

CORPORATE PPA: NEXT ECONOMIC MODEL FOR LARGE SCALE SOLAR

CPPA development
Focus on France and Germany

Keynote, May 5th, 2021



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Sustainability & Energy
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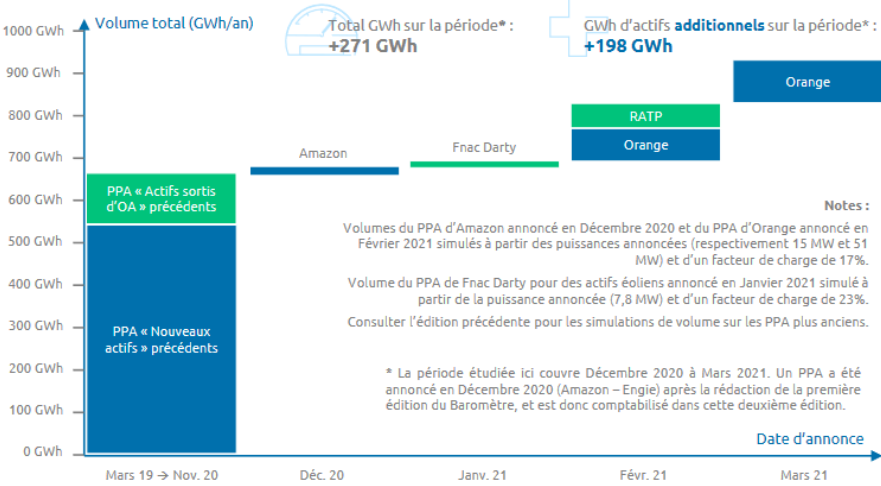


Thomas Gebetsroither
Director
Data driven Energy &
Utilities

Check out our quarterly barometer for updates on green power sourcing !

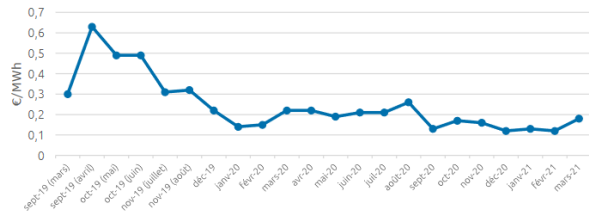


Latest CPPA signed



GoOs prices

EVOLUTION DU PRIX DE VENTE MOYEN DEPUIS LE LANCEMENT DES ENCHÈRES



CHIFFRES CLÉS DES ENCHÈRES DE JANVIER A MARS 2021*

0,15€/MWh	Prix de vente moyen d'une GO	7 M de GO mises en vente, ~ 56% vendues
0,43€/MWh - Prix de vente le plus élevé (solaire / Occitanie en février)		1 Ile de France 0,28 €
0,1€/MWh - Prix de vente le plus faible (prix de réserve en mars)		2 Centre-Val de Loire 0,16 €
		2 PACA 0,16 €

L'INTERVIEW

VISION D'UN DÉVELOPPEUR

Laurent Pillot, Head of Power Sales, Cofely

Quelle est votre vision du marché PPA aujourd'hui ?

Quels sont les principaux défis de la PPA ?

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L'INTERVIEW

VISION D'UN ACHETEUR

Corinne Long, Head of Energy Department, EDF

Quelle est votre vision du marché PPA aujourd'hui ?

Quels sont les principaux défis de la PPA ?

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« CROSS-BORDER » PPA : PRINCIPES ET ENJEUX

Quels sont les enjeux et les défis de la PPA ?

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Interviews with experts and focus articles

<https://www.capgemini.com/fr-fr/ressources/barometre-achats-energies-vertes>

We support green sourcing strategy design and implementation

1. Design of "RE100 roadmap"

- *Green sourcing scenarios*
- *Environmental, technical and economical stakes*

2. CPPA strategy design

- *CPPA stakes*
- *Definition of key attributes with alignment of all internal stakeholders*
- *ExCom decision process*

3. CPPA implementation

- *Preparation of the tender (spec, ratings...)*
- *Support to assessment and negotiation until contract signature*

We share our knowledge to support the growth of the CPPA business



Regular releases on CPPA market and trends



Works with the CPPA stakeholders to set the right standards



Many corporates are already committed to green energy sourcing, acting through various mechanisms



Various ongoing initiatives...

RE 100

Example of the **RE100** campaign: **over 300 companies** have committed to reach **100% renewable electricity**



Google

Acquisition of **2.6 GW** of renewable production assets since 2010, with a total investment of over \$3.5 billion.

IKEA

Target of a renewable energy production equivalent to the consumption by 2020. **\$1.6 billion** invested in wind and solar PV energy production (shops and distribution centers).

AB InBev

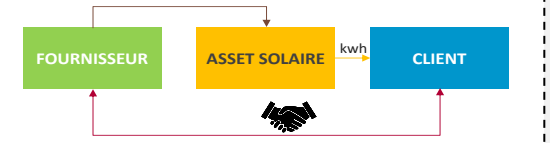
100% of electricity purchased from renewable sources before 2025.

Nestlé

Carbon footprint reduction target of **40%** in the UK by 2020. Signing of a 15-year PPA to purchase electricity from the community Sanquhar wind farm in Scotland for its plants in the UK and in Ireland.

...with a wide variety of available solutions

Corporate PPA (direct purchase of electricity contract)



Labels and additional criteria

Self-Consumption



Purchase of electricity from a chosen source

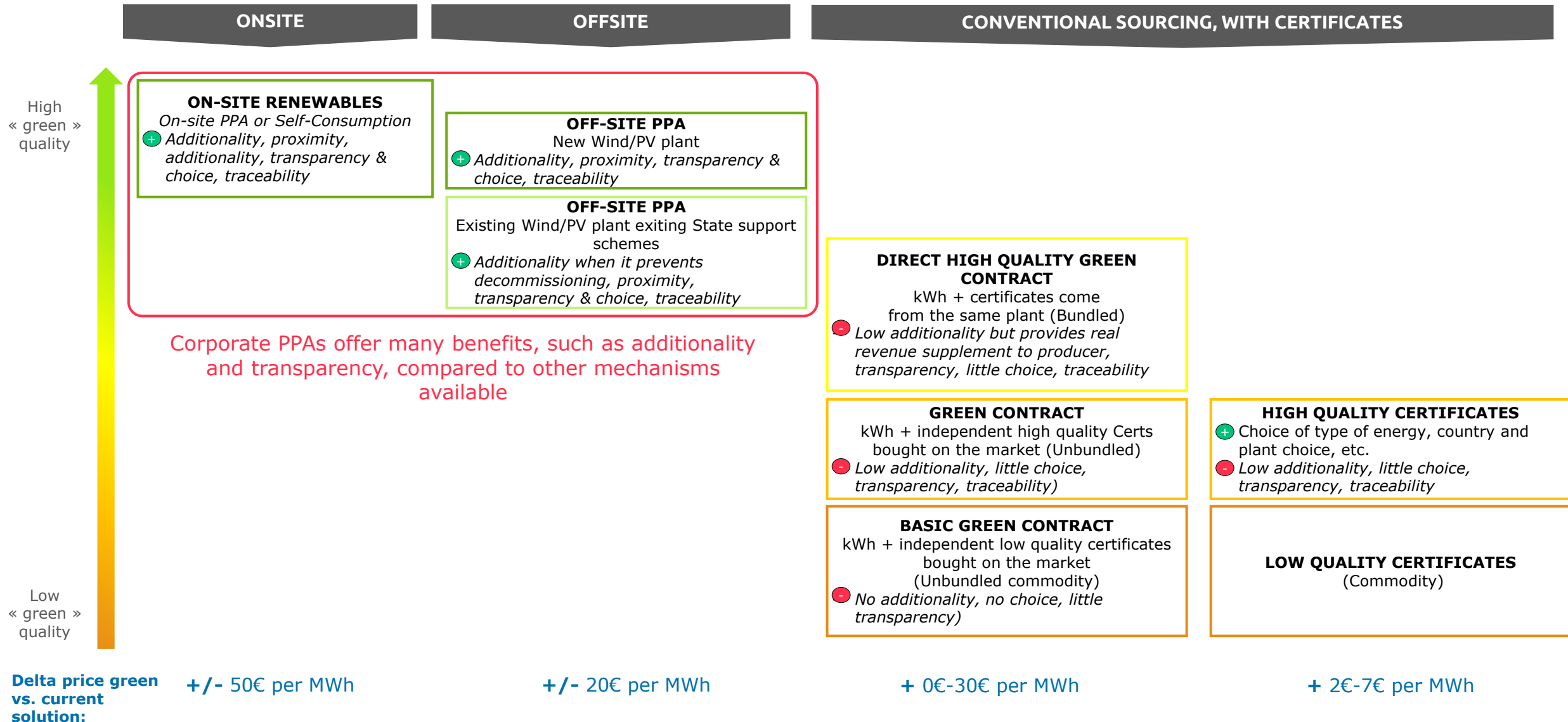
Renewable Certificates

THE INTERNATIONAL REC STANDARD

RECS (US), Garanties d'origines

...

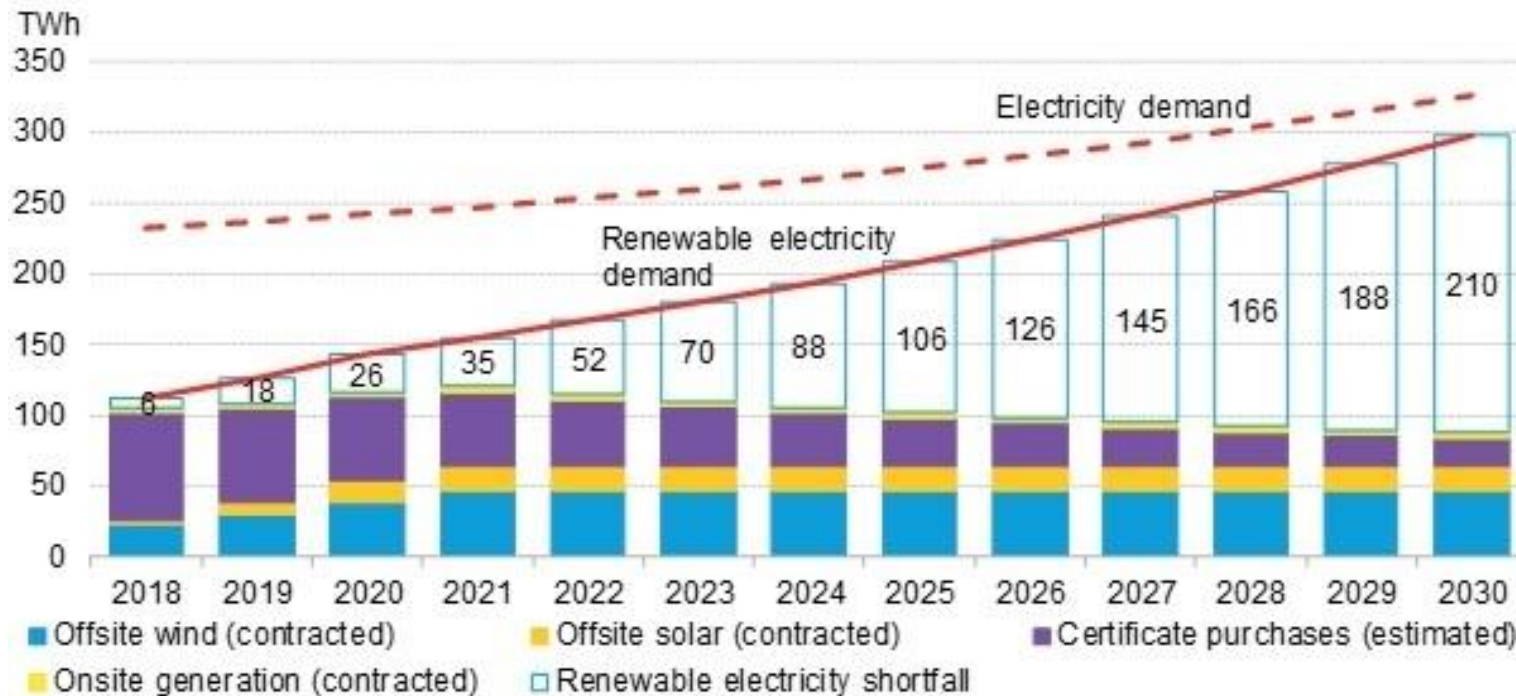
Among the many solutions for decarbonizing electricity sourcing, Corporate PPAs have high “green” qualities





The rise of renewable energy demands from corporates will push renewables developers to seek new contracting modalities such as PPAs

Projected renewables shortfall for RE100 companies



Source: BloombergNEF, Bloomberg Terminal, The Climate Group, company sustainability reports. Note: Charts are for RE100 members that have disclosed electricity demand. Certificate purchases includes non-U.S. green tariff programs, and are assumed to step down 10% each year. Onsite generation and contracted wind and solar purchases are assumed to remain flat through 2030. Regional breakdown of shortfall estimated based on each company's share of revenue by region.

400 companies committed to setting a **science-based target** in 2019 (x2 compared to previous years), and 63 have pledged to have a RE100 target (100% of green electricity consumption)

Resulting from these objectives, BNEF estimates that **Corporate PPAs will catalyze 105 GW of new solar and wind build globally.**

Corporate PPA started in North America then Nordics in Europe to extend today to all geographies

General perspective

Corporate PPA market keeps rising worldwide:

- **+18% of volumes in 2020** with the first drop since 2016 for the US (Covid-19 pandemic and the uncertainty about U.S. presidential election)
- **130+ companies from all sectors signed a PPA**. Top 2020 buyers are Amazon (35 PPAs, wind and solar), Total (solar) and TSMC (wind)

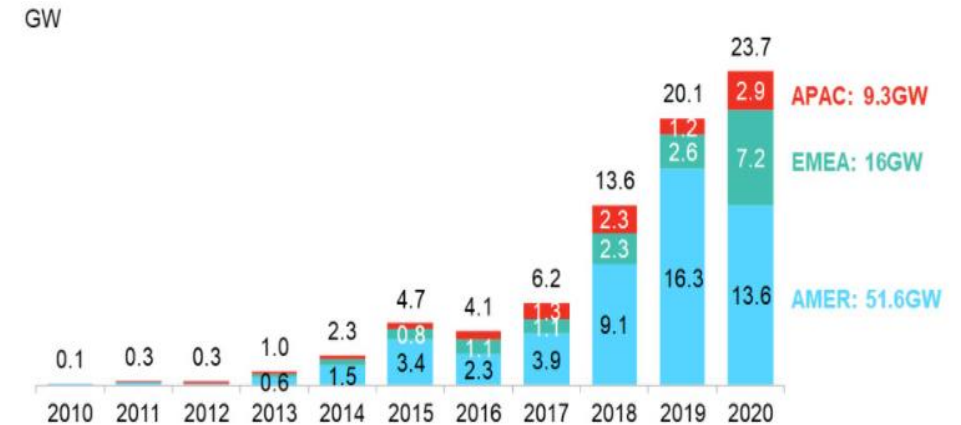
European perspective

Even though Nordics were historically the most important corporate PPA buyers, new countries are signing their first corporate PPA each year:

- **9.8 GW volume dominated by wind** (85% of signed PPA for the period 2013-2018)
- **Solar is on the rise**, led by Spanish market with 4.39 GW pipeline in January 2020, followed by Italy (1.91 GW) and Germany (1.05 GW)



Global Corporate PPA volumes (GW)



Source: BloombergNEF. Note: Data is through 2020, reported in MW DC capacity. Onsite PPAs not included. Australia sleeved PPAs are not included. Pre-market reform Mexico PPAs are not included. APAC number is an estimate. These figures are subject to change and may be updated as more information is made available.



A CPPA is...

Direct purchasing contract

- Private agreement to purchase renewable electricity, **negotiated between a buyer and a producer**
- A contract is also signed with a supplier to provide the complementary electricity and other services related to PPA management

Fixed / regulated price

- A **fixed price** for the electricity from the PPAs is **set in advance**
- The price is decorrelated from the market prices and is instead **based on the production costs of renewable technologies**

Long term (when additional)

- Long-term contract: usually **between 10 and 20 years**
- Grants the **producer** more visibility and thus an **access to financing**
- Clear **visibility on future costs for the buyer**

PPA types

Physical onsite

The offtaker pays the electricity to the producer at a fixed price for 10-20 years and have the asset on site.

Physical sleeved

The consumer pays the electricity to the producer at a fixed price for 10-20 years with a “physical link” (electricity flow).

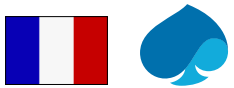
Can be cross-border theoretically, but hard to implement

Virtual

The consumer pays the electricity price difference between PPA price and market price to the producer (CFD).

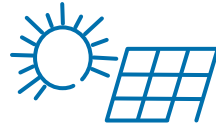
Can be cross-border

Public PPA landscape in France



New plants (additional)

12 PPAs
~765 GWh



Existing plants exiting support schemes

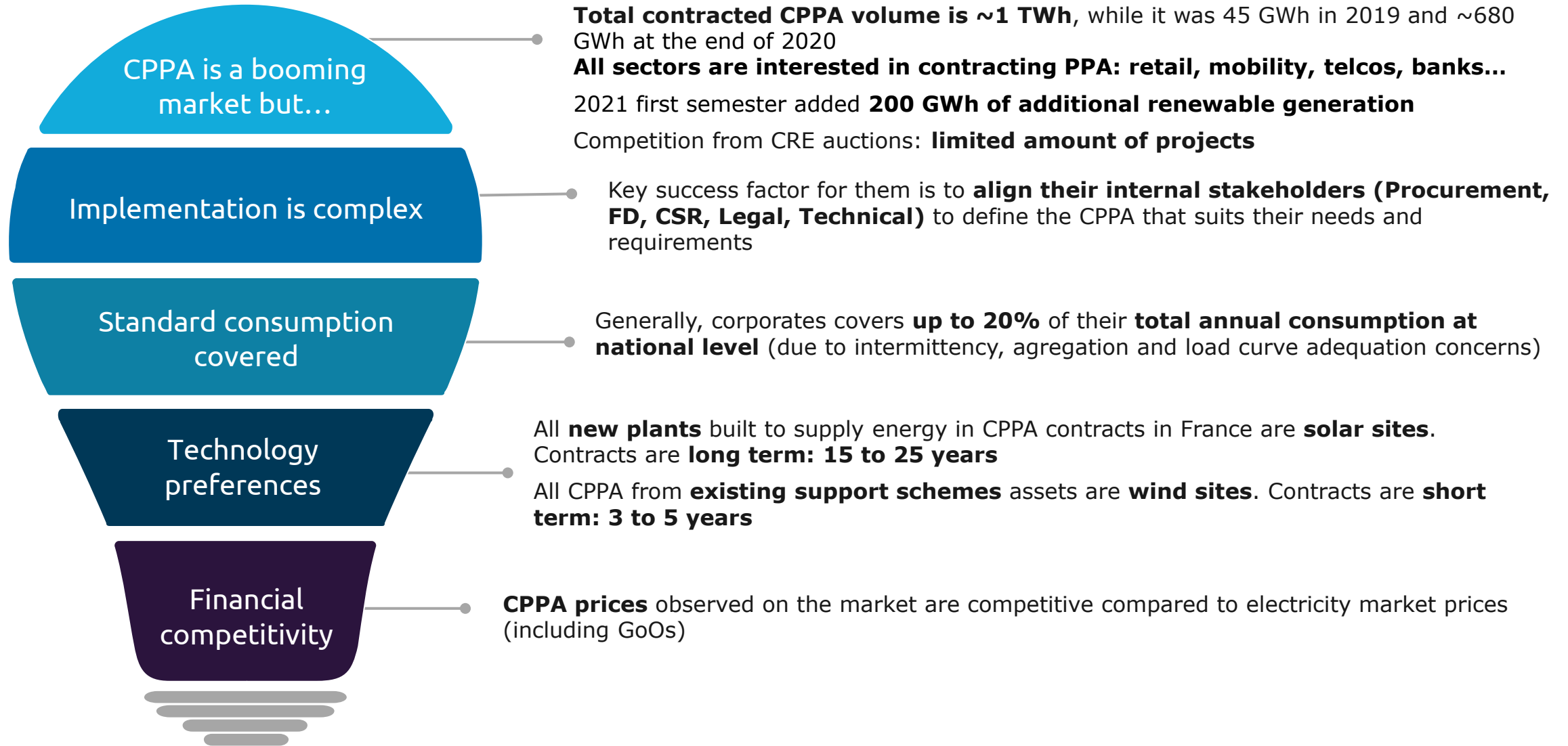
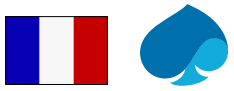
8 PPAs
~210 GWh



Offtaker	Producer	Volume / Time	% Conso
		47 GWh / 21 yrs	10%
		143 MW / 25 yrs	3,6%
		10 MW / 25 yrs	5%
		5 MW / 25 yrs	10%
		61 MW / 20 yrs	NC
		40 MW / 15-20 yrs	~2%
+ 15 other offtakers		55 MW / NC	~2%
		16 MW / NC	15%
		15 MW / NC	NC
		51 MW / 15 yrs	4%
		80 MW / 15 yrs	5%
		20 MW / 20 yrs	NC

Offtaker	Producer	Volume / Time	% Conso
		27 GWh / 3 yrs	10%
		20 GWh / 3 yrs	15%
		25 GWh / 3 yrs	16%
	 	NC / ~3 yrs	NC
		67 GWh / 5 yrs	3%
	 	16 GWh / NC	14%
		60 GWh / 3 yrs	4%
		NC / 5 yrs	55%

Key takeaways about French PPA market



German PPA Market is steadily growing with Q12021 already responsible for one-fifth of overall German PPA market volume

German PPA Market Overview



Total amount of PPA Projects

39

Average PPA tenor (years)

~11

Average PPA project size (MW)

~ 68

Total PPA project volume (MW)

~ 2640

Total PPA project volume in 2021 (MW)

~ 449

List of the last 20 PPA project closures

Date	Buyer	Seller	Technology	Project Size (MW)	PPA Tenor (years)
April 21	VW	RWE	Solar	172	10
April 21	Deutsche Bahn	RWE	Offshore Wind	50	15
März 21	Daimler	Statkraft	Solar	120	
Februar 21	EnBW	Energiekontor AG	Solar	52	15
Januar 21	Deutsche Bahn	Statkraft	Onshore Wind	35	1
Januar 21	Deutsche Bahn	Getec	Onshore Wind	20	2
Dezember 20	Amazon	Orsted	Offshore Wind	250	10
November 20	N/A	Luxcara	Solar	172	
November 20	Deutsche Bahn	Enerparc	Solar	80	30
November 20	Deutsche Bahn	RWE	Offshore Wind	65	15

Date	Buyer	Seller	Technology	Project Size (MW)	PPA Tenor (years)
November 20	Deutsche Bahn	Verbund AG	Hydro	50	5
Oktober 20	Naturstrom AG	Statkraft	Solar	50	11
Oktober 20	Bosch	RWE	Solar	50	16
August 20	Bosch	Statkraft	Solar	47	12
August 20	Bosch	Vattenfall	Solar	10	12
August 20	EWE Trading	Maxsolar	Solar	8	5
August 20	Statkraft	Anumar	Solar	50,00	11
August 20	Enovos Deutschland GmbH	Solar-Konzept	Solar	10,00	10
Juli 20	Engie	Energiekontor AG	Solar	41	15
Juli 20	Naturstrom AG	Statkraft	Solar	50	11

Continued PPA market growth is mainly fuelled by Solar Power but transaction complexity is still high

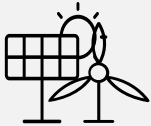


Key market characteristics



Slow Project ramp-up in 2018 and 2019

Slow ramp-up in 2018 and beginning of 2019 due to the missing market transparency and unclear regulatory structure.



Trend towards Solar PPA projects

Increasing trend towards solar energy as proportion of overall PPA market volume.



Moderate price sensitivity and sustained competitiveness

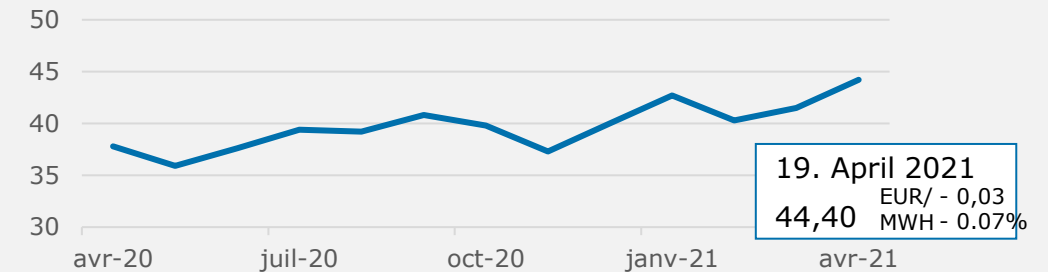
Despite increasing PPA prices demand of PPA projects remains strong; observed PPA market prices stay competitive with regards to electricity prices.



High complexity and transaction costs

Missing contractual standardization and transaction-related complexity are still crucial barriers for corporates off-takers.

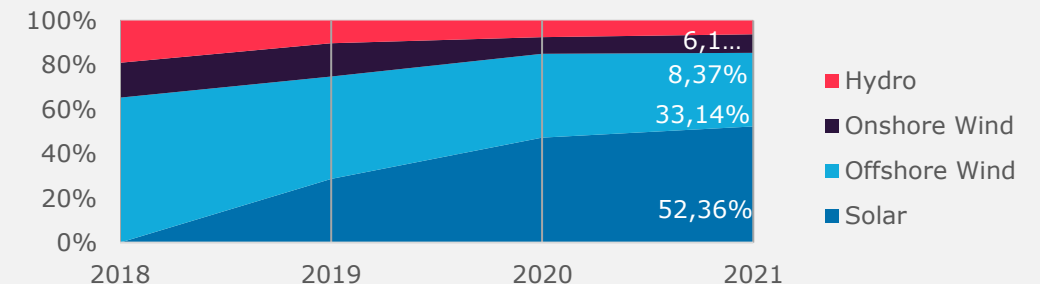
PPA Price Index* / Germany



* Chart is a simplification of the actual Price development

The German PPA Price Index has steadily increased over the past year and is expected to rise further

Share of overall PPA project volume by source



By 2021 Solar energy represents >50% of overall PPA market

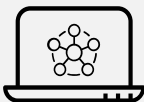
Emergence of digital PPA trading platforms will support continued rise in demand by corporates & financial investors



Market trends and opinions



Market trends



Rising transparency and speed due to digital PPA platforms

Growing importance of digital PPA trading platforms, e.g., Instatrust by DNVGL, will increase overall market transparency and speed resulting in rising competitiveness



Continued strong corporate demand due to sustainability and price-hedging targets

Increased corporate focus on securing electricity prices and work towards their long-term sustainability goals will push the overall PPA market

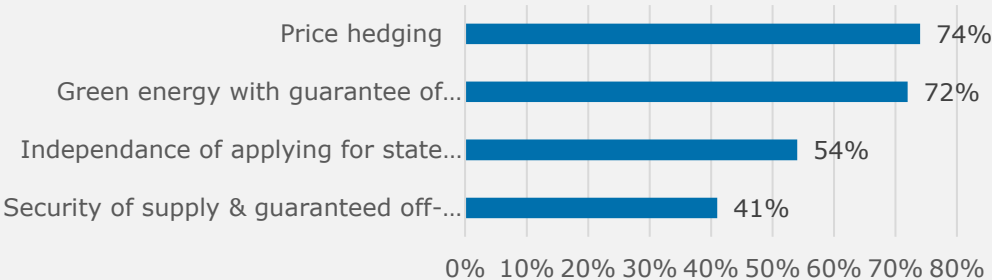


Rising investment popularity for investors

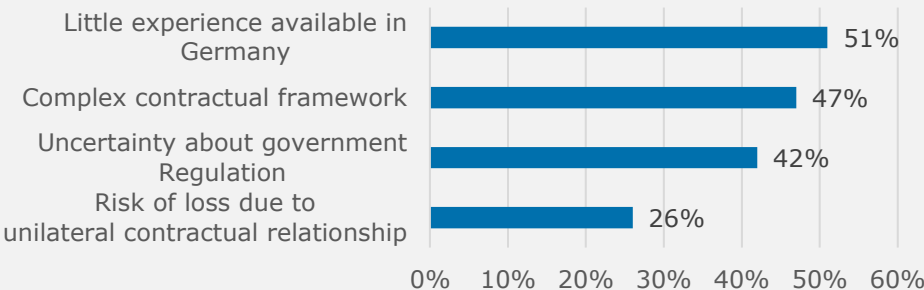
Driven by sustainability and low carbon investment strategies (E.g.: ESG taxonomy) banks, investors and insurers are becoming increasingly active in the German PPA market.

Market opinions

What benefits do you expect from concluding a PPA?



What barriers or risks are currently preventing you from entering into a PPA?



Source: dena-Marktmonitor 2030 / Extract of top four categories/ Survey of 138 industry experts



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