



# Corporate PPAs - What's trending in Germany?

Bassam Darwisch  
Renewables Origination Germany  
Vattenfall Energy Trading GmbH

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# What can you expect?

- Vattenfall
- How big is the market
- Driver
- Vattenfall's role



# Vattenfall

# This is Vattenfall

## Basic facts

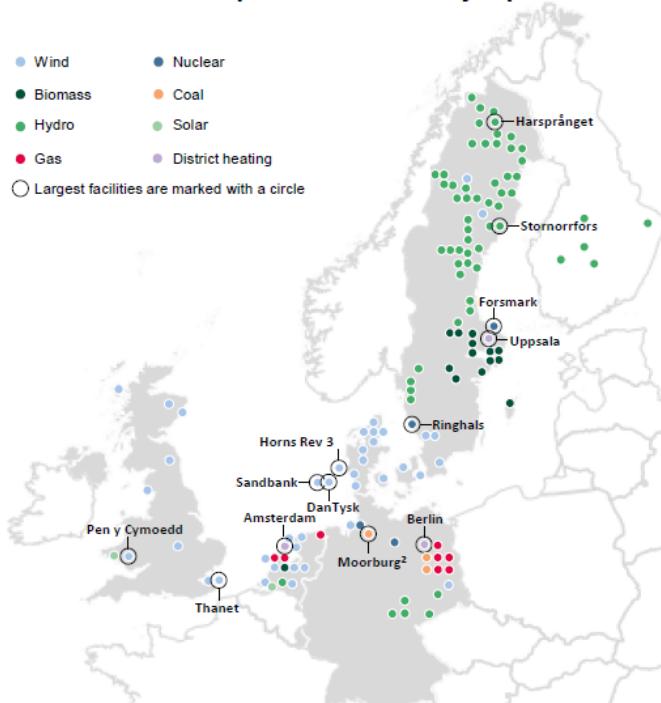
- One of Europe's largest producers of electricity and heat
- 100% owned by the Swedish state
- Main products: electricity, heat, gas and energy services
- Main markets: Sweden, Germany, Netherlands, Denmark and the UK
- Almost 20,000 employees

## Key data

SEK bn	FY 2020	FY 2019
Net sales	158.8	166.4
Underlying operating profit <sup>1</sup>	25.8	25.1
Operating profit (EBIT)	15.3	22.1
Profit for the period	7.7	14.9
Return on capital employed, %	5.8	8.5
Return on capital employed excl. items affecting comp., %	9.7	9.6
Funds from operations/adjusted net debt, %	28.8	26.5
TWh	FY 2020	FY 2019
Electricity generation	112.8	130.2
Customer sales, electricity	118.2	119.0
Customer sales, heat	13.8	17.1
Customer sales, gas	56.8	59.2

## Location of our operations and major plants

- Wind
  - Nuclear
  - Biomass
  - Coal
  - Hydro
  - Solar
  - Gas
  - District heating
- Largest facilities are marked with a circle



<sup>1</sup> Operating profit excluding items affecting comparability

<sup>2</sup> Coal-fired generation at Moorburg has been discontinued as of year-end 2020



# Our milestones towards fossil-free living within one generation



We provide electric charging for 1 billion fossil-free kilometers annually

750 MW of additional, flexible hydro capacity enables more renewable generation

We reduce CO<sub>2</sub> intensity by >40% from 2017

We generate fossil-free electricity to power 30 million homes

We provide 7 TWh of renewable energy through corporate PPAs.

Our HYBRIT partnership produces fossil-free steel

We reduce CO<sub>2</sub> intensity by nearly 70% from 2017

We have completely phased out coal

We operate a bio-energy carbon capture and storage plant

2030

2035

# Operating wind farms, construction and pipeline

## In operation

Name	Capacity (MW)	Country
Thanet	300	UK
Ormonde (51%)	150	UK
Aberdeen Bay	97	UK
Kentish Flats	90	UK
Kentish Flats extension	50	UK
Pen y Cymoedd	228	UK
Ray	54	UK
Lillgrund	110	SE
Stor-Rotliden	78	SE
Horns Rev 3	407	DK
Horns Rev 1 (60%)	158	DK
Klim (98%)	67	DK
DanTysk (51%)	288	DE
Sandbank (51%)	288	DE
Alpha ventus (26%)	60	DE
Nordzee Wind (50%)	108	NL
Princess Ariane	294	NL
Prinsess Alexia	122	NL
Other onshore and solar	645	

Total 3,593 MW



## In construction

Name	Capacity (MW)	Commissioning	Country
Kriegers Flak	605	2021	DK
Hollandse Kust Zuid 1-4	1,520	2023	NL
Jaap Rodenburg	30	2021	NL
Nieuwe Hemweg	19	2021	NL
Ny Hiddum Houw	14	2021	NL
A 16	20	2022	NL
Blakliden + Fäbodberget	353	2022	SE
South Kyle	240	2022	UK
Other, incl solar & batteries	78		

Total ~ 3 GW

## Pipeline

Name	Capacity (MW)	Commissioning	Country
Norfolk projects	3,600	2027-2029	UK
Vesterhav	344	2023/2024	DK
Windplan Blauw	57	2023	NL
Grönhult	67	2023	SE
Klevberget	126	2023	SE

Total >4 GW

# How big is the renewables market?

# 60 GW decommissioning of conventional power until 2030 will push RES built out

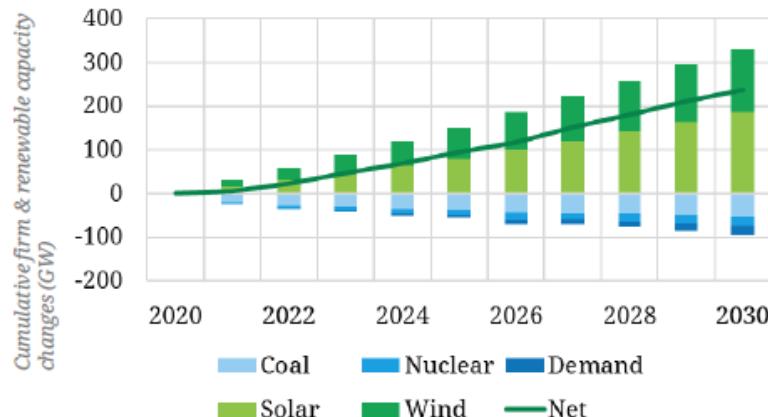
At the same time support schemes for RES will more and more phase out due to market prices meeting cost for RES projects which will make fixed price PPAs necessary

E-7 coal & nuclear closures by 2030

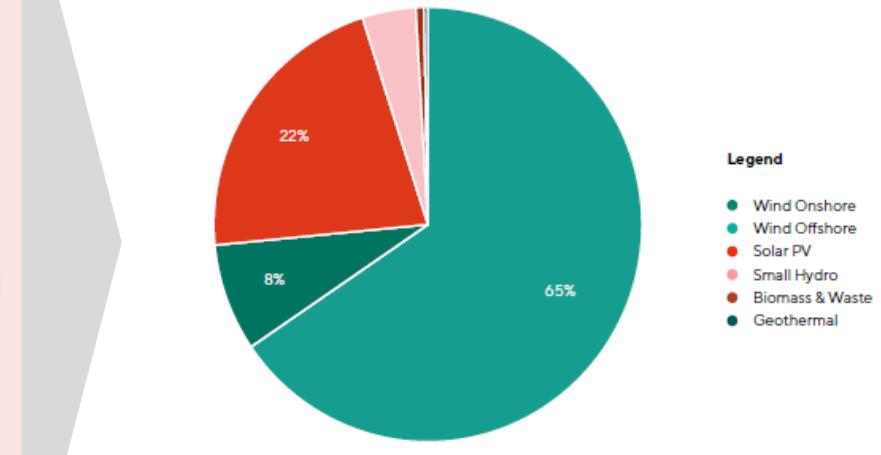
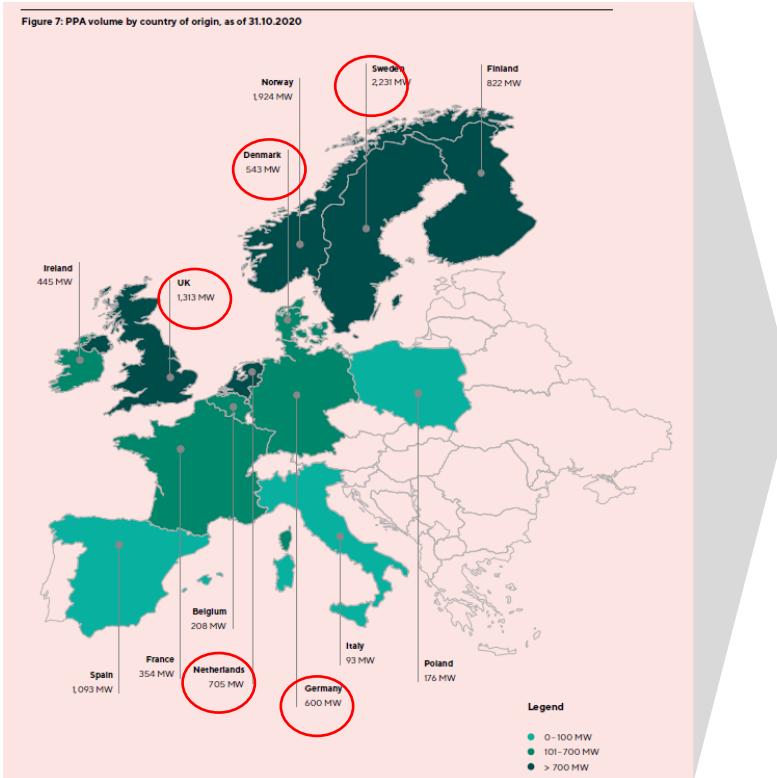


Note: in some markets capacity closures will be much higher as ageing CCGTs close (e.g. UK, IT, ES)

E-7 incremental nominal capacity



# In the countries where we are most active in we have seen ~5.3GW PPA Volumes until end of 2020

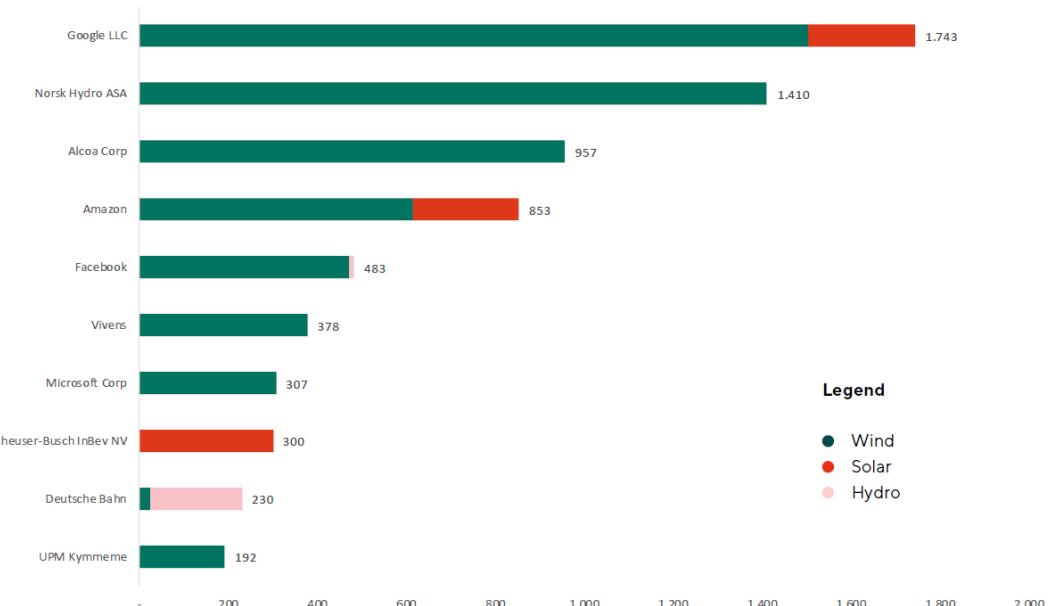


Source: Bloomberg New Energy Finance, company information, Hamburg Commercial Bank

# Top 10 PPA buyers mixed but with high Tech share



Figure 9: Top 10 PPA buyers in Europe, contracted capacity in MW, as of 31.10.2020



Source: Bloomberg New Energy Finance, company information, Hamburg Commercial Bank

# Drivers

# Drivers

European Green Deal	is a driver for the Renewables Energy development	
Corporates and utilities	Demand for real green power from corporates and utilities	<ul style="list-style-type: none"><li>Companies want green and increasingly "real" green supply</li><li>Is a longterm pricing hedge</li><li>Hedging green property</li></ul>
Power generation costs development	The generation must be orientated by the market price (cherry picking effect)	
Decreasing supported rates and changing regulatory conditions		
Wholesale marketprice	Base 2022: +18 Euro/MWh since Dec. 2020	We have price increase and currently a backwardation situation
CO2 Price	+23 Euro/MWh since Nov. 2020	
Electrification transport, heating, digitalization and sector coupling	Increase from 545 TWh p.a up to 788 TWh p.a.	

# Drivers – long term market price outlook

future markets

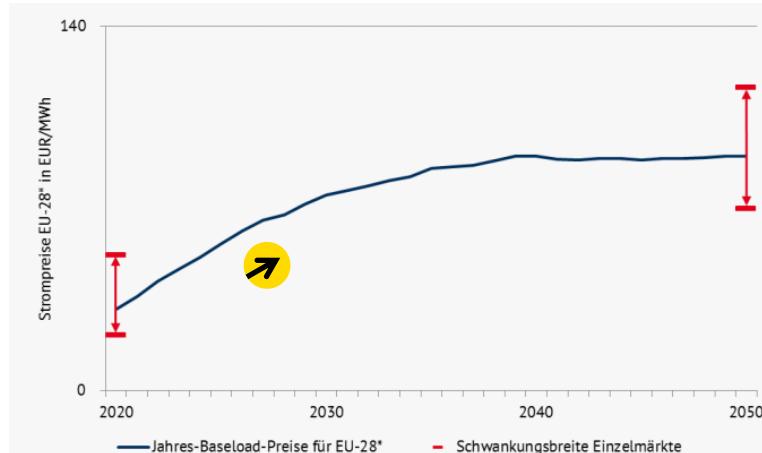


Abbildung 4: Strompreise (real: EUR 2015) und Jahres-Baseload-Preise EU-28\*. Quelle: Energy Brainpool

expected changes and effects on future market prices

## Continental

Phase out coal and nuclear power



Uncertain commodity price level (gas, hard coal, oil)



Electrification of transport and heat increase the demand



CO<sub>2</sub>-Tax



RES expansion to achieve targets



2008

2018

2024

in direction to 2040...



# Vattenfall's role

# We have different PPA experiences in our countries

Vattenfall signs PPA with Marguerite for 42MW Swedish wind farm



18. März 2021  
Air Liquide first customer for  
offshore wind farm  
Hollandse Kust Zuid

Microsoft signs 15 year PPA for 90MW in Netherlands

Bringing the company's global clean power purchase to 1.5GW

VERTRIEB  
VATTENFALL UND TELEKOM-TOCHTER  
UNTERZEICHNEN PPA

STROM | 01.02.2020 - 12:56  
VON STEPHANIE GÖRIG



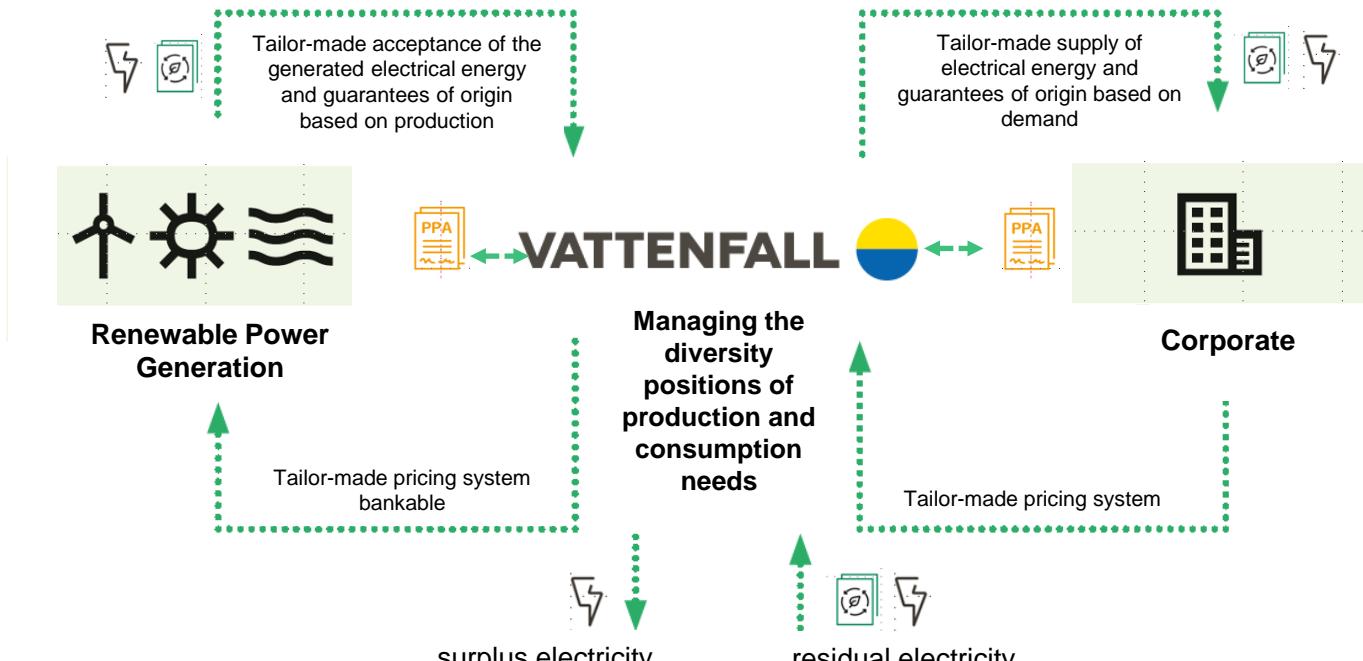
STROMIEFERVERTRÄGE  
BOSCH SCHLIESST LANGFRIST-PPAS ÜBER 100  
MIO. KWH AB

STROM | 05.08.2020 - 12:14  
VON STEPHANIE GÖRIG



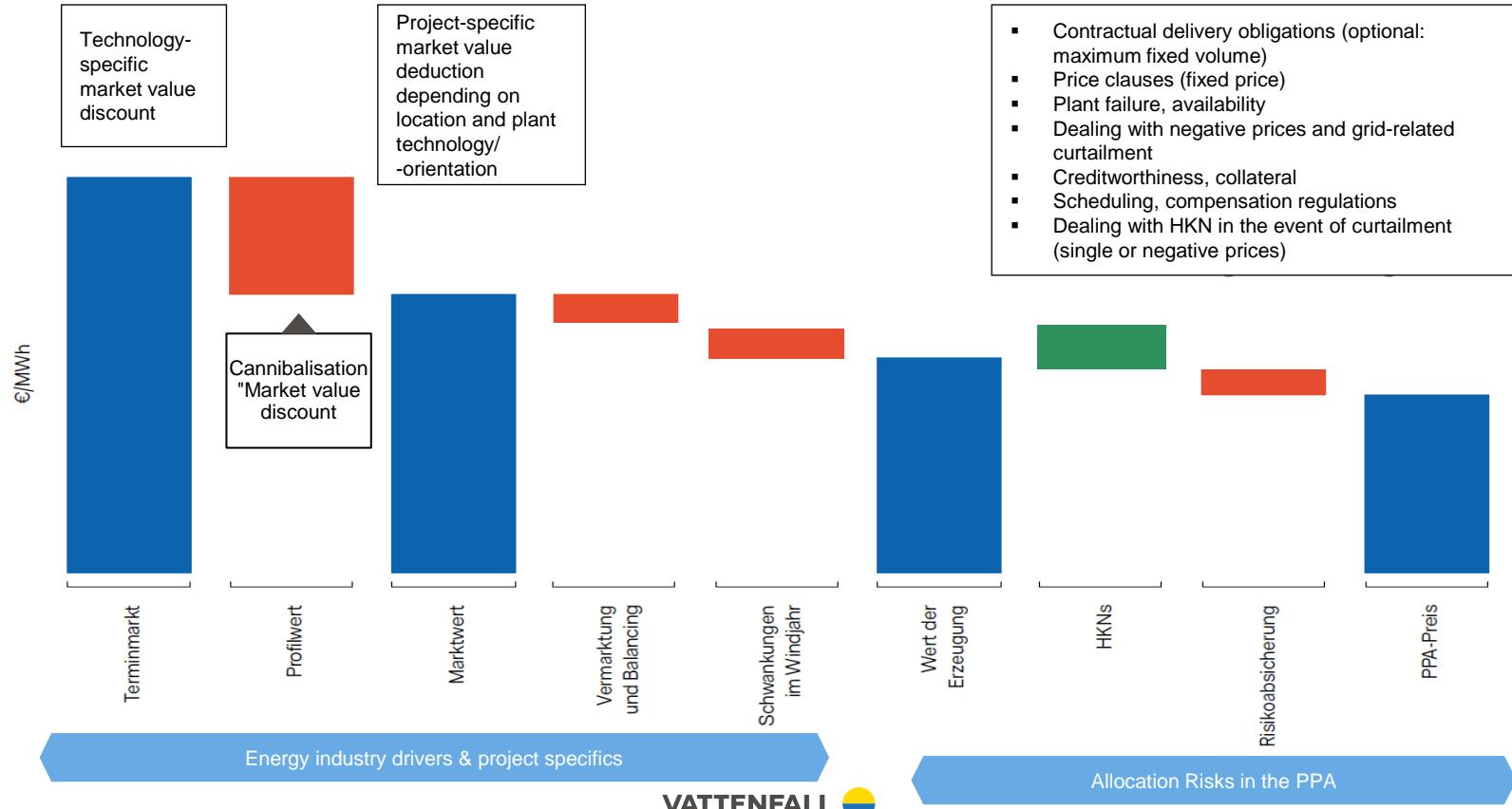
Bosch installiert an vielen seiner Werke auch Eigenversorgungsanlagen - hier Photovoltaik und Windkraft am Standort Eisebach. (Foto: Bosch)

# Vattenfall's role



Portfolio Vattenfall

# Risks - assessment and pricing

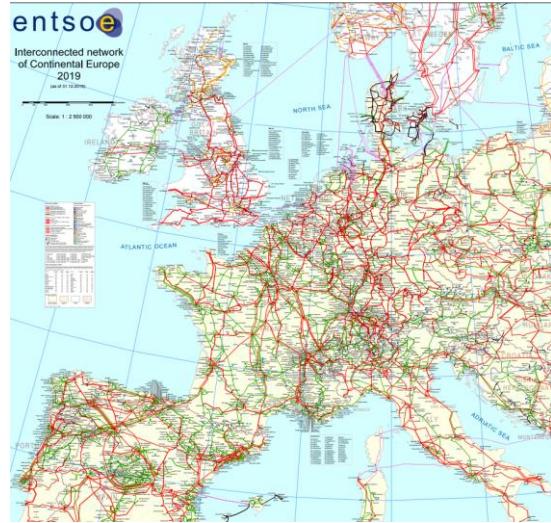


# What risks are embedded in a long term fixed price offtake deal?

- |   |                            |  |
|---|----------------------------|--|
| 1 | <b>Longterm price risk</b> | <ul style="list-style-type: none"><li>• Occurs when a fixed price is agreed in a contract that is longer than the market horizon (&gt; 3 years)</li><li>• Fixed prices in contracts &lt; 3 years can be hedged on futures markets</li><li>• Vattenfall uses its own fundamental methodology to develop its LTMO = Long Term Market (Price) Outlook.</li></ul>  |
| 2 | <b>Profile risk</b>        | <ul style="list-style-type: none"><li>• Occurs because the production profile of a wind and solar plant does not match the profile of tradable products, i.e., base load, peak, annual, quarterly, or monthly products.</li><li>• In Germany comparable to the difference between "market value wind/solar" and spot price.</li></ul>  |
| 3 | <b>Volume risk</b>         | <ul style="list-style-type: none"><li>• Occurs when hedging forward contracts.</li><li>• This is a long-term volume risk that is managed by buying back underproduction in the short-term market (buy@spot and sell@long term/forward price) and selling overproduction the other way round</li><li>• The volume risk cannot be completely separated from the profile risk - the profile risk covers part of the volume risk as well</li></ul> |
| 4 | <b>Balancing risk</b>      | <ul style="list-style-type: none"><li>• Arises from the balancing of the traded quantities and the quantities actually produced.</li><li>• This is a short-term "under/overproduction risk" that is settled with the imbalance price</li></ul>   |
| 5 | <b>Credit/default risk</b> | <ul style="list-style-type: none"><li>• Insolvency of the SPV</li><li>• Longer-term default =&gt; M2M delta</li></ul>  |

# European grid infrastructure

- Benefits
- Expansion
- Think - Plan - Act european



Renewable energy supply is possible at the European level, good complement between sun-rich and wind-rich locations in the exchange of countries - expansion of interconnectors!

example

# Physical virtual delivery



# Types of PPA

Types of generation	Invest	purchaser	Physics	Financing
Solar	Old plants (continued operation)	Corporate	Public grid connection	Fixprice
Wind	New plants	Utility	Direct link	Spot price
Water		Trading	Balancing group delivery	Combination of fixed and spot price
Geothermal power			Crossboarder	Floor with Cap
Biogas			Virtual	

# Project opportunities for PPAs

Produktionsart	Lieferstruktur		Lieferung		Lieferbeginn	Lieferende	Zeitraum	Preis		Anlageninvestor	Alter der Anlagen	Land	HKN Qualität /Standort	Spezifikation der Anlage	Installierte Kapazität	Benutzungsstruktur	Volumen
	Energie	HKN	Energie	HKN				Energie	HKN					MW/MWp	h	MWh/a	
GoO's	-	Jahresübertragung	-	HKN Konto	01.01.2021	31.12.2030	10 Jahre	-	Fixpreis	Vattenfall	Altanlagen	S	nordics mit support	Wasserkraft	100	8.760	876.000
GoO's	-	Jahresübertragung	-	HKN Konto	01.01.2021	31.12.2030	10 Jahre	-	Fixpreis	Vattenfall	Neuanlagen	DK	nordics mit support	Windkraft	100	8.760	876.000
Wind	CFD Contract for Pricedifference (wie)	Jahresübertragung	-	HKN Konto	01.01.2023	31.12.2032	10 Jahre	Verkauf am Spotmarkt NL gegen Fixpreis	Fixpreis	Vattenfall	Neuanlage	NL	Nordsee	Windkraft	100	4.000	400.000
Wind	wie prognostiziert	wie prognostiziert	Bilanzkreis	HKN Konto	01.01.2023	31.12.2032	10 Jahre	Fixpreis	Fixpreis	Vattenfall	Neuanlage	NL	Nordsee	Windkraft	100	4.000	400.000
Solar	wie prognostiziert	wie produziert	Bilanzkreis	HKN Konto	01.01.2022	31.12.2031	10 Jahre	Fixpreis	Fixpreis	Drittpartei	Neuanlage	DE	diverse	Solar	bis zu 250 MW	1.050	262.500
Solar	wie prognostiziert	wie produziert	Bilanzkreis	HKN Konto	01.01.2023	31.12.2032	10 Jahre	Fixpreis	Fixpreis	Vattenfall	Neuanlage	DE	diverse	Solar	bis zu 150 MW	1.050	157.500
Wind onshore	wie prognostiziert	wie produziert	Bilanzkreis	HKN Konto	01.01.2021	31.12.2025	5 Jahre	Fixpreis	Fixpreis	Drittpartei	Altanlage geg. > 20 Jahre	DE	diverse	Windkraft	bis zu 100 MW	1.200	120.000
Wind offshore	wie prognostiziert	wie produziert	Bilanzkreis	HKN Konto	01.01.2025	31.12.2034	10 Jahre	Fixpreis	Fixpreis	Vattenfall	Altanlage geg. > 20 Jahre	DE	Nordsee	Windkraft	bis zu 100 MW	4.000	400.000

# Questions & decisions for Corporates

Which requirements does the corporate has in the following:

- **Countries:** where should be the RES production => versus consumption
- **Technology:** Wind Offshore, Onshore (ex-EEG, solar)
- **Contract duration:** long term 10y (offshore, solar) versus short term 1-3y  
(wind ex-EEG)
- **Product quality:** pay as produced
- **Pricing:** fix price, spot price
- **Risks:** which risks can I cover ?
- **Legal contracts:** definition and negotiation
- **Board:** existing board decision ? How many time do I need ?
- **Timeline:** what is the right moment for the purchase decision regarding market prices ?

# Conclusion

- The unsubsidized PPAs complement the subsidized PPA
- PPAs must be oriented by the market price
- The level of the CO2 price will be the driver for the PPAs.
- We must act european



Bassam Darwisch  
Head of Renewables Origination Germany

T +49 40 24430 410  
[bassam1.darwisch@vattenfall.de](mailto:bassam1.darwisch@vattenfall.de)

