

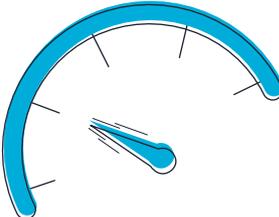
# THE EUROPEAN CPPA BAROMETER

Real Power Matters

Q2 2023



# CONTENTS



# 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), direct contracts between a producer and a consumer to secure a supply of high-quality green energy for the long-term and at a firm price.

Every quarter, Capgemini Invent publishes its **European CPPA Barometer, a comprehensive report on the latest deals and trends**, to bring more transparency to this dynamic market composed of over-the-counter contracts.

## This new edition of the Barometer covers Q2 2023.

After the spectacular PPA market activity in the beginning of 2023, a slowdown in new announcements is observed, along with a decrease in the average deal size during the second quarter: about 50 deals were signed for a total of 6.5 TWh/y across our panel of countries (vs. 65 CPPAs in Q1 for 15.1 TWh/y).

Still, PPA activity remains strong across the continent: these three months saw about half as much deals and volumes as the whole 2022 year, for the same perimeter. In addition to the usual market leaders (Spain and the Nordic countries), Germany and France drew attention with numerous announcements throughout the quarter. Another interesting development is the appearance of PPAs backed by guarantees issued by public organizations, as national regulations start to study the market more closely and support new offtakers in accessing it. As in each edition, this report provides the panoramas of national markets to visualize these trends.

Additionally, just like its French edition, the Barometer now includes interviews, involving players of the green sourcing ecosystem across Europe. In this edition:

- Patrick Koch, head of German Origination for Statkraft Markets, shares his vision of the PPA market in Europe, with a focus on Germany in particular, highlighting trends, obstacles and his recommendations to corporates exploring this mechanism.
- EPEX Spot, which operates the Spot electricity markets in 13 European markets, launched last year a unique Pan-European auction market for Guarantees of Origin: Delphine Strunski, Senior Business Developer, and Maria Kitano, Key Account Manager, explain this new market in detail and look back on one full year of trading.



# Q2 2023 ACTIVITY IN NATIONAL CPPA MARKETS

## SPAIN



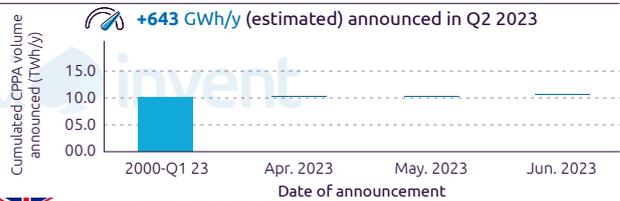
## NORWAY



## NETHERLANDS



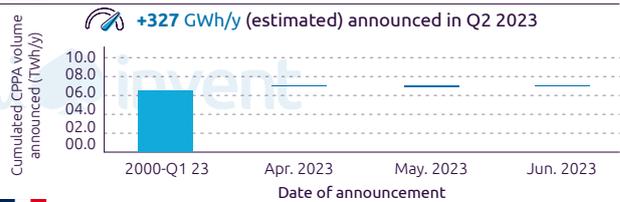
## SWEDEN



## GERMANY



## UNITED KINGDOM



## FINLAND



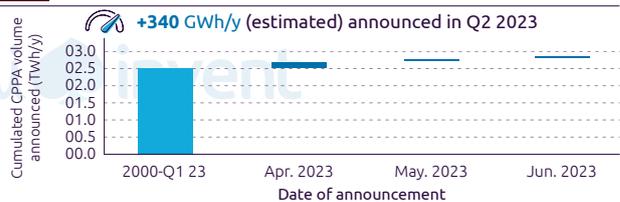
## FRANCE



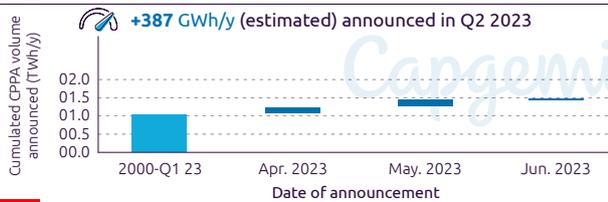
## BELGIUM



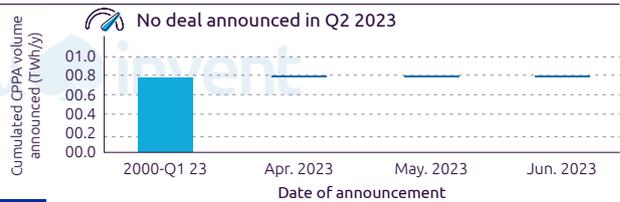
## POLAND



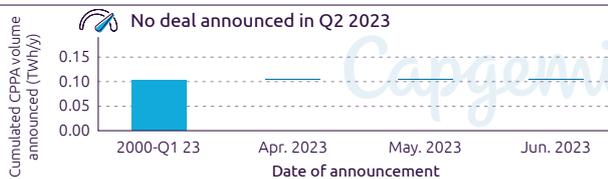
## ITALY



## PORTUGAL



## SWITZERLAND



## MULTI-COUNTRY



■ Cumulated volume of CPPAs announced during Q2 2023 ■ Cumulated volume of CPPAs announced annually, before Q2 2023

# SPAIN

## CORPORATE PPA ACTIVITY OF THE QUARTER: Q2 2023



**5 deals**  
announced during  
the Quarter



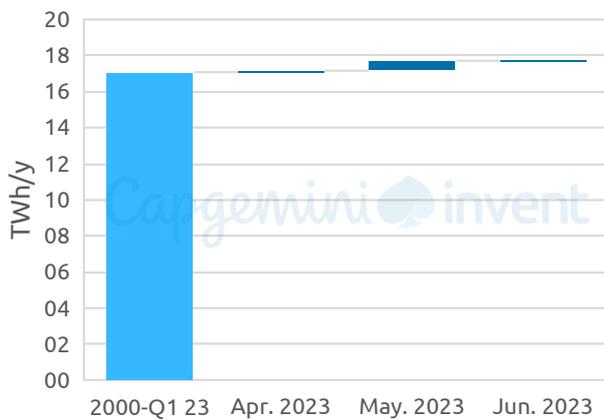
**506 GWh/y**  
of cumulative volume (estimated)  
announced during the Quarter



**100%**  
greenfield CPPA volume  
announced during the Quarter

### RAMP-UP OF CPPA ANNOUNCED

Cumulated Volume of CPPA announced



### KEY DEALS ANNOUNCED DURING THE QUARTER

	Type	Offtaker	Producer	Volume	Duration	Energy
Apr.	Greenfield	Sidenor	Sonneditx	52 GWh/y(e)	12 years	
	Greenfield	Atlantic Copper	Capital Energy	44 GWh/y	10 years	
May	Greenfield	Inditex	EDPR	44 GWh/y	10 years	
	Greenfield	Draxton	Naturgy	N/A	10 years	Unspecified renewable energy
	Greenfield	Equinix	Sonneditx	240 GWh/y	10 years	

+ 2 explicitly pan-European VPPAs (total of 483 GWh/y): see p.19

The most mature market within the Barometer’s panel, Spain continued to witness regular new CPPA announcements, as well as new UPPAs and onsite PPAs although they are not the focus of the report.

As usually observed, these deals are almost exclusively based on future solar projects (thanks to competitive pricing and good production conditions) and involve both experienced players and whole new market participants on both the producers’ and the offtakers sides. One interesting new development is the fact the Export Credit Agency has started supporting energy-intensive companies secure contracts, by issuing guarantees to cover risk (precisely one of the biggest challenges in negotiating long-term PPAs).

- Indeed, Sonnedix and Sidenor signed the first PPA in Spain to be supported by the Spanish Reserve Fund for Guarantees of Electro-intensive Entities, a new mechanism under which the Spanish Export Credit Agency is granting the guarantee for the contract.
- In parallel, Atlantic Copper and Capital Energy announced a PPA based on a new 41 MW solar plant, allowing the offtaker to increase the share of its energy consumption covered by renewables from 30% to 42%.
- EDPR signed a greenfield wind PPA (a rarer type than the traditional greenfield solar deals on this market) with Inditex, based on two projects to start operations in 2025 and 2026.
- Naturgy and Draxton agreed on a deal to cover the energy needs of the latter’s four production centers in the country.
- Finally, Sonnedix signed a PPA with Equinix based on three solar plants in Cuenca with a cumulated capacity of 150 MWp, to be commissioned by the end of 2024.
- Other PPAs based on Spanish assets, explicitly dedicated to cover offtakers’ consumptions at a pan-European scale, are accounted for in the “Multi-country” page (p.19).

# NORWAY

## CORPORATE PPA ACTIVITY OF THE QUARTER: Q2 2023



**3 deals**  
announced during  
the Quarter



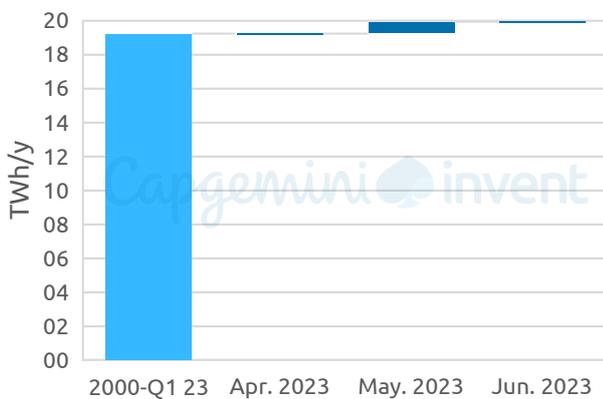
**707 GWh/y**  
of cumulative volume (estimated)  
announced during the Quarter



**0%**  
greenfield CPPA volume  
announced during the Quarter

### RAMP-UP OF CPPA ANNOUNCED

Cumulated Volume of CPPA announced



### KEY DEALS ANNOUNCED DURING THE QUARTER

	Type	Offtaker	Producer	Volume	Duration	Energy
Apr.	Brownfield	INEOS	Skagerak Energitjenester	N/A	N/A	
May	Brownfield	Celsa Armeringsstål	Statkraft	267 GWh/y	9 years	
Jun.	Brownfield	Hydro	Statkraft	440 GWh/y	15 years	Unspecified renewable energy

The acceleration of PPA activity in Norway at the beginning of the year was confirmed in the second quarter, as the country continued to witness massive deals signed with already experienced industrial offtakers.

As in the past, Statkraft remains the main provider and deals are typically based on portfolio of existing assets instead of new and precisely identified plants.

- INEOS signed a PPA with Skagerak Energitjenester to cover all of the electricity needs of its Rafnes and Bamble plants in Norway, reaching a 100% renewable energy coverage ratio for all its assets in the country.
- Reinforcing steel producer Celsa Armeringsstål signed an agreement with Statkraft, to purchase 2.4 TWh of green energy over 9 years for its recycling activities.
- Finally, Hydro announced a PPA with Statkraft of 6.6 TWh over 15 years to continue reducing the carbon footprint of its aluminium production activities in Northwestern Norway.

# NETHERLANDS

## CORPORATE PPA ACTIVITY OF THE QUARTER: Q2 2023



**3 deals**  
announced during  
the Quarter



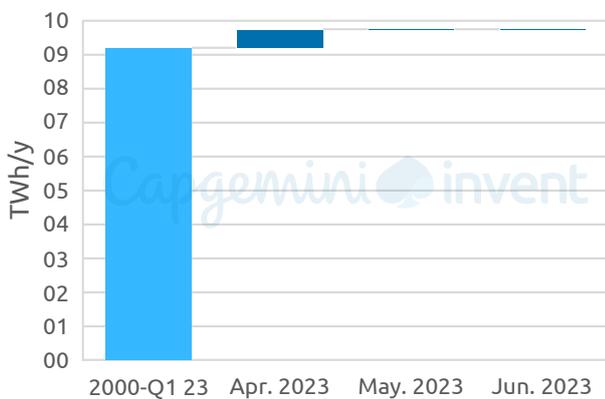
**568 GWh/y**  
of cumulative volume (estimated)  
announced during the Quarter



**100%**  
greenfield CPPA volume  
announced during the Quarter

### RAMP-UP OF CPPA ANNOUNCED

Cumulated Volume of CPPA announced



### KEY DEALS ANNOUNCED DURING THE QUARTER

	Type	Offtaker	Producer	Volume	Duration	Energy
Apr.	Greenfield	Google	Eneco	515 GWh/y	10 years	
	Greenfield	Iron Mountain	Sunrock	4 GWh/ye	N/A	
Jun.	Greenfield	Google	Kronos Solar (EDPR)	49 GWh/y	10 years	

After a first quarter without much activity, several new greenfield deals have been reported again in Netherlands in Q2 2023, mainly driven by Google.

Solar-based deals, albeit small-sized, are becoming more widespread in 2023, after having been almost non-existent in this market for several years.

- Almost all cumulated volume from Q2 come from the massive CPPA announced in April by Google and Eneco: the former will purchase the production of the Frylân and Kroningswind wind farms (with a combined capacity of 153 MW), allowing its datacenter in Eemshaven to run on 80% renewable energy.
- In parallel, in order to supply its campus in the West Amsterdam with green electricity, Iron Mountain agreed to buy the production of Sunrock’s solar assets deployed on warehouse rooftops across Rotterdam harbor
- Two months later, Google announced another deal with developer Kronos Solar EDPR (signing its first PPA in the country), based on four new PV plants in development.

# SWEDEN

## CORPORATE PPA ACTIVITY OF THE QUARTER: Q2 2023



**3 deals**  
announced during  
the Quarter



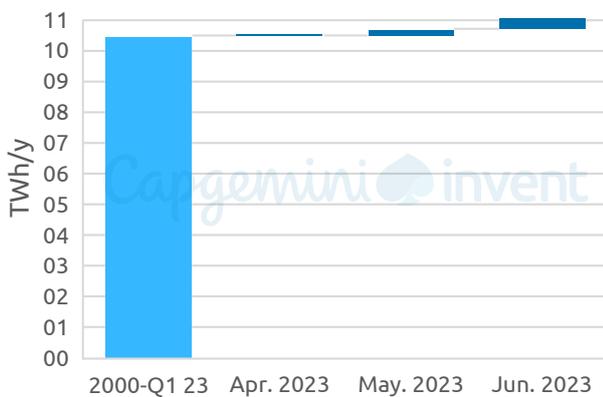
**643 GWh/y**  
of cumulative volume (estimated)  
announced during the Quarter



**46%**  
greenfield CPPA volume  
announced during the Quarter

### RAMP-UP OF CPPA ANNOUNCED

Cumulated Volume of CPPA announced



### KEY DEALS ANNOUNCED DURING THE QUARTER

	Type	Offtaker	Producer	Volume	Duration	Energy
May	Greenfield	Volvo	Vattenfall	230 GWh/y	10 years	
Jun.	Greenfield	Axfood	Alight	63 GWh/y	12 years	
	Brownfield	Talanx (through AIM)	Uniper	350 GWh/y	15 years	

+ 1 explicitly pan-European VPPA (417 GWh/y): see p.19

Following spectacular announcements in Q1 (including a 2.3 TWh/y deal by Fortum, for instance), the new volumes announced in Q2 in Sweden may appear small. Yet, as for the activity of the panel in general, they still represent impressive progress compared to previous years.

The new contracts include new offtakers, last for longer durations than other countries, and cover both portfolios of existing assets and new power plants bringing additional green power to the grid. Multiple technologies are represented, with a growing interest for solar PV which was previously quite rare in the market.

- Volvo signed a PPA with Vattenfall to purchase half of the production of the Bruzaholm wind farm, to be commissioned in 2025.
- Following previous partnerships together, Axfood and Alight announced another CPPA: the asset to be built for the PPA, a 64-MW PV park in Hallstavik, is the first solar project in Sweden to be financed with a non-recourse debt, which is an encouraging sign for the development of the technology in the country.
- Finally, Talanx Group (via Augusta Investment Management) agreed with Uniper to purchase part of the production of a portfolio of 15 existing hydropower plants, representing 5.3 TWh over 15 years.

# GERMANY

## CORPORATE PPA ACTIVITY OF THE QUARTER: Q2 2023



**11 deals**  
announced during  
the Quarter



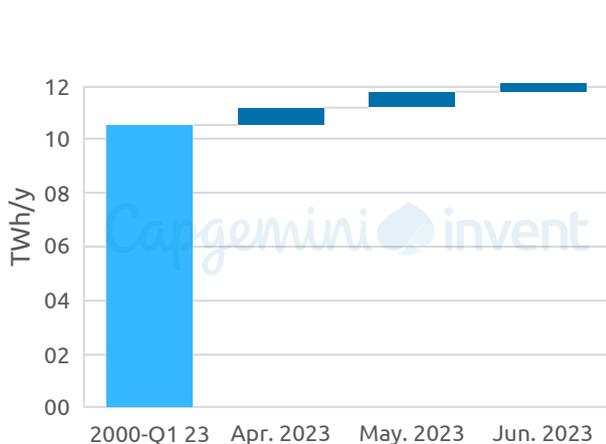
**1,606 GWh/y**  
of cumulative volume (estimated)  
announced during the Quarter



**60%**  
greenfield CPPA volume  
announced during the Quarter

### RAMP-UP OF CPPA ANNOUNCED

Cumulated Volume of CPPA announced



### KEY DEALS ANNOUNCED DURING THE QUARTER

	Type	Offtaker	Producer	Volume	Duration	Energy
Apr.	Brownfield	Schwarz Group	RWE	250 GWh/y	10 years	
	Greenfield	Salzgitter Flachstahl	Iberdrola	386 GWh/y(e)	15 years	
May	Brownfield	SKW Piesteritz	RWE	175 GWh/y	10 years	
	Brownfield	ALPLA	Statkraft	76 GWh/y for both ALPLA's	10 years	
	Brownfield	ALPLA	Statkraft	PPAs	10 years	
	Greenfield	Siltronic	Axpo	60 GWh/y	10 years	
Jun.	Greenfield	Holcim	Iberdrola	250 GWh/y	N/A	
	Greenfield	Fraport	Centrica Energy Trading (through PNE)	63 GWh/y	5 years	
	Brownfield	Air Liquide	Statkraft	118 GWh/y(e)	3 years	
	Greenfield	SHS	Iberdrola	200 GWh/y	15 years	
	Brownfield	Google	Engie	28 GWh/y	10 years	

In Q2 2023, Germany takes the lead over Spain as the most active PPA market in Europe, both in terms of deal number and cumulated volumes.

Energy-intensive industrials have demonstrated a strong appetite for large PPAs based on offshore wind assets (under construction or built very recently), whose productions can be split between multiple offtakers.

You can read more information on the German PPA market in our interview with Statkraft (p.20).

- Over half of the volume announced during the quarter is based on a single, massive project by Iberdrola currently under construction: the 476-MW Baltic Eagle offshore wind farm, scheduled to start operations at the end of 2024. After a first agreement with Amazon in March, Iberdrola has disclosed each month a new offtaker for additional shares of the future production, including two steel producers: Salzgitter Flachstahl, Holcim, and Stahl Holding Saar GmbH & Co. KGaA (SHS).
- RWE accounts for a quarter of new volumes in Q2. A first one was signed with Schwarz Group's retail divisions (Lidle and Kaufland), to be the first corporate offtakers of the recently commissioned Kaskasi offshore wind farm. In parallel, chemical company SKW Piesteritz will purchase enough production from RWE's portfolio of hydro plants in the country to cover 40% of its electricity needs.
- Statkraft mobilized its portfolio of production plants in the country to sign two PPAs with packaging manufacturer ALPLA (combining six solar farms and one onshore wind farm), and one with Air Liquide to power its new electrolyzer plant in Oberhausen.
- Other, comparatively smaller PPAs include the fixed-price deal between Axpo and silicon wafer producer Siltronic, the short-term contract between Centrica and Fraport (owner and operator of Frankfurt Airport), and a solar PPA between Engie and Google (through developer Greencells).

# UNITED KINGDOM

## CORPORATE PPA ACTIVITY OF THE QUARTER: Q2 2023



**4 deals**  
announced during  
the Quarter



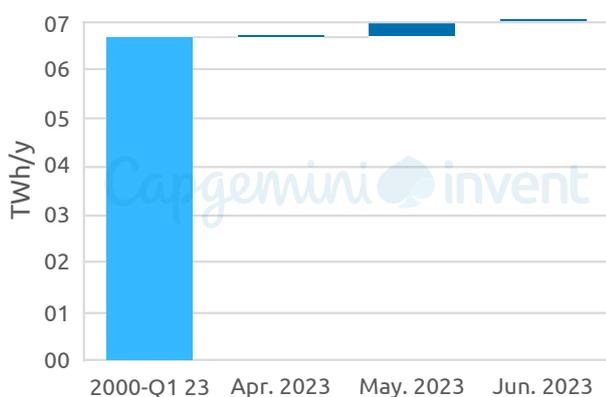
**327 GWh/y**  
of cumulative volume (estimated)  
announced during the Quarter



**100%**  
greenfield CPPA volume  
announced during the Quarter

### RAMP-UP OF CPPA ANNOUNCED

Cumulated Volume of CPPA announced



### KEY DEALS ANNOUNCED DURING THE QUARTER

	Type	Offtaker	Producer	Volume	Duration	Energy
Apr.	Greenfield	BNP Paribas	Conrad Energy	40 GWh/y	15 years	
May	Greenfield	Canary Wharf Group	Brookfields	247 GWh/y(e)	15 years	
	Greenfield	Faerch	European Energy	40 GWh/y	10 years	
Jun.	Greenfield	Yorkshire Water	Shell Energy	N/A	10 years	

Among the oldest and most mature markets of the panel, the UK PPA sector harbors deals of multiple structures (Virtual and Physical) and technologies. It continued to welcome new offtakers during the quarter, signing their first deal of the sort in the country.

All new four PPAs are greenfield: the signature of these contracts is helping securing the financing of new green power plants, of various technologies, bringing additional capacity to the grid.

- BNP Paribas signed a PPA with Conrad Energy for a new solar farm in Herefordshire.
- Canary Wharf Group agreed with Brookfields to purchase the production of a 60-MW windfarm to be commissioned by 2026, to cover over 70% of its electricity consumption.
- Faerch will purchase the production of European Energy's 40-MW solar plant in Shropshire, starting in 2025.
- Yorkshire Water entered a PPA with Shell Energy based on the Thanet and Dogger Bank offshore wind plants (the latter will reach a 3,600 MW capacity once fully operational).

# FINLAND

## CORPORATE PPA ACTIVITY OF THE QUARTER: Q2 2023



**3 deals**  
announced during  
the Quarter



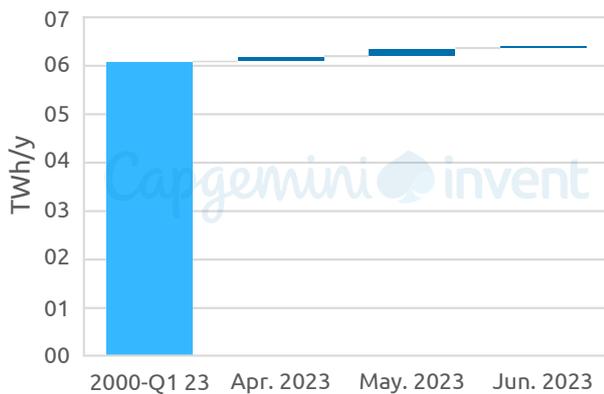
**274 GWh/y**  
of cumulative volume (estimated)  
announced during the Quarter



**64%**  
greenfield CPPA volume  
announced during the Quarter

### RAMP-UP OF CPPA ANNOUNCED

Cumulated Volume of CPPA announced



### KEY DEALS ANNOUNCED DURING THE QUARTER

	Type	Offtaker	Producer	Volume	Duration	Energy
Apr.	Brownfield	Borealis	Axpo	100 GWh/y	8 years	
May	Greenfield	Kemira	Ålandsbanken	N/A	8 years	
	Greenfield	Amazon	Renantis	174 GWh/y	N/A	

Following little activity in Q1, new PPAs have been announced again in Finland during the quarter.

The Finnish PPA market is almost exclusively dedicated to onshore wind projects: accordingly, all Q2 deals are based on this technology and involve producers and buyers already well familiar with CPPAs in the Nordics. Though they are based on recent or yet-to-be-built power plants, disclosed contract durations are a bit shorter than the average in the country and in the rest of the panel.

- Following a previous contract together in Sweden in late 2022, Borealis and Axpo signed a new deal based on a recently commissioned wind farm, to cover the electric consumption of the offtaker’s activities in Finland.
- Ålandsbanken Wind Power Fund Non-UCITS will sell the production of its Murtomäki wind project to chemical company Kemira Oyj.
- Amazon signed for the offtake of the production of Renantis’s first wind farms in Finland, two projects that are to be commissioned at the end of the year and which will support associations to develop cultural and social activities for the local community.

# FRANCE

## CORPORATE PPA ACTIVITY OF THE QUARTER: Q2 2023



**8 deals**  
announced during  
the Quarter



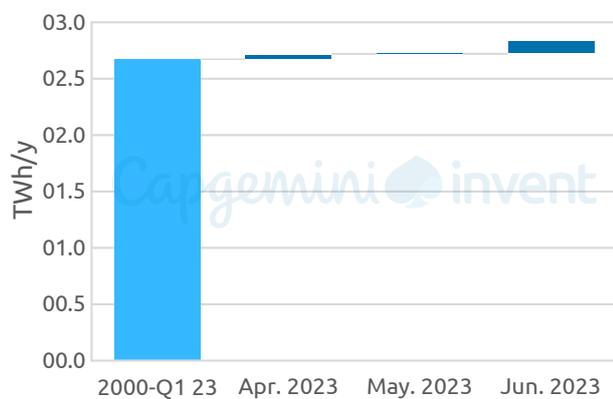
**163 GWh/y**  
of cumulative volume (estimated)  
announced during the Quarter



**74%**  
greenfield CPPA volume  
announced during the Quarter

### RAMP-UP OF CPPA ANNOUNCED

Cumulated Volume of CPPA announced



### KEY DEALS ANNOUNCED DURING THE QUARTER

	Type	Offtaker	Producer	Volume	Duration	Energy
Apr.	Greenfield	Les Mousquetaires	Qenergy	33 GWh/y	15 years	
	Brownfield	Les Mousquetaires	Engie	17 GWh/y	20 years	
Jun.	Greenfield	Les Mousquetaires	Valorem	0.4 GWh/y(e)	20 years	
	Greenfield	E.Leclerc	EDF	46 GWh/y	20 years	
	Greenfield	bioMerieux	TSE	24 GWh/y	20 years	
	Brownfield	Lesaffre	Sun'R	25 GWh/y	20 years	
	Greenfield (actually 2 PPAs)	Keolis	Urbasolar	18 GWh/y	15 years	

Though among the youngest of the panel, the French PPA market has steadily grown over the past few years and actually saw one of the highest number of deals across Europe in Q2. Never before have so many contracts been signed in the country in a single quarter, allowing many consumers to sign their first CPPA in France.

All new deals are linked to solar PV assets, for small volumes compared to the activity in other countries but with consistently longer durations than everywhere else. Long-term brownfield deals are observed for the first time, as producers start to switch their project from public CfD to PPA before the expiration date.

- Les Mousquetaires announced multiple PPAs successively during the quarter: one with QEnergy for a 29-MWp power plant under construction; one with Engie for a 13-MWp power plant commissioned in 2021; and one with Valorem for a 250-kWp agrivoltaic project.
- E.Leclerc will cover 1.5% of its consumption by signing with EDF a PPA for 3 future power plants with a total capacity of 31 MWp.
- bioMérieux and TSE unveiled a 21-MWp PPA based on a ground-based power plant and an agricultural canopy.
- Sun'R and Lesaffre have announced a PPA for a solar park commissioned in 2021, located near the off-taker's plant.
- Keolis signs two PPAs with Urbasolar, for a total solar production of 18 GWh/year from the beginning of 2025.

# BELGIUM

## CORPORATE PPA ACTIVITY OF THE QUARTER: Q2 2023



**1 deal**  
announced during  
the Quarter



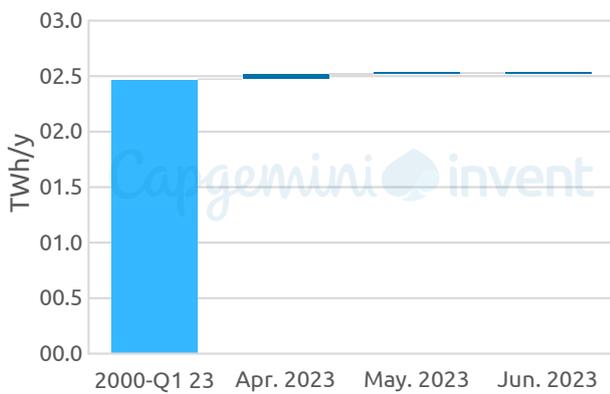
**46 GWh/y**  
of cumulative volume (estimated)  
announced during the Quarter



**100%**  
greenfield CPPA volume  
announced during the Quarter

### RAMP-UP OF CPPA ANNOUNCED

Cumulated Volume of CPPA announced



### KEY DEALS ANNOUNCED DURING THE QUARTER

	Type	Offtaker	Producer	Volume	Duration	Energy
Apr.	Greenfield	Google	Luminus	46 GWh/y	12 years	

CPPAs are less frequently reported in Belgium than in other countries of the panel, with a dozen observed over the past few years. However, activity did resume in Q2 2023.

- After a previous short-term PPA with Engie concluded with Engie in 2019, Google signed in April with Luminus, EDF's subsidiary in the country, for the offtake of four new onshore wind projects to supply its Belgian datacenters and offices with green energy.

# POLAND

## CORPORATE PPA ACTIVITY OF THE QUARTER: Q2 2023



**3 deals**  
announced during  
the Quarter



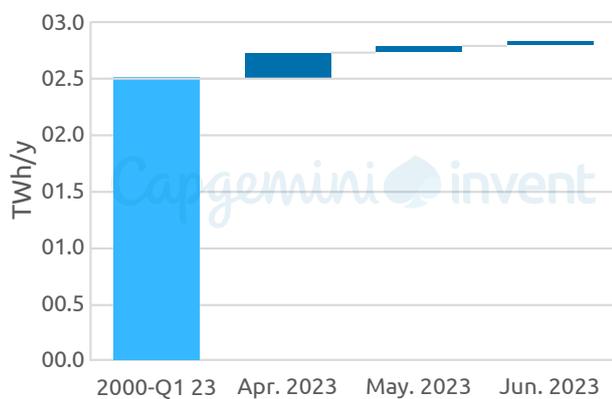
**340 GWh/y**  
of cumulative volume  
announced during the Quarter



**18%**  
greenfield CPPA volume  
announced during the Quarter

### RAMP-UP OF CPPA ANNOUNCED

Cumulated Volume of CPPA announced



### KEY DEALS ANNOUNCED DURING THE QUARTER

	Type	Offtaker	Producer	Volume	Duration	Energy
Apr.	Brownfield	Lafarge Cement	KGAL	230 GWh/y	15 years	
May	Greenfield	Faerch	Better Energy	60 GWh/y	10 years	
Jun.	Brownfield	Zabka Polska	Modus Asset Management	50 GWh/y	10 years	

One of the youngest markets in the panel, Poland had demonstrated a strong acceleration in PPA activity in Q1 2023, with 5 deals exceeding a cumulated total of 700 GWh/y: the mechanism had been recognized by buyers as a useful tool to reduce Scope 2 emissions, secure electricity supply and stabilize the sourcing costs, in a country more dependent on fossil fuels than other EU States.

The market activity slows down a bit in Q2 2023 but remains strong, and new participants appear both on the sellers' and the offtakers' sides.

- The total volume of the quarter is mostly driven by KGAL which, following a tender, has selected Lafarge Cement as the offtaker of the entire production of two wind farms for 15 years, a longer duration than the average for Polish PPAs.
- The two other deals of the Quarter are smaller-size agreements, based on solar assets in development or recently commissioned, as opposed to existing wind plants more frequently observed in this market. They were signed respectively by Faerch with Better Energy and Żabka Polska with Modus Asset Management.

# ITALY

## CORPORATE PPA ACTIVITY OF THE QUARTER: Q2 2023



**2 deals**  
announced during  
the Quarter



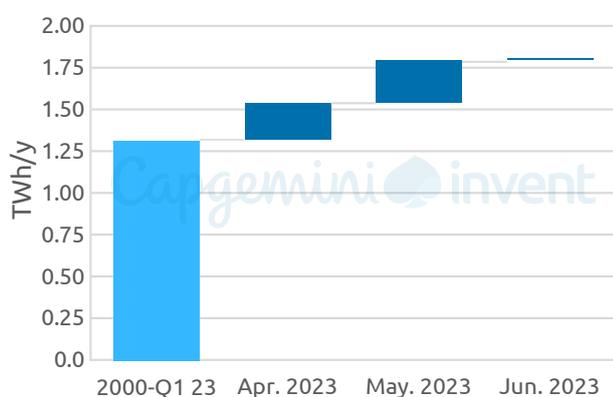
**387 GWh/y**  
of cumulative volume (estimated)  
announced during the Quarter



**48%**  
greenfield CPPA volume  
announced during the Quarter

### RAMP-UP OF CPPA ANNOUNCED

Cumulated Volume of CPPA announced



### KEY DEALS ANNOUNCED DURING THE QUARTER

	Type	Offtaker	Producer	Volume	Duration	Energy
Apr.	Greenfield	Procter & Gamble	EDPR	187 GWh/y(e)	N/A	
May	Brownfield	TIM	ERG	200 GWh/y	9 years	Unspecified renewable energy

Two CPPAs were announced in Q2 in Italy, a number consistent with the level of activity of the three previous quarters.

This time however, the contracts represent much larger volumes than previous deals (close to 200 GWh/y each, versus an average 60 GWh/y observed since 2018) and reunite companies that had already partnered on PPAs together.

Though not the focus of the Barometer, the Utility PPA market in the country also demonstrated strong activity, with Statkraft signing with Sonnedix, Enfinity Global and NextEnergy Solar Fund for instance.

- Procter & Gamble signed a PPA with EDPR for two solar projects in Italy, representing a total capacity of 142 MW DC/109 MW AC, to supply energy to its operations in the country.
- TIM and ERG strengthened their PPA partnership by agreeing to a new baseload volume of 200 GWh/y, as an extension of their existing 340-GWh/y deal signed in 2021.

# PORTUGAL

## CORPORATE PPA ACTIVITY OF THE QUARTER: Q2 2023



**0 deal**  
announced during  
the Quarter



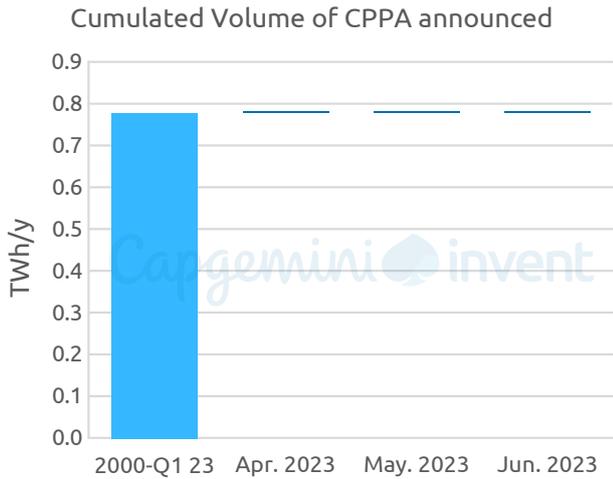
**0 GWh/y**  
of cumulative volume (estimated)  
announced during the Quarter



**0%**  
greenfield CPPA volume  
announced during the Quarter

### RAMP-UP OF CPPA ANNOUNCED

### KEY DEALS ANNOUNCED DURING THE QUARTER



Following two announcements in Q1 2023, no new CPPA has been observed in Portugal in the second quarter.

However, Utility PPAs, which are not the focus of this report, do remain commonplace in the country: during Q2 2023, Statkraft agreed to purchase the production of solar plants from NextEnergy Capital and from Green Venture.

# SWITZERLAND

## CORPORATE PPA ACTIVITY OF THE QUARTER: Q2 2023



**0 deal**  
announced during  
the Quarter



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

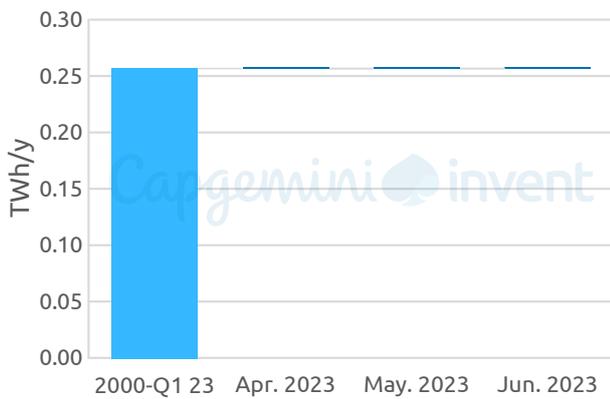


**0%**  
greenfield CPPA volume  
announced during the Quarter

### RAMP-UP OF CPPA ANNOUNCED

### KEY DEALS ANNOUNCED DURING THE QUARTER

Cumulated Volume of CPPA announced



Switzerland remains the country with the smallest and most recent CPPA market out of the panel studied in the Barometer, with just two deals announced since early 2021 with assets based in the country (each time by Axpo).

Interestingly however, a Swiss multinational company did announce a CPPA in Q2 2023: Lonza Group signed a virtual cross-border PPA with Ignis for the offtake of solar plants based in Spain. Since the green certificates purchased will not only cover Lonza’s consumption in Switzerland but also in all of its EU locations, the PPA is accounted for in the “Multi-country” category (p.19).

# MULTICOUNTRY

## CORPORATE PPA ACTIVITY OF THE QUARTER: Q2 2023



**6 deals**  
announced during  
the Quarter



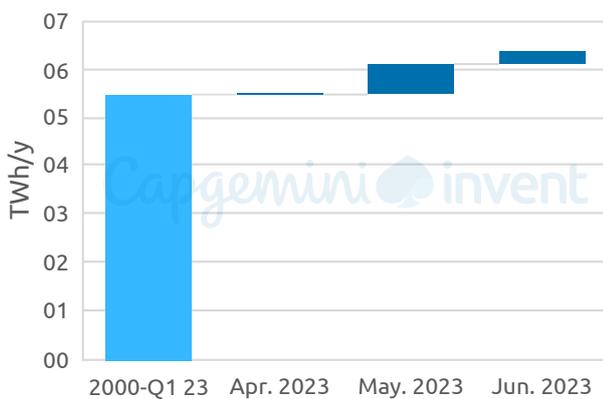
**900 GWh/y**  
of cumulative volume (estimated)  
announced during the Quarter



**100%**  
greenfield CPPA volume  
announced during the Quarter

### RAMP-UP OF CPPA ANNOUNCED

Cumulated Volume of CPPA announced



### KEY DEALS ANNOUNCED DURING THE QUARTER

	Type	Offtaker	Producer	Volume	Duration	Energy
May	Greenfield (actually 3 PPAs)	Owens Corning	Shell Energy	223 GWh/y	10 years	
	Greenfield	Forvia	Renewable Power Capital	417 GWh/y	10 years	
Jun.	Greenfield	SKF	Enel	260 GWh/y	15 years	
	N/A	Lonza	Ignis	N/A	10 years	

The “multi-country” category includes cross-border PPAs where the offtakers explicitly state that the deal will cover consumption in multiple European countries (virtual PPAs, with no physical delivery), as well as groups of separate country-specific PPAs without enough data to analyze each one in its dedicated page.

As in previous years, the PPAs of this type observed during the quarter are mostly large-scale deals based on greenfield solar PV projects in Spain.

- Construction material company Owens Corning closed 3 VPPAs with Shell Energy, to purchase guarantees of origin that will cover the consumption of its production sites and science & tech centers across Europe.
- SKF signed a 10-y agreement with Enel, for a future Spanish asset which will produce the equivalent of one third of the company’s electric needs for its operations in Europe.
- As mentioned in the previous page, Swiss company Lonza opted for a Spanish solar VPPA as well, with Ignis, to cover its electric consumption in its home country and its other locations in the EU.
- Sweden also harbors such pan-European deals: automotive supplier Forvia signed with Renewable Power Capital for the output of an onshore wind farm in construction in Sweden, equivalent to over 40% of its consumption across the continent.

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

# INTERVIEW: RENEWABLE ENERGY PRODUCER

*Starting with this edition, the European CPPA Barometer will include interviews of market players active in the green sourcing sector across the continent: producers, offtakers and other members of the ecosystem. These actors will share their views on the state of the market in their country and give advice to companies that aim to secure their first PPA.*

*For this Q2 2023 edition, we interviewed Statkraft, experienced in PPA contractualization in multiple countries across Europe and notably in Germany.*



**Patrick Koch**

Head of German Origination  
- STATKRAFT MARKETS

## **Given your experience with CPPAs across Europe, how do you see the current state of the market in Germany? Do you see differences with other European countries?**

We continue to see an increasing demand from industry for PPA solutions for several reasons: on the one hand, industry needs long-term planning security in times of highly fluctuating and high power prices and, on the other hand, sustainable CO<sub>2</sub>-free power supplies in order to implement sustainability strategies. This trend can now be observed not only among large industrial companies, but also among medium-sized, smaller companies. Companies like Statkraft, which bridge the gap between the different needs of renewable energy operators and industrial customers, are playing an increasingly important role. Market-based PPA solutions are getting more and more relevant for the financing of renewable energies.

In Germany, there is a clear preference for physical energy deliveries from renewables, while in other European countries financial, virtual PPA solutions are also increasingly used.

## **What typical difficulties do you encounter when implementing CPPAs in Germany?**

One of the biggest challenges in long-term PPA contracts remains the hedging of credit risks. The PPA contracting parties must be able to rely on the other party meeting its supply, offtake, and payment obligations over the entire term of the contract. As a Norwegian State-owned company, Statkraft has been a reliable partner to both generators and consumers for 125 years.

Additionally, the different and individual needs of generators and consumers must be met: to put it bluntly, generators want to have their power purchased and paid for when the sun is shining and the wind is blowing, while industrial customers depend on receiving power when it is actually needed.

There is also a desire by industry to incorporate PPAs into their usual hedging strategy. The icing on the cake for many industrial customers is then to have as regional a connection to the plant as possible. Statkraft has not only developed solutions for these complex and diverse issues, but has already successfully implemented them with numerous industrial companies.

## **What were the motives for concluding your recent PPA with Schott in Germany? What significance does this agreement have in your overall PPA strategy in the country?**

Statkraft and SCHOTT signed a PPA with a term of two years in spring 2023. This also shows that PPAs are not always concluded for a long-term period of 10 years. Statkraft, for example, covers a range of terms from a few months to 12 years.

From 2022 to 2023, Statkraft will supply the technology group with around 30 gigawatt hours of regional green power from a wind farm in Rhineland-Palatinate with an installed capacity of around 10 MW.

The PPA supports SCHOTT in becoming the first climate-neutral company in its industry by 2030. An important component of this is the use of 100 percent renewable power for energy-intensive processes such as glass melting. The power supplied comes from Statkraft's own wind farm portfolio and enabled the wind turbines to continue operating economically.

With this agreement, the two companies strengthened an existing partnership. In 2022, Statkraft already supplied wind power from three wind farms in North Rhine-Westphalia with a total installed capacity of around 10 MW as well.

## What would you recommend to a company starting to explore PPA opportunities in Germany?

Industrial and commercial customers have very individual and different requirements for the design of PPAs. Therefore, we do not see that this product can be standardised in the foreseeable future. For one company, it is important that electricity comes from a specific, perhaps even regional wind or solar park. Another customer wants to map as broad a mix of technologies as possible. Because we have access to a large number of our own and third-party assets in different regions and with different renewable technologies, we can serve these needs very well.

The following factors play a key role when entering into green power PPAs:

- Term of the PPA
- Pricing model - long-term fixed price vs. flexible prices
- Origin of the power (country, region,...)
- Structure of the supply (e.g. as produced, as forecasted, etc.)
- Start year of the power supply - this has an influence on the price
- Technology: should the green power come from solar, wind or hydropower plants?
- Integration of power delivery into the customer's supply/hedging model.
- What share of the supply should the PPA have (supply volume)?

## Do you have any concluding remarks?

PPAs are a cornerstone in the expansion of renewable energies in Europe. We have a big task ahead of us in Europe: we want to end our dependence on Russian gas, strengthen energy security and tackle the climate crisis at the same time. Alternative energy sources, especially renewables, are the key to meeting these challenges. We need large amounts of renewable energy - and we need them fast.

Market-based PPAs, alongside state support systems such as the Renewable Energy Sources Act (EEG), are an important building block in the accelerated expansion of renewable energy in Germany and Europe. To achieve the ambitious expansion targets, we need both models (market-based and subsidised) to coexist. Our clear demand is that PPAs be strengthened and coexist with other support systems. Only market-based PPAs can be tailored to industry needs and bring constant innovation. Only in this market-based and competitive environment have we been able to make green power from unsubsidised renewable energy plants available to industry, implementing new products and tailored variants time and time again while increasing efficiency in supply. In the long term, all market participants will benefit from these innovations, and a functioning market is essential for this.

# INTERVIEW: PAN-EUROPEAN MARKET FOR GUARANTEES OF ORIGIN

*In parallel with private PPAs and public CfDs, auctions of Guarantees of Origin (GOs) constitute an interesting source of complementary revenues for renewable energy producers. Wholesale trading of GOs in Europe was traditionally addressed by the Over-the-Counter market on top of some national primary auction systems. However, a new market created in September 2022 now allows players to sell and buy GOs at a pan-European scale. EPEX SPOT operates this unique mechanism and looks back on one full year of auctions.*

**About EXPEX SPOT:** EPEX SPOT SE operates the Spot electricity markets in 13 European markets, across the Central West, UK, Nordic regions – including for example France, Germany, Poland and Norway. As part of the EEX Group, EPEX SPOT is committed to the creation of a pan-European energy market.



**Delphine Strunski**  
Senior Business Developer  
- EPEX SPOT



**Maria Kitano**  
Key Account Manager  
- EPEX SPOT

## What were the motivations behind the creation of this pan-European market? What were the desired benefits?

**The market for Guarantees for Origin in Europe is still currently under development.** Some markets are more mature than others (for instance, France is the only one to have adopted a monthly time step) and some rules change from one country to another (in Germany, it is impossible to sell GOs from subsidized assets, although this is authorized in France and Italy).

On top of this heterogeneity, there is a **lack of transparency:** GOs are either traded on national auctions or on secondary, over-the-counter markets.

Launching a pan-European auction aims at **improving the liquidity of the GO market** in general:

- By creating a **set of trading standards** shared by multiple European countries (all members of the AIB, sharing the same definition of the European Energy Certificate System, and accepted by EPEX: 22 countries in total)
- By communicating **price signals reflecting the competitiveness of technologies and regions.**

There is another important added value for buyers and sellers: EPEX absorbs most of the inherent complexity of the market infrastructure, taking in charge the physical settlement and delivery of the GOs, on top of securing all financial transactions. We take care of delivering the GOs to the buyers' account on the accepted registry of their choice: they do not need to worry about a potential transfer failure of the GOs they purchased, which can happen in bilateral trades.

EPEX has successfully launched the first auction in September 2022 and is now organizing a new session every month.

### How do these new auctions work?

Each month, EPEX SPOT collects on its platform GOs from sellers, to be included in a single, anonymous auction.

Each GO is characterized across three dimensions:

- **Technology** (was the GO generated by a hydro, wind or solar asset?)
- **Country of origin** (where was the GO generated?)
- **Subsidy scheme** (was the asset of origin subsidized through a public mechanism ?).

Bidders can bid on generic GOs (no particular characteristic required) or to the contrary on increasingly specific types of GOs, along one or several of the three dimensions (e.g., a French GO from an unsubsidized asset, whatever the technology).

An algorithm optimally matches supply and demand: different clearing prices are generated, reflecting the value of each type of GO (generic or more or less specific); all buyers pay the same price for the same type of certificate. GOs are then delivered to buyers via the French GO registry, operated by EEX.

Finally, we publicly reveal several indices resulting from the auction (Europe GO, Europe Hydro, Europe Solar, Europe Wind, Nordic Hydro), to serve as reliable price references for GOs across Europe.

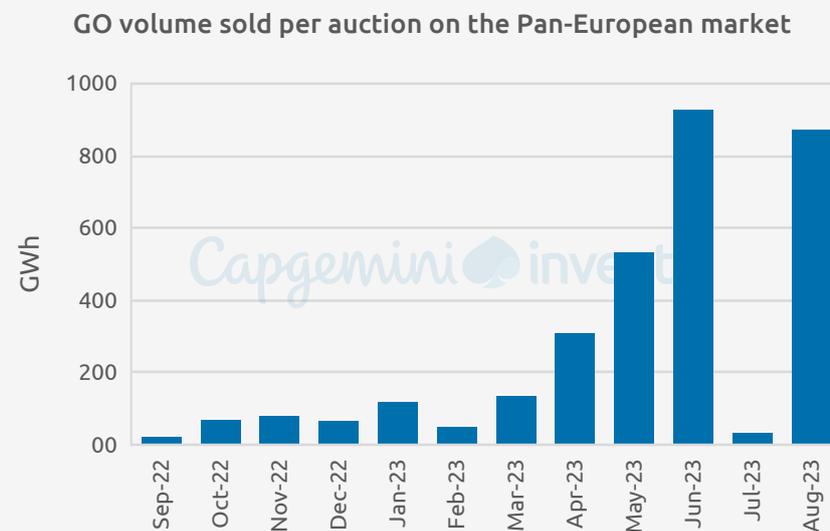
Taking into account participants' feedback, a fourth dimension is currently in the works: **temporality**. Starting in Q4 2023 (pending technical readiness), buyers will be able to choose GOs from specific months of production to comply with specific national regulations (in France, for instance), and sellers can value their GOs at different prices according to the month of production.

## What evolution have you observed, since the first auction?

After twelve auctions, participation and traded volumes have already increased significantly.

During the first auction in **September 2022**, participants were testing the system with small volumes: we observed **26 market players**, trading about **19 GWh** out of 149 GWh deposited.

Since then, interest in our auctions has increased significantly, and in **August 2023**, **54 participants** took part in the auction, gathering utilities, producers, suppliers, brokers as well as direct consumers (the full list is available on our website: <https://www.epexspot.com/en/exchangemembers#list-of-exchange-members>). The deposited volumes increased to 1,356 GWh and **873 GWh** were traded (a 64% execution ratio for sellers). We even reached a maximum of 925 GWh traded in June. Despite the temporary drop of activity in July due to summer holidays (with little trade on the OTC market as well), we reached a compound growth rate of 376% per month since the launch. Overall, about **3,200 GWh have already been traded on this pan-European market.**



Source: EPEX SPOT

Beyond these figures, we are pleased with the **diversity of countries** (with strong activity from Norway and France for instance) **and technologies** (hydro, wind and solar assets, most of them unsubsidized): it reflects the truly pan-European nature of this market.

Regarding prices, we launched in February the Europe GO index, covering all countries for all technologies: this volume weighted average price has varied a little over 1 year, from €5.8/MWh in September 2022 to **€5.2/MWh in August 2023.**

## How do you see the future of this pan-European market?

Participants' enthusiasm for the platform remains strong (we expect to reach 60 members by the end of the year), and the volumes traded have steadily increased over the past year. We will continue to help market participants, by studying their feedback and adding new products and dimensions so that they can comply with regulations (or even go one step beyond).

This is the first market to allow GOs trading across Europe with an innovative algorithm, so it is a great initiative: we aim at accompanying the development of the market, improving the offer on a regular basis to match our customers' needs, having regulators further enhancing the GOs scheme, and even at offering a solution to those from countries not currently within the EU GO system.



***Our goal is that these private initiatives, which promote standardization and transparency, encourage in turn regulations to move forward so that GOs can support even more the energy transition in Europe.”***

EPEX will host a GO-focused event in  
**Madrid on October 5th**

and a webinar on  
**October 25th**

(subscription page: <https://attendee.gotowebinar.com/register/8115247268320399448>).

If you wish to learn more, contact them at  
[sales@epexspot.com](mailto:sales@epexspot.com).

# CONCLUDING REMARKS

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



After the impressive level of activity witnessed in Q1, a slowdown in terms of new volumes is clearly visible in Q2. However, this should not be overinterpreted as a severe decline of the market. To the contrary, the performance actually remains impressive across most countries of the panel compared to previous years. Corporates stayed determined to sign PPAs to reach their sustainability targets and protect themselves against the threat of price volatility, even while market prices were decreasing across Europe.

Additionally, Q2 still saw the second-highest number of deals announced in a single quarter within the Barometer's scope. The drop of volume is mostly caused by a decrease of the average size of PPAs, which is not necessarily bad news for the sector: new, medium-sized offtakers are finally accessing the market, and are securing accordingly smaller PPAs than the large multinational groups, which had remained the main buyers for a long time.

Other positive developments are observed in the quarter: besides the usual market leaders, new countries like Germany and France start to shine, and a new growth area is secured with the multiplication of PPAs specifically dedicated to electrolyzers for green hydrogen production.

Finally, the interaction of PPAs with public support mechanisms continues to evolve, beyond a question of replacement or separate coexistence. As governments study the mechanism with increasing interest, potential public auctions allowing projects to mix CfDs with PPAs are evoked (for instance, in France). Furthermore, several States follow in the steps of Norway by mobilizing public organizations (the Export Credit Agency in Spain, BPIFrance in France) to help offtakers secure financial guarantees to sign PPAs.

Stay tuned for the next issues of Capgemini Invent's Barometer, to monitor these evolutions and read new interviews of market players sharing their experience.

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