

The European *CPPA* Barometer

Real power matters

H2 2023



Capgemini  invent

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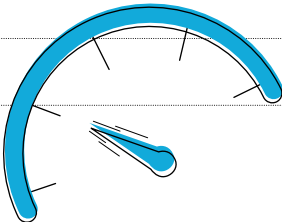
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Introduction

To meet their Sustainability targets and protect themselves against the price volatility in energy markets, an increasing number of companies across Europe pay close attention to Corporate Power Purchase Agreements (CPPAs). The agreements are direct contracts between a producer and a consumer to secure a supply of high-quality green energy at a fixed price for the long-term.

Capgemini Invent's **European CPPA Barometer** is a comprehensive report on the latest deals and trends, bringing more transparency to this dynamic market composed of over-the-counter contracts.



After record-breaking highs in 2022 led many corporates to turn to these contracts, the subsequent return to much lower power market prices in 2023 could have caused a slowdown in CPPA activity in Europe. Yet, to the contrary, offtakers showed an **unprecedented appetite** throughout the year.

After spectacular level of activity at the beginning of the year, a **consistently high number of new deals** was observed during the second semester (98 CPPAs vs. 117 in H1 2023); although, these were for a lower total volume (+10.5 TWh/y

announced vs. +21.6 TWh/y in H1 2023) as the sector continued to open up to medium-size consumers.

Almost all countries on the panel experienced vigorous levels of activity, be they the usual leaders (such as the Nordics) or the historically smaller markets (such as Italy). Still, as in each edition, Spain remains on top of the podium, with ever more large-scale cross-border PPAs being signed to leverage the country's competitive conditions. It is for this reason our testimony in this edition of the Barometer comes from Ignis, a global developer of renewable assets.



Methodology

The main section of the Barometer (p.5-19) covers the CPPA activity of 13 European countries during the Semester.

France is also covered in detail in the Baromètre des Achats d'Énergie Verte, a quarterly green sourcing report published in parallel: <https://www.capgemini.com/fr-fr/perspectives/publications/barometre-achats-energie-verte-france/>

Only CPPAs that have been publicly announced are listed in the Barometer. All figures are public data, shared by the corporations in official press releases. In some cases, the annual volume of a CPPA has been estimated using the official capacity figure and an estimate of the country's technological capacity factor: such estimated volumes are indicated with an "(e)". Characteristics that remain unknown and without the possibility to make an estimate are indicated with "Unknown".

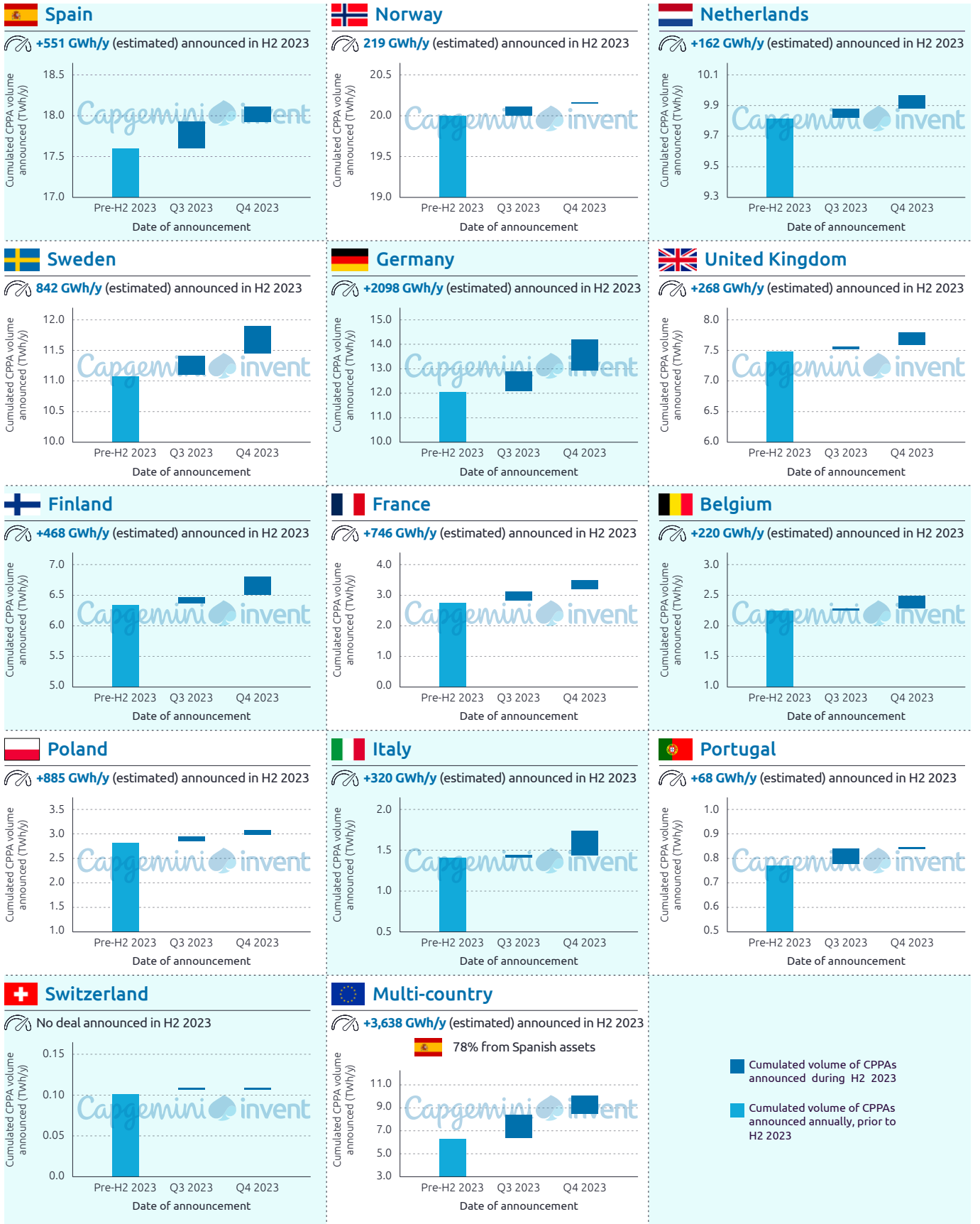
CPPAs referred to as "Greenfield" are based on new renewable energy production plants, under development at the time of the signature. "Brownfield" CPPAs are based on already existing assets, typically leaving the public feed-in

tariff mechanism. In some cases, a CPPA covers both types of asset (or transitions from Brownfield to Greenfield during the contract), while in others the type of asset has not been officially disclosed.

Onsite PPAs (for self-consumption) and Utility PPAs (for reselling and trading of renewable power) are not covered by this Report.

Cross-border CPPA volumes are accounted for in the Offtaker's country (e.g., a CPPA signed for a Sweden-based asset to cover energy consumption in Norway is accounted for in Norway). The many explicitly pan-European CPPAs are studied in the "multi-country" category (p.19).


H2 2023 activity in national CPPA markets



Spain

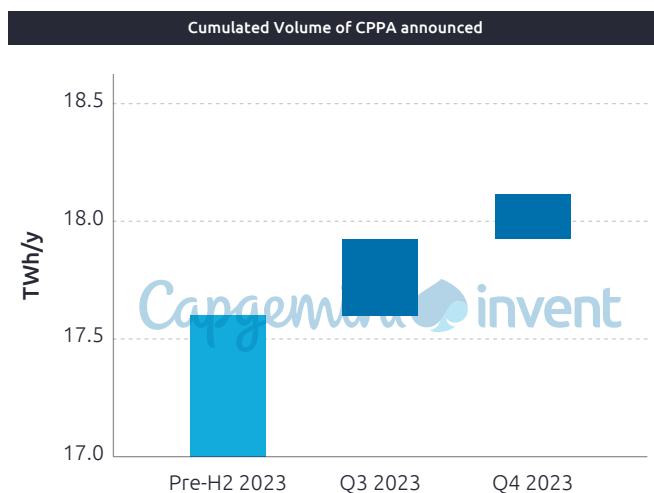
Corporate PPA activity in the semester: H2 2023

 **9 deals**
announced during H2






 **551 GWh/y**
of cumulative volume (estimated) announced during H2

 **95%**
of greenfield CPPA volume announced during H2

Ramp-up of CPPA announced



Deals announced during the semester

	Type	Producer	Offtaker	Volume	Duration	Energy
Jul.	Greenfield	Iberdrola	Vodafone	280 GWh/y	Unknown	
Aug.	Brownfield	EDP	Resonac Graphite	Unknown	10 years	Renewable Energy
Sep.	Greenfield	Soltec	Unnamed investment grade company	43 GWh/y(e)	Unknown	
Nov.	Brownfield	Iberdrola	Adif Alta Velocidad	28 GWh/y	2 years	Renewable energy
	Greenfield	Statkraft	Mondelēz	100 GWh/y	11 years	
Dec.	Greenfield	ABO Wind	Unnamed US Tech company	100 GWh/y	10 years	
	Unknown	Statkraft, via Fortia Energia	Aludium	Unknown	10 years	Renewable energy
	Greenfield	Axpo	Towa International	Unknown	Unknown	
	Unknown	Statkraft	Mercadona	Unknown	10 years	Renewable energy

Plus 10 pan - European VPPAs based on Spanish assets signed during the semester (total of 2,820 GWh/y); see p.19

Spain started to take the helm of the European CPPA market around 2020. Since then, it has solidified its position, both in terms of cumulated volume and the sheer number of deals.

H2 2023 continued the trend, with numerous new announcements based on greenfield solar projects, involving experienced players and newcomers on both the buyers' and sellers' side.


However, a new trend is observed, detailed in the multi-country section (p.19). More and more pan-European virtual PPAs are being signed by large international groups. Moreover, thanks to ideal production conditions and competitive cost, almost all of them are based on assets in Spain. You can read our interview with developer Ignis about this phenomenon in p.20-21.

- *Iberdrola signed new contracts with Vodafone Spain (the offtaker signed separate PPAs for its needs in Spain, Germany, and Portugal) and State-owned railway company, Adif Alta Velocidad.*
- *Statkraft also announced multiple PPAs throughout the semester, with Mondelēz International, Aludium, and Mercadona.*
- *Other contracts of the period include EDP's PPA with Resonac Graphite Spain and Axpo's deal to cover 70% of Towa's center in Barcelona. ABO Wind and Soltec announced significant solar volumes as well, though the names of their offtakers were not disclosed.*

Norway

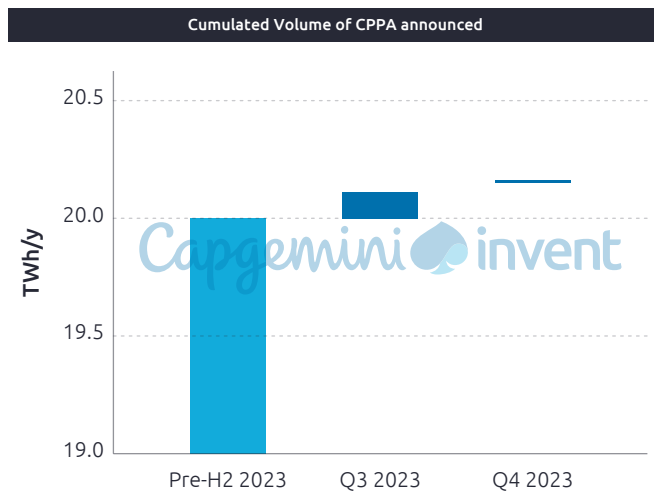
Corporate PPA activity in the semester: H2 2023

 **3 deals**
announced during H2


 **219 GWh/y**
of cumulative volume (estimated) announced during H2

 **N/A**
of greenfield CPPA volume announced during H2

Ramp-up of CPPA announced



Deals announced during the semester

	Type	Producer	Offtaker	Volume	Duration	Energy
Jul.	Unknown	Aker Horizons	Statkraft	Unknown	10 years	Renewable Energy
Sep.	Unknown	Hydro	Alpiq	131 GWh/y	9 years	Renewable Energy
Oct.	Unknown	Borregaard	ÅEnergi	88 GWh/y	10 years	

After a strong level of activity witnessed in the previous semester, H2 2023 saw fewer signatures in Norway, driven by energy-intensive industrial offtakers. Volumes per deal remained high, especially in comparison with other countries, leveraging on the hydropower resources of Norway.


Statkraft continues to be a major provider of PPAs in the country. It was joined during the semester by two other utility companies.

- *Aker Horizons signed a 10-year PPA with Statkraft to supply energy to its green ammonia plant under development in Narvik. The agreement will bring green electrons and price predictability to one of the first large-scale facilities of its kind in Europe.*
- *Aluminium producer, Hydro, already one of the most experienced offtakers in this market, announced another PPA with Alpiq for 1.18 TWh during 2024-2032. This was to continue reducing the carbon footprint of its production activities.*
- *Biorefineries operator, Borregaard, signed a long-term PPA with Å Energi to receive 88 GWh annually for its Sarpsborg facility.*

Netherlands

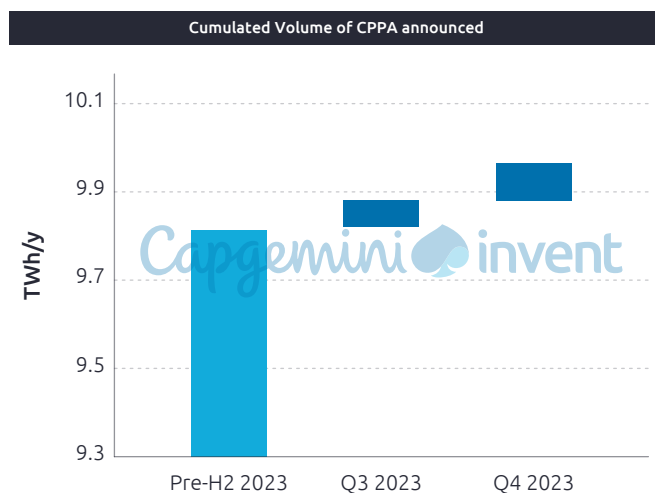
Corporate PPA activity in the semester: H2 2023

 **7 deals**
announced during H2








 **162 GWh/y**
of cumulative volume (estimated) announced during H2

 **100%**
of greenfield CPPA volume announced during H2

Ramp-up of CPPA announced



Deals announced during the semester

	Type	Producer	Offtaker	Volume	Duration	Energy
Jul.	Greenfield	Grosch (Asahi)	AMPYR	23 GWh/y	Unknown	
Sep.	Greenfield	Nobian	Axpo, via Wircon	17 GWh/y	15 years	
	Greenfield	Lidl	Meewind	19 GWh/y	10 years	
Nov.	Greenfield	Xidoor	GLP Green Energy	3 GWh/y	15 years	
	Greenfield	Allego	Energy Solution Group	100 GWh/y for both PPAs	10 years	
	Greenfield	Allego	Energy Solution Group		10 years	
Dec.	Greenfield	Albert Heijn	Eneco	Unknown	15 years	

After little activity during H1 2023, except for one massive contract announced by Google, the second semester saw smaller but more frequent CPPAs in the Netherlands.


Small greenfield solar deals (including intra-country Virtual PPAs) are now commonplace, after being practically non-existent during most of the long history of this PPA market.

- *The Dutch CPPA market is usually characterized by a few large offshore wind deals, representing most of the volumes announced. During H2 2023, one such deal was signed between supermarket chain, Albert Heijn, and provider, Eneco, based on the 760-MW Ecowende farm to be commissioned by the end of 2026.*
- *The rest of the activity was driven by numerous smaller PV-based contracts, signed with buyers from various sectors: food and beverage, chemicals, retail, etc.*

Sweden

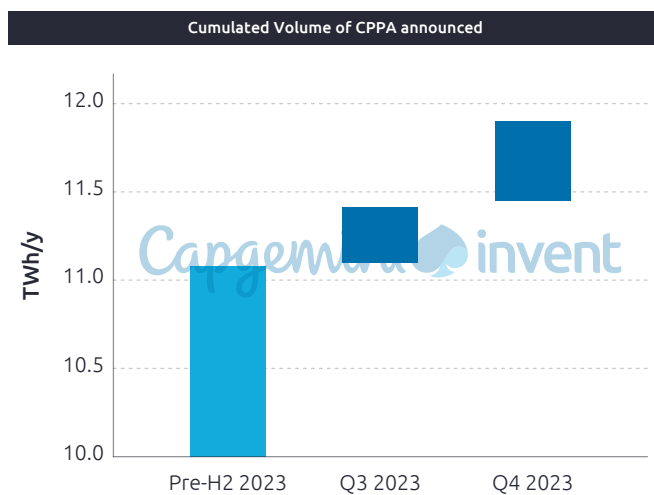
Corporate PPA activity in the semester: H2 2023

 **6 deals**
announced during H2





 **842 GWh/y**
of cumulative volume (estimated)
announced during H2

 **96%**
of greenfield CPPA volume
announced during H2

Ramp-up of CPPA announced



Deals announced during the semester

	Type	Producer	Offtaker	Volume	Duration	Energy
Jul.	Brownfield	Rottneros	EnBW	30 GWh/y	8.5 years	
Aug.	Greenfield	AstraZeneca	Statkraft	200 GWh/y	10 years	
Sep.	Greenfield	Arla	Svea Solar	100 GWh/y	10 years	
Oct.	Unknown	Hydro	Fortum	440 GWh/y	13 years	Renewable energy
	Greenfield	Volvo	Eolus	Unknown	Unknown	
Dec.	Greenfield	Equinix	Neoen	72 GWh/y (e)	Unknown	

H1 2023 was particularly impressive for the Swedish CPPA market, mainly due to the record-breaking agreement between Fortum and H2 Green Steel.

H2 2023 lacked a similar multi-TWh deal but saw a stable number of new contracts from a diverse panel of producers. It also still scored one of the highest cumulated volumes among the panel.

Most deals were greenfield and, though they remain rare as of now, the trend of large-scale solar-based deals slowly started to emerge.

- *Greenfield offshore wind PPAs were announced near the end of the year, with Volvo signing with Eolus and Equinix with Neoen.*
- *EnBW and Statkraft disclosed onshore wind PPAs respectively with market pulp producer, Rottneros, and biotechnology company, AstraZeneca, the latter to cover 80% of its needs in Gothenburg and Södertälje.*
- *Svea Solar signed with dairy cooperative, Arla, the largest solar PPA in Sweden to date: 100 GWh/y in volume from a newly-built park will cover about half of the off-taker's needs in Sweden.*
- *Finally, Fortum is again providing the largest CPPA of the semester by signing with aluminum producer, Hydro, for the delivery of 0.44 TWh/y in Sweden.*

Germany

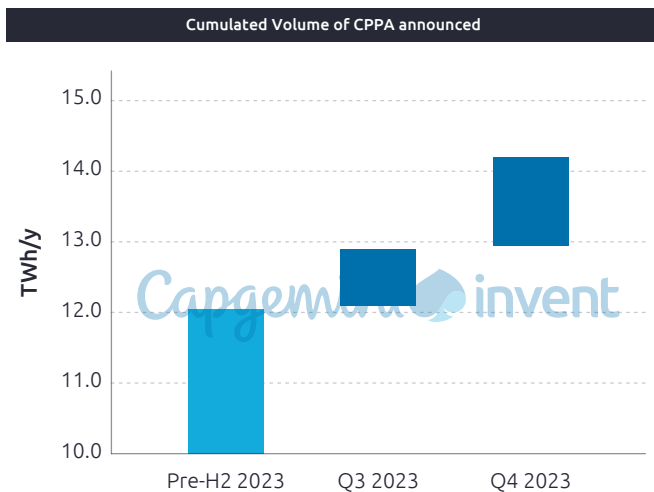
Corporate PPA activity in the semester: H2 2023

 **17 deals**
announced during H2

















 **2,098 GWh/y**
of cumulative volume (estimated) announced during H2

 **57%**
of greenfield CPPA volume announced during H2

Ramp-up of CPPA announced



Deals announced during the semester

	Type	Producer	Offtaker	Volume	Duration	Energy
Jul.	Greenfield	Vodafone	Iberdrola	62 GWh/y(e)	Unknown	
	Brownfield	Deutsche Bahn	Recap	18 GWh/y	2 years	
Aug.	Greenfield	Allego	Encavis	72 GWh/y	10 years	
	Brownfield	Deutsche Bahn	Centrica	70 GWh/y	2 years	
Sep.	Greenfield	Microsoft	Shell Energy, via Hansainvest	356 GWh/y(e)	15 years	
	Greenfield	Deutsche Telekom	Vattenfall	87 GWh/y(e)	10 years	
	Mix	Zeiss	Statkraft	73 GWh/y	11 years	
Oct.	Greenfield	TMD	Iberdrola	50 GWh/y	15 years	
	Mix	Daimler Truck	Statkraft	Unknown	Unknown	
	Greenfield	Salzgitter	Friesen Elektra	88 GWh/y(e)	N/A	
	Brownfield	Unnamed (green H2 facility)	Consortium (WPD, Schröder's Greencoat, EWZ, Industrielle Pensions, CTRG, Pacific...)	700 GWh/y(e)	6.5 years	
Nov.	Greenfield	Deutsche Telekom	EnBW	339 GWh/y(e)	15 years	
	Unknown	Gerresheimer	PNE	35 GWh/y(e)	Unknown	
Dec.	Unknown	Messer	Südwerk, via Axpo	Unknown	Unknown	
	Greenfield	Messer	Südwerk, via Axpo	40 GWh/y	3 years	
	Greenfield	Deutsche Bahn	MVV	40 GWh/y	4 years	

Germany solidified its position as the second most active CPPA market across Europe behind Spain, with the second-highest number of new deals and record-level volumes.


In addition to its sheer scale, this market is characterized by its diversity. Offshore wind drew attention in H1 2023, thanks to some colossal agreements. However, smaller-scale onshore wind and solar PPAs are signed very frequently for existing or new plants. Deals can be signed for shorter or longer durations than the 10 years usually found in the rest of the panel. Finally, multiple energy-intensive sectors are represented on the off-takers' side (transport, chemicals, steel, telecom, hydrogen, etc.), sometimes through multi-buyer structures.

- *The majority of the deals announced during the semester were based on greenfield solar PV projects. They included the single largest solar CPPA in the country, a 323-MW back-to-back agreement involving Microsoft, Shell, and HANSAINVEST Real Assets.*
- *As in the previous semester, a few offshore wind deals generated most of the volumes. In particular, an unnamed green hydrogen producer secured a significant share of the production of the 288-MW Butendiek farm, commissioned in 2015 and owned by a consortium of investors.*
- *Some buyers (Deutsche Bahn, Deutsche Telekom, and Messer) actually signed several PPAs successively during the semester, with varying technologies, durations, and volumes.*

United Kingdom

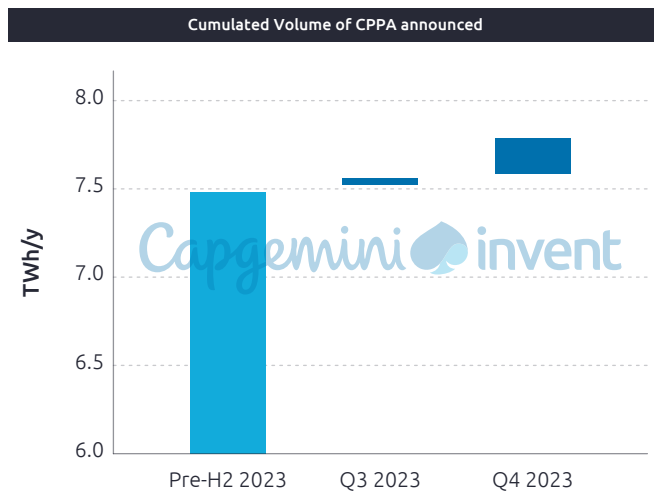
Corporate PPA activity in the semester: H2 2023

 **6 deals**
announced during H2







 **268 GWh/y**
of cumulative volume (estimated) announced during H2

 **100%**
of greenfield CPPA volume announced during H2

Ramp-up of CPPA announced



Deals announced during the semester

	Type	Producer	Offtaker	Volume	Duration	Energy
Jul.	Greenfield	Britvic	Atrato	33 GWh/y	10 years	
	Greenfield	Arla	Engie & Infinis	23 GWh/y	Unknown	
Oct.	Greenfield	Sainsbury's	Capital Dynamics	150 GWh/y	15 years	
Nov.	Greenfield	Multiplex	AMPYR	9 GWh/y	Unknown	
	Greenfield	Co-op	Volitalia	34 GWh/y	15 years	
Dec.	Greenfield	Workspace Group	Statkraft	18 GWh/y (e)	10 years	

The British market saw slightly less deals during the semester than during H1 2023.

Total volumes also decreased but this is mostly due to the increasing share of small-size solar-based PPAs, as opposed to the massive onshore wind agreements, which were initially the norm for the country.


As new offtakers with lower electricity consumption enter the market, the production of these smaller plants (sometimes supplied as a baseload) is enough to cover a significant share of their needs.

- *Most of the volumes announced during H2 2023 come from the PPA signed by Capital Dynamics. This is for a newly built large-scale wind farm that will cover a third of Sainsbury's electricity needs in the UK.*
- *All other CPPAs in the semester were smaller greenfield solar-based deals. For instance, soft drinks company, Britvic, will cover 75% of its electricity needs in the country following its contract with Atrato. Dairy cooperative, Arla, secured 30% of its consumption needs with Engie. Consumer cooperative, Co-op, agreed 7.5% with Volitalia.*

Finland

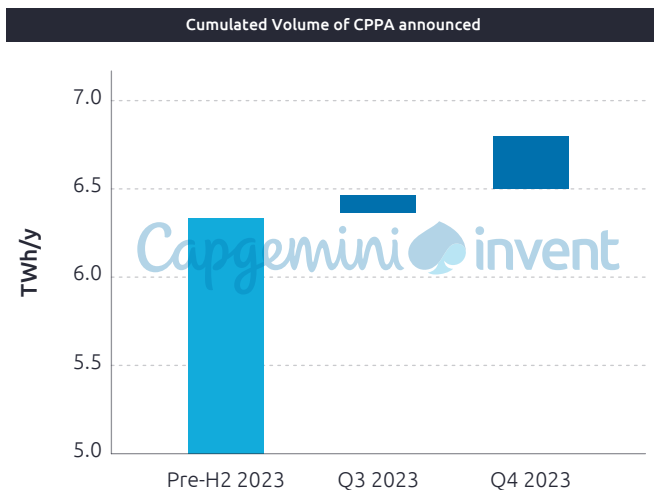
Corporate PPA activity in the semester: H2 2023

 **6 deals**
announced during H2







 **468 GWh/y**
of cumulative volume (estimated) announced during H2

 **100%**
of greenfield CPPA volume announced during H2

Ramp-up of CPPA announced



Deals announced during the semester

	Type	Producer	Offtaker	Volume	Duration	Energy
Jul.	Greenfield	Telenor	Statkraft	94 GWh/y(e)	10 years	
Sep.	Greenfield	Pilkington Automotive	Axpo	35 GWh/y	8 years	
Oct.	Greenfield	Borealis	Alpiq	90 GWh/y	9 years	
Nov.	Greenfield	Neste	CPC	24 GWh/y	Unknown	
	Greenfield	Mondelēz	Ilmatar Energy	125 GWh/y	10 years	
Dec.	Greenfield	Unnamed US Tech Company	ABO Wind	100 GWh/y	10 years	

After little activity during the first semester, the Finnish CPPA market accelerated in H2 with twice as many deals and volumes.

As observed in previous periods, all agreements were signed between corporations already familiar with the market. The deals were based on greenfield onshore wind assets, with the notable exception of one solar PPA.


- *Statkraft will cover 80% of the consumption of Telenor’s Finnish subsidiary, DNA.*
- *Pilkington Automotive secured green energy from Axpo for its glass manufacturing plants in the country.*
- *Following other CPPAs in the Nordics in the past two years, Borealis signed a contract with Alpiq to provide green energy for its chemical production facilities in Porvoo.*

- *After multiple previous PPAs in Finland, Ilmatar secured Mondelēz as the offtaker of its new Korpilevonmäki wind farm currently under construction.*
- *ABO Wind signed a PPA with an undisclosed US tech group based on a greenfield wind project in Northern Finland (plus another deal based on a Spanish solar asset with similar annual production, for the same unnamed offtaker).*
- *Finally, after several wind- and hydro-based agreements signed over the years, Neste announced a rare example of Finnish solar PPA. It will cover about 2% of the electricity needs of its Porvoo refinery.*

France

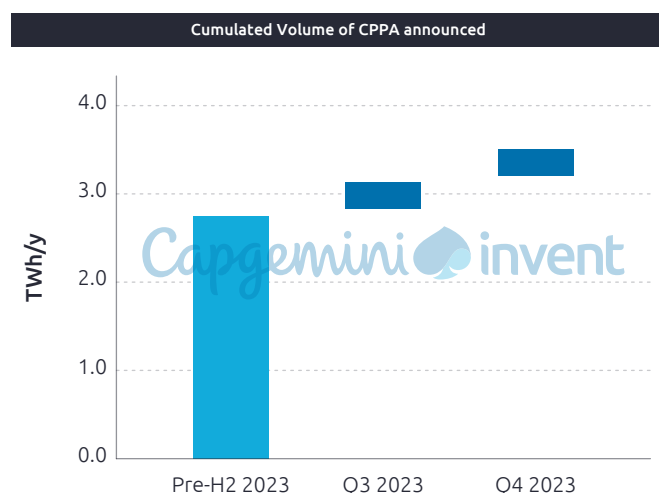
Corporate PPA activity in the semester: H2 2023

 **14 deals**
announced during H2















 **746 GWh/y**
of cumulative volume (estimated) announced during H2

 **89%**
of greenfield CPPA volume announced during H2

Ramp-up of CPPA announced



Deals announced during the semester

	Type	Producer	Offtaker	Volume	Duration	Energy
Jul.	Greenfield	Les Mousquetaires	TSE	141 GWh/y	15 years	
	Greenfield	SNCF	CNR	88 GWh/y	25 years	
	Greenfield	SNCF	Volitalia	78 GWh/y	25 years	
Sep.	Brownfield	Metro	Eurowatt	25 GWh/y	10 years	
	Brownfield	Lhyfe	VSB	27 GWh/y	16 years	
	Greenfield	Plastic Omnium	EDF Renouvelables	45 GWh/y	20 years	
Oct.	Greenfield	Agrial	TSE	36 GWh/y	20 years	
	Greenfield	Bonduelle	Arkolia	12 GWh/y	20 years	
	Greenfield	Lhyfe	Kallista	46 GWh/y	15 years	
Nov.	Greenfield	Saint Gobain	Alpiq	36 GWh/y	14 years	
	Greenfield	Auchan	Borex	60 GWh/y	20 years	
	Brownfield	Auchan	Borex	32 GWh/y(e)	3 years	
	Greenfield	Les Mousquetaires	Kallista	100 GWh/y	20 years	
Dec.	Greenfield	Arkema	EDF Renouvelables	20 GWh/y	20 years	

With spectacular acceleration in 2023, France, along with Spain and Germany, scored one of the highest number of deal, though the cumulated volume remained small.

CPPAs in H2 2023 continued the tradition of individually small deals, almost exclusively based on new assets, with much longer durations than in other countries on the panel.


However, several evolutions were noticed during the semester. Greenfield wind deals, appearing for the first time in the country early in 2023, are becoming commonplace. Additionally, the first PPA backed by the guarantee fund from Bpifrance was signed. It is hoped that this public support, as in Norway and Spain, will encourage developers and their banks to accept more diverse profiles of offtakers.

- *Greenfield wind deals represent an increasing share of the French market: non-existent in previous years, they accounted for most of the volumes signed during the semester. Many developers, such as CNR, Volitalia, Eurowatt, VSB, Kallista, and Borex are now using such contracts to secure financing for new constructions or repowering projects. This technology is a welcome addition to the PPA portfolio of many offtakers (SNCF, Metro, Lhyfe, Auchan, and Les Mousquetaires), complementing the production shape of the solar contracts they had signed previously.*
- *Many classic greenfield solar PPAs continue to be signed in parallel by such experienced developers as EDF Renouvelables, Alpiq, and TSE. In particular, the PPA signed by Arkolia and Bonduelle marks the first application of Bpifrance's guarantee fund scheme.*

Belgium

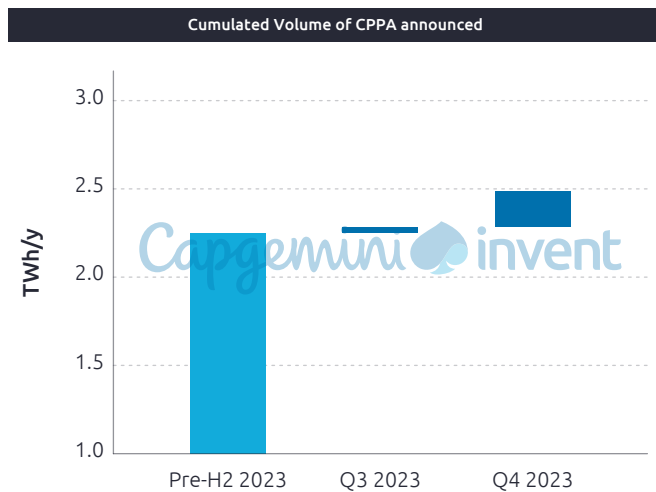
Corporate PPA activity in the semester: H2 2023

 **8 deals**
announced during H2









 **220 GWh/y**
of cumulative volume (estimated)
announced during H2

 **27%**
of greenfield CPPA volume
announced during H2

Ramp-up of CPPA announced



Deals announced during the semester

	Type	Producer	Offtaker	Volume	Duration	Energy
Oct.	Brownfield	Aluminium Duffel	Engie	161 GWh/y in total for Engie's 5 PPAs	5 years	
	Brownfield	Umicore	Engie		5 years	
	Brownfield	Agristo	Engie		5 years	
	Brownfield	Pfizer Puurs	Engie		5 years	
	Brownfield	Proximus	Engie		5 years	
	Greenfield	Umicore	Storm	16 GWh/y	25 years	
	Greenfield	Capgemini	Storm	30 GWh/y	20 years	
	Greenfield	Umicore	Storm	13 GWh/y	20 years	

CPPAs are observed less frequently in Belgium than in other countries on the panel, with a dozen deals reported in previous years.


However, October 2023 was an unusually active month, with the signing of multiple PPAs from two sellers: Engie (splitting the production of a large offshore brownfield asset among five offtakers) and Storm (proposing several assets under construction or repowering to the buyer).

- *Engie signed five contracts with offtakers for a total of 161 GWh/y from its C-Power offshore wind site, in operation since 2013.*
- *Already among the buyers for Engie's asset, Umicore has also contracted multiple agreements with Storm. These are for offshore and onshore wind sites totaling 60 GWh/y, which is to be supplied by its facilities in the country. They comprise the longest PPA durations reported in Belgium.*

Poland

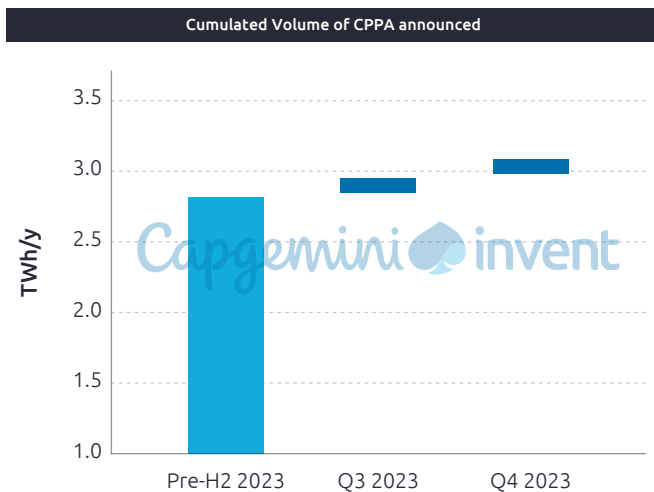
Corporate PPA activity in the semester: H2 2023

 **8 deals**
announced during H2

 **885 GWh/y**
of cumulative volume (estimated) announced during H2

 **100%**
of greenfield CPPA volume announced during H2

Ramp-up of CPPA announced



Deals announced during the semester

	Type	Producer	Offtaker	Volume	Duration	Energy
Jul.	Greenfield	Żabka	Qair	113 GWh/y	15 years	
Sep.	Greenfield	Microsoft	Lightsource BP	43 GWh/y(e)	Unknown	
Oct.	Greenfield	PURO	Polenergia	125 GWh/y(e)	10 years	
	Greenfield	PURO	Polenergia	48 GWh/y(e)	10 years	
	Greenfield	Orange	R.Power	60 GWh/y	10 years	
Nov.	Greenfield	Google Cloud	Polsat Plus Group	105 GWh/y	Unknown	
	Greenfield	Umicore	Ignitis Renewables	390 GWh/y(e)	10 years	
Nov.	Unknown	Cemex Polska	Statkraft	Unknown	8 years	

2023 marked a shift for the Polish market, which experienced almost 2 TWh/y worth of new PPAs. A multitude of players are entering the sector. On the sellers' side, they include international utilities, such as Statkraft, and national diversified corporations, such as Polsat Plus Group.

The second semester, despite a level of activity slightly below the dazzling start of the year, saw the signing of eight supply contracts, all in greenfield and involving both wind and solar.


Buyers in Poland increasingly see CPPAs as useful tools to reduce Scope 2 emissions, secure electricity supply, and stabilize the sourcing costs. These are all important factors in a country more dependent on fossil fuels than other EU States.

- *Nearly half of the volume of the semester came from the deal signed between Ignitis and Umicore: the new wind farm will supply 390 GWh per year over a decade to Umicore's sites.*
- *The independent French producer Qair signed a 15-year deal with retail group, Żabka, for a total of 1.7 TWh, based on both a wind farm and a solar asset.*
- *Polenergia signed PPAs with the PURO hotel chain to provide renewable energy for 10 years, notably from a 44-MW wind farm and a 45-MWp PV asset.*
- *Google signed its first PPA in Poland with Polsat Plus Group for the development of a 50.4-MW wind farm to be commissioned at the end of 2024.*
- *To provide renewable energy to its data center and telecom networks, Orange Polska signed a 10-year PPA with Polish solar developer, R.Power.*
- *Finally, Lightsource BP and Microsoft contracted a PPA (a first in the country for both corporations) based on a 40-MWc solar project.*

Italy

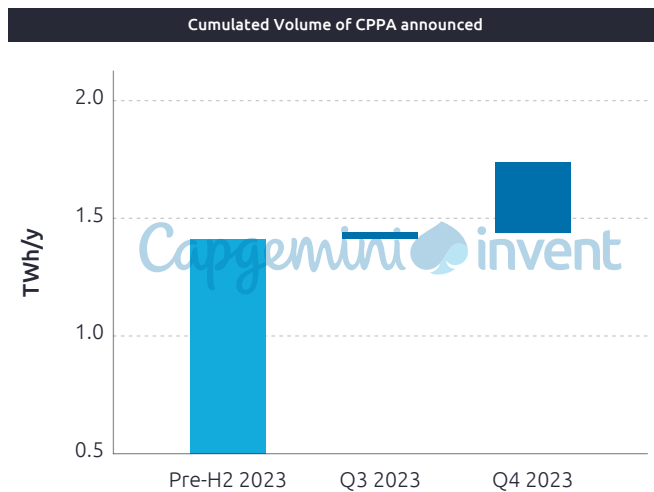
Corporate PPA activity in the semester: H2 2023

 **4 deals**
announced during H2





 **320 GWh/y**
of cumulative volume (estimated) announced during H2

 **100%**
of greenfield CPPA volume announced during H2

Ramp-up of CPPA announced



Deals announced during the semester

	Type	Producer	Offtaker	Volume	Duration	Energy
Oct.	Greenfield	Unnamed NYSE-listed company	Galileo	40 GWh/y	10 years	
	Greenfield	Chiesi	Statkraft	30 GWh/y	10 years	
Nov.	Brownfield	MIX	Solarpack Mirto	Unknown	5 years	
	Greenfield	ST Microelectronics	ERG	250 GWh/y	15 years	

As in the two previous semesters, four new CPPAs were announced in H2 2023 in Italy. Nonetheless, this represents an acceleration for the market in comparison with the bearish preceding years: the sector grows in maturity, longer durations are signed, and the cumulated volume of CPPAs in the country almost doubled in 2023.


This progress is made possible thanks to key large-scale wind-based deals, in addition to the traditional small solar-based PPAs.

- *STMicroelectronics and ERG signed the largest PPA of the year in Italy, based on two repowering wind projects that will deliver 3.75 TWh of renewable energy over 15 years for ST's operations in the country.*
- *Other CPPAs in the semester were shorter and smaller deals based on new solar plants, as frequently observed in previous periods. Chiesi signed with Statkraft and Galileo with an undisclosed corporation.*

Portugal

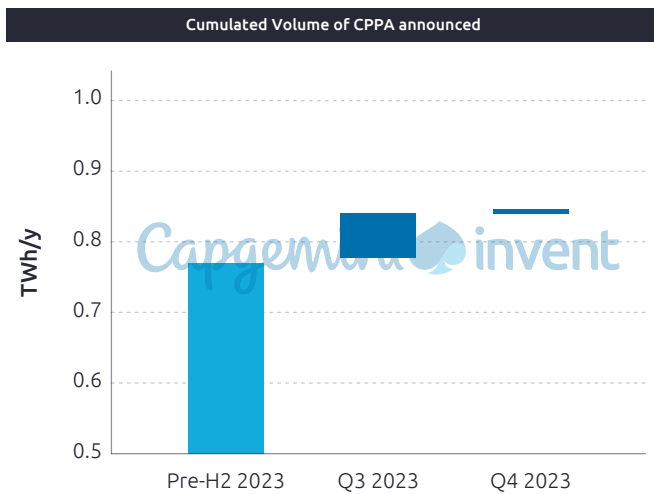
Corporate PPA activity in the semester: H2 2023

 **1 deal**
announced during H2


 **68 GWh/y**
of cumulative volume (estimated) announced during H2

 **100%**
of greenfield CPPA volume announced during H2

Ramp-up of CPPA announced



Deals announced during the semester

	Type	Producer	Offtaker	Volume	Duration	Energy
Jul.	Greenfield	Vodafone	Iberdrola	68 GWh/y(e)	Unknown	

Portugal remains one of the smallest markets on the panel, with little new activity observed during the second half of 2023. One CPPA covering consumption in the country was announced. With the asset being based in neighboring Spain, it is actually a cross-border deal.


Utility PPAs, which are not the focus of this report, are more commonplace than Corporate PPAs in Portugal. For instance, Statkraft announced several deals in H1 2023.

- *Telecom company, Vodafone, signed multiple country-specific PPAs with Iberdrola in July 2023. While its Spanish and German sister companies will receive energy from assets developed in their respective countries, the PPA for Vodafone Portugal is a cross-border agreement, involving a newly-built plant in Spain. The volume is estimated based on the known sum of all three PPAs and the data on the other two contracts.*

Switzerland

Corporate PPA activity in the semester: H2 2023

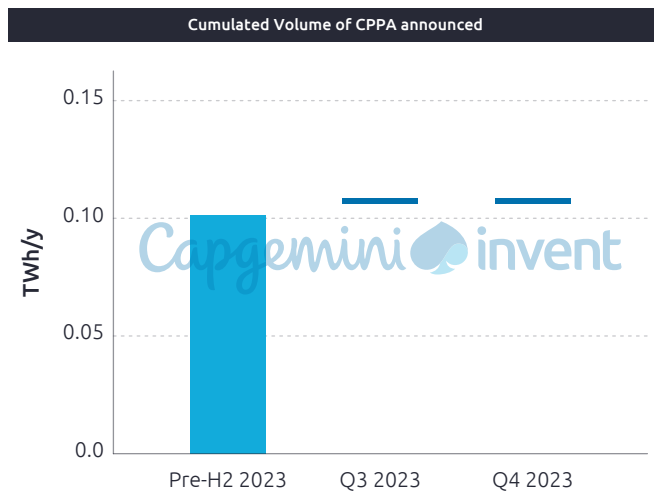
 **0 deals**
announced during H2

 **0 GWh/y**
of cumulative volume (estimated) announced during H2

 **0%**
of greenfield CPPA volume announced during H2

Ramp-up of CPPA announced

Deals announced during the semester



As in each edition, no new PPA activity is reported in the Swiss section of this Barometer.


Three years have passed since the last deals based on assets in the country without any subsequent announcement.

However, as was observed in H1 2023, it is possible some of the pan-European VPPAs studied in p.19 were used to cover the consumption of the offtakers' activities in Switzerland.

Multicountry

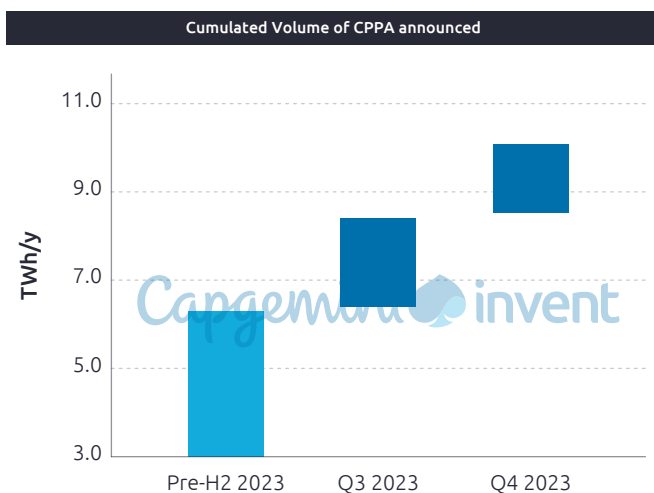
Corporate PPA activity in the semester: H2 2023

 **14 deals**
announced during H2

















 **3,638 GWh/y**
of cumulative volume (estimated) announced during H2

 **59%**
of greenfield CPPA volume announced during H2

Ramp-up of CPPA announced



Deals announced during the semester

	Type	Producer	Offtaker	Volume	Duration	Energy	Country of production
Jul.	Greenfield	Axa	Ignis	84 GWh/y	10 years		
	Greenfield	Alstom	Unnamed	160 GWh/y	10 years		
	Greenfield	Adidas	Enel	50 GWh/y	10 years		
Sep.	Greenfield	Grundfos	ABO Wind	263 GWh/y(e)	10 years		
	Mix	Amazon	FRV	1,500 GWh/y	Unknown		
Oct.	Greenfield	LyondellBasel	Lightsource BP	284 GWh/y	10 years		
	Greenfield	Fashion Pact (consortium)	Lightsource BP	Unknown	Unknown		
	Greenfield	Air Liquide	Vattenfall	544 GWh/y(e)	15 years		
Nov.	Greenfield	Merck	Renantis	100 GWh/y	10 years		
	Greenfield	Merck	Matrix Renewables	200 GWh/y	10 years		
Dec.	Greenfield	Thermo Fisher Scientific & Eurofins Scientific	Ibvogt	239 GWh/y	Unknown		
	Greenfield	Egmont	Axpo, via Soltech	11 GWh/y	7 years		
	Greenfield	Boston Scientific	BayWa r.e.	22 GWh/y(e)	10 years		
	Greenfield	Pfizer	Bruc Energy	181 GWh/y(e)	15 years		

The “multi-country” category includes cross-border PPAs, which are explicitly stated to cover the offtaker’s consumption in multiple European countries (virtual PPAs with no physical delivery). Groups of separate country-specific PPAs without enough data to analyze each one in its dedicated page are also studied here.

PPAs of this type are usually large-scale, pan-European deals based on greenfield solar PV projects in Spain: they allow international offtakers to secure enough volume at a low price to cover multiple locations with a single contract.

Though they had already been observed for several years, the trend accelerated in H2 2023. This is because many large groups signed their first PPA using this configuration. These massive deals ended up accounting for a third of all volumes announced across the Barometer’s panel during the semester.

- *Three quarters of the volumes in this category come from pan-European deals based on Spanish PV assets, usually of over 100 GWh/y. This group even includes the largest CPPA signed in 2023 in Europe: Amazon Web Services signed with FRV, part of Abdul Latif Jameel Energy, for five solar plants, totaling over 1.5 TWh of annual production.*
- *Massive multi-country PPAs have also been observed in the Nordics, leveraging the abundant wind resources. Water tech group, Grundfos, signed with ABO Wind to cover its operations across Europe. Air Liquide signed with Vattenfall for 70% of its electricity consumption in Benelux.*

Additionally, several large-scale CPPAs described in the previous pages may include such deals, without having been stated in the official announcement.



Interview: *Renewable energy* producer

The strong dynamism in Spain and the emergence of innovative pan-European VPPAs are among the main takeaways from the H2 2023 Barometer. To analyze the trend, we interviewed Ignis, a global developer of renewable assets experienced in such PPAs.

Santiago Bordiú

CEO, Asset and Energy Management
IGNIS

For several years, Spain has been one of the most active PPA markets in Europe: how do you analyze the current state of the sector in the country?

Historically, Spain has been one of the countries leading the renewable energy deployment in Europe. Now, the country also leads the renewable PPA market in the region. This is not only thanks to the favorable conditions of sun, wind, and land availability, but because of the strength and reliability of the Spanish power transmission network and the high-profile environment of companies and talent in the Spanish energy sector.

Energy buyers are increasingly interested in signing long-term renewable power agreements driven by their ESG commitments and an attempt to reduce the volatility of the electricity prices. Here, in Spain, these buyers can find some of the lowest PPA prices in Europe while securing the purchase of Guarantees of Origin (GoOs) on a long-term basis with no volatility.

The current status of the renewable energy sector in Spain is a positive factor, but we must be ambitious. Given the favorable structural conditions for renewable energy in Spain as a source of cheap, clean, and abundant energy, we believe that one of the key priorities at all levels should be to leverage this great advantage to boost industrial competitiveness and economic growth. The focus must be on fostering demand: retaining current electro-intensive industries with support mechanisms for their renewable PPAs, attracting high growth energy-intensive industries (e.g., Data centers), and promoting energy demand electrification (currently, only 20-25% of the final energy demand is consumed through electricity). PPAs will be the key tool to provide the long-term visibility that economic agents on the demand side require to make their investment decisions.

In 2023, Ignis signed cross-border, virtual PPAs with AXA and Lonza: can you tell us more about these deals and their place in your strategy?

During 2023, IGNIS reached the milestone of 1,000Mwp of PV projects under PPA. These PPAs have been executed with important players, such as AXA, Lonza, Equinix, and other outstanding confidential counterparts. These parties enable the financing of the solar projects linked to these contracts. This accomplishment is the result of IGNIS's strong commitment to supporting clients in the energy transition around the world.

For IGNIS, as a large global developer of renewable assets, PPAs are critical to the optimization of financing and protection of our returns as investors. Moreover, our approach as an integrated energy player, with 6,000+ MW currently operating under our management leveraging cutting-edge capabilities in terms of power markets participation, enables us to be very flexible and adapt to our client's needs. We can provide both physical and virtual PPAs (VPPAs) with a wide range of pricing structures, depending on the offtakers' preference (retailers, industrials, large European corporates, etc.).

The great majority of corporations looking for PPAs pursue renewable PPAs as a tool to meet their sustainability goals. Through these contracts, they secure the GoOs generated by the renewable projects under the PPAs while supporting the developer of such projects to obtain better financing conditions. As a result, they provide the supplementary options that many corporations are searching for.

The cross-border renewable VPPA enables the corporate buyer to benefit from GoOs produced by new renewable energy projects. These are installed at the European Union at the lowest price possible, no matter where their electricity consumption is located (thanks to the Association of Issuing Bodies (AIB) system). This mechanism has enhanced the corporate buyer's capabilities to negotiate PPAs in the most competitive markets (as in Spain) even while having delocalized consumption points in several European countries.

Today, many PPA offtakers in Europe are more accustomed to physical contracts than Virtual PPAs. What difficulties do you typically encounter when negotiating and implementing a VPPA in Spain?

Negotiating and implementing VPPAs can involve some challenges, such as more complex pricing structures or detailed assessment of accounting treatments to avoid unforeseen impacts in the Profit and Loss Account (P&L).

VPPAs often entail intricate pricing structures, such as indexing prices to market benchmarks, which require a profound comprehension of market dynamics for the establishment of a fair and mutually beneficial pricing mechanism. Settlement mechanisms in VPPAs differ from physical PPAs, involving financial settlements. This highlights the importance of establishing transparent and efficient mechanisms for both parties. Additionally, the accounting treatment of VPPAs can be complex, impacting financial reporting and requiring the PPA counterparties to align with accounting standards.

On the other hand, VPPAs enable corporations to sign PPAs with different developers regardless of their set up for the physical supply of electricity, providing a more flexible framework for consumers to hedge their energy price risk and secure the green origin of their power consumption.

Beyond the choice between virtual or physical structures, our view is that PPAs are complex contracts, the negotiation of which require the integration of different perspectives: energy management, development and construction, financing, accounting, regulation, and, of course, legal. With that in mind, IGNIS's approach has been to set up a strong internal PPA team, combining business and legal professionals capable of integrating all those perspectives and therefore able to successfully negotiate and execute PPAs in a very agile and flexible manner.

What would be your recommendations to a corporation starting to investigate PPAs?

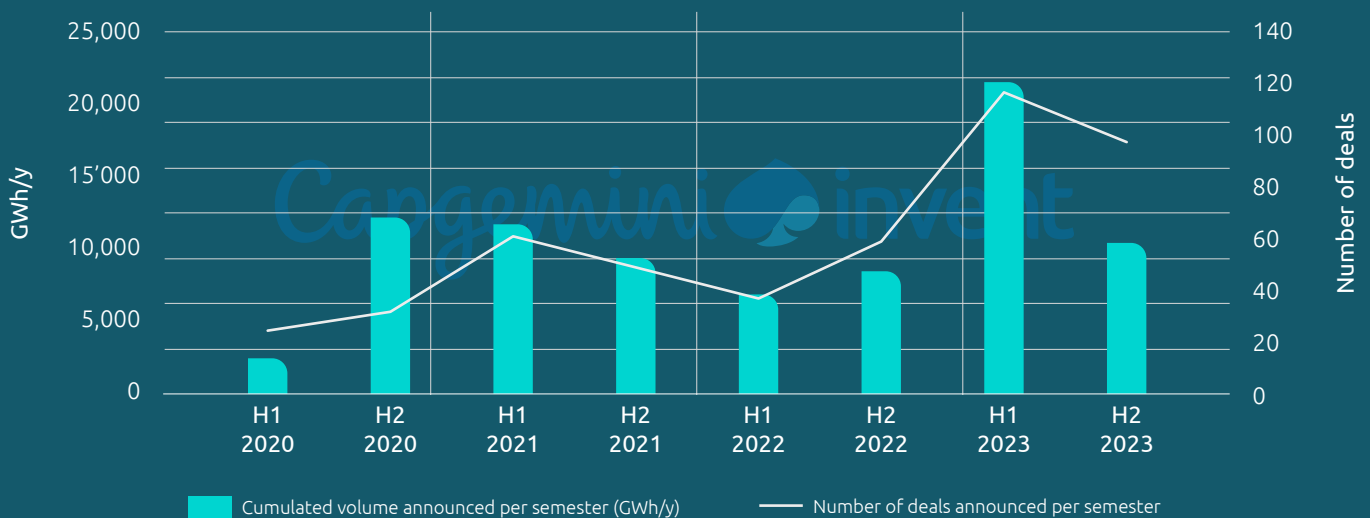
Embarking on a PPA process is a significant step for a corporation aiming to procure renewable energy and achieve sustainability goals. Starting the research process as soon as possible facilitates better positioning to identify and capitalize on suitable PPAs. This is because opportunities in the renewable energy market can be limited, especially for projects with earlier Commercial Operation Dates (CODs). As a first step, an offtaker should clearly articulate its company's sustainability and renewable energy goals and get to understand the role of PPAs in achieving these objectives. To accurately size the volume required, companies should conduct a comprehensive assessment of their energy needs, understand their current and future electricity consumption patterns, and develop a long-term renewable energy procurement strategy aligned with their overall business objectives. For unexperienced players, it is highly recommended to seek advice from industry experts, consultants, or renewable energy professionals. This can help corporations choose the PPA that better accommodates the company's internal requirements while reducing risks and maximizing the benefits. It is important to ensure alignment among key internal stakeholders, including finance, procurement, legal, and sustainability teams, thereby maintaining the momentum during the negotiation phase.

When assessing available offers, offtakers should not only rely on purely economic criteria, but also on qualitative criteria regarding the energy seller. This is because VPPAs involve long-term relationships. Choosing a reliable partner with a proven track record, a deep expertise in the development of renewable projects, and financial stability is crucial for the success of the negotiation and, later, to the benefit of the relationship during the contract term.

Last but not least, energy buyers must be prepared for the creativity of developers, who are often tasked with finding innovative solutions to ensure project success despite external obstacles. On the corporate side, it is important to clarify the top priorities early in the negotiation process, together with the dimensions in more flexibility to approaches will be expected.

Concluding remarks

Evolution of CPPA announcements per semester within the Barometer's Panel



Despite power market prices having mostly recovered from the 2022 levels across Europe, the extreme volatility experienced by energy-intensive consumers during the crisis has convinced them to accelerate the exploration of PPA opportunities. This is part of their effort to reduce their exposure while progressing in their decarbonization targets.

Following the impressive announcements of H1 2023, the second semester marks a slowdown in new volumes. However, the number of deals remains at far higher levels than in previous years, with around one hundred CPPAs signed across the Barometer's panel in six months: the drop in volume, already noticeable in Q2 2023, was due to the expansion of individually smaller contracts.

Two factors are driving this trend. First, there is an increasingly diverse array of corporations trying to enter the market. Second, public support schemes help new profiles of buyers overcome the main difficulties of these contracts (such as securing financial guarantees). As a result, smaller CPPAs are spreading across Europe, new technologies are used, and innovative structures are tested (multi-buyer, repowering, intra-country VPPA, etc.).

2023 ended with very positive developments in almost all countries on the panel, setting the conditions for bright CPPA prospects in 2024.

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