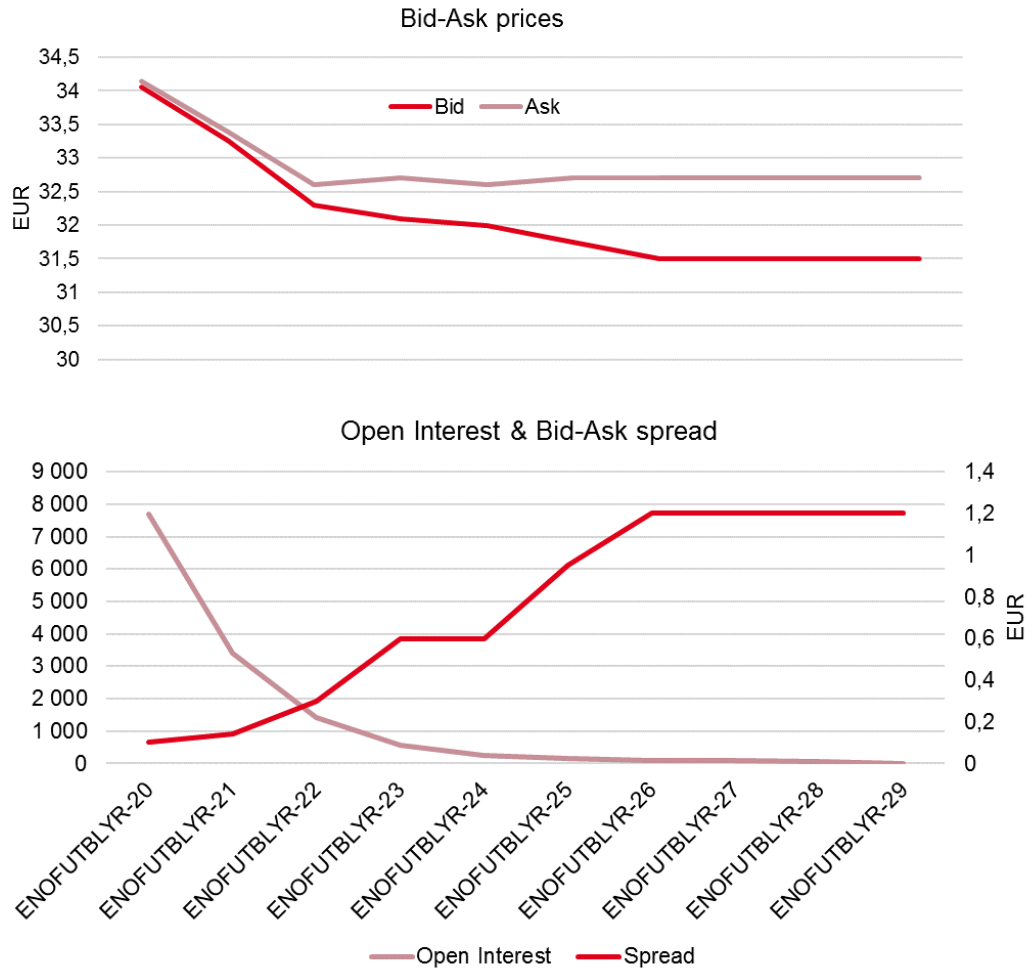
Swedish-Norwegian Subsidy Scheme: Elcertificates

- Market based subsidy scheme
- Joint scheme in Norway and Sweden since 2012
- Targets 28,4 TWh of new renewables by 2020
  - Target reached
- Sweden have an additional target of +18TWh by 2030
- The average price for year ahead in 2013 was 20 EUR/MWh
- The year ahead price is now around 5 EUR/MWh



Trends in the financial market

- Decreasing liquidity
- Less volumes traded meaning larger price spreads
- Price area divergence –grid and congestion
- LT: large spreads and low liquidity
- Shape –reflect LT sellers and few LT buyers
- Increased transaction cost for hedging long-term transactions



PPAs in the Nordics

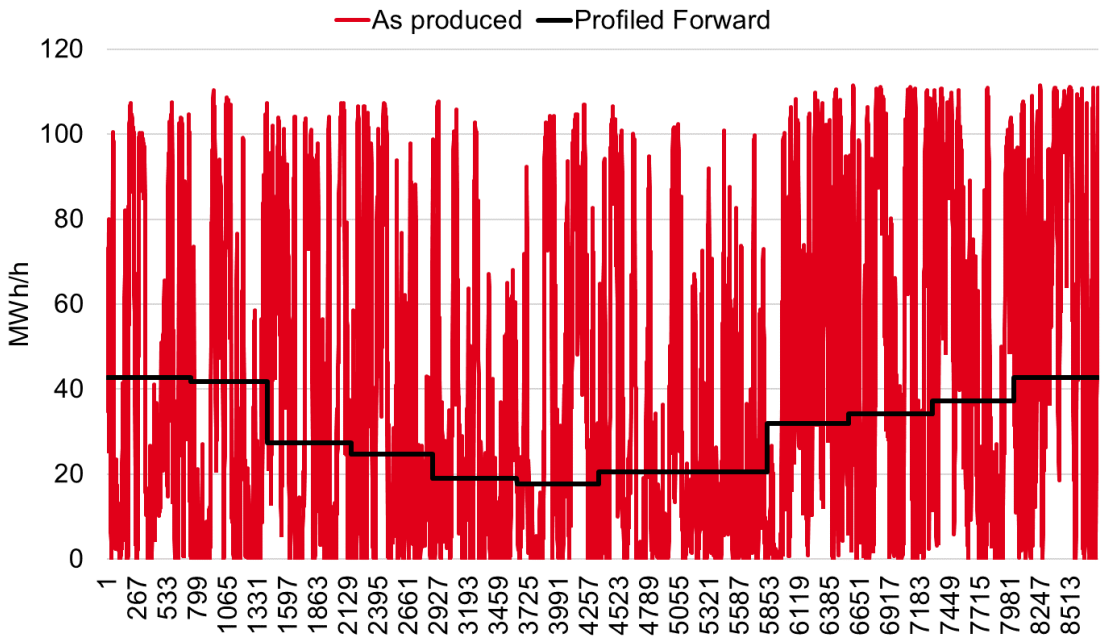
The Nordic PPA market

- A PPA in the Nordic context is a fixed price (EUR/MWh) agreement for a fixed or variable amount of power (~70% of P50)
  - Direct agreement with SPV and offtaker
  - Can be physical or financial
  - Tenors of typically 5-15 years (can be even longer)
  - Elcertificates and GoOs are included, but usually as a route to market

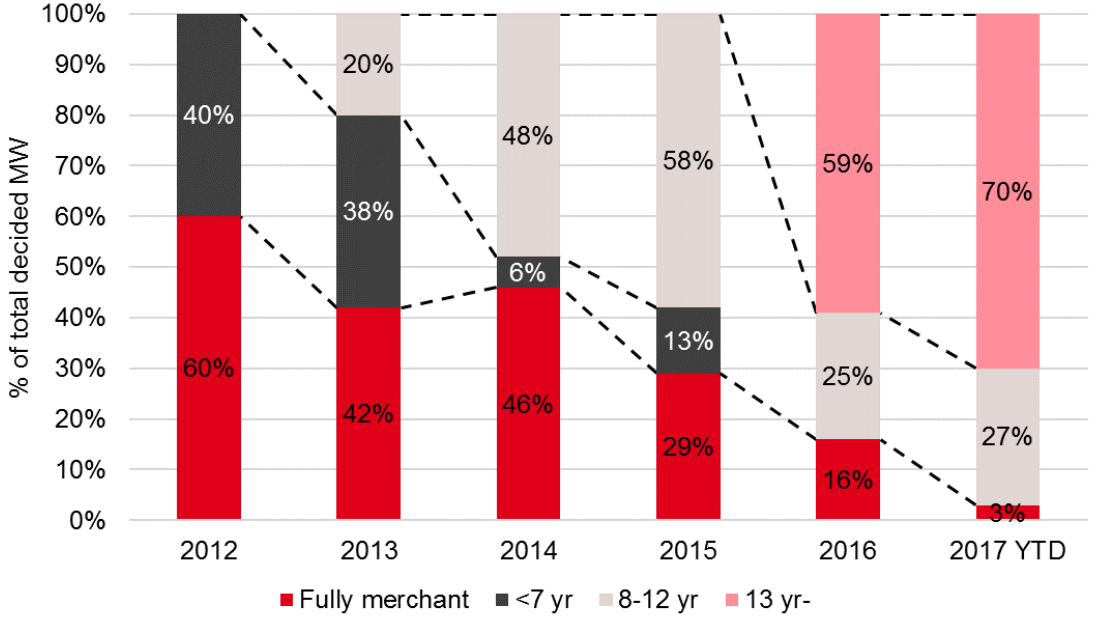
- PPAs are essential to wind developers with project financing
  - The SPV is exposed to merchant risk and the subsidy scheme is market based
  - It is usually a requirement for the bank and it can improve financing solutions for the SPV

PPA share and structures

PPA structures

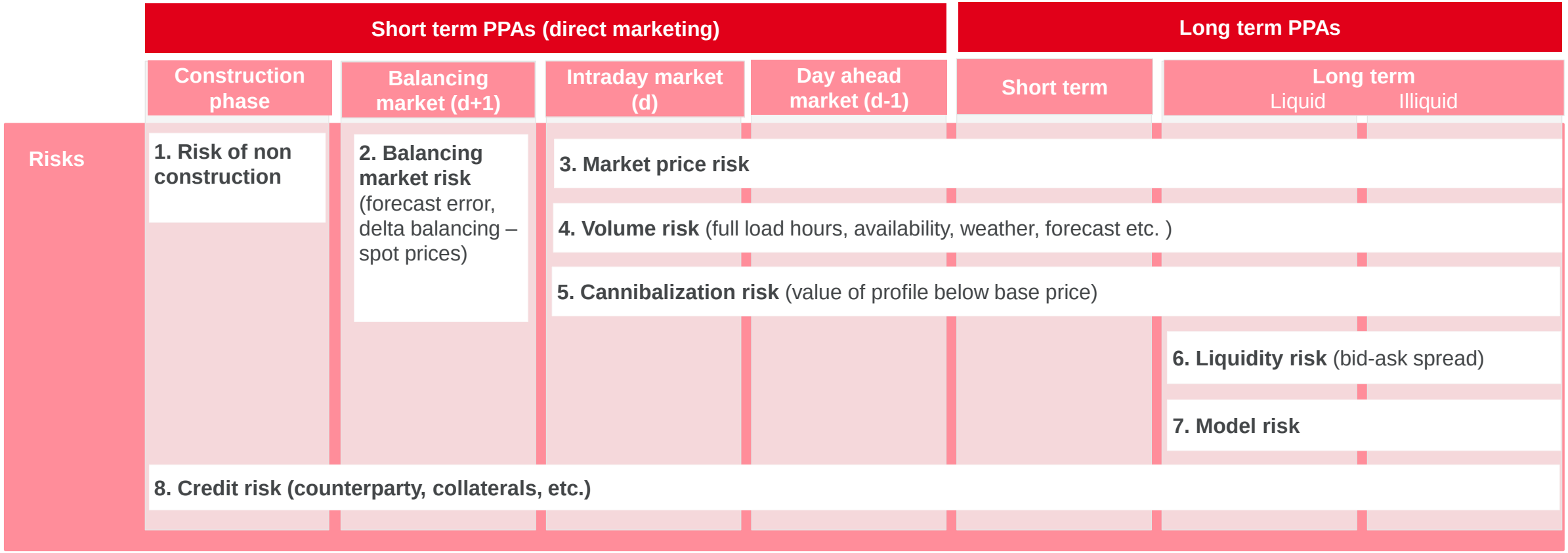


Inv. decisions with PPAs (Nor. and Swe.)

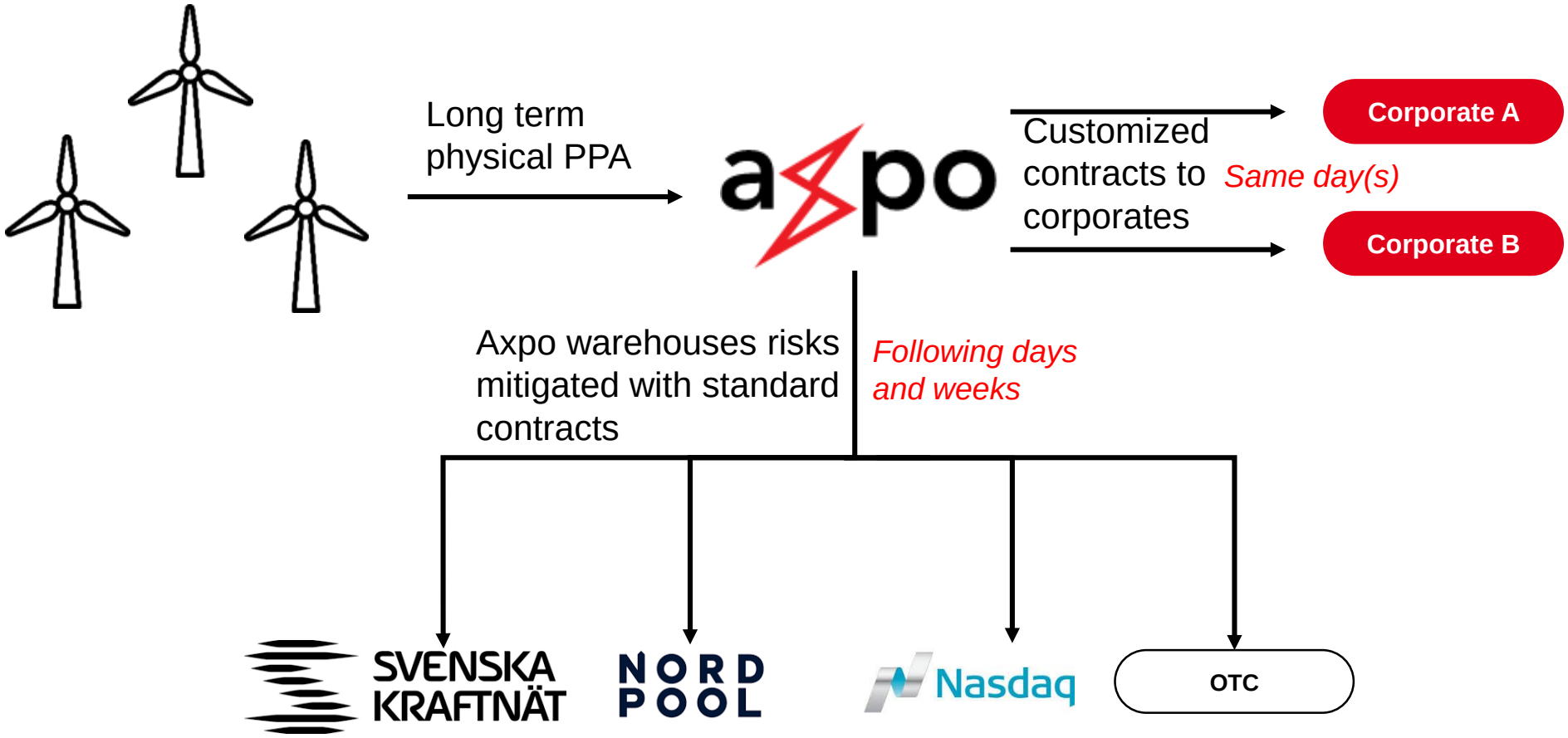


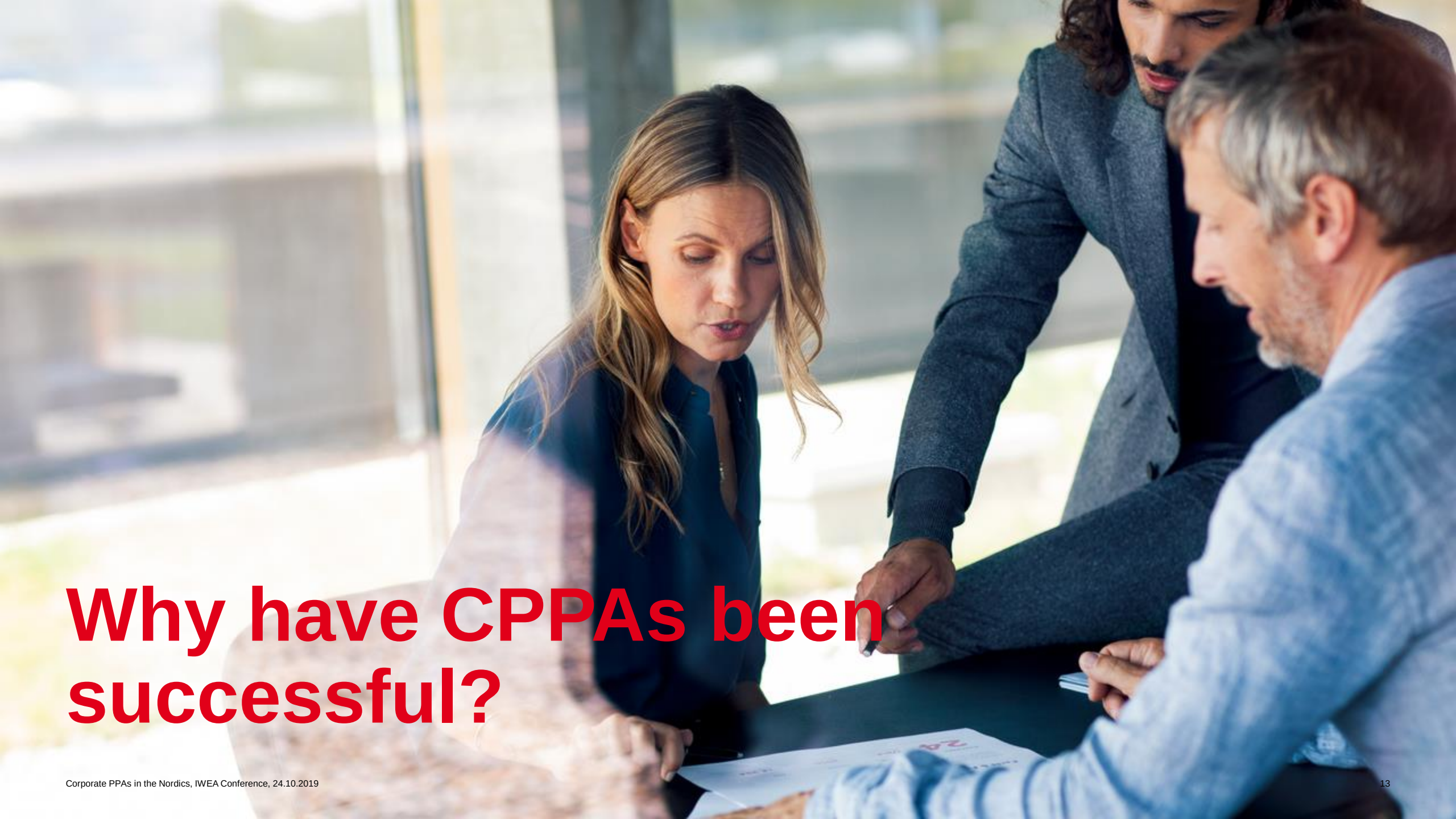
Source: Eurelectric, 2019

PPA risks



Managing a PPA





Why have CPPAs been successful?

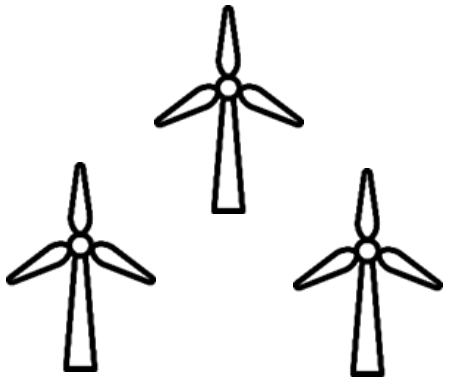
Increasing share of CPPAs –why?

- **Timing** → expiration of existing hedges and new industries
- **Green values** → additionality and direct agreements/sourcing between SPV and the Corporate
- **Competitiveness** → wind LCOE at ~30 EUR/MWh
- **PPA experience** → many stakeholders have PPA know-how (utilities, investors, banks, lawyers etc.)
- **PPA shaping** → Utilities help shape and structure the CPPA

Key criterias for successful CPPAs

- Increased PPA knowledge among investors and banks
- LCOE of wind power
- Solid counterparties and guarantees
- Knowledge and pricing of risks on both sides
- Additionality and green values
- Contractual framework

Axpo’s role



Long term
physical PPA

Baseload

axpo

BRP
responsibility

Physical
delivery

Corporate

- Profile swap
- Bridge hedge start
- Price areas
- BRP

SVENSKA KRAFTNÄT

NORD POOL

Will the CPPA trend continue?

Challenges for the CPPA market

- Additionality and green values have been an important driver for CPPAs so far
  - In a power market dominated by hydro (particularly Norway) –the green value is less attractive
  - Some industrial corporates don't buy the GoOs when sourcing from wind power

- Traditionally corporates prefer to hedge for shorter tenors –can be difficult to place a 10 year PPA

- Many corporates are reluctant to offer buyer guarantees
  - e.g. for Alcoa's CPPAs, the Norwegian Export Credit Guarantee Agency (GIEK) guaranteed Alcoa's payment obligations

Will the CPPA trend continue?

Opportunities for the CPPA market

- Many corporates have been targeted by SPVs and some have started to review their hedging policies
- Industry hedging needs post-2020 and new demand
- With an LCOE of around 30-35 EUR/MWh (and dropping?) wind is highly competitive –a CPPA removes the liquidity risk premium for a long term hedge for both parties
- PPA volume can be split between traditional off-takers and corporates to match hedging/vol. needs for smaller corporates

Thank You

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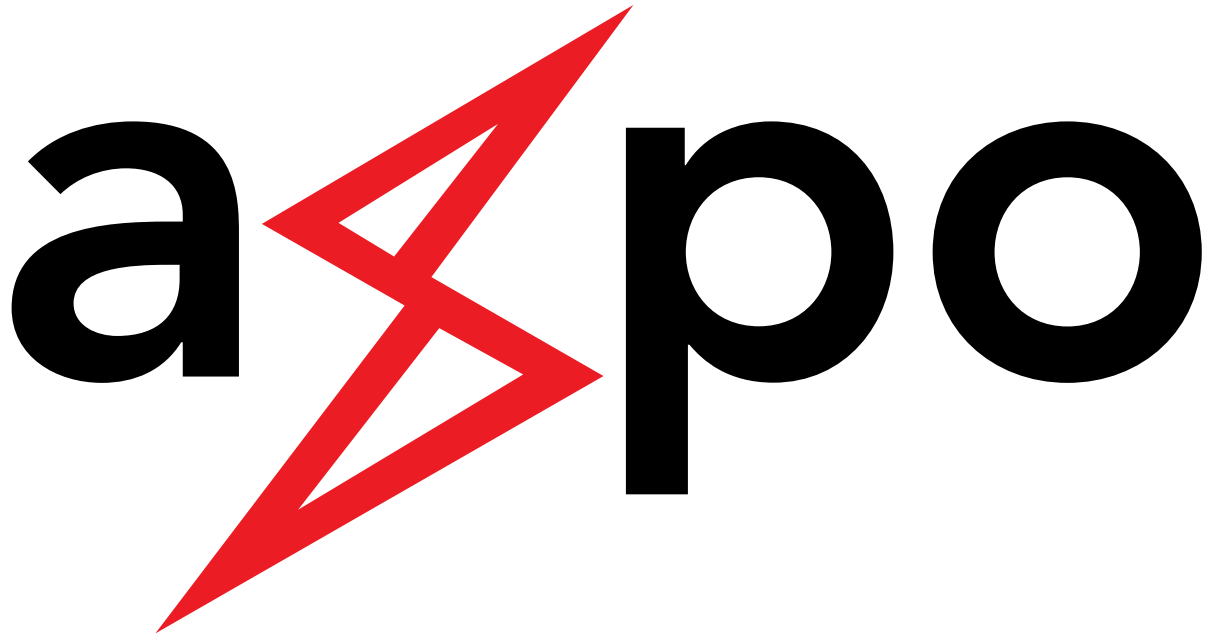
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