
Global CPPA market landscape

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Executive summary

The French CPPA market is nascent but has the potential to expand importantly, once market barriers are removed, driven by a favourable business environment

More established CPPA markets suggest that 40% of the RE projects capacity buildout could be supported by CPPAs in the right environment

- We have identified five main drivers that impact the development of CPPAs and how these play out and ultimately influence a specific CPPA market remain unique to each market
 - An adequate environment is necessary for CPPAs to expand, including the right market structure and the correct regulatory and business environment
 - Competitiveness of RE electricity and greenification in the power generation supply chain are and will also remain underlying drivers for increased use of CPPAs
- CPPAs have emerged in the US more than 10 years ago and have been growing since then globally, although at different pace depending on geographies
 - Today the US CPPA market is twice the size of all other CPPA markets in the world, having benefitted from a competitive RE sector early-on supported by state backed incentives both on the seller and buyer sides
 - In Europe, Sweden and Norway have led the way supported by strong RE capacity and low electricity prices combined with an established pool of corporate buyers with large energy needs
 - Other markets such as Spain and the UK have followed with most active markets being those having moved away from regulatory support early
- The French CPPA market remains nascent with limited scope for growth under the current setup, but we see good potential once key drivers align to unlock it
 - As the majority of French RE projects benefit from long-term inflation-linked CfD provided by the state above the current market price levels (around 50 €/MWh), there is limited benefit for developers to enter into CPPA currently
 - On the other side, buyers remain hesitant to commit to long-term CPPA in view of the market dynamics, including impression of price stability provided by the ARENH, which is more a perception issue rather than a true limitation, and the absence of strong green incentives
 - However as the sector becomes more competitive, subsidies fade away and the French power market becomes more efficient, we expect the French CCPA market to pick up

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Introduction

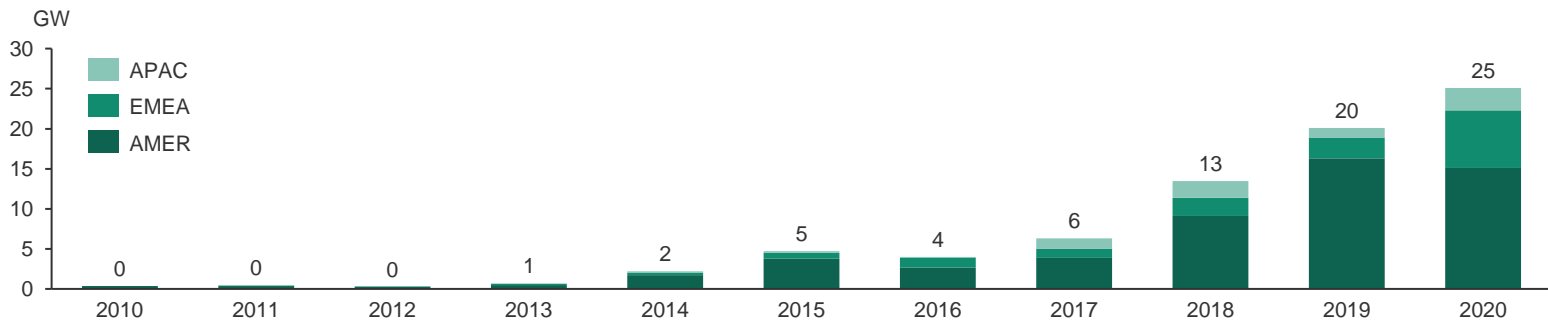
CPPAs have emerged in the US more than 10 years ago and have been growing since then globally

GoOs

- Guarantees of Origin (“GoO”) guarantee the electricity source and method of production per MWh
- They are tradable in the marketplace and serve as an incentive for RE
- They play an important role in CPPA, certifying the link between green production and consumption, thus allowing to claim and adding credibility

- A corporate power purchase agreement (“CPPA”) is a long-term power purchase contract under which a RE producer undertakes to directly sell and a corporate undertakes to directly buy electricity at certain agreed terms for a defined period of time
 - This differs from the traditional intermediated approach of buying electricity from utilities which themselves source this electricity on the power market or from power producers
- CPPAs emerged in the US in the 2000’s, with the first CPPA of significance being signed by Google in 2010
 - Since then, the CPPA market has kept growing globally with the largest CPPA markets today being the US, accounting for over 70% of global CPPA volume signed in 2019
- Initially these CPPAs had very long tenors - in the 20-25-year range - to match financiers’ bankability requirements and support projects leverage, but as capex decreased, and technologies and volumes improved, CPPAs have shortened to a sweet spot of between 10-15 years today
- Major buyers have typically been
 - Tech companies and data centre owners such as Google, Amazon, Facebook and Apple (“GAFA”)
 - Power-intensive industrial groups such as aluminium smelters used to long-term contracting
 - BtC and telecom companies more recently

CPPA annual volumes globally



Sources: BNEF, News articles, company press releases

Main CPPA structures (flow structures in appendix)

The choice of CPPA structure will depend on the wishes of the buyer (ownership, location, additionality, accounting), as well as the degree of flexibility sought by the parties involved

The sleeved CPPA is the most widely used structure in Europe, while the synthetic CPPA dominates in the USA

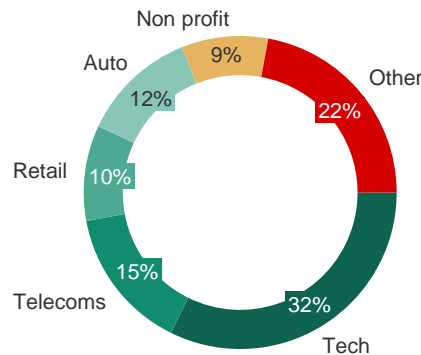
	On-site PPA	Sleeved PPA	Synthetic / virtual / financial PPA
Description	Physical transfer of power between power producer and corporate buyer, located close to each other	Contractual transfer of power enabled by third-party such as a utility, with grid access as parties' sites are not connected	Financial flows only between power producer and corporate buyer (except for GoO), comparable to a financial derivative
Pros	<ul style="list-style-type: none"> ✓ Simplest contractual structure with no intermediary ✓ Strong "green visibility" and easy to prove additionality 	<ul style="list-style-type: none"> ✓ Allows access to large volumes, with no space constraints, ✓ Intermediary to provide sleeving services, easy as long as in the same power market ✓ Generally accounted as standard executory contract with delivered power expenses included in IS [under IFRS] 	<ul style="list-style-type: none"> ✓ Access to possibly all installations in theory (incl. cross-borders), as there are no physical flows of power (except GoO) ✓ No need to consider technical or regulatory of power installation
Constraints	<ul style="list-style-type: none"> ✗ RE asset to be located close to and connected to buyer's site ✗ Possibly no GoO generated by the self-consumed or sold behind the meter power ✗ Impacts on the power supply contracts 	<ul style="list-style-type: none"> ✗ Intermediary party may be required to deliver power with additional sleeving fee ✗ Impacts on the power supply contracts 	<ul style="list-style-type: none"> ✗ Complexity of market transactions and derivatives flows ✗ May be accounted as a derivative (IFRS 9) in Buyer's financial accounts
Common application	Well suited for self-consumption and low volumes or corporate buyers located in areas where the grid is challenged in capacity, coverage or connection point	Generally occurring in mature markets with good quality grid and subject to IFRS rules This is the prevalent model in Europe	Generally occurring in geographies with fragmented electricity markets Best suited for non IFRS countries (USA, UK,..)
Examples	Commercial and industrial rooftop solar installations for self-consumption	CPPA in the Nordics sharing access to the wider Nord pool market	Multi-zone CPPA in the US signed by the GAFA

Main CPPA buyers

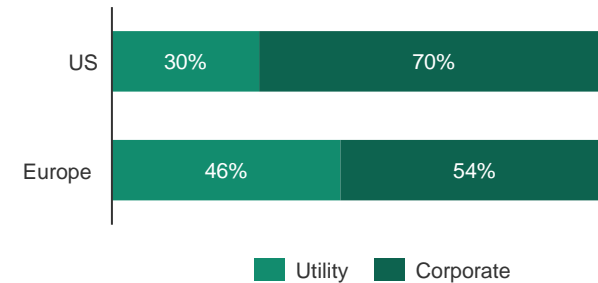
Major tech and power intensive corporates have been particularly active in signing CPPAs globally, but the pool of buyers is expanding, as support via new CPPA structures allows buyers to regroup and better manage risks

While CPPAs have grown substantially in recent years, this should not mask that utilities will continue to play a significant role in the RE market, as CPPAs are expected to remain insufficient to meet demand

CPPA per Buyer (2020)



PPA by Type of Counterparty (2020¹)



New developments

- Club deal PPAs are developing, enabling corporates to join forces and benefit from economies of scale and negotiation power
 - This structure allows smaller corporates to aggregate their power consumption needs and meet the scale of RE projects
- Anchor tenant structures are being signed, allowing smaller corporates to join larger and more experienced players
 - Under this structure, a large creditworthy corporate commits to a significant portion of the offtake of a project, securing the repayment of the debt and ensuring its bankability
 - Small corporates tag along for a lesser portion or a shorter tenor
- Proxy generation PPAs and volume firming agreements are developing, allowing corporates to limit volume and shaping risks that they are not capable of managing
 - While a traditional CPPA is based on the actual output of a project, a proxy generation CPPA is calculated against the expected output based on the project's specification and energy yield profile
 - A volume firming agreement eliminates the intermittency and weathers related risks of production, with an insurer typically bearing such risks

Sources: BNEF, News articles, company press releases Notes: 1. 2019 data for the US

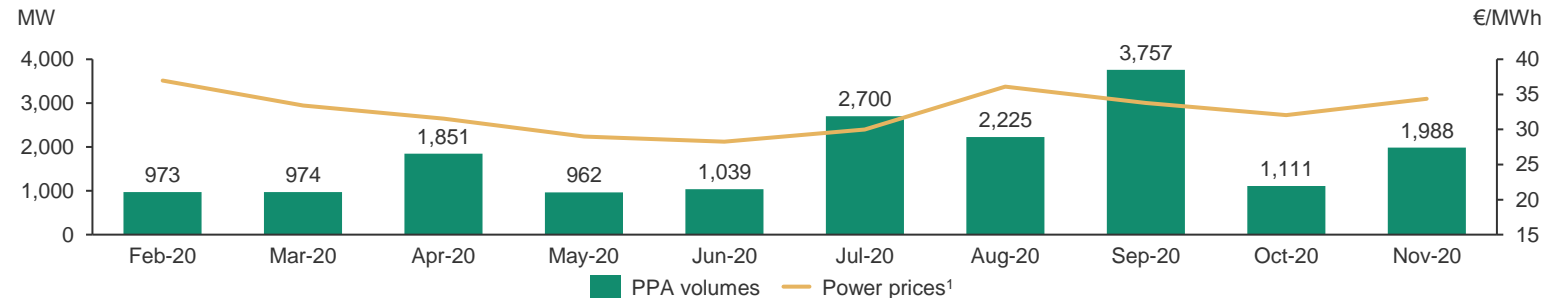
Impact of COVID on CPPA markets

After a halt in Q2-20 due to the COVID outbreak, CPPA activity has been picking up again, driven by recovering power prices and renewed demand from buyers

The CPPA market remains strong; growth will depend on the pace of recovery and the development of new products to widen the pool of bankable buyers

- COVID has caused a sharp drop in energy prices and increased uncertainty about near-term industrial energy demand which led to a slowdown in CPPA negotiations in Q2 2020
 - Developers and sponsors were reluctant to sign CPPAs at depressed prices relative to Q1 and corporates were not willing to commit to volumes without visibility on their energy requirements after the crisis
- In H2 2020, market activity has resumed in select markets at first (such as Spain or the Nordics)
 - Power prices have recovered and perception of market uncertainty has reduced with forward curves at or above their pre-pandemic levels
 - On the buyers' side, CPPA demand remains strong for non-affected businesses (tech, pharma, food, etc.), driven by low strike prices and sustainability targets
- The fundamentals driving long-term PPA growth remain strong including in the short term
 - Demand from buyers continues to increase driven by sustainability targets, noting the pace of recovery will depend on the length and breadth of the economic fallout and the damage to credit risk and industrial demand
 - Germany in particular with its strong industrial network is expected to become an active CPPA market this year
 - Greater environmental awareness and new contracts or category buyers may lead a CPPA rebound
 - Alternative counterparties such as public entities, new models such as aggregated buyers or new products such as insurance are expected to further develop and widen the pool of buyers and diversify credit risk
 - EU green recovery funds may trigger a sustainability wave among corporates, ultimately bolstering CPPA deals

Global Corporate PPA volumes and power prices pre and post-Covid



Source: BNEF, Bloomberg, EIA, OMIE, Ofgem, Nord pool

Note: 1. Average power prices across the US (Average price), France, the Nordics (Sys price), the UK, the Netherlands, Italy, Poland and Spain

CPPA key global drivers

Main CPPA drivers across markets

We have identified 5 main drivers that impact the development of a CPPA market globally

How these play out and ultimately influence a specific CPPA market remain unique to each market

	Electricity market design	Regulatory framework	Business environment	RE competitiveness	Green incentives
	<ul style="list-style-type: none"> ✓ Market structure ✓ Grid & network size ✓ Market depth and liquidity ✓ Wholesale power price and forecasts 	<ul style="list-style-type: none"> ✓ Subsidy level and availability ✓ GoO allocation rules ✓ GoO trading ✓ Grid charges ✓ Accounting treatment of CPPA 	<ul style="list-style-type: none"> ✓ Availability of buyers ✓ Availability of supply ✓ Maturity of investors and lenders ✓ Standardisation of CPPA and counterparty risk monitoring 	<ul style="list-style-type: none"> ✓ LCOE ✓ Duration ✓ Volumes ✓ Security of supply ✓ Carbon prices 	<ul style="list-style-type: none"> ✓ Regulatory obligation ✓ Voluntary commitments ✓ External indirect incentive
Buyers	✓	✓	✓	✓	✓
Sellers	✓	✓	✓		

- Depending on markets, certain drivers may be favouring or hindering the growth of CPPA and certain drivers may affect the motivations of the seller or the buyer

The right environment is key for CPPAs to develop and offer their full benefits

An adequate environment is necessary for CPPAs to expand, including the right market structure and the correct regulatory and business environment

Key Drivers	
Electricity market	<ul style="list-style-type: none">■ Market structure<ul style="list-style-type: none">– Level of market regulation and access to market■ Wholesale power price<ul style="list-style-type: none">– Volatility and price trends■ Market depth and liquidity<ul style="list-style-type: none">– Market intermediaries and availability of balancing and other shaping services■ Level of competition for alternative routes to market (utility PPA, market hedging)■ Grid & network size<ul style="list-style-type: none">– Quality and extent of the grid– Market interconnections and regional grid harmonisation
Regulatory framework	<ul style="list-style-type: none">■ Subsidy level and availability<ul style="list-style-type: none">– Low subsidy levels and restrictive entry conditions will incentivise projects to further optimise their electricity sales■ GoO benefits<ul style="list-style-type: none">– Conditions for GoO issuance even if power producer benefits from subsidy schemes (e.g. feed in tariffs/premiums)■ Accounting treatment of CPPA<ul style="list-style-type: none">– A supportive accounting framework to avoid leases (IFRS 16) or derivative accounting and MtM fluctuations on balance sheet (IFRS 9)

The right environment is key for CPPAs to develop and offer their full benefits (Cont.)

Key Drivers

Business environment

















- Availability of buyers
 - Credit-worthy companies willing and capable to execute a long-term CPPA (GAFA, telecoms, power intensive major chemical or industrial groups, para-public or BtC companies)
 - Credit enhancement solutions such as ECA guarantees, private insurance, utilities back-to-back contracts to broaden the pool of buyers to smaller and mid-tier groups
 - Pooling of small to medium-sized CPPA to increase demand size
- Generating power capacity
 - Good wind and solar resources with a growing pool of RE projects
 - Credit-worthy developers and IPP with access to financing
 - Projects approaching the end of life subject to repowering possibilities
- Maturity of investors and lenders
 - Participants' familiarity with CPPA structures
 - Investors' appetite for merchant risk
 - Lenders' appetite for CPPA backed lending
 - Lenders' ability to assess corporate credit risk
- Standardisation of CPPA
 - Legal documentation standards for CPPA to become affordable in terms of costs and effort

Economic, reputational and sustainability drivers motivate buyers

Competitiveness of RE electricity and greenification in the power generation supply chain are and will remain underlying drivers for increased use of CPPAs

Key Drivers	
Competitiveness of RE	<p>RE needs to be more attractive than electricity bought in the wholesale market in terms of :</p> <ul style="list-style-type: none"> ■ Cost <ul style="list-style-type: none"> - LCOE versus electricity wholesale prices and forwards, taking into account capture prices and cannibalisation expectations - Carbon price from Emissions Trading System (“ETS”) and carbon taxes increasing value for RE PPAs and making fossil fuels power plant less competitive ■ Duration <ul style="list-style-type: none"> - CPPA tenor versus liquid market horizon ■ Volumes <ul style="list-style-type: none"> - Typical project size in line with corporate needs - Aggregation of producers ■ Security of supply <ul style="list-style-type: none"> - Level of project development risks, including permitting process and development timelines - Development of technologies and battery storage
Green incentives	<p>Corporates green commitments for RE sourcing can come from:</p> <ul style="list-style-type: none"> ■ A voluntary commitment, whether via leading organisations such as RE100 or independently with corporates’ sustainability commitments and green strategy ■ An external indirect incentive, as a more global “low-carbon” market increasingly values the use of RE ■ Consumer and stakeholder pressure to reduce corporates’ carbon footprint and their scope 1, 2 and 3 emissions

Main drivers across regions

Countries	CPPA volume 2020 (GW) ¹	Electricity market design	Regulatory framework	Business environment	RE Competitiveness	Green incentives	Comments
 United States	 7.2	✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	Synthetic CPPA sourced in deregulated regional markets, providing bankability to sellers and hedging to buyers
 Nordics	 1.0	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	Liquid CPPA market driven by large tech companies and industrials highly influenced by market makers in a buyer's market
 Spain ²	 4.7	✓✓	✓✓	✓✓	✓✓✓	✓	A market that developed organically to allow developers to benefit from the fall in LCOE while raising project finance
 United Kingdom	 0.5	✓✓	✓✓	✓	✓✓	✓✓	Growth spearheaded by initial withdrawal of subsidies and uncertain now w/ regulatory changes
 France	 0.2	✓✓	✓✓	✓✓	✓	✓	Large base of credit-worthy corp. offtakers but limited number of unsubsidised RE projects
 Poland	 0.0	✓✓	✓✓	✓✓	✓✓	✓✓	An emerging market that combines many drivers both on the sell and buy-sides to grow quickly
 Netherlands	 0.0	✓✓	✓✓	✓✓	✓✓	✓✓	A flexible market dominated by subsidies but designed to grow alongside CPPAs
 Italy	 0.1	✓	✓✓	✓✓	✓✓	✓✓	A nascent market still constrained by market structure but with a high demand from corporates

Source: BNEF, La Plateforme Verte internal research

Notes: 1. Includes onshore wind, offshore wind and solar PV CPPAs; 2. Includes Total 3GW CPPA signed in 2020

The US, the leading CPPA market

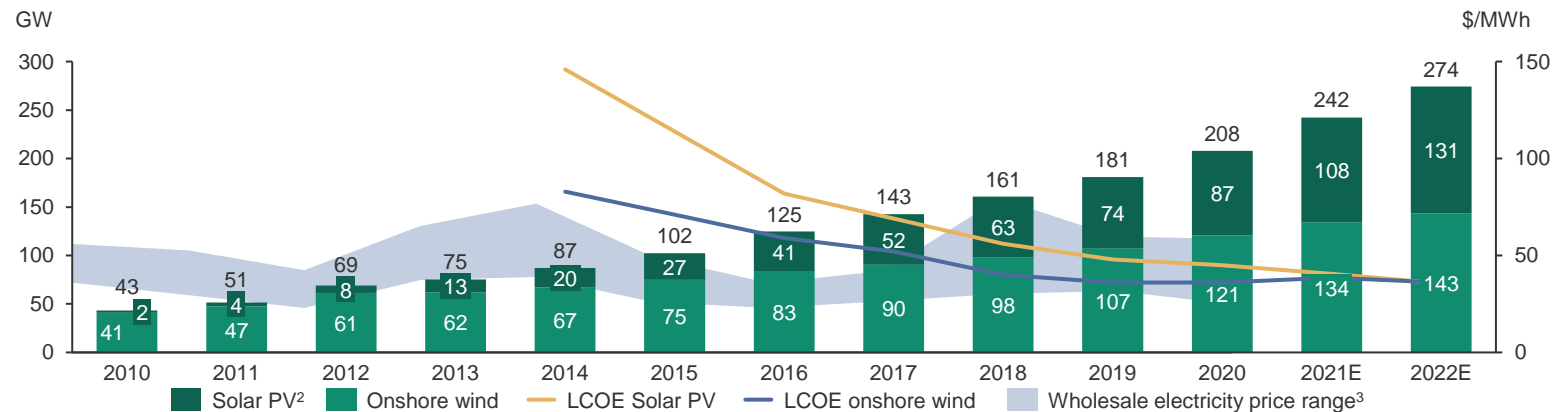
The US government support has been key to create a competitive RE sector...

Having developed a competitive RE sector early-on, the US have been able to lead the way on CPPAs

Today the US CPPA market is twice the size of all other CPPA markets in the world

- The growth of the RE sector in the US has initially been driven by government support, this has helped lower RE costs through tax and credit incentives, while at the same time encouraged utilities and corporates to buy RE
 - Such actions resulted in meaningful growth of solar and wind power production since 2005, allowing the sector to become more efficient and increasingly competitive with other more conventional energy sources in the second half of the 2010's
 - Battery storage and advances in technologies are likely to continue to lower RE costs going forward
- The LCOE of wind and solar PV in the US has dropped significantly over the years, and is now comparing favourably with average wholesale electricity price, as reflected below
 - LCOE of Solar PV (tracking & non-tracking) reached \$32-56/MWh and LCOE of onshore wind \$26-59/MWh
- Consequently, CPPA pricing has become increasingly competitive, especially in areas with strong wind resources (Texas, Oklahoma)

Evolution of installed capacity and LCOE of onshore wind and solar in the US



Sources: BNEF, EIA, EPA

Notes: 1. LCOE for fixed axis solar; 2. Includes utility, residential and commercial solar; 3. Minimum and maximum of yearly electricity prices across CAISO SP &NP, PJM West, Palo Verde, Nepal, Mid C Peak, Indiana and ERCOT;

...through financial credits and demand incentives, which always left room for CPPAs

The establishment of adequate support measures from the 1990's both on the supply side and the demand side has been instrumental in developing the CPPA market

- Since the 1990's the government has used a combination of tax-based and credit-based incentives to lower costs in the RE sector
 - Federal Production Tax Credit (“PTC”) providing a tax credit per kWh produced for the first 10 years of operation (mainly used by wind producers and currently being phased out to disappear in 2020-2022)
 - Investment Tax Credit (“ITC”)¹, providing tax credit equal to 30% of the total capital cost that can be taken in a single year and under the form of cash grants following the 1603 Cash Grants (mainly used by solar producers with a higher ratio of capex to production)
 - Credit based incentives in the form of loan guarantees through the Department of Energy (“DOE”), covering up to 80% of the overall debt for RE projects with a debt to equity ratio of less than 80/20
- On the demand side, the government introduced various policies to motivate buyers to buy RE especially since 2005:
 - State-imposed standards requiring electricity providers to increase the use of RE (Renewable Portfolio Standards – “RPS”)
 - Federal policies, mandates, and incentives enacted by the Energy Policy Act in 2005 and subsequent legislation
 - Executive Orders and Agency actions supporting the purchase of RE
- The government support policies have mostly been directed to lower the LCOE or boost corporate demand and in no case to guarantee a stream of revenues, as we have seen in some European countries and in France in particular
 - As such, these policies left room for CPPAs to optimise the revenue structures and provide support required by investors and lenders to reach bankability

Major policy milestones and changes– Tax incentives/ Targets/ RECs



Note: 1. Only projects that qualify to certain standards can benefit from the Investment Tax Credit
Source: BNEF, Federal Energy Regulatory Commission













Power intensive GAFAs were instrumental to kick off the CPPA market initially

The US was uniquely positioned to grow its CPPA market, being the home of large power-intensive technology companies and data centre owners

The market remains dominated by major industrial and retail corporates

- With RE projects becoming more competitive, CPPAs started to grow more substantially in the US, providing bankability support to power developers while offering long-term electricity contracts at attractive prices to buyers
- However, in view of the long CPPA tenors still required for power projects bankability in the early 2010's (20-25 year debt repayment to cover still high capex), only a limited number of corporates were able to support obligations and present creditworthiness in line with such long tenors
 - GAFAs have initially been the only CPPA buyers in the US and still account for 70% of CPPAs signed in 2015 in the US
- Since then, CPPA tenors have declined towards the 10-15 year range and new entrants have joined the market, including large industrial corporates, retail stores (more focused on solar with rooftop installations) as well as universities and hospitals. This is driven by costs savings and their increasing willingness to meet sustainability objectives

CPPAs by offtaker type in the US in 2020

Category	Total capacity signed in 2020 (GW)	Sample corporates
Tech		
Telecoms	 1,383.8	
Auto	 1,122.0	
Retail	 924.4	
Govt/Non profit ²	 837.1	
Other ¹	 2,070.4	

Source: BNEF

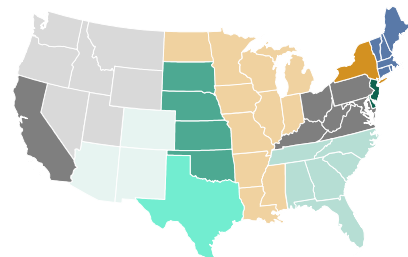
Note: 1. Includes states, municipalities and universities; 2. Includes Food and Beverage, financial services, healthcare, chemicals, aeronautics, and oil & gas;

CPPAs developed irregularly, influenced by regional market structures

The electricity market in the US is divided into regional markets with different levels of liberalisation, specific regulations and various grid zones

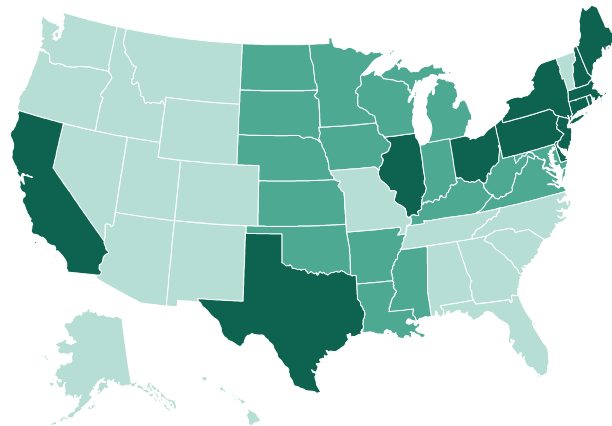
A majority of CPPAs are found in deregulated markets, with green tariffs developing elsewhere

- The US wholesale electricity market is a mix of seven regional markets including
 - Competitive deregulated markets (Northeast, Midwest, Texas, and California) run by independent system operators that allow independent power producers and non-utility generators to trade power
 - Other more regulated markets, whereby vertically-integrated utilities are responsible for the entire flow of electricity to consumers and typically own most RE projects
- Only deregulated markets allow for CPPAs, with most activity registered in CAISO, PJM and ERCOT
 - In many of the regulated markets, utilities have been developing alternative green tariffs for corporates to access green energy directly, but these are closer to utility PPAs than typical CPPAs
 - “Green tariffs” provide green electricity from specific RE projects through special utility tariff rates



Northwest	CAISO	Southwest	SPP	ERCOT	MISO	PJM	Southeast	NYISO	ISO-NE
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US regional markets¹



Physical PPA²	Projects must be located in	Synthetic PPA	Projects must be located in
	Facilities must be located in		Facilities must be located
			anywhere in the US

Sources: Federal Energy Regulatory Commission, EPA

Notes: 1. Regional markets according to FERC on Jun-20, approximate regions; 2. Physical PPAs include On-site and Sleeved PPAs

US regional markets

Main regional markets in the US include:

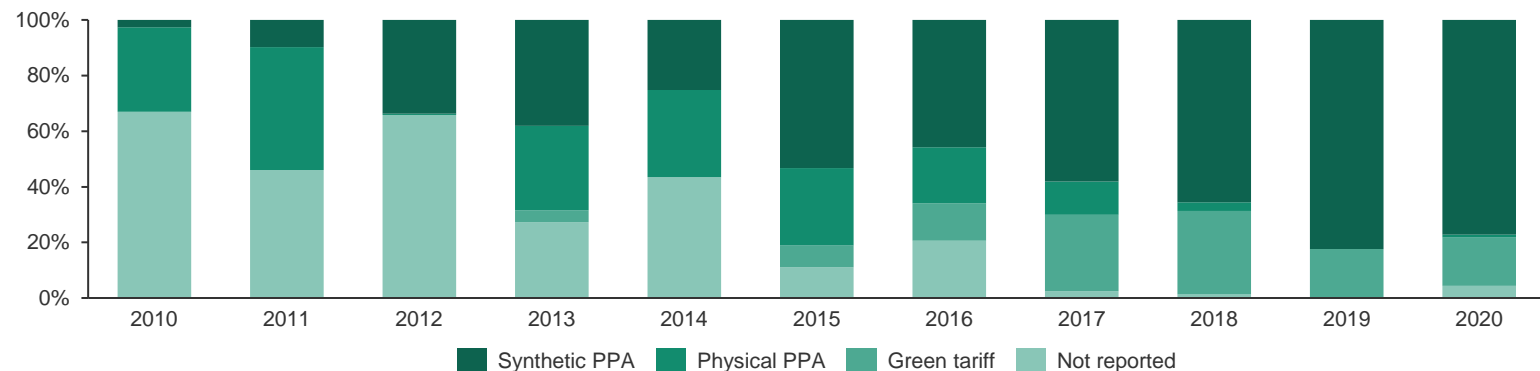
- **CAISO (California)**, where synthetic CPPAs are more common, as corporates are not able to enter into a “direct access PPA”
 - Developers are required to sell their electricity through CAISO where they must register as a “Participating Generator”
- **PJM (Northeast)**, where some states allow retail customers to purchase their electricity from a licensed provider but where we see increasing CfD, supported by a more liquid power trading market
- **ERCOT (Texas)**, where the direct sale of renewable electricity to corporates is allowed via a “retail electric provider” which manages the purchase and distribution of power to the corporate

Synthetic CPPAs dominate in the US and are expected to continue being favoured

With no derivative accounting under US GAAP, synthetic CPPAs have been the favoured CPPA structure in the US

- Synthetic CPPAs have become the preferred offtake type in the US mainly because they offer much more flexibility than sleeved CPPAs¹, without the detrimental accounting treatment imposed under IFRS
 - A CPPA can often be structured in a way that there is no reliable and determinable notional value, therefore derivative accounting can be avoided under US GAAP
- This flexibility addresses the challenges associated with the geographical size of the US and the disaggregated energy markets
 - Synthetic CPPAs are simpler as they function as a contract for difference / financial hedge, rather than two back-to-back contracts for the sale of power
 - Synthetic CPPAs are also easier to handle for non-electricity specialists, with no physical flow of electricity to manage
 - Major corporates (GAFA and tech companies, large retail stores, ..) which dominated the CPPA market have facilities located across the US and synthetic CPPAs allow buyers to meet needs in multiple regional markets and improve cost effectiveness
- Synthetic CPPAs in the US do not suffer from the negative perception experienced in Europe with respect to additionality

CPPAs by contract type in the US (2010 to 2020)



Source: BNEF

In parallel the pool of buyers is widening, driven by corporate sustainability targets

There is an increasing demand for green power from corporates and the CPPA market is becoming increasingly creative at overcoming credit and capacity matching issues to unlock its full potential

- The Biden administration has brought forward an ambitious plan for the US to become a global leader in clean energy, reversing Trump's measures by re-entering the Paris agreement and putting over \$400bn on clean energy over the next ten years to achieve 100% of RE into the energy mix by 2035
- This plays well into the wider market shift towards sustainability, which already started under the Trump administration despite its lack of support for green standards and renewables
 - An increasing number of US corporates have been pledging carbon reduction targets or signing the RE100 pledge to achieve 100% renewable electricity sourcing (e.g. Target, Bank of America, Bloomberg, Facebook)
 - A growing number of universities have also set RE targets with over 15 universities and colleges entering into CPPA agreements since the beginning of 2019
 - Corporates are also starting to impose RE targets on their suppliers driving up demand for CPPAs from small vendors
- Motivated by the increasing interest of all corporates to source RE, the US market has developed new products and sale structures to help smaller players access the CPPA market:

Aggregation of buyers

- ✓ Aggregated consortia of buyers, allowing SMEs to reach critical size and improve credit risk through diversification: the first multi-party PPA signed by MIT, Boston Medical Center, and the Post Office Square Redevelopment Corporation in 2016
- ✓ Community choice aggregation, whereby municipalities can procure power for residents and local businesses from green RE producers: very developed in California and NY

Credit risk enhancement

- ✓ Private insurance products for credit risk enhancement
- ✓ Retail sleeving, with utilities fronting a buyer to allow the RE producer to benefit from the utility credit worthiness

Production shaping

- ✓ Proxy revenue swap to smooth out delivery of volumes and increase level of certainty with weather-related fluctuations eliminated

Recent PPAs signed in the US

Year	Developer / Owner	Project(s)	Power Region	Offtaker	MW ¹	Technology	Term
2020	Apex Clean Energy	Apex Lincoln Land Wind Farm	MISO	Facebook	170	Onshore wind	n.a.
2020	CIP (50%), Tri Global Energy (50%)	Exus Bearkat Wind Farm Phase II	ERCOT	Digital Realty	89	Onshore wind	7.5
2020	Pattern Energy Group	Pattern Energy Phoenix PV Plant	ERCOT	Digital Realty	85	Solar PV	12
2020	Apex Clean Energy	Apex White Mesa Wind Farm	ERCOT	Applied Materials	50	Onshore wind	n.a.
2020	Geronimo Energy	Geronimo Prairie Wolf PV Plant	MISO	Cargill	260	Solar PV	n.a.
2020	Cypress Creek Renewables	Dominion Madison PV Plant	PJM	Northrop Grumman	81	Solar PV	n.a.
2020	Longroad Energy	Longroad Prospero 2 PV Plant	ERCOT	DaVita	166	Solar PV	15
2020	Longroad Energy	Longroad Prospero 2 PV Plant	ERCOT	Zimmer Biomet Holdings	166	Solar PV	15
2020	Silicon Ranch	Silicon Ranch Madison PV Plant	Southeast	Facebook	91	Solar PV	n.a.
2020	Origis Energy	Origis Energy Golden Triangle PV Plant	Southeast	General Motors	134	Solar PV	n.a.
2020	Community Energy	Community Energy Great Cove PV Plant Phase I	PJM	University of Pennsylvania	91	Solar PV	25
2020	Community Energy	Community Energy Great Cove PV Plant Phase II	PJM	University of Pennsylvania	195	Solar PV	25
2020	Origis Energy	Origis Rockhound C PV Plant	ERCOT	DSM	101	Solar PV	n.a.
2020	Not Reported	Amazon Ohio PV Plant	MISO	Amazon	260	Solar PV	n.a.
2020	Not Reported	Amazon Ohio 2 PV Plant	MISO	Amazon	104	Solar PV	n.a.
2020	rPlus Energies	rPlus Energies Graphite Solar PV Plant	Southwest	Facebook	104	Solar PV	n.a.
2020	D.E. Shaw Renewable Investments	Rocket PV Plant	Southwest	Facebook	104	Solar PV	n.a.
2020	D.E. Shaw Renewable Investments	Horseshoe PV Plant	Southwest	Facebook	98	Solar PV	n.a.
2020	ibV Energy Partners	LG&E and KU Kentucky PV Plant	Southeast	Dow Chemical	33	Solar PV	n.a.
2020	ibV Energy Partners	LG&E and KU Kentucky PV Plant	Southeast	Toyota Motor	55	Solar PV	n.a.
2020	Not Reported	Amazon Virginia 2 PV Plant	PJM	Amazon	85	Solar PV	n.a.
2020	Clearway Energy	Clearway & Boston Scientific Massachusetts PV Plant	New England	Boston Scientific	55	Solar PV	20
2020	Clearway Energy	Clearway & Verizon Texas PV Plant Phase I	ERCOT	Verizon	165	Solar PV	n.a.
2020	Clearway Energy	Clearway & Verizon Texas PV Plant Phase II	ERCOT	Verizon	165	Solar PV	n.a.
2020	DTE Energy	DTE & GM Michigan PV Portfolio	MISO	General Motors	429	Solar PV	n.a.
2020	First Solar	First Solar Horizon PV Plant	ERCOT	Dow Chemical	195	Solar PV	15
2020	174 Power Global	Gerdau PV Plant	ERCOT	Gerdau	104	Solar PV	20
2020	Lendlease	Gaicho PV Plant	PJM	University of Pittsburgh	26	Solar PV	20
2020	Sol Systems	Sol Systems Microsoft PV Portfolio	Various	Microsoft	650	Solar PV	n.a.
2020	Brookfield Renewable Partners	Brookfield New York Wind Farm Repowered Phase I	New York	Verizon	80	Onshore wind	12
2020	Brookfield Renewable Partners	Brookfield New York Wind Farm Repowered Phase II	New York	Verizon	80	Onshore wind	12
2020	First Solar	First Solar Verizon PJM PV Plant Phase I	PJM	Verizon	192	Solar PV	15
2020	First Solar	First Solar Verizon PJM PV Plant Phase II	PJM	Verizon	192	Solar PV	15
2020	Pine Gate Renewables	Pine Gate North Carolina PV Portfolio	PJM	Duke University	131	Solar PV	n.a.
2020	Candela Renewables	Candela Google PV Plant	ERCOT	Google	182	Solar PV	n.a.
2020	Lightsource Renewable Energy	Elm Branch PV Plant	ERCOT	L3Harris Technologies	130	Solar PV	n.a.

Note: 1. Gross MW

CPPA trends and markets in Europe

CPPAs have surged in Europe in the few last years...

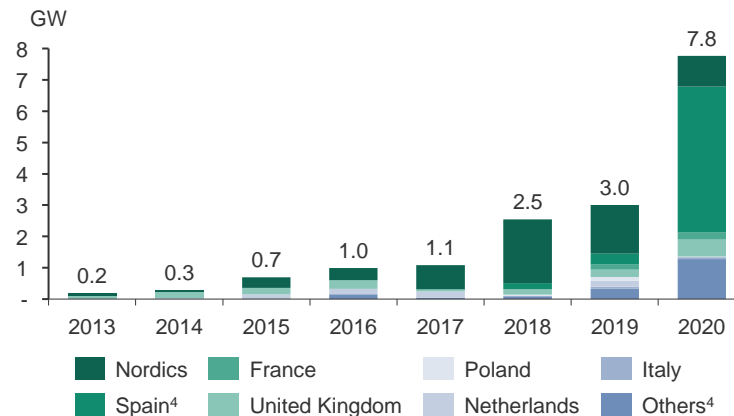
Sweden and Norway have led the way in Europe, followed by Spain and the UK

Europe has supported the CPPA growth with the implementation of the RED II

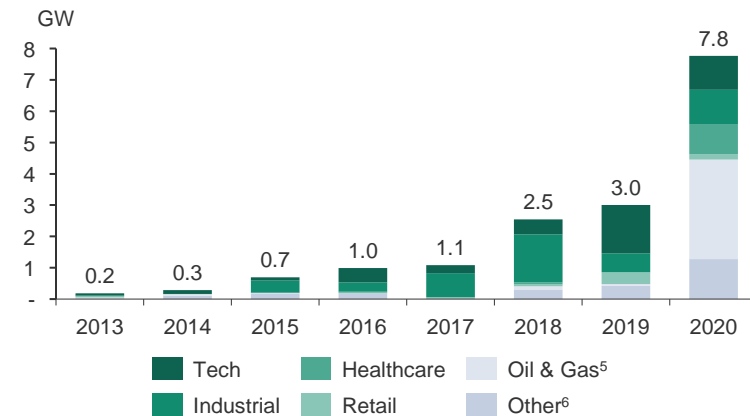
Most active markets have been those removing regulatory support early

- The European CPPA market has significantly grown over the past 3 years, mostly led by Spain and the Nordics¹
 - Depending on electricity market structures, regulatory systems, support regimes and the industrial landscape, CPPA markets have developed differently across jurisdictions
- The European CPPA market is expected to grow and expand in new countries supported by the Renewable Energy Directive (RED II) . Adopted at the end of 2018, RED II has set a binding EU-wide 32% RE target for 2030 and established a supportive framework for CPPAs with certain obligations and guidelines for members states :
 - removing unnecessary regulatory and administrative barriers for CPPAs by June 2021
 - recognising GoOs issued by other member states
 - allowing issuance and transfer of GoOs directly to corporates under a CPPA even if the supplier benefits from a support scheme

CPPA by country^{2,3}



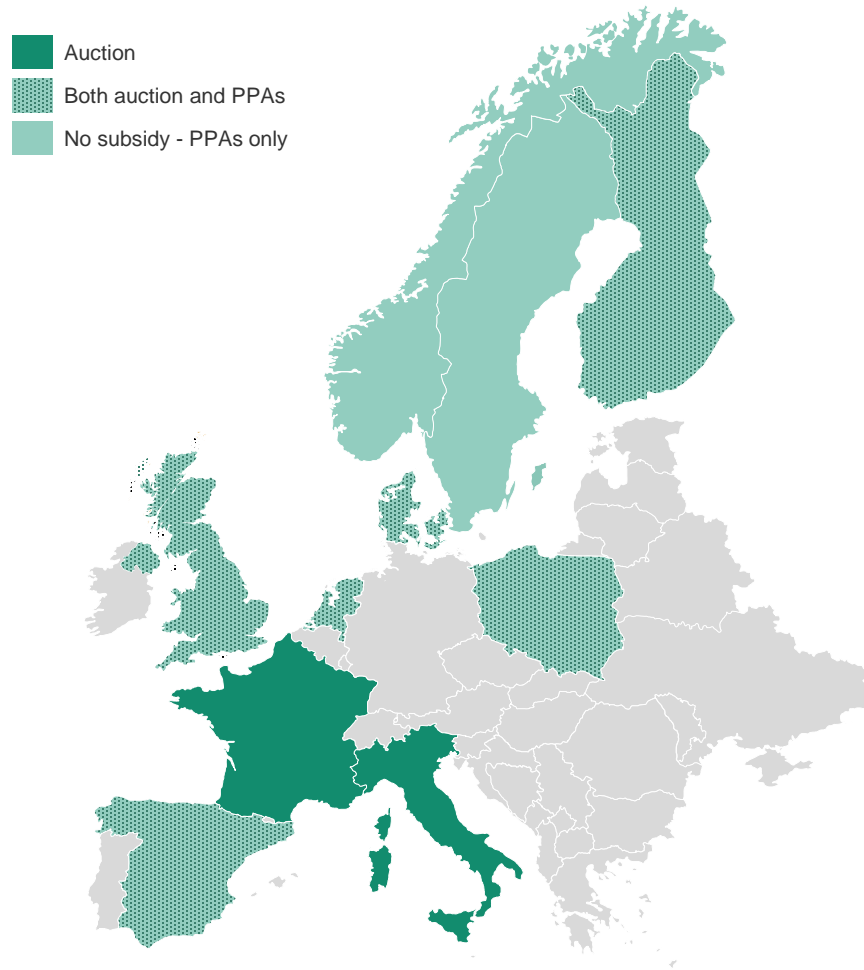
CPPA by type of counterparty^{2,3}



Sources: BNEF; News reports, La Plateforme Verte internal research

Notes: 1. Norway, Sweden, Finland; 2. Limited to no data for utility PPAs prior to 2018; 3. Includes long-term Solar PV, Onshore wind and Offshore Wind; 4. Includes 700MW of offshore wind CPPA signed in Belgium and Germany; 5. Includes Total 3GW CPPA signed in 2020; 6. Includes Retail, Transportation, Food & Beverages, Financial, Automobile, Utilities, Universities and Cities

...with most active markets being ex- or low-subsidies jurisdictions



Indicative offtake options and tenors		
Country	Tariff or PPA	Tenor
Denmark	Auction (Premium)	20years
	PPA	10-15 years
Finland	Auction (Premium)	12 years
	PPA	10-15 years
France	Auction (CfD)	20 years
Italy	Auction (CfD)	20 years
Netherlands ²	Auction (CfD)	15 years
	PPA	15 years
Norway	Certificates PPA & GoOs	10-15 years
Poland	Auction (CfD)	15 years
	PPA	10 years
Spain	Auction (IRR based CfD)	25 years
	PPA or Hedging with floating floor	5-15 years
		3-5 years
Sweden	Certificates	10-15 years
	PPA	
UK ⁴	Auction (CfD)	15 years
	PPA	10 years

Sources: BNEF, News articles

Notes: 1. Reflects main off-take solution in each market. Terms are indicative and as of H2-2020; 3. A majority of all capacity in the latest auction was awarded to onshore wind; 4. UK Govt. will re-introduce the CfD auction for onshore wind and solar PV assets in late 2021;

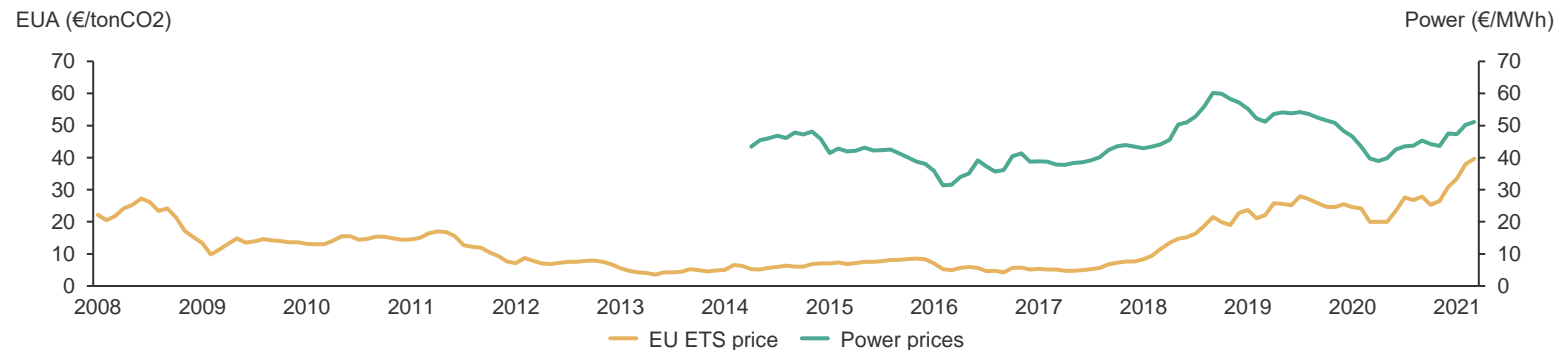
Upward trend in EU carbon price is likely to further attractiveness of CPPAs

The EUA price has risen sharply since 2018 increasing wholesale power prices and RE competitiveness

Consensus is that EUA price will continue to rise in the medium to long term which is expected to further improve the economics of CPPAs and their use as a long term hedge solution

- Since its implementation in 2008, the EU Emission Trading Scheme (ETS) has been largely adjusted with increasing influence and efficiency since 2018
 - Today the EU ETS is the biggest carbon market worldwide that works as a cap and trade system¹, with corporates receiving emission allowances and selling their surplus on a secondary market
 - Following oversupply of emission allowances resulting in carbon prices dropping to below €10/tCO₂ in the 2010's, the ETS has been adjusted to gain in efficiency and a market stability reserve has been implemented to remove allowances from the market in case of oversupply
 - As result, EUA price increased from 7€/tCo₂ (2014) to €30/tCO₂ (2020), representing an extra cost of c.27 euros/MWh for coal-fired power plant, and c.13 euros/MWh to combined-cycle gas plant
- The EUA price has increased sharply since the start of the pandemic as investors believed in policymakers ability to control the supply of allowance though various instruments including the market stability reserve
 - Consensus among market players is that the EUA price will continue to increase in the medium to long term and continue to drive power prices up generally
 - At the moment, EUA market is benefitting form this market sentiment with counterparties looking to hedge against carbon rising costs in the current market

Evolution of the EUA price and power prices



Source: BNEF, EU commission, Bloomberg

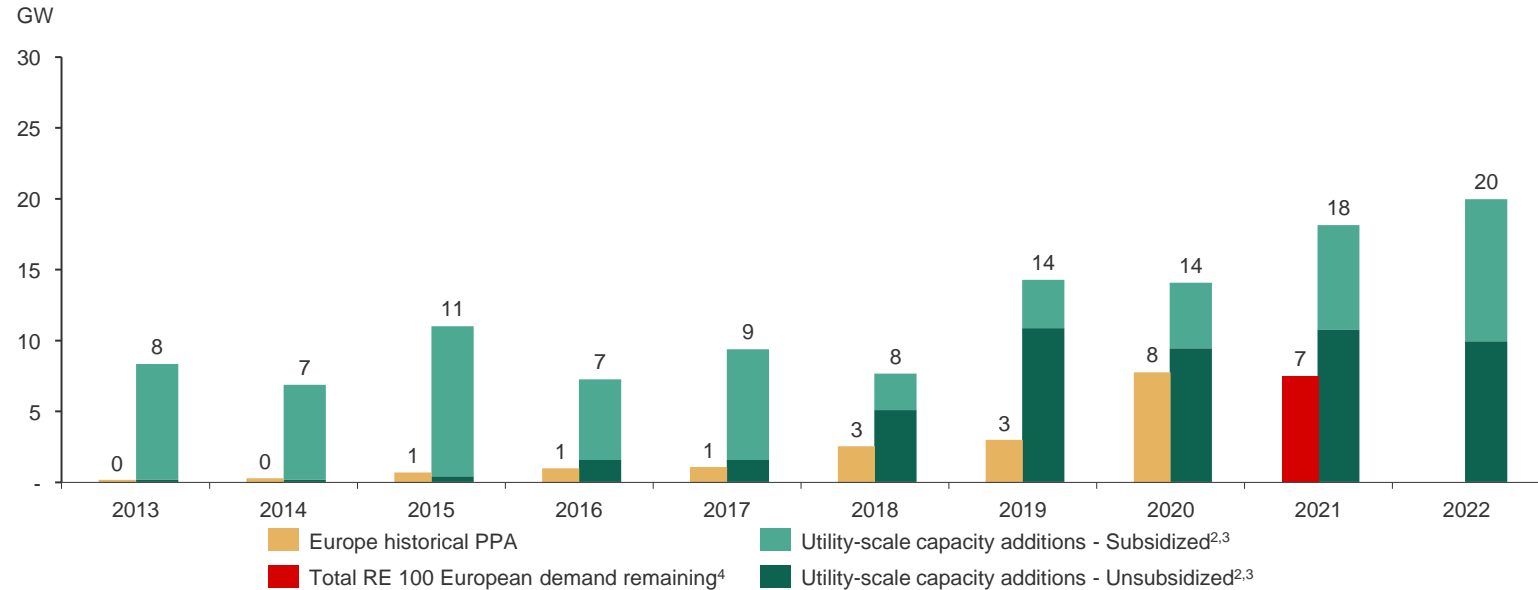
Notes : 1. Regulator set a cap yearly on the total number of EUAs which are distributed and auctioned among participants which then trade EUAs between themselves

CPPA growth has been strong but will be insufficient to meet demand

The trend in CPPA growth should not obscure the coming shortage of offtakers, making it a buyer's market

Utilities play and will continue to play a significant role in the market, filling part of the shortage

PPA volume compared to annual additions of wind and PV¹



- PPA volumes will continue to grow, but not at the rate required to meet total RE buildout outside of tariff markets
 - There is insufficient demand from RE100 companies to meet Europe's RE objectives
 - Furthermore, the majority of RE100 companies have traditionally sourced their RE energy through green certificates⁴ suggesting that only a portion of the 11.4GW targeted will support the development of new unsubsidised plants
- To ensure CPPA supply meets demand, new corporates in addition to the signatories of the RE100 need to enter the market and CPPAs need to become the privileged solution for corporates
 - This may require the development of new products and alternative structures such as aggregated CPPA

Sources: BNEF; La Plateforme Verte internal research; News articles; RE100 Annual Report 2020

Notes: 1. Across France, the UK, Poland, Italy, the Netherlands and the Nordics; 2. Includes solar, onshore and offshore wind; 3. Figures approximate estimates based on RE auction policies; 4. Assuming a 30% average CF for RE installations; 4. More than ¼ of RE certificates received so far by RE100 companies came from certificates purchases

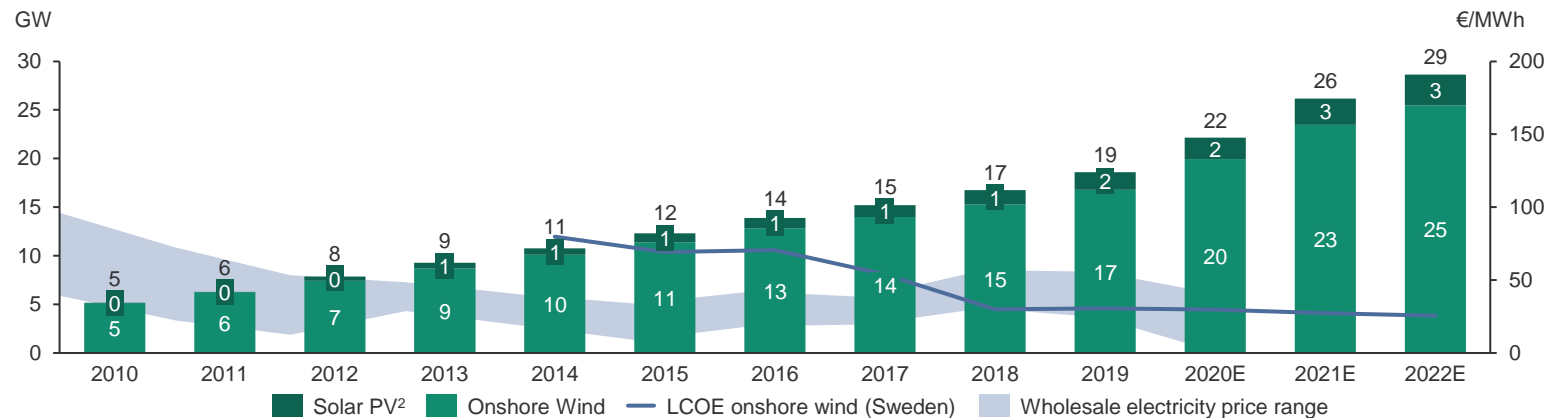
The Nordics, the leading market in Europe

A very active region supported by the right RE supply, market structure and buyers

The Nordics have been the CPPA pioneer in Europe, supported by strong RE capacity and low electricity prices combined with an established pool of corporate buyers with large energy needs

- The Nordics' renewables market has been the fastest growing RE market in Europe with ample capacity added each year and a rapidly decreasing LCOE
 - The region benefits from plenty of available land and attractive wind resource allowing it to build a competitive wind sector
 - The construction of large-scale projects has driven down the LCOE and allowed for attractive CPPA prices
 - Nordic electricity production is now two-thirds renewable, mainly due to the large amount of hydropower in Norway, and Sweden, but also due to growing sources of other renewables, with onshore wind leading the way
- In parallel, the integrated Nord pool electricity market has allowed liquidity in the electricity market
 - Denmark, Norway, Sweden and Finland share a transmission grid and their energy is traded on Nord Pool¹, the world's largest power market with c.500TWh of electricity traded
 - The integration in the Nord Pool market and the high share of Hydropower with zero marginal cost have contributed to lower power prices in the region, and to create a large base of credit-worthy energy-intensive consumers

Evolution of installed capacity and LCOE of onshore wind and solar in the Nordics



Sources: BNEF, Bird & Bird, Nord pool Group

Notes: 1. Operates power trading markets in Norway, Sweden, Finland, Estonia, Latvia, Lithuania, Germany, the Netherlands, Belgium, Austria, Luxembourg, France and the UK; 2. Includes utility, residential and commercial solar; 3. Minimum and maximum of monthly wholesale prices across the different Nord pool market areas;


Markets with strong demand developing at a different pace based on Gvt policy

Respective countries' government policies leads to the CPPA market evolving differently in each

- The combination of ample RE capacity and volatile electricity prices has motivated buyers to enter into CPPAs. With a well-developed network of energy-intensive industries, the Nordics have had significant demand for CPPAs
 - Large heavy industrial companies including aluminium, paper, chemicals and automotive manufacturers with large power consumption and increasing clean energy targets have used PPAs to decrease their price risk
 - Tech giants have also selected the Nordics to set up their data centres for the proximity to Europe, political stability and cooler weather, in addition to comparatively lower regional power prices
 - Buyers have benefited from a snowball effect, learning from the first European PPAs struck in the Nordics
- Depending on the regulatory environment, CPPA markets have developed at different speeds across the Nordics
 - Sweden and Norway have led the way, benefitting from government support schemes which left developers still exposed to market-based electricity price risks, making CPPAs a requirement to achieve bankability

 Sweden & Norway 

- ✓ In 2003, Sweden has put in place a green certificate scheme, which Norway joined in 2012
- ✓ Due to an oversupply of green certificates, its trading price has collapsed leaving generators exposed to merchant risk
- ✓ Since lenders require part of the electricity price to be hedged, CPPA demand has been growing
- ✓ Both Norway and Sweden will be exiting this scheme by 2021
- ✓ Norway is also providing credit guarantee on behalf Norwegian offtakers in certain sectors

Denmark 

- ✓ Dynamic energy policy for renewables with no further legislative framework in place for subsidies
- ✓ Although CPPAs are known in Denmark, Danish backed CPPAs have only been struck abroad (with Danish developers or sponsors)
- ✓ This reflects the open and internationally-integrated nature of Denmark's overall economy
- ✓ First PPA in 2018: Vattenfall supplying electricity to Novozymes and Novo Nordisk, from Kriegers Flak offshore wind farm

Finland 

- ✓ In 2017, the Finnish government introduced new legislation to support RE projects through competitive auctions, replacing the old FiT support scheme
- ✓ With awarded capacity limited to only 2TWh from 2018 to 2020, this quota was used up rapidly
- ✓ Combined with relatively tight wholesale electricity prices, this establishes an incentive for developers to turn to corporates to secure PPAs and lock-in financing

Overall a market set for continuous growth with increasing power from buyers

Long-term CPPAs signed by digital platforms to power their data centres dominate the sector

Pricing has been increasingly competitive in a buyer's market

- The first CPPA was struck in 2007 and significant volumes appeared in 2015
 - Initially CPPAs had a 5-to-10 years duration, shorter compared to CPPA durations seen in the current market
- Over 3GW of PPAs were signed between 2018 and 2020, of which over 90% have been for onshore wind projects
 - In recent years, CPPA terms have been extended to 10-15 years as large credit-worthy industrial corporates, including mining and metals groups and GAFAs requiring energy for data centres, looked to secure electricity from green sources
 - In 2017, Nork Hydro and the Markbygden wind farm entered into a 29-year CPPA, breaking the record as one of the largest wind CPPAs
 - While “as produced” contracts in excess of 12 years have been a standard in the market, baseload contracts for 60-70% of production with tenors below ten years are becoming more common
 - More recently since the market drop post-Covid, we have also seen an increasing number of utilities and market makers willing to push tenors from their traditional 5-7 year range and offer up to 10-year tenors, motivated by the higher volatility found in the market
 - There is still a good number of sellers willing to enter PPAs but corporate buyers are starting to face constraints on volume and structure, increasing buyers' power of negotiation and leading to a slowdown of the market in recent years
- On the investors and lenders side, players have been supporting the growth of CPPAs
 - Nordic banks have been providing flexible terms to PPA-backed projects and financing both baseload and as produced CPPA projects
- CPPA drivers remain strong in the Nordics supported by decreasing subsidies and increasing power price expectations, but growth prospects for CPPAs will very much depends on the consolidation of the offtaker base
 - While many large existing offtakers have reached some volume limits, new data centres and the increasing number of buyers setting green targets could drive a rebound of the CPPAs market
 - Sweden and Norway are expected to continue to lead the growth of the onshore wind sector in Europe, providing ample opportunities for new CPPAs

Recent PPAs signed in the Nordics

Year	Owner	Project(s)	Country	Offtaker	Sector	MW	Technology	Tenor
2020	Infranode & Alight	Infranode & Alight	Sweden	Martin & Servera Group	Food & Beverage	18	Solar PV	15
2020	Neoen (80%), Prokon Finland (20%)	European Energy	Finland	Heineken, Philips, Signify and Nouryon	Tech	126	Onshore wind	10
2020	Enlight Energy and Prime Capital	Bjornberget	Sweden	Microsoft	Tech	180	Onshore wind	10-12
2020	Glennmont Partners	Piiparinmaki project	Finland	Google	Tech		Onshore wind	n.a.
2020	European Energy	Asset	Denmark	Large international company	n.a.	50	Solar PV	n.a.
2020	Brattmyrliden Wind ¹	Brattmyrliden project	Sweden	Ball Corporation	Industrial	52	Onshore wind	10
2020	Ilmatar Energy ²	A tranche of Ilmatar Finnish	Finland	Neste, Borealis	Industrial	50	Onshore wind	10
2020	WDP	n.a.	Finland	K Group	Retail	15	Onshore wind	15
2020	Better Energy	2 PV plants	Denmark	Chr. Hansen	Industrial	50	Solar PV	10
2020	Agder Energi	Agder Energi 's portfolio	Sweden	Boliden	Industrial	n.a.	Onshore wind	15
2020	Statkraft	Fosen Vind complex	Finland	Kemira	Industrial	n.a.	Onshore wind	10
2020	WPD AG	Karhunnevangas	Finland	UPM Kymmene	Industrial	192	Onshore wind	n.a.
2020	n.a.	Metsälamminkangas	Finland	Lundin Petroleum	Oil & Gas	132	Onshore wind	n.a.
2020	GIG	Tysvær and Buheii	Norway	Eramet (through Axpo)	Industrial	116	Onshore wind	n.a.
2019	BP	Västernorrland	Sweden	Amazon	Tech	122	Onshore wind	n.a.
2019	Siemens Financial Services, Nordrheinische Arzteversorgung, consortium of Korean investors	Stavro	Sweden	Google (Alphabet)	Tech	154	Onshore wind	10
2019	Siemens Financial Services, Nordrheinische Arzteversorgung, consortium of Korean investors	Stavro	Sweden	Holmen	Industrial	100	Onshore wind	10
2019	Fortum	Kalax	Finland	Neste	Industrial	63	Onshore wind	12
2019	n.a.	n.a.	Finland	Google	Tech	107	Onshore wind	n.a.
2019	GE Renewable Energy	Björkvattnet Cypress	Sweden	Google	Tech	175	Onshore wind	n.a.
2019	Neoen (80%), Prokon Finland (20%)	Mutkalampi	Finland	Google	Tech	130	Onshore wind	n.a.
2019	Better Energy	Three	Denmark	Google	Tech	100	Solar PV	n.a.
2019	WdP	Aldermyrberget	Sweden	Big industrial group	Industrial	72	Onshore wind	n.a.
2019	Statkraft	Alcoa Norway plant	Norway	Alcoa	Industrial	152	Onshore wind	7
2019	Eolus Vind	Backhammar	Sweden	Amazon	Retail	91	Onshore wind	10
2019	European Energy	Apple Denmark plant	Denmark	Apple	Tech	42	Solar PV	
2018	Vattenfall	Elkem Vattenfall Norway plant	Norway	Elkem	Industrial	30	Offshore wind	7
2018	Green Investment Group	Overturingen	Sweden	Norsk Hydro	Industrial	106	Onshore wind	10
2018	Vestas Wind Systems (40%), Vattenfall (30%), Pensionskassernes Administration (30%)	Fabodberget Farm	Sweden	Norsk Hydro	Industrial	143	Onshore wind	10
2018	Engie	Tonstad	Norway	Norsk Hydro	Industrial	208	Onshore wind	25
2018	SUSI Partners	n.a.	Sweden	Hydro Energi	Industrial	208	Onshore wind	
2018	BlackRock	Guleslettene	Norway	Alcoa	Industrial	197	Onshore wind	15

Notes: 1. Falck Renewables subsidiary; 2. JV between Ilmatar Windpower and Omnes Capital

The UK, an evolving market due to regulatory changes

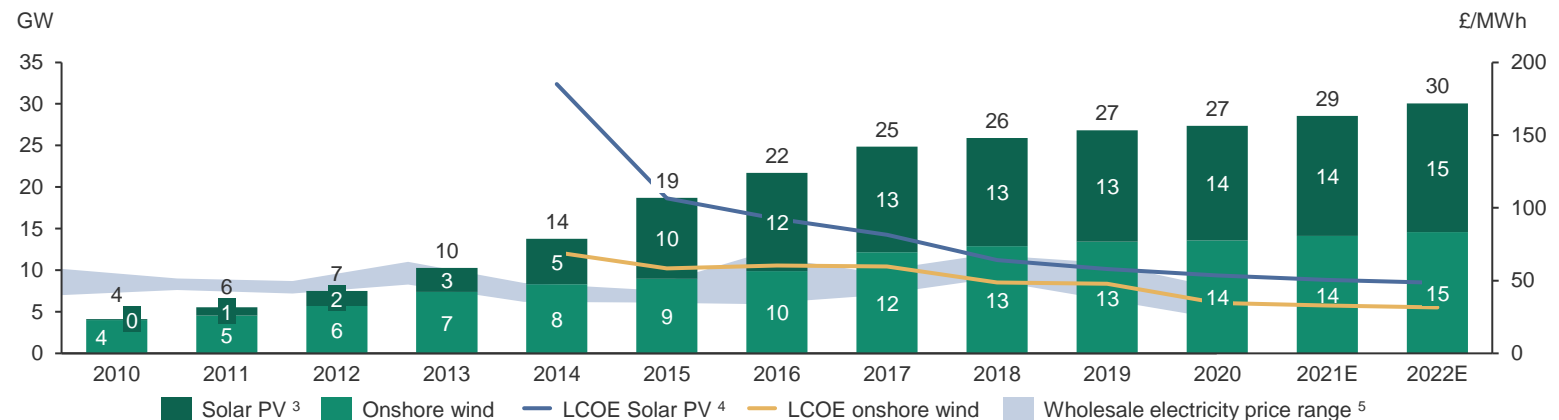
An island economy and a small pool of large credit-worthy offtakers

While project LCOEs have fallen in the UK, they remain high relative to other European countries

There is a limited pool of large credit-worthy offtakers in the UK

- The UK's RE market has been fast growing, largely sustained by the development of its offshore wind sector but the LCOE for RE projects in the UK remains high compared to neighbouring countries
 - Limited space for the development of new projects and a complex and slow permitting structure greatly increase development costs¹
- Despite high LCOEs, UK corporates have been actively looking at CPPAs as UK power prices are among the highest in Europe
 - The UK power mix is largely dominated by coal and gas with high marginal costs
 - With only 3GWs of interconnectors with mainland Europe representing 6.5% of its peak demand, the UK power market has remained independent from its neighbouring countries resulting in slightly higher power prices
- With a largely service-oriented economy, the UK has a limited number of large credit-worthy industrial players. Increasing number of corporates have announced plans to procure their energy from renewable sources driving some demand for CPPAs
 - A number of companies such as Unilever, Tesco, M&S, BT and Virgin Media are now RE100 signatories

Evolution of installed capacity and LCOE of onshore wind and solar in the UK



Source: BNEF, OFGEM

Notes: 1. Many permitted projects are no longer viable as permits were based on expensive and obsolete technologies; 2. As calculated by BNEF; 3. Includes utility, residential and commercial solar; 4. LCOE for fixed axis solar; 5. Minimum and maximum monthly wholesale electricity prices;

A sophisticated CPPA market driven by government policy and rising price forecasts

An established CPPA market whose growth was accelerated by the UK government's decision to stop subsidising onshore utility scale RE projects in 2017

- One of Europe's first CPPAs was signed in the UK in 2008 by the retailer Sainsbury's with a 6MW onshore wind farm in Scotland¹
- The growth of the UK's CPPA market was accelerated following the government's initial decision to withdraw subsidies for utility scale onshore wind and solar PV projects
 - The last auction for onshore wind and PV projects took place in 2015
 - With no secured revenues, developers sought CPPAs to raise project finance
 - CPPA volumes increased, reaching ~600MW in 2019 and became increasingly competitive, with certain CPPAs signed at £40/MWh
 - Over 180MW of solar PV projects were brought online in the UK between 2018 and 2019 through CPPAs
- While more corporates were willing to enter into PPAs, there was still not enough demand to meet the supply of projects, leaving negotiating power in the hands of the buyers
- Corporates adopted more sophisticated PPA structures, leaving the majority of pricing and production risk to the developers
 - Baseload PPAs preferred to as-produced PPAs
 - Shorter tenors

UK's regulatory framework

- ✓ The UK government removed all subsidies for utility scale onshore wind and solar PV projects in Mar-17
 - ✓ Utility-scale projects were previously subsidised through Renewable Obligation Certificates (ROCs) whereby they received a premium to the wholesale market price through the sale of their certificates
 - ✓ Or were successful bidders in the UK's first CfD auction held in Feb-16
- ✓ To ensure that it meets its RE targets, the UK government announced that it will re-introduce the CfD for utility scale onshore wind and solar PV projects in the 2021 auction
 - ✓ Awarded projects will receive support for 15 years
 - ✓ Auctions prices are expected to clear at very competitive levels, close to prices of the last remote island CfD (£39.7- £41.6/MWh)
 - ✓ Developers will need to source alternative revenue streams to ensure the profitability of their projects

Sources: Companies' press release, BNEF, Bird & Bird
Note: 1. As per company press release;

UK may lack drivers to maintain CPPA growth

With the Government planning to reintroduce CfD, depressed post-Covid power prices and a variety of less conventional investment models, CPPA remains only an option amongst others for developers and need to benefit from obvious economic advantages

- With the CPPA market volumes remaining well below RE project supply, alternative investment models have developed in the UK with sophisticated investors and lenders having successfully adjusted to less conventional projects structures
 - Developers have been sourcing multiple revenue streams for their projects, combining CPPAs with shorter tenor market hedging to secure some minimum level of revenues
 - Banks have been supportive and provided long-term financing against these less conventional structures, adopting a panel of risk mitigations measures such as cash sweep mechanisms and mini-perms
 - Certain projects are also now developing on a fully merchant basis benefitting from a more sustained price environment than the rest of Europe and from sophisticated investors able to bear price risk and progress on an unlevered basis
- Notwithstanding the above, CPPAs remain an attractive route for buyers seeking to lower energy costs and new structures are starting to emerge in the UK to help a wider pool of offtakers access that market at competitive terms
 - Some smaller counterparts are aggregating to offer sufficient scale and increase bargaining power
 - In 2019, twenty universities signed a stacked PPA with Statkraft to source 10 years green energy in a single transaction
 - A “mini-utility” model has also been seen where power producers themselves set up an affiliated mini supply company which acts as the main balancing party and offers access to RE power to smaller counterparts
 - Octopus investments has pushed the model to its maximum and has set up its own licensed supply company offering a range of 100% renewable tariffs to businesses and domestic customers
- These alternative structures should not negate the fact that an important share of the RE in the UK is and is expected to still be procured through utility PPA
- Since 2020, CPPA market growth has slowed down importantly due to both the Government announcement to reintroduce CfD but also the negative impact of COVID-19 on current and forecasted power prices
 - Consultants shifted their views on power prices which are now expected to face structural decline until 2030, mainly due to large number of RE assets with zero marginal costs expected to come online and replace coal power plants
 - The further reduction of power prices curves post Covid-19 has removed the economic incentives for corporates in the UK to enter into CPPAs
 - Many corporates that entered into PPAs in 2018 and 2019 are now losing money as both power requirement and power prices have fallen

Sources: Inspiratia, BNEF, Bird & Bird

Recent PPAs signed in the UK

Year	Owner	Project(s)	Offtaker	Sector	MW	Technology	Tenor
2020	Lightsource BP	n.a.	EY	Financial	12	Solar PV	10
2020	BP	n.a.	Amazon	Tech	122	Onshore wind	n.a.
2020	BP	n.a.	Amazon	Tech	129	Onshore wind	n.a.
2020	Volitalia	South Farm	City of London	Other	50	Solar PV	15
2020	Low Carbon	n.a.	Tesco	Retail	100	Solar PV	n.a.
2020	Engie	n.a.	John Lewis	Retail	n.a.	Solar PV	n.a.
2020	BayWa	Inverclyde	Tesco	Retail	24	Onshore wind	15
2020	Orsted	Race Bank	Nestle	Food & Beverage	31	Offshore wind	15
2020	NextEnergy Capital among other investors	Headquarters solar rooftop in Banbury	Karcher	Other	n.a.	Solar PV	25
2020	Vattenfall	UK portfolio	AG Barr	Food & Beverage	10	Onshore wind	10
2019	BP Lightsource	1 Solar plant	Ibstock Brick	Industrial	5	Solar PV	25
2019	EDF Renewables	15,000 UK rooftop solar panels	Tesco	Retail	5	Solar PV	20
2019	EDF Renewables	Burnfoot East	Tesco	Retail	11	Onshore wind	n.a.
2019	EDF Renewables	Unnamed	Tesco	Retail	54	Onshore wind	n.a.
2019	Scottish Power	Kintyre	Amazon	Retail	50	Onshore wind	n.a.
2019	Drax	Selby	Ford	Industrial	n.a.	Biomass & Waste	n.a.
2019	Statkraft	Statkraft's operating portfolio in Scotland and Wales	20 Universities across UK	Other	10	Onshore wind	10
2019	Cleanearth Energy	Accolade Wine Avonmouth	Accolade Wines	Food & Beverage	3	Onshore wind	n.a.
2019	Orsted	n.a.	Bristol Airport	Transportation	n.a.	Offshore wind	n.a.
2018	Not Reported	Amazon fulfilment centres	Amazon	Retail	40	Solar PV	n.a.
2018	Lightsource Renewable Energy	AB InBev Lightsource plants	Anheuser-Busch InBev	Food & Beverage	100	Solar PV	n.a.
2018	Lightsource Renewable Energy	Lightsource Gibson	Brett Martin	Industrial	6	Solar PV	n.a.
2017	Ren Energy	Ren Energy Norwich	Briar Chemicals	Industrial	1	Solar PV	n.a.
2016	Lightsource Renewable Energy	Lightsource Crookedstone	Belfast International Airport	Transportation	5	Solar PV	n.a.
2015	Capital Stage	Evesham	BT Group	Telecommunication	2	Solar PV	n.a.
2015	Capital Stage	Capital Stage Bedfordshire	BT Group	Telecommunication	3	Solar PV	n.a.
2015	Capital Stage	Capital Stage Hall England	BT Group	Telecommunication	3	Solar PV	n.a.
2015	Capital Stage	Capital Stage Sowerby	BT Group	Telecommunication	3	Solar PV	n.a.
2015	Capital Stage	Capital Stage Tonedale	BT Group	Telecommunication	3	Solar PV	n.a.
2015	Capital Stage	Trewidland	BT Group	Telecommunication	3	Solar PV	n.a.
2014	Banks Renewables	Banks Renewables Heysham South	BT Group	Telecommunication	8	Onshore wind	n.a.
2013	Octopus Investments	Octopus Bentley	Bentley Motors	Automobile	5	Solar PV	n.a.
2012	Lightsource Renewable Energy	Lightsource Waterbeach	AmeyCespa	Industrial	3	Solar PV	n.a.
2012	Lightsource Renewable Energy	Lightsource Waterbeach	AmeyCespa	Industrial	3	Solar PV	n.a.

Spain, a growing market supported by recent regulatory stability

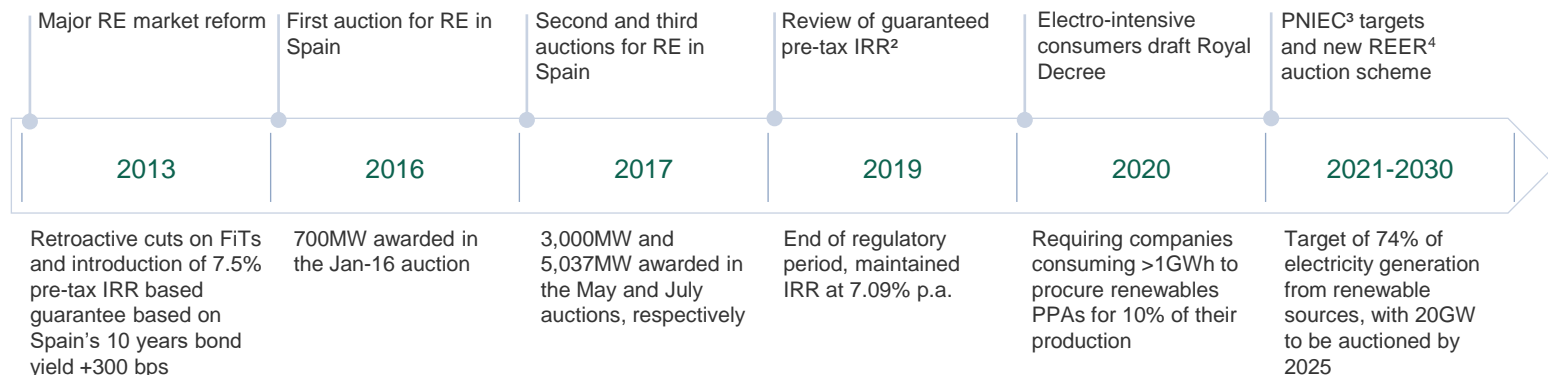
Controversial Spanish regulatory framework

Spain's RE market has collapsed in 2013 following retroactive cuts from the government

New auctions held in 2016-17 have brought back certainty in the Spanish market

- The development of the RE market in Spain was initiated by the introduction of a substantial generation-based subsidy in 2004
 - The sector experienced high growth with Spain becoming one of the largest PV installers globally
 - Given the generous state subsidy, project owners did not require PPAs to secure long term financing
- However, following the 2008 financial crisis, the cost of maintaining the subsidy scheme proved unsustainable for the state
 - In 2012 and 2013, the Spanish state reversed its RE policy and through a series of decrees, eliminated economic incentives for greenfield RE installations
 - Uncertainty due to the retroactive tariff cuts led to a complete collapse of the Spanish renewables market until 2016-17 when the first auctions under the new IRR based regime were held
 - As the IRR guarantee support scheme provided limited support and no new auctions were held since 2017, project owners actively sought out alternative offtake structures to ensure profitability and secure financing
- In 2020, in order to achieve its RE Targets, Spain reintroduced a series of pay-as-bid auctions, for the first time since 2017
 - The first auction was held in Jan-20 with 3GW awarded but was largely oversubscribed with 9.7GW of bids received

Major policy milestones and changes



Sources: Spanish national renewables plan, Spanish public policies, CNMC, OMIE, EnergyRev

Notes: 1. RDL 24/2013; 2.RDL17/2019; 3. Plan Nacional Integrado de Energía y Clima, draft sent to European Commission in Mar-20; 4. Regimen Economico de Energias Renovables

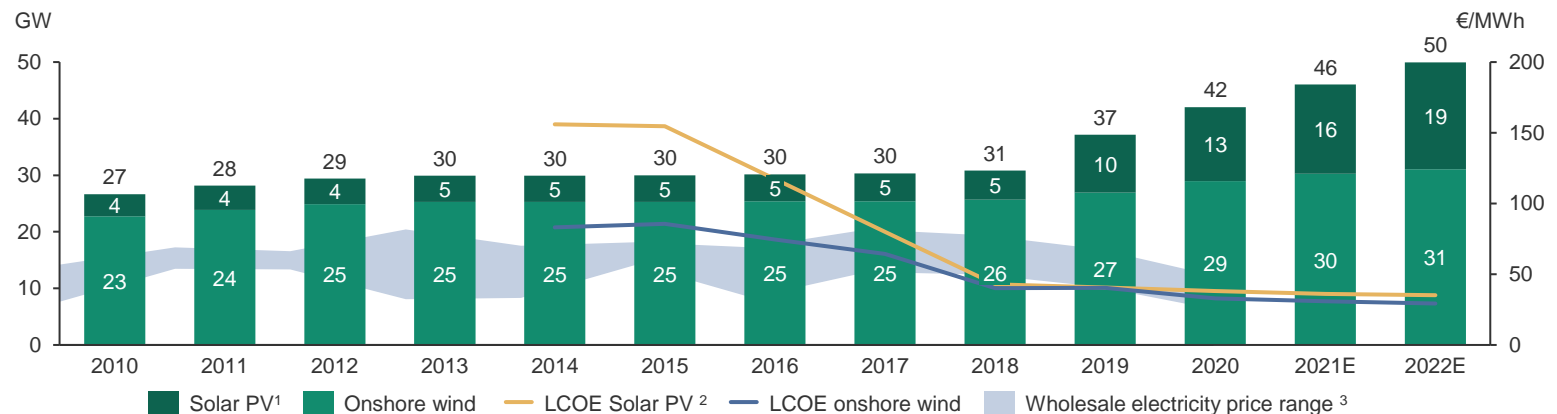
A rapidly growing CPPA market driven by the need to secure project finance

Lenders' requirements for long-term contracted cashflows led to the development of the CPPA market in Spain

Consolidation of the Spanish market has allowed for subsidy free projects to become viable

- The Spanish CPPA market has been driven by developers' need to secure stable cash flows to secure financing as banks were not ready to finance merchant projects
 - Banks viewed merchant project as too risky in Spain due to the high volatility in the spot market
- The rapid decrease of RE LCOE due to attractive solar resources and land availability, and the consolidation of the Spanish market has made PPAs a profitable option in Spain
 - CPPAs are struck at a heavy discount to merchant prices with PPA priced c.10€/MWh below the pool price
 - The most recent Jan-21 auction was incredibly competitive with average prices closing at €25/MWh, well below typical 10 years PPAs in Spain priced around €33-37/MWh, mainly because of the 12 years tenor
- The Spanish CPPA market is now relatively well established with typical CPPAs covering 70-80% of project output for 10 year
 - With a large industrial base and large energy demands, Spain has an important pool of potential off-takers
 - First Corporate PPA in Spain was signed in 2017 between EDP Renovaveis and Calidad Pascual for 5 years
 - In Sep-2020, Total signed the biggest Corporate PPA worldwide for 3GW of PV plants that will come online by 2025

Evolution of installed capacity and LCOE of onshore wind and solar in Spain



Sources: BNEF, OMIE

Notes: 1. Includes utility, residential and commercial; 2. LCOE for fixed axis solar; 3. Minimum and maximum monthly wholesale electricity prices solar;

A consolidated Spanish RE policy framework

As the Spanish market matures, developers are adopting alternative offtake structures to maximise their profits

The government is pursuing policies that will ensure continued demand from corporates by mandating that electricity intensive businesses procure 10% of their energy through renewables CPPAs

- With a very liquid CPPA market, new structures have evolved to allow developers to share the premium with off-takers while meeting banks' requirements:
 - Banks are now financing projects based on combined 4-5 years PPAs and 5 years floors, as many PPAs are only 4-5 years long
 - Collar structures and time based mechanisms, whereby offtakers have an option to continue the PPA after a first contracted period, are now available on the market
 - Spanish banks are experienced with a variety of PPA structures and are willing to finance both baseload and as produced PPA backed projects
- The market is now experiencing huge demand from developers but the limited number of credit worthy offtakers has given them large bargaining power and has tightened margins for project owners
 - The newly auction roadmap that aims to tender c.20GW of RE capacity by 2025 is expected to have a positive impact on CPPAs, removing capacity from the PPA market hence enabling developers to negotiate more favourable CPPA terms
 - The new auctions also enable developers to bid for a portion of their project output. Projects could therefore benefit from a long term hedge and sell the remaining production through the open market or via a PPA
 - The royal decree introduced by the Spanish government in Jan-20 goes in that direction, with the aim of providing continued offtake demand and motivate large corporates to engage into new CPPAs

Spain's Electro-intensive consumers Royal Decree

In Jan-20, the government issued the draft electro-intensive consumer's royal decree to provide continued offtake demand

- The decree will force large industrial companies consuming more than 1GWh p.a. to contract at least 10% of their consumption through renewables PPAs with a minimum term of 5 years.
- The government plans to provide public coverage for these contracts through a fund and guarantees issued by the Spanish Export Credit Insurance Company.
- This represents an additional 600 potential corporate off-takers with up to 4,000GWh per year

Sources: Spanish national renewables plan, Spanish public policies, CNMC;

Notes: 1. RDL 24/2013; 2.RDL17/2019; 3. Plan Nacional Integrado de Energía y Clima, draft sent to European Commission in Mar-20;

Recent PPAs signed in Spain

Year	Owner	Project(s)	Offtaker	Sector	MW	Technology	Tenor
2021	Solaria	1 project in Spain	Shell Energy Europe	Energy	300	Solar PV	n.a.
2020	BP	n.a.	Amazon	Tech	50	Solar PV	n.a.
2020	Enel Green Power	n.a.	Novartis	Pharmaceuticals	78	Onshore wind	10
2020	EDP Renewables	WdP	Novartis	Pharmaceuticals	63	Solar PV	15
2020	EDP Renewables	Statkraft	Novartis	Pharmaceuticals	36	Onshore Wind	15
2020	Acciona	Eolus Vind	Novartis	Pharmaceuticals	135	Solar PV	10
2020	Iberdrola	Vattenfall	Bayer	Pharmaceuticals	590	Solar PV	10
2020	Iberdrola	n.a.	MAKRO	Retail	6	Solar PV	n.a.
2020	Total	n.a.	Total Group	Oil & Gas	3,000	Solar PV	n.a.
2020	Iberdrola	1 plant in Murcia	SABIC	Industrial	100	Solar PV	25
2020	n.a.	Asset in Andalusia	Air Liquide	Industrial	n.a.	Onshore wind	10
2020	Iberdrola	Puylobo	Vodafone	Telecommunication	65	Onshore wind	n.a.
2020	wpd	Corralnuevo	Ball Corporation	Industrial	42	Onshore wind	n.a.
2020	Acciona	n.a.	Telefonica	Telecommunication	45	Onshore wind	10
2020	EDPR	2 PV plants and one wind farm	Royal DSM	Pharmaceuticals	59	Various	n.a.
2020	Elecnor	Cofrentes	Compania Espanola de Petroleos	Oil & Gas	50	Onshore Wind	n.a.
2020	Iberdrola	Iberdrola's wind and solar portfolio	Juver Food	Food & Beverage	n.a.	Various	2
2020	Endesa	Endesa's portfolio	Tendam	Retail	n.a.	Various	n.a.
2020	n.a.	n.a.	Heineken	Food & Beverage	52	Solar PV	n.a.
2020	Iberdrola	Ceclavin	Orange	Telecommunication	150	Solar PV	12
2020	Engie	1 asset in Spain	Química del Cinca	Industrial	n.a.	Solar PV	9
2020	BayWa r.e.	2 PV plants	AB InBev	Food & Beverage	130	Solar PV	10
2020	Iberdrola	Nunez de Balboa	Kutxabank	Financial	13.7	Solar PV	10
2019	Encavis	Cabrera	Amazon	Tech	149	Solar PV	10
2019	BP	1 PV asset	Amazon	Tech	50	Solar PV	n.a.
2019	Engie	Spanish renewable portfolio	Grupo Lactalis	Food & Beverage	n.a.	Various	9
2019	Iberdrola	Andévalo	Heineken	Food & Beverage	50	Solar PV	11
2019	Acciona	n.a.	Aena airports	Transportation	n.a.	Various	1
2019	Enerfin	Enerfin Cofrentes Wind Farm	Compania Espanola de Petroleos	Oil & Gas	50	Onshore wind	10
2019	Engie	Go Fit plant	GO Fit	Retail	2	Solar PV	10
2019	Foresight Group	Escalonilla Norte and Escalonilla Sur	ArcelorMittal	Industrial	10	Solar PV	10
2019	Acciona	n.a.	Unilever	Retail	n.a.	Various	1
2019	Iberdrola	Iberdrola Cavar	Nike	Retail	40	Onshore wind	n.a.
2019	Acciona	n.a.	Telefonica	Telecommunication	n.a.	Onshore wind	1

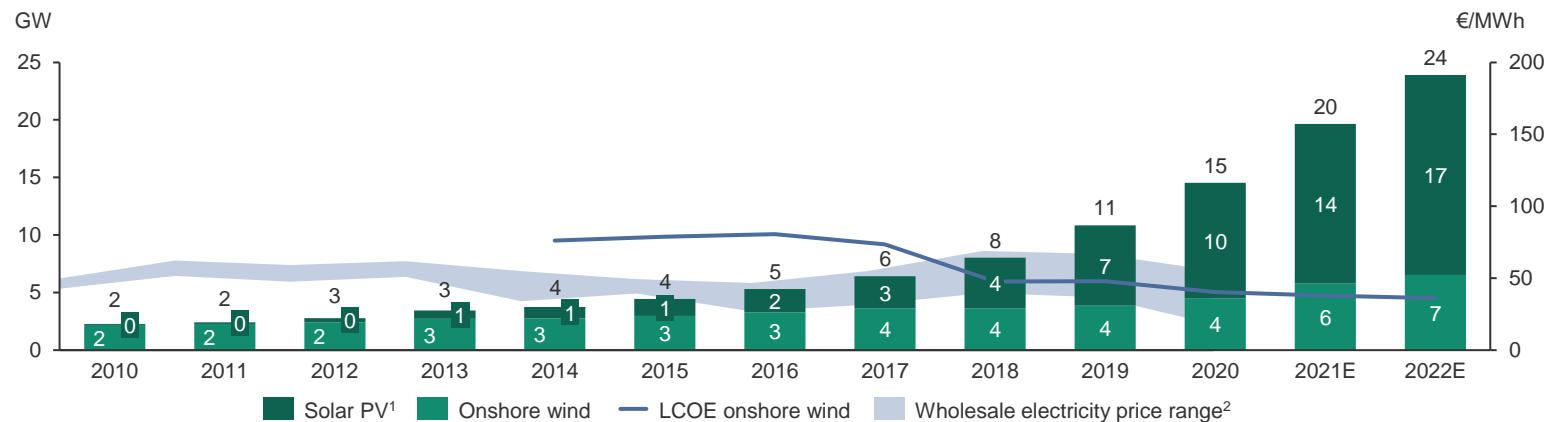
The Netherlands, an active CPPA market alongside subsidies

An active region benefitting from good natural resources and motivated buyers

After the Nordics, the Netherlands has been one of the most active CPPA markets in Europe but the CPPA market has since slowed down

- Favourable natural resources and sophisticated RE players have allowed the Dutch RE market to thrive
 - An energy market structure which allows corporates to enter into PPAs with projects without needing a utility as the grid operator acts as the “sleeper” in the Netherlands
 - Favourable conditions for the development of onshore wind and solar PV: flat windy plains and relatively good sun resources compared to northern European countries
 - Sophisticated players in the market that have adopted the best technologies available while managing assets at minimal cost
- With a well-developed logistics infrastructure, competitive tax structure and highly trained, English-speaking workforce, the Netherlands has attracted a wide pool of credit-worthy offtakers with significant electricity demand
 - A leading country in the tech space with companies like Microsoft, Infosys, Oracle, IBM and Google as well as many leading gaming companies having based a majority of their European operations in the Netherlands. These companies have large demand for energy and have ambitious RE targets
 - Chemical companies where 19 of the top 25 worldwide maintain significant operations in the Netherlands e.g. LyondellBasell, SABIC and Dow

Evolution of installed capacity and LCOE of onshore wind and solar in the Netherlands



Source: Bloomberg, BNEF, OMI

Notes: 1. Includes utility, residential and commercial; 2. Min and max monthly (quarterly until 2013) wholesale electricity prices;

With a subsidy system which has evolved alongside CPPAs

The Dutch subsidy system was designed to work in conjunction with corporate PPAs

As a result, corporates have developed new PPA structures to limit barriers to entry into the market and reduce their risk

- The current SDE++ Dutch RE subsidy takes form in a FiP, which leaves projects exposed to some merchant pricing
 - Price risk occurs when the wholesale power price falls below the floor price
 - Curtailment risk also exists since the SDE++ does not ensure that the plant's power will be bought when supply exceeds demand
 - Some producers have been using CPPAs in conjunction with the subsidies to hedge the remaining price risk exposure
- Subsidised projects are also eligible for GoOs
 - GoO prices in the Netherlands have consistently been higher compared to GoO prices in the rest of Europe
 - This provides additional revenue streams to the projects and allow generators to provide PPAs at lower prices
- The growth in the Dutch CPPA market has been underpinned by high credit-rated corporates' demand. The Dutch Wind Consortium pools together corporate off-takers including Google, Akzo Nobel, DSM and Philipps leading to:
 - higher demand for power, supporting the development of larger projects
 - increased diversification of corporate credit and default risk
 - reduced time required to close a deal with the second Dutch Wind Consortium agreement finalised in 6 months

The Netherlands' regulatory framework

The Netherlands has ambitious RE targets

- ✓ EU mandated RE generation target of 16% by 2023
- ✓ A successful case brought by Dutch citizens and the Urgenda Foundation led to an increase in the country's binding greenhouse gas emissions target from 14-17% to 25% by 2020

The Dutch government provides generous subsidies to RE projects through the following two mechanisms

- ✓ SDE ++ (which replaced the SDE+ in January 2020) is the Stimulation of Sustainable Energy Production
 - Projects will receive a subsidy which will be calculated on the basis of reduced emissions brought about by the construction of the project
- ✓ EIA is the Energy Investment Tax-Reduction
 - Allows companies to deduct 55% of capex from the fiscal profits in addition to depreciation

Projects in the Netherlands are eligible for GoOs even when receiving a subsidy

Sources: Bird & Bird, BNEF

Recent PPAs signed in the Netherlands

Year	Owner	Project(s)	Offtaker	Sector	MW	Technology	Tenor
2020	n.a.	Dutch portfolio	QTS Realty Trust	Tech	n.a.	Onshore wind	n.a.
2019	Cooperatives made of local Dutch citizens	Windpark Krammer	Philips, DSM, Google, Nouryon	Tech	97	Onshore wind	15
2019	Eneco	Borssele III & IV	Microsoft	Tech	90	Offshore wind	n.a.
2017	Wirsol Deutschland	Wirsol Deutschland Sunport Delfzijl	Google	Tech	31	Solar PV	n.a.
2017	Vattenfall	Wieringermeer repowered	Microsoft	Tech	20	Onshore wind	n.a.
2017	Vattenfall	Nuon Wieringermeer	Microsoft	Tech	160	Onshore wind	n.a.
2016	E Connection Project	Bouwdokken repowered	Akzo Nobel	Industrial	10	Onshore wind	n.a.
2016	Enercon, Delta Wind, Zeeuwind	Krammer	Akzo Nobel	Industrial	24	Onshore wind	n.a.
2016	E Connection Project	Bouwdokken repowered	DSM	Pharmaceuticals	10	Onshore wind	n.a.
2016	Enercon, Delta Wind, Zeeuwind	Krammer	DSM	Pharmaceuticals	24	Onshore wind	n.a.
2016	Eneco	Anna-Vosdijkpolder	Fujifilm	Tech	15	Onshore wind	n.a.
2016	E Connection Project	Bouwdokken repowered	Google	Tech	9	Onshore wind	n.a.
2016	Enercon, Delta Wind, Zeeuwind	Krammer	Google	Tech	26	Onshore wind	n.a.
2016	E Connection Project	Bouwdokken repowered	Philips	Industrial	10	Onshore wind	n.a.
2016	Enercon, Delta Wind, Zeeuwind	Krammer	Philips	Industrial	24	Onshore wind	n.a.
2016	Eneco (50%) (Mitsubishi) Diamond Generating Europe (50%)	Luchterduinen	TU Delft	Other	14	Offshore wind	n.a.
2016	Eneco (50%) (Mitsubishi) Diamond Generating Europe (50%)	Luchterduinen	Unilever	Retail	17	Offshore wind	n.a.
2015	Eneco (50%) (Mitsubishi) Diamond Generating Europe (50%)	Luchterduinen	Vivens	Industrial	7	Offshore wind	n.a.
2015	Koepel Windenergie Noordoostpolder	Westmeerwind	Vivens	Industrial	120	Offshore wind	n.a.
2014	Eneco	Delfzijl Noord	Google	Tech	63	Onshore wind	n.a.
2013	Stedin Holding	Eneco Golden Raand	Akzo Nobel	Industrial	25	Biomass	n.a.
2010	Eneco	FUJIFILM Tilburg	Fujifilm	Tech	10	Onshore wind	n.a.

Italy, steadily overcoming structural market barriers

A changing regulatory environment has affected the sector's growth

Although the Italian government has implemented multiple support mechanisms for RE development over the last 20 years, the changes in policies have made it difficult for the sector to sustain long-term consistent growth

Italy has been a pioneer in RE development due to the 1987 nuclear energy moratorium and has introduced a series of government-led incentives

Green Certificates (2002-15)

- ✓ Tradable Green Certificates (TGC)¹ awarded by MWh of electricity produced from renewable sources
- ✓ Introduced by GSE² under the quota obligation requiring power producers to source a certain percentage annually (starting at 2% and reaching 7.55% in 2013) from RE, with an option of fulfilling the requirement by purchasing certificates from third parties in an independent market
- ✓ This mechanism was phased out by the end 2015³

Feed-in-Tariffs (2007-13)

- ✓ Replacement of TGC by FiTs under the 2nd Conto Energia legislation (2007-10)
- ✓ FiTs were among the highest in Europe and triggered a solar boom that peaked in 2011: capacity increased from 431MW to 18,185MW between 2008 and 2013
- ✓ In June 2013, the FiT system ended after annual spend on RE reached the cap set by the Government (€6.7bn for PV)
- ✓ Through a decree in 2014, retroactive cuts on FiTs could be applied. Developers and investors sued the Italian Government but the Supreme Court ruled in favour of the Government. Some disputes are under international arbitration

Reverse auctions (2012-16)

- ✓ Introduced in 2012 for >5MW RE projects, replacing former green certificate scheme
- ✓ Solar PV excluded from auctions as considered to have reached optimal commercial development
- ✓ Three annual auctions over 2012-2014 with an annual capacity cap of 500MW (no auction in 2015 due to uncertainty around subsidy budget caps)
- ✓ 'Pay as bid' system with some constraints⁴

Sources: Public information from Italian agencies, BNEF, SparkSpread, Inspiratia

Notes: 1. CIP/92 regulation; 2. Gestore Servizi Energetici, Italy's government agency responsible for the promotion of RE; 3. Complete phase out of the certificates through a gradual decrease in yearly obligation levels. GSE acts as a buyer-of-last-resort for all unsold GC. Quotas will stand at 0% starting from 2016 on; 4. Opening bid can be no less than 98% of base tariff, EUR 127/MWh and the final bid can be no less than 70% of base tariff;

Current government regulations remain supportive of RE development

The Italian government continues to support RE development through technology-neutral auctions

The underweighting of solar projects in the auction allocation could be an indication that these projects are commercially viable in a subsidy-free world

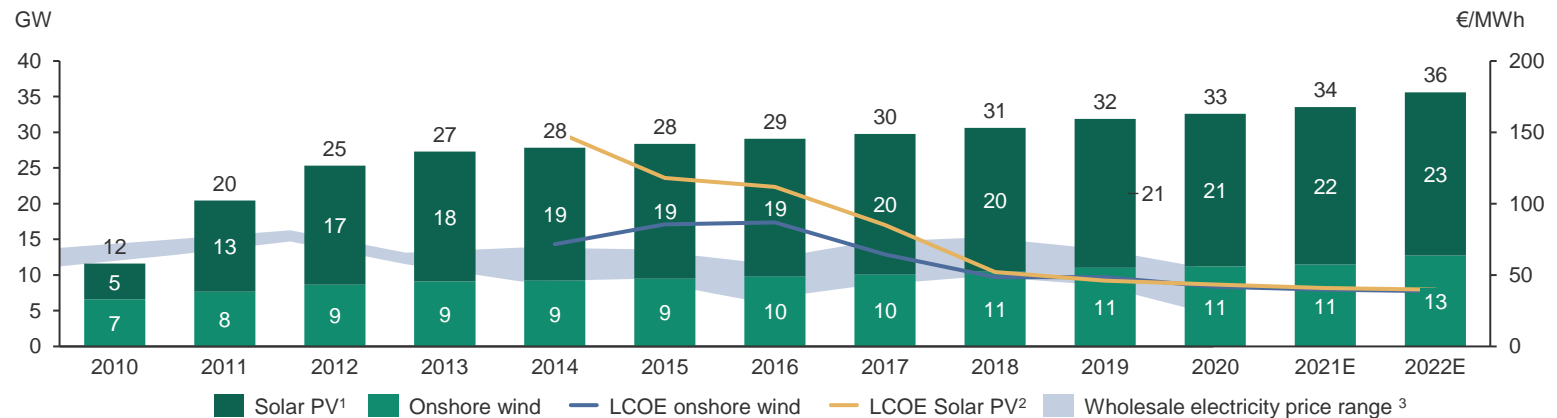
FER1 (Fonti Energetiche Rinnovabili) Decree (2019) set out the new target of allocating 4.8GW of RE capacity over seven rounds by year-end 2021, enabling investments of c.€10bn to achieve the 30% RE consumption target by 2030

- Utility scale onshore wind and solar PV compete in technology-neutral competitive auctions
- Projects are awarded a 20-year two-way CfD and bids must be between 30% and 98% of the reference price

Auctions have been largely undersubscribed and remain above market price but restrictions on PV projects have led developers to consider alternative offtake solutions

- Italian latest 4th RE auction awarded only 25% of the initially planned 1.16GW capacity with the lowest bid coming at 68.2€/MWh
- Two other auctions took place in 2020 and the average tariffs attributed were €64.6/MWh in Italy 2nd auction and €68.1/MWh in Italy 3rd auction, well above the average wholesale electricity price seen this year of 40€/MWh
- Restrictions on the use of agricultural land for PV projects have led to a bias toward onshore wind projects with only 20MW awarded to solar in the latest auction
- These lands constraints motivated solar developers to look at alternative offtake solutions with the use of CPPA

Evolution of installed capacity and LCOE of onshore wind and solar in Italy



Sources: Public information from Italian agencies, BNEF, SparkSpread, Inspiratia, Bloomberg

Notes: 1. Includes utility, residential and commercial; 2. LCOE for fixed axis solar; 3. Min and max monthly (quarterly until 2013) wholesale electricity prices;

Interest for CPPA is growing but potential remains constrained by the environment

The volume of CPPAs in Italy remains low compared to other European markets

The less integrated Italian power market and electricity infrastructure makes it more difficult for developers to match optimal generation assets with energy-intensive consumers

Despite Italy having one of the highest irradiances and electricity prices in Europe, constant change in regulations and retroactive tariff cuts have had an impact on investors' confidence

CPPAs could act as an attractive alternative to manage long-term price volatility but certain factors such as the economy, power infrastructure and electricity market dynamics are expected to limit wider use of CPPAs in Italy

- The country's economy is mainly composed of SMEs rather than large companies
- The optimal solar and wind sites tend to be concentrated in southern Italy whereas most of the industrial centres are located in the north. The grid infrastructure linking north and south are under-developed
- The Italian electricity market has historically been divided in six independent zones and a seventh zone has just been created in the Calabria region. The different spot prices seen in each of these seven zones on top of very significant power price differences between northern and southern Italy makes entering synthetic PPAs very challenging
- Italy was hit hard by COVID-19, therefore the government may shift its focus to re-stimulating its economy in the next 12-to-18 months and there is a current risk that some auction awarded projects may actually never be built

CPPA activity and trends

- There have been few CPPAs in Italy however the most active offtakers have been energy traders such as Axpo, Octopus Investments, DXT Commodities
- Typically the CPPAs have a baseload profiling with tenors varying between 5 and 10 years
- The lack of large corporates in the south has led SMEs to consider club structures (grouping multiple power buyers / offtakers) as seen in other countries such as Spain¹
- Pre-Covid Corporate PPAs were priced at around €45/MWh but the depressed power prices following Covid have led to a discount of €3-5/MWh, making CPPA less attractive compared to auction prices

Sources: Public information from Italian agencies, BNEF, SparkSpread, Inspiratia

Notes 1. a group of energy-intensive industries represented by Fortia signed a 10-year baseload PPA with Statkraft in early 2019;

Recent PPAs signed in Italy

Year	Owner	Project(s)	Offtaker	Sector	MW	Technology	Tenor
2020	Engie SA	Statkraft	Amazon	Tech	66	Solar PV	n.a.
2020	Sonnedix	5 solar assets in Sicily	TrailStone Renewables	Energy	18	Solar PV	10
2020	DXT Commodities	1 PV plant	Acciaierie Venete	Industrial	n.a.	Solar PV	5
2019	FERA Fabbrica Energie Rinnovabili S.r.l.	n.a.	Duferdofin Nucor	Industrial	11	Onshore wind	7
2019	European Energy	Italian portfolio	Axpo	Energy	300	Solar PV	12
2019	KGAL	n.a.	Ori Martin	Industrial	53	Solar PV	n.a.
2018	Octopus Investments	5 solar plants in Lazio	Ego	Energy	63	Solar PV	n.a.
2018	Octopus Investments	n.a.	Shell Energy Europe	Energy	71	Solar PV	5
2018	Octopus Investments	Assemini plant	Ego	Energy	40	Solar PV	5
2018	Ing. Conti Vecchi	Eni Saline Conti Vecchi plant	Eni, Gestore dei Servizi Elettrici	Energy	26	Solar PV	n.a.
2015	Enersol Flomar	L'Oreal Settimo Torinese Rooftop Plant	L'Oreal SA	Retail	3	Solar PV	n.a.

Poland, underpinned by strong corporate demand

Poland, a RE sector regaining activity with renewed government support

Recent renewed support from the Polish government has boosted development of RE capacity

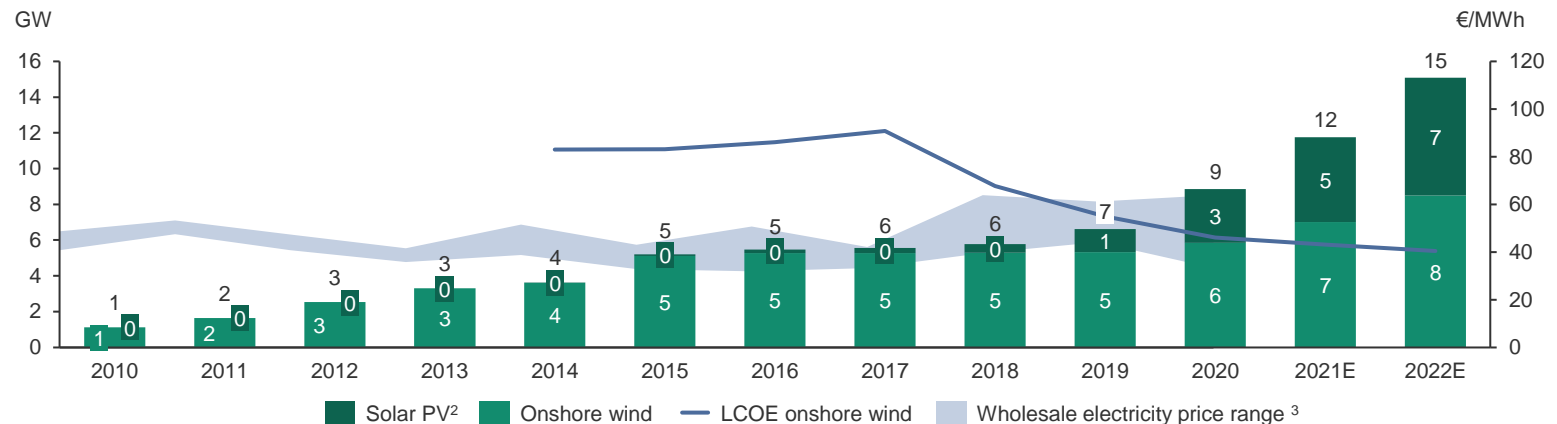
The Polish power market is amongst the 10th largest in terms of production capacity in Europe but mostly relies on fossil fuels

- Development of RE in Poland trailed behind other European countries due to legislation being introduced in 2016 to support the coal industry
- Poland has become the second-largest European coal producer, with 87% of its power generation mix coming from fossil fuels¹

The EU 2020 targets continue to apply to Poland which is struggling to meet the 15% target of the total energy consumption to come from renewable sources

- To ease tensions with the EU, the Polish government shifted its stance and put in place the current support scheme, adopted into law in June 2015 initially for 6 years but that is expected to be extended until June 2026
- RE projects are subsidised through quota based green certificates and 15-year CfDs with levels set in auctions
- Wind installations are expected to grow to 10GW in 2030 mainly from offshore wind whilst onshore wind capacity is estimated to grow as much as 9 GW with changes in legislation (10h law)
- Solar PV capacity is planned to more than double in the next two years, forecasted to reach 6GW in 2022, with prosumers and being the driving force behind solar PV's fast deployment with more than half of the installed capacity to date

Evolution of installed capacity and LCOE of onshore wind and solar in Poland



Source: Bloomberg, BNEF, OMIE

Notes: 1. In 2019; 2. Includes utility, residential and commercial; 3. Min and max monthly (quarterly until 2013) wholesale electricity prices;

Potentially significant CPPA market driven by underlying corporate demand

There is a good network of industrial corporates in Poland that are able and keen to act as credible buyers

However the CPPA market is still nascent due to government-backed subsidies remaining relatively attractive

Government support schemes for RE have been relatively attractive therefore the Polish market has had few CPPAs executed. There are some emerging dynamics combined with high electricity prices which may create the ideal environment for CPPAs in Poland

- Heavy industry with high energy needs and international corporates committing to consume 100% green power (RE100) have been using CPPAs to demonstrate their ESG commitments
 - With a heavy carbon footprint associated with the power business due to a large coal reliance, environmentally conscious corporates needed to secure power from green sources
- Although development of green PPAs has been driven by companies' CSR policies, off-takers also have economic considerations such as price stability and diversification of power sources
 - Poland has one of the highest electricity prices on the continent and prices have been consistently rising and becoming more volatile
 - Ensuring price stability was therefore particularly relevant to energy-intensive businesses in Poland
- The legal framework setting conditions for PPAs in Poland are favourable to off-takers compared to other jurisdictions

Corporate and utility PPAs are growing and becoming available at terms which make unsubsidised projects a possibility as wholesale power prices rose 66% between Jan-18 and Jul-19

- The first CPPA in Poland was signed in 2018 between the developer VSB Holding GmbH and Mercedes Benz for an existing 45.1MW wind farm (2013 COD). This was followed by the first solar corporate PPA signed in 2019 for a 5MW project between Grupa Azoty, a Polish chemical company, and project developer PGE Polska Grupa Energetyczna (also a state-owned utility)
- Since then, CPPA off-takers in Poland have been mainly international corporates such as Heineken, Asahi, Mercedes Benz, CMC, Orange or local coal and sulphur miners which usually enter into on-site CPPAs
- Local companies with weak credit quality have also been active in the market, using synthetic PPAs and/or credit enhancement solutions to overcome the credit constraint barriers
- In the last 12 months, larger CPPAs have been executed with tenors extending to 10 years and pricing have dropped to around €45/MWh post-Covid

Recent PPAs signed in Poland

Year	Owner	Project(s)	Offtaker	Sector	MW	Technology	Tenor
2020	wpd	Jarocin Kozmin and Slupca-Kolaczkowo	Engie	Energy	87	Onshore wind	n.a.
2020	wpd	Jarocin Wschod and Krotoszyn	Orange	Telecommunication	25	Onshore wind	10
2020	Statkraft	Statkraft's renewable portfolio	Commercial Metals Company	Industrial	n.a.	Onshore wind	10
2019	Innogy	Nowy Staw	Kompania Piwowarska (Owned by Asahi)	Food & Beverage	73	Onshore wind	10
2019	Green Investment Group	Kisielice	Signify	Industrial	42	Onshore wind	10
2019	Green Investment Group	Kisielice	Axpo Polska	Energy	42	Onshore wind	10
2019	PGE	Siarkopool Osiek	Grupa Azoty Kopalnie I Zaklady Chemiczne Siarki Siarkopol	Pharmaceuticals	5	Solar PV	10
2018	WSB Neue Energien	Taczalin	Mercedes-Benz	Automobile	45	Onshore wind	10

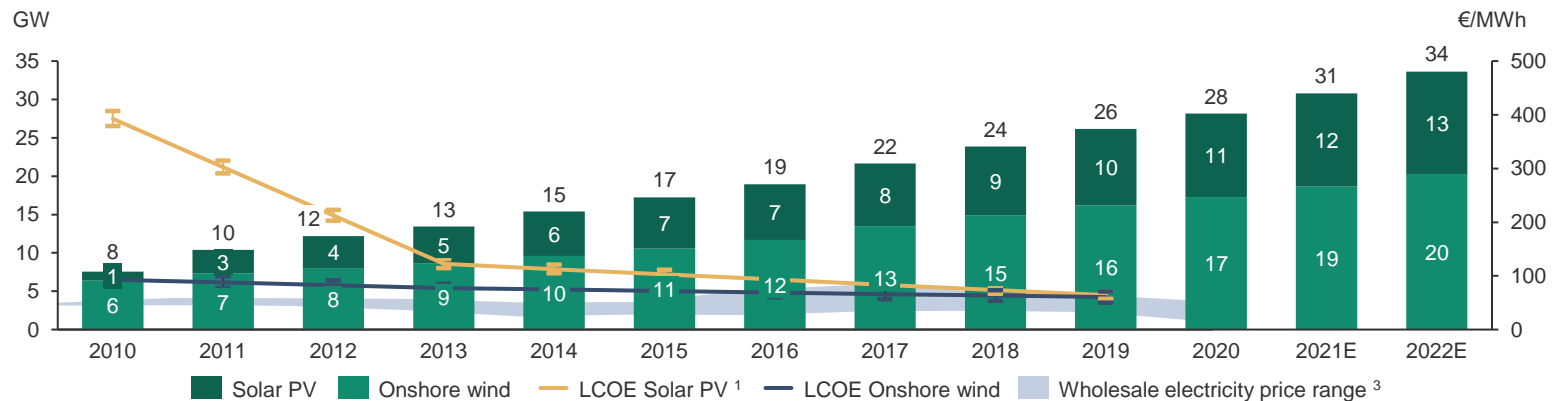
France, a nascent PPA market with strong potential

The growth of the RE sector has been largely driven by government support...

The attractive subsidy scheme in France remains the dominant support to the development of renewables

- France has seen its deployment of RE production capacity largely driven by ambitious government targets and a very favourable subsidy system
 - Installed capacity of onshore wind and solar PV grew 16% CAGR between 2010 and 2019
 - During that time, the LCOE fell below €60/MWh, still above the average for large RE countries in Europe due to the complexity of the regulatory environment in France and the below than average scale of installations
- To support these ambitious objectives, the French Government continues to grant subsidies through a long-term guaranteed price. This is one of the most generous support schemes in Europe:
 - A Feed-in-Premium (FiP) system has been introduced recently for wind and PV > 500 kW, granting 20-years support
 - French renewable subsidies are inflated by the L-factor⁵, which is a composite index made up of the base component, the country's hourly wage index and producer price index, which differs for wind and solar

Evolution of installed capacity and LCOE of onshore wind and solar in France



Source: Ademe, Bloomberg, BNEF, CRE, MTES

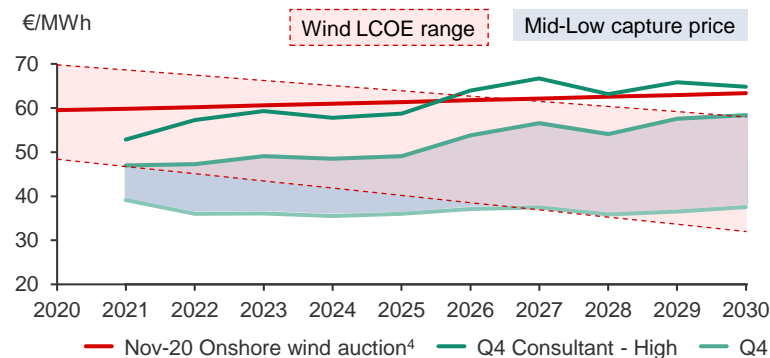
Notes: 1. LCOE for ground mounted solar; 2. Includes utility, residential and commercial; 3. Min and max of monthly (quarterly until 2013) wholesale electricity prices; 4. The "guichet ouvert" is open for solar PV of less than 0.5MWp and wind farms of less than 6 turbines with a rated capacity of 3MW max per WTG; 5. $L_{wind[Solar]} \text{ factor} = 0,7 [0,8] + 0,15 [0,1] * (\text{Wages index}) + 0,15 [0,1] * (\text{Producer price index})$;

...and shall continue with FiP auctions planned until 2024 at the minimum

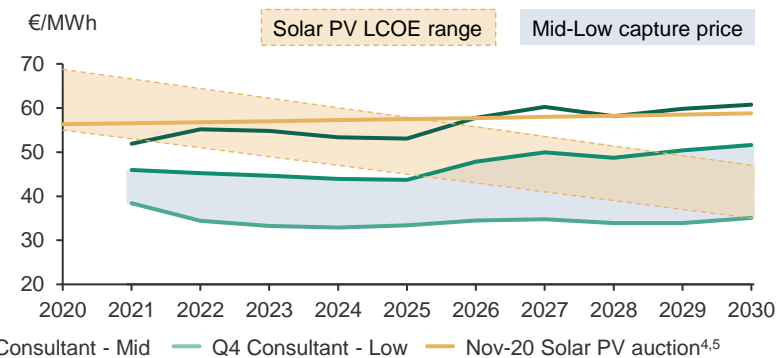
French subsidies have reached strong levels, with inflation linked auction strike prices exceeding market prices

- Under its 2020 Multi Annual Energy Plan, the French government announced that over the next four years it would subsidise 11.6GW of solar PV projects and 7.4GW of onshore wind projects:
 - Call for tenders will be issued for wind and solar PV projects at a rate of 900MW per year for rooftop solar, 2GW per year for ground-mounted solar and 1,850MW per year for onshore wind¹
- Auction clearing prices have been above market prices and may remain at comparable levels in the near future as the French state is under pressure to meet its EU RE targets and RE LCOE remain high
 - Latest solar PV auctions cleared at €86/MWh² for rooftop in Sep-20 and €60.1/MWh for ground-mounted in Oct-20
 - Latest wind auction in October 2020 cleared at €59.5/MWh
- Auction prices would need to be in the same range as consultants capture prices in a mid-low scenario for CPPA to make greater economic sense
 - Offtakers price for long term greenfield PPAs is often based on consultants forecasts while producers' minimum profitability is determined by the LCOE
 - Pricing for short term brownfield PPAs is more driven by forward prices but must exceed producers' operating costs

Wind – LCOE vs consultant capture prices³



Solar PV – LCOE vs consultant capture prices³



Source: BNEF, Bloomberg, CRE, Nasdaq, Consultant wholesale power price curves (Q3-20)

Notes: 1. Excluding repowering projects; 2. For PV projects greater than 5MWp; 3. Q4-20 power prices in nominal terms, inflated at 2% p.a.; 4. Average bid inflated to the L factor; 5. Weighted average price for ground mounted solar from Family 1 and 2

Status and Perspective of the CPPA market in France

A nascent PPA market with limited potential for growth under the current setup...

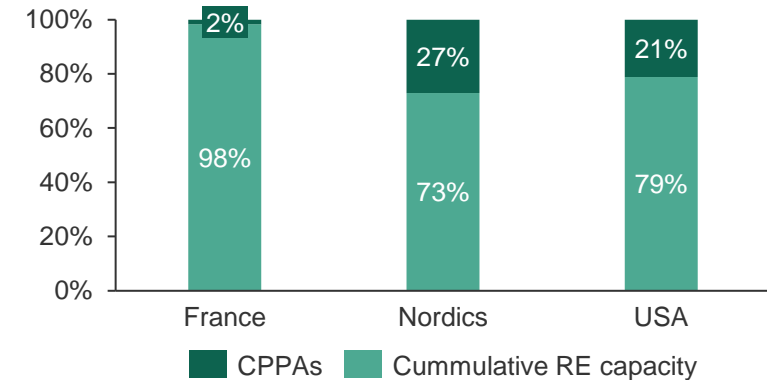
As the majority of French RE projects benefit from long-term inflation-linked offtake contract provided by the state, there is limited scope for the growth of the CPPA market

Public, para-public and consumer-centric companies have been the first movers in France entering into CPPAs to meet their CSR requirements and mitigate their power price risk

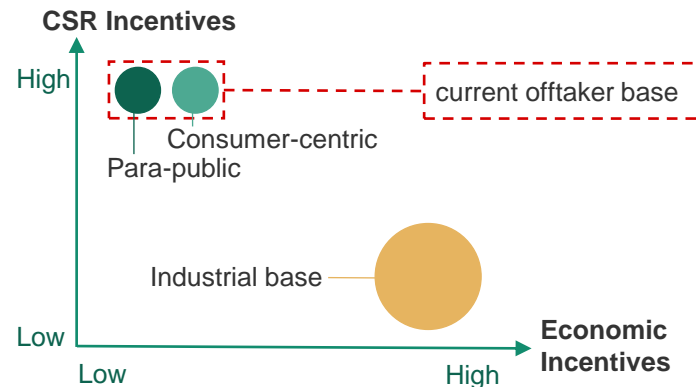
French CPPA market overview

- The growth of PPA markets in Europe and North America has been contingent on a decline in LCOEs and an erosion of subsidies
 - PPAs first emerged in countries where projects could be built at scale driving down the per unit costs (USA, Nordics and Spain)
- As the French government continues to support the majority of RE projects with secured tariffs above or at market prices, there are limited incentives for developers to seek CPPAs
 - As auctions become more competitive and market prices increase, we expect developers to start exploring alternative offtake solutions

CPPA volumes VS cumulative RE capacity



CPPA motivations by offtakers







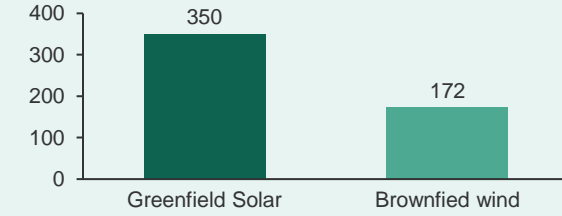
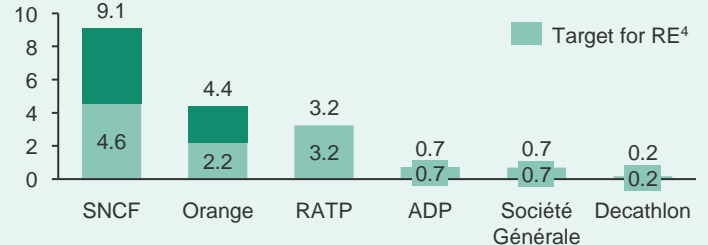
- In the current market set up, offtakers are mostly large consumer-centric, public and para-public companies, more motivated by the green value of a CPPA than its economics
 - The gap in economic attractiveness of a CPPA for both offtakers and producers is yet to be closed
 - The green value of CPPA is intangible and hard to price, and depends on offtakers' willingness to showcase their green commitments

Sources: BNEF

...with only a limited number of projects and offtakers

Most CPPAs in France have been concluded between:

- large-scale strong-credit offtakers keen to demonstrate their green branding and;
- first-class IPPs with non-eligible large-scale solar greenfield projects or end of tariff wind farms

	Sellers	Buyers
Players	<p>Experienced first-class French RE producers for specific projects, including:</p> <ul style="list-style-type: none"> Large scale solar greenfield projects not eligible for auctions  <ul style="list-style-type: none"> Brownfield assets reaching end of tariff period with repowering opportunities 	<p>Large and well-established investment grade French corporates with high energy consumption needs including:</p> <ul style="list-style-type: none"> Public or para-public entities¹  <ul style="list-style-type: none"> Large privately-owned consumer centric entities² 
Rationale	<ul style="list-style-type: none"> For solar greenfield projects: To secure long term revenues in order to reach bankability and raise PF, when projects are not eligible for auctions For brownfield assets reaching end of tariffs: To lock in minimum profitability and/or finance revamping <p>Contracted MWs</p> 	<ul style="list-style-type: none"> To secure long-term fixed electricity prices at attractive levels To fulfil their RES commitments and improve their green branding, in sectors with significant public exposure (Retail, Transport, Telecoms) <p>Total electricity consumption (GWh)³</p> 






















Note: 1. French state owns 64% of Orange, 100% of SNCF and 50.6% of ADP; 2. Famille Mulliez is the main shareholder of Auchan, Boulanger, Decathlon and Voltalia; 3. Based on 2019 figures; 4. Based on companies RES targets for the 2022-25 period

PPAs signed in France to date – Greenfield projects

Long-term CPPAs in France have been mostly associated with large solar PV projects not eligible for auctions, providing long-term price stability and bankability support with an weighted average tenor of 21.3 years

The first multi-buyer PPA has been agreed this year between Voltalia and a group of ten to fifteen offtakers led by LCL

French Corporate PPAs - Solar PV projects¹










Date	Developer	Corporate	Tech	MW	Tenor	Comments
Feb-21			PV	51	15yrs	<ul style="list-style-type: none"> Portfolio in the Hautes Alpes, due to come online in 2023
Dec-20			PV	15	n.a.	<ul style="list-style-type: none"> This PPA with Amazon is part of a larger global agreement encompassing 570MW PV plants in the USA and 66MW in Italy
Nov-20			PV	16	n.a.	<ul style="list-style-type: none"> PV plant dedicated to Decathlon's consumption, due to come online in 2023, to cover 15% of Decathlon's energy needs
Oct-20			PV	55	n.a.	<ul style="list-style-type: none"> LCL will contract part of the production alongside 10-15 French SMEs & ETI, existing LCL clients First multi-purchaser Power Purchase Agreement in France
Jun-20			PV	40	15-20yrs	<ul style="list-style-type: none"> Signed for a PV portfolio due to come online between 2021-2023 Covers 2% of SNCF's energy requirement
Jun-20			PV	61	20yrs	<ul style="list-style-type: none"> PPA signed for a portfolio of two PV plants in the South of France due to come online between 2021-2022, providing 97GWh per year
Feb-20	 		PV	40	21yrs	<ul style="list-style-type: none"> GazelEnergie will support ADP in power management for the first three years of production from the solar sites The plants will produce 47GWh per year and enough to provide 10% of ADP energy needs
Dec-19			PV	10	25yrs	<ul style="list-style-type: none"> Covers 5% of the bank's energy requirement, in line with CM commitment to reduce its carbon footprint by 30%
Jun-19			PV	143	25yrs	<ul style="list-style-type: none"> Among the 10 largest PPAs in Europe Covers 3-4% of SNCF's energy requirement
May-19			PV	5	25yrs	<ul style="list-style-type: none"> First corporate PPA signed in France Covers 10% of Boulanger's energy requirement

Note: 1. As of February 2021

CPPAs signed in France to date – Operating assets

Shorter tenor CPPAs have also been recorded in France mostly for older onshore wind operating assets reaching the end of their tariff period and looking to secure minimum profitability and/or finance revamping

These CPPAs with tenors ranging from 3 to 5 years often required an aggregator

French Corporate PPAs - End of tariff / repowering assets ¹						
Date	Developer	Corporate	Tech	MW	Tenor	Comments
Feb-21			Wind	35 ²	3yrs	<ul style="list-style-type: none"> Signed with a portfolio of 5 windfarms, PPA will provide RATP with 51GWh in 2021 and 30GWh in 2022 and 2023 to cover 4% of its annual energy needs Agregio will ensure the balancing of the power
Jan-21		FNAC DARTY	Wind	8	n.a.	<ul style="list-style-type: none"> Solvay Energy Services will ensure power balancing for this PPA expected to cover 14% of Fnac-Darty's annual energy needs
Jul-20	BORALEX		Wind	39	5yrs	<ul style="list-style-type: none"> PPA will provide 67GWh annually and will start at the end of the current FiT purchase obligation in Jan-2021
Jun-20	BORALEX	Auchan	Wind	16	3yrs	<ul style="list-style-type: none"> PPA signed with existing plant to provide power until Dec-2023 for the post-FIT period
Jun-20		Auchan	Wind	30 ²	3yrs	<ul style="list-style-type: none"> PPA signed with existing plant to provide power until Dec-2023 for the post-FIT period
Nov-19			Wind	13 ²	3yrs	<ul style="list-style-type: none"> Société Générale will purchase 27GWh per year, representing 10% of the group's annual needs Agregio will act as an aggregator to facilitate the procurement between the two sites
Aug-19		MAISADOUR <small>NOTRE CULTURE. VOTRE BIEN-VIvre</small>	Wind	12	3yrs	<ul style="list-style-type: none"> PPA signed with a plant commissioned in 2006 will start in 2022, when the current tariff ends Maisadour will buy the 20GWh per year at a fixed price, that will cover 15% of its annual energy needs Agregio will purchase the power and supply it to Maisadour
Mar-19		METRO	Wind	13 ²	3yrs	<ul style="list-style-type: none"> First French CPPA Agregio will purchase the entire 25GWh annual output from Eurowatt to supply the French group Metro

Note: 1. As of February 2021; 2. La Plateforme verte estimates






Key CPPA drivers and limitations in France

The market structure in France allows for CPPAs but does not prompt them

The unregulated French market allows for CPPAs to be signed between private parties

However current market conditions, including power price trends do not provide oftakers with strong incentives to enter into PPAs

Electricity market design

- 
 - Deregulated market with a range of intermediaries and channels allowing for electricity sale between private players
 - Balancing and other shaping services are now available with well-established experienced aggregators
 - This is supported by a good-quality grid system, significant interconnection opportunities and experienced grid operator (EDF)
- 
 - The Covid-19 crisis led to temporarily low prices hitting a bottom of €14/MWh¹, and an extreme volatility
 - While Covid-19 had a limited impact on long term power prices forecast, it has given an overview of what future electricity systems with high RE penetration could look like
 - It has made the use of CPPAs as a long term hedge more relevant, both for producers and consumers
- 
 - Price cannibalisation may become a prominent issue in the French power market within a 10 years horizon, as RE penetration increase
 - Cannibalisation would affect RE producers returns under baseload CPPAs and new balancing mechanism will be essential to offset some of the cannibalisation effects
 - The cannibalisation effect should be lower than in other European country, due to lower RE penetration
- 
 - The establishment of the ARENH² law in 2011, allowing electricity providers to buy up to 100TWh from nuclear sites at a fixed price often lower than wholesale prices and below RE LCOE falsely distorts the market
 - It provides a misleading impression of price stability lowering CPPA's attractiveness as a long term hedge
 - In practice, entering CPPA will not affect buyers ability to benefit from the ARENH mechanism
- 
 - Power market liquidity and time horizon remains constrained beyond three years
 - No market visibility on long-term prices, making it difficult for buyers to assess their risk
 - No long-term hedge available, allowing buyers and intermediaries to adjust their price cover
 - Balancing / sleeving services typically not available beyond three years, making it difficult for producers to enter into longer-term baseload CPPAs
 - Balancing / sleeving costs hard to price on the long term resulting in greater PPA pricing complexity

Note: 1. Lowest Wholesale baseload prices seen in March-April 2020; 2. Law for "Accès Régulé à l'Electricité Nucléaire Historique"

The regulatory environment remains the most stringent limitation to CPPAs

The key obstacle to CPPA growth in France remains the highly attractive Government subsidies and their incompatibility with CPPAs to date

Regulatory framework

- 
 - Falling subsidies and tighter auctions will gradually increase the pool of RE projects to be built without CfD
 - CRE eligible land for solar PV plants is increasingly scarce and expensive and this is expected to widen the pool of PV projects that will look at a CPPA based business model as an alternative
 - All utility scale wind and solar assets have to meet strict guidelines and bid into competitive auction to receive government support and CfD levels are due to meet LCOEs and market prices at some point, as the French power and RE market matures
- 
 - First RE assets now coming to the end of their tariffs period are looking for CPPA to prolong revenue stabilisation
 - Projects with repowering potential in particular will be looking to lock in a minimum profitability until the repowering project is implemented
- 
 - The decision to proceed with retroactive PV tariffs cuts and the lack of visibility on ARENH beyond 2025 will motivates market players to look at alternatives and possibly safer revenue structures
 - The French government recently announced it would proceed an amendment to reconsider pre-2011 solar PV tariff levels, risking to jeopardise the trust in state backed subsidies
 - The ARENH scheme is about to be reformed. Its future design remains very uncertain, but is expected to be less attractive for offtakers, giving more space to CPPAs.
- 
 - High tariffs in France limit the rationale for producers to enter into corporate PPAs
 - Lowest auction prices observed for utility scale wind and solar PV are currently above market prices and may remain above market prices in the medium-term. Negotiated CPPA prices based on forwards prices and long-term views therefore remain less economic than tariffs
- 
 - The structure of the French subsidies prohibit subsidized projects to enter into CPPAs
 - A RE project which benefits from subsidies cannot transfer GoOs to corporate buyers. Other European countries have a more lenient view of the “double subsidy” with the European legislation clarification (as part of REDII); this may hopefully pave the way for a change in French legislation
 - Combining a FiP with a CPPA would disrupt the natural hedge of a FiP and deteriorate bankability, as the French FiP is based on a premium which varies with market price as opposed to being a fixed premium

The necessary business environment is in place but needs structuring

France has both a growing RE sector and an adequate network of potential offtakers to support the development of a healthy CPPA market

Lenders are starting to become more familiar with CPPAs and the emergence of aggregators are showing promising signs



Business environment

- 
 - Consolidation in the French market means that the majority of RE projects in France are backed by credible projects owners
- 
 - France has a solid network of commercial and industrial corporates with strong credit profiles, on top of public and para-public entities that are easily bankable offtakers
 - CPPA RfP have been oversubscribed recently in France, proving increasing leverage and negotiation power to developers
 - France has also a wide network of SMEs that could help widen the pool of potential CPPA buyers. However:
 - Credit risk of these SMEs is generally not bankable beyond 3-5 years, defeating the purpose of CPPAs as a long-term leveraging instrument for power producers
 - Credit risk insurance product are not widely available to mitigate such risk and extremely expensive
 - Aggregation of buyers may help with size and risk diversification with aggregators increasingly looking at ways to take on some of the credit risk. Such structures are just emerging in the French market (see CPPA Voltalia – LCL)
- 
 - Players in the industry are hesitant investing or supporting CPPA-backed projects
 - Investors and lenders in France favour involvement in subsidies-backed projects, still widely available, profitable and bankable, and see limited benefits in making the effort to look at CPPA-backed projects
 - Investors and lenders are starting to familiarise themselves with CPPAs but still lack the necessary tools to assess and price CPPA credit risk
- 
 - CPPA documentation lacks standardisation, particularly on the following terms still subject to long negotiations:
 - Strike price negotiations; Contract tenor; Risk-sharing arrangements; Transaction costs;
 - Some guidance is now being developed to help players get more comfortable with Corporate PPAs:
 - Wind association FEE has issued a standard for CPPAs
 - La Plateforme Verte has released a CPPA Guide for negotiating and drafting CPPAs



RE lacks competitiveness, with CPPAs providing few incentives for offtakers

To increase the pool of corporate buyers, CPPA prices will need to become competitive with wholesales prices and development processes to be more streamlined

Competitiveness of RE








- 
 - The current status and characteristics of RE assets in France do not favour the growth of CPPAs
 - LCOE of RE assets in France remains high, requiring high guaranteed prices to be profitable, very often higher than currently available CPPA strikes, forcing producers to stick to auctions
 - The French market is fragmented with the majority of projects being relatively small (c. 8-12MW) and production volumes aggregation is not available yet to meet the buyer's electricity demand
 - Long development timelines and perception of acute development and permitting risks in France bring complexity to CPPA negotiations, with buyers not set to assess and take these risks
 - 
 - Buyers have limited financial incentives to enter into CPPAs in France
 - CPPA prices are still perceived as too high for large industrials that prefer to take on some price risk
-

Green incentives

- 
 - Many French firms have set RE targets but are yet to incorporate CPPAs in their strategy
 - French RE100 members already pledged to have c.4.6TWh sourced from RE power
 - More than half of this will come from certificate purchase with the remaining 2.1TWh still outstanding and only 10GWh would come from PPAs
 - 
 - CPPA have limited green benefits in France compared to neighbouring countries
 - French power mix carbon intensity is already very low due to a large nuclear power base, hence international offtakers will have limited environmental benefit when entering a CPPA in France
 - There aren't any regulatory incentive in place to encourage the use of CPPA
-




What CPPA development model for France

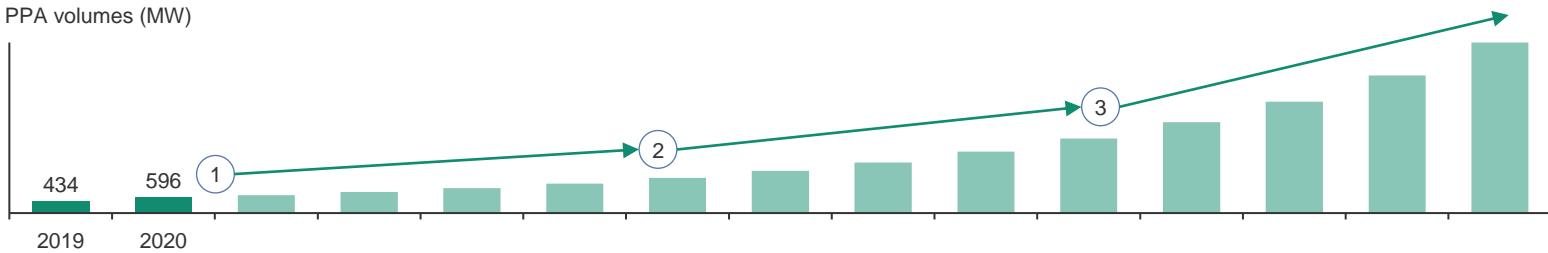
Different CPPA models have emerged in Europe when LCOE met wholesale prices

	Liquidity	Main structure	Similarities with French market	Differences with the French market
	<ul style="list-style-type: none"> Established market 	<ul style="list-style-type: none"> Synthetic 		<ul style="list-style-type: none"> ✗ Deregulated market ✗ Tax and regulatory incentives to motivate buyers ✗ No tariff-based subsidies ✗ Aggregation of buyers, buyers credit risk enhancement, revenue swap product ✗ Sizeable RE projects with low LCOE
	<ul style="list-style-type: none"> Established market 	<ul style="list-style-type: none"> Synthetic Sleeved 	<ul style="list-style-type: none"> ✓ Large multinationals and industrials base 	<ul style="list-style-type: none"> ✗ Low subsidies rates ✗ Sizeable RE projects with low LCOE ✗ Liquid trading market and market in contango
	<ul style="list-style-type: none"> Growing market 	<ul style="list-style-type: none"> Sleeved On site 	<ul style="list-style-type: none"> ✓ Large pool of SME and small individual RE projects ✓ Service oriented industry, green marketing (retailers, ...) 	<ul style="list-style-type: none"> ✗ Mature CPPA players ✗ Withdrawal of subsidies ✗ Bullish market price expectations (less bullish in France)
	<ul style="list-style-type: none"> Growing market 	<ul style="list-style-type: none"> Sleeved On site 	<ul style="list-style-type: none"> ✓ Industrials and SMEs 	<ul style="list-style-type: none"> ✗ Initially, IRR based guarantee with limited support ✗ Recent auction oversubscribed ✗ Regulatory purchase obligation for corporates ✗ Sophisticated base of investors and lenders, comfortable with CPPA and merchant risk ✗ Sizeable RE projects with low LCOE
	<ul style="list-style-type: none"> Growing market 	<ul style="list-style-type: none"> Sleeved On site 	<ul style="list-style-type: none"> ✓ Numerous credit worthy offtakers with significant power needs 	<ul style="list-style-type: none"> ✗ FiP subsidy offering flexibility to combine with CPPA ✗ Tariff-secured projects allow to transfer GoOs ✗ No need for sleever with the grid taking this role
	<ul style="list-style-type: none"> Nascent market 	<ul style="list-style-type: none"> Sleeved 	<ul style="list-style-type: none"> ✓ CfD in place 	<ul style="list-style-type: none"> ✗ Highly carbon intensive fuel mix ✗ Very high prices that have been rising ✗ Volatile prices
	<ul style="list-style-type: none"> Nascent market 	<ul style="list-style-type: none"> On site 	<ul style="list-style-type: none"> ✓ CfD in place with land constraints for PV projects ✓ Numerous SMEs and a lack of large corporates 	

A continued decline in the LCOE of RE projects should kick off the growth of CPPAs

Growth of CPPAs is contingent on a decline in both subsidy and LCOE for RE projects

Stage	1 Nascent PPA market	2 Maturing PPA market	3 Established PPA market
EU examples			
CPPA market dynamics	<ul style="list-style-type: none"> Limited supply of projects, with subsidies being the most profitable option 	<ul style="list-style-type: none"> CPPA as fair alternatives to subsidies, allowing for concrete benefits such as higher leverage 	<ul style="list-style-type: none"> Buyers constraints limiting the market, with alternative hedges available
Subsidy schemes and merchant risk	<ul style="list-style-type: none"> Subsidy requires that all electricity be purchased by the state utility and prevents the use of CPPAs Auction drive down subsidy levels 	<ul style="list-style-type: none"> Subsidy allows for a portion of the electricity to be purchased by third parties Subsidised projects bear some merchant risk 	<ul style="list-style-type: none"> N.A. or Certificates Projects fully exposed to merchant risk
Off-takers' type and motivations	<ul style="list-style-type: none"> Para-public and consumer centric companies to demonstrate their green commitments 	<ul style="list-style-type: none"> First tier industrials to save on energy bills or to hedge against future price increase Environmentally conscious offtakers 	<ul style="list-style-type: none"> Industrials to save on energy bills and/or hedge against power prices volatility Clubs of SMEs to save on energy prices
Sellers' type and alternatives	<ul style="list-style-type: none"> Greenfield projects not entitled to subsidies will look at CPPAs as alternative long term hedges Brownfield projects with repowering possibilities 	<ul style="list-style-type: none"> CPPA may provide a fair alternative to subsidies or can sometimes be on top of them 	<ul style="list-style-type: none"> No subsidies available hence producers need to hedge part of their production to reach bankability using <ul style="list-style-type: none"> Long term CPPAs Shorter hedging options (swap, futures)
Policies examples to drive CPPA growth	<ul style="list-style-type: none"> Excluding mature RE projects from auctions or lowering auctions caps <ul style="list-style-type: none"> Removal of subsidies in the UK Incentives to lower RE costs resulting in lower bids in auctions <ul style="list-style-type: none"> Tax and credit-based incentives (USA) 	<ul style="list-style-type: none"> Government have levers to foster CPPAs <ul style="list-style-type: none"> Transferring GoOs while receiving FIP (Netherlands) Constraining energy intensive companies to buy RE power (Spain) 	<ul style="list-style-type: none"> Support the development of alternative CPPA buyers (SMEs) <ul style="list-style-type: none"> Credit risk enhancement products (USA) Guarantees (Norway)

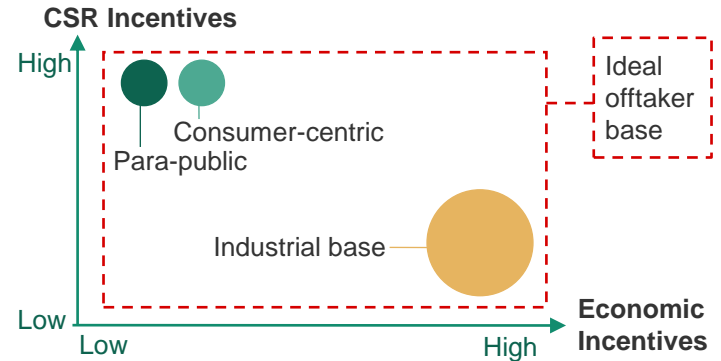


What potential for the CCPA market in France?

The French CCPA market will be able to rely on a favourable business environment to expand once market and regulatory barriers are removed

More established CCPA markets suggest that 40% of the RE projects capacity buildout could be supported by CPPAs

- As of 2021, offtake demand for CPPAs largely exceeds supply, creating strong levers for RE pipelines to enter CPPAs which forecasts a positive outlook for France
 - For the first time in Dec-20, a PPA with an industrial offtaker was signed in France, between Amazon and Engie for the output of a 15MW solar farm
 - Power intensive companies are also starting to turn to offtake tenders to source long term contracts
- Once the gap between LCOE and wholesale power prices narrows (helped by lower costs and by a more efficient market without ARENH), auction prices will naturally align with market incentivising producers to enter into CPPAs



France PPA market potential

	Maturing CCPA market		Established CCPA market		France ²		
EU markets							
RE Buildout (2019-20)	11.3GW	1.5GW	6.6GW	48.9GW	4.3GW		
CCPA ¹ (2019-20)	5.0GW	0.6GW	2.5GW	20.8GW	0.4GW		
[Buildout] / [CCPA]	44%	40%	38%	43%	9%		

- We are seeing a growing appetite for PPA in France, from developers with greenfield projects not eligible for auctions and end of tariff brownfield wind assets
 - Plants built on restricted land areas remain excluded from the auctions and are expected to continue driving French CPPAs going forward
 - Aggregators could help widen the pool of offtakers, as short tenors associated with brownfield PPAs allow for lower credit constraints
- Established CCPA markets have shown that 40% of new RE additions could be built under CPPAs, which prospects huge growth opportunities for the French market
 - BNEF forecasts RE additional capacity to reach 3.5GWp.a. in France over the next two years

Note: 1. For long term onshore wind and solar PV CPPAs; 2. Excluding short term brownfield CCPA that are not accounted for other countries

Appendix 1: Main CPPA structures

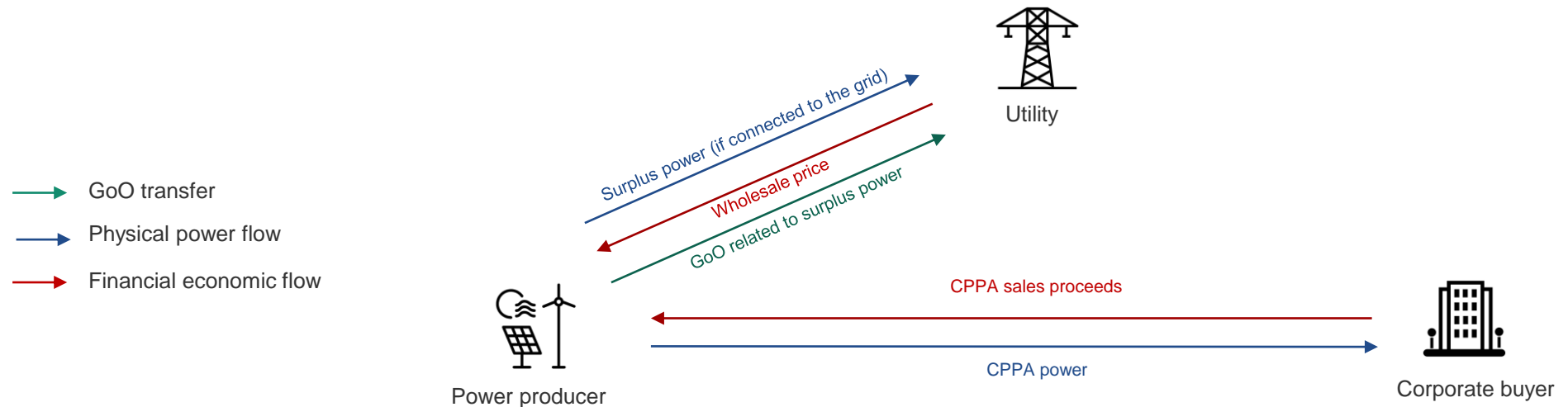
The on-site CPPA

The on-site CPPA is the simplest form of CPPA, but presents strict geographic constraints

There are no GoOs generated by the self-consumed power under the CPPAs

Definition and illustration

- On-site CPPA establish a direct connection between the power producer and the corporate buyer of electricity, and allows for direct physical flows between the parties without intermediary
- The power generating site is located on the premises of the corporate buyer or nearby, relying in this latter case on a private-wire connection (behind-the-meter CPPA)
- The power installation could be self-owned by the corporate buyer, leased or contracted from a third party owning and managing it
- The power installation would typically be sized to meet 100% of the corporate's buyer needs, with any excess power possibly sold to the market subject to grid access
- There is no GoOs generated by the power self-consumed or sold behind the meter



Note: for the purpose of this presentation the above illustration is simplified and may vary

The sleeved CPPA

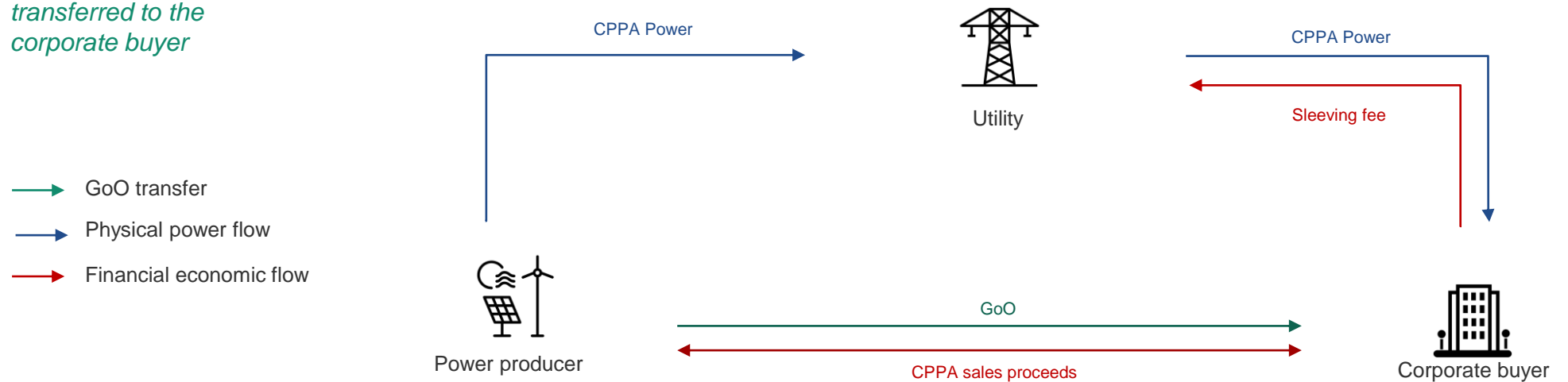
Sleeved CPPA can be referred to as a physical offsite CPPA and is the main model in Europe

A third party is required to physically transfer the power

GoOs are bundled with the power and transferred to the corporate buyer

Definition and illustration

- A sleeved PPA involves a physical transfer of power between the power producer and the corporate buyer via the electricity grid, as the power producer does not have the capacity to actually deliver the power to the buyer
- A third-party, typically a utility (the “Sleever”), acts as the buyer’s agent to allow for grid access and balancing services against a sleeving fee, transferring the balancing obligations and liabilities of the power producer to the utility
- The Sleever bears the price risk created by the necessity to buy or sell additional electricity in the spot market to match CPPA contractual volume obligations can vary, depending on CPPA terms
- GoOs are attached to the power delivered and transferred to the corporate buyer as part of the CPPA



Note: for the purpose of this presentation the above illustration is simplified and may vary

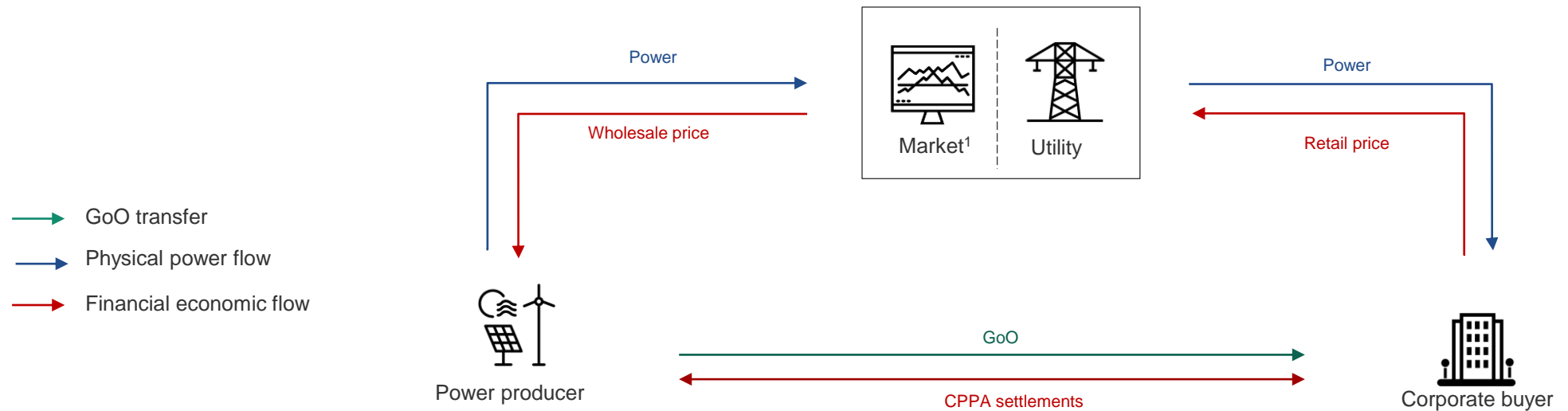
The synthetic CPPA

Synthetic CPPA can also be referred as financial CPPA

Synthetic CPPA are comparable to a financial derivative, with no physical flows except for the GoO

Definition and illustration

- Synthetic CPPA take the form of a financial derivative or a contract for difference, whereby the parties pay the difference between a negotiated reference price (strike price) and, in general, a market price, for a certain volume of MWh produced and sold on the market (the “CPPA settlements”)
- The power producer sell its power to, and the corporate buyer buy its power from, the market
- There is no physical transfer of power between the CPPA parties, which as a result can be located anywhere
- The synthetic CPPA may be considered as a derivative under IFRS9 or as a lease under IFRS 16, potentially impacting significantly the buyer’s balance sheets
- GoOs are attached to the power delivered and transferred to the corporate buyer as part of the CPPA



Note: for the purpose of this presentation the above illustration is simplified and may vary; 1. usually through a trader or an aggregator