

PEXAPARK

┌ EUROPEAN

# PPPA

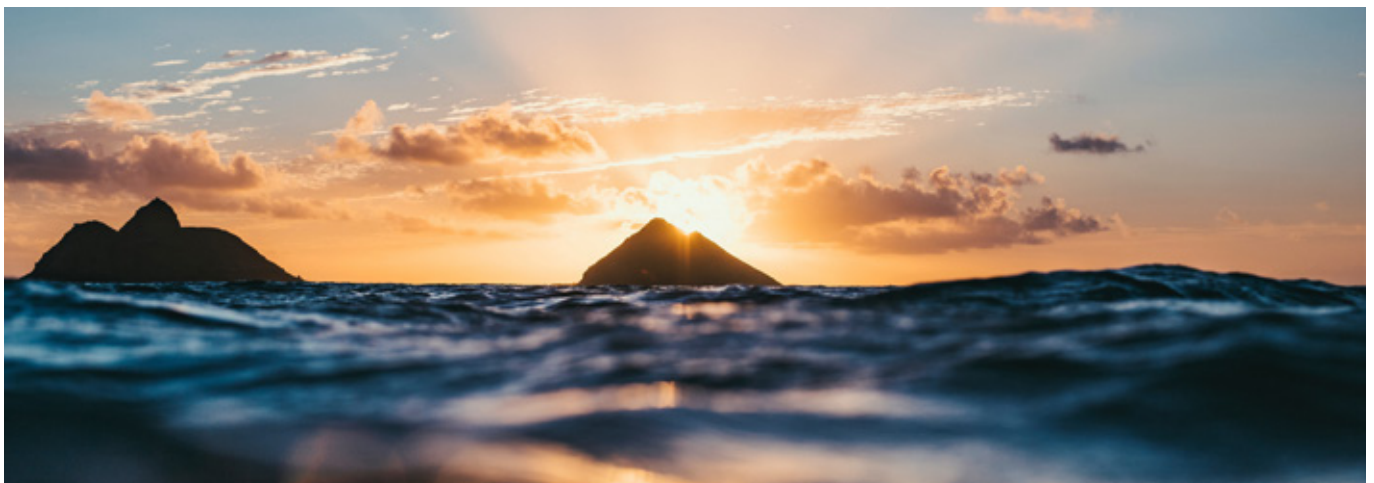
The letters 'PPPA' are rendered in a large, bold, sans-serif font. The interior of each letter is filled with a photograph of a mountain range under a sunset or sunrise sky, with warm orange and pink tones. The letters are positioned on a dark background that transitions to white on the right side of the page.

MARKET OUTLOOK 2022

- The rise of a new operating model for renewables

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# 1. EXECUTIVE SUMMARY

## Key findings from our market observations:

**Overall yearly PPA activity kept strong** – Despite yet another turbulent year, PPA activity in 2021 led to a 58% CAGR growth in deal count and 42% in contracted capacity since 2018. In 2021, we tracked 11.2GW of PPAs that enabled new capacity to come online across more than 140 deals.

### > Important disclaimer:

Pexapark updated its PPA Tracker methodology and we now only include deals that meet certain criteria. Above all, a PPA needs to carry price risk (offering a fixed-price or similar pricing structures per MWh).

The primary driver of our move is that we wanted to track the deployment of new subsidy-free capacity. Therefore, we aim to emphasise PPAs that act as the primary revenue stability tool and contribute substantially to the financing of new assets.

**Volatility led October to be the slowest PPA month** – PPA activity almost came to a standstill in October, just when the pricing surge that started in September made it clear that it was not a temporary bump in the road and price volatility increased even more dramatically. The most conducive environment to PPA deal making is when price changes are moderate, a situation which did not normalise throughout the rest of the year and continued into the new year, remarkably given the current environment, most transactions that were halted during the price wobbles managed to close before the end of the year, making December 2021 the strongest PPA deal month ever recorded volume-wise.

**For the first time, volumes executed in Corporate PPAs significantly outperformed utility PPAs** – In total, 2021 saw 6.5GW of disclosed contracted capacity for corporate PPAs, and 4.63GW for utility PPAs. Amazon is the biggest PPA offtaker, taking home 16% of the year's contracted capacity and 30% of European corporate PPAs overall. Corporates take over the Top 3 positions for Top Sellers, with Alcoa and BASF filling up the spots next to the IT conglomerate.

**Q4 witnessed onerous volatility levels** – Prices are continuously subject to fluctuations, measured via volatility, a central tool to how utilities and trading houses assess and manage financial risk. Annualised volatilities of front year contracts, a core determinant of PPA prices, reached realised volatility levels of up to 250% - five times the level of usual spikes of up to 50% seen throughout the years.

**Many market players are recalibrating their pricing** – As a result of the Q4 price surge, the principle approach utility offtakers use to risk manage their PPA book, known as stack and roll hedging, was severely impacted. Price correlation between hedges and PPAs broke down. Such price moves resulted in significant mark-to-market losses and cash drains on margin payments.

PPA deal making entails risk transfers between counterparties. At Pexapark we illustrate the price adjustments made by utilities to cover the hedging and warehoused risks as risk discounts to fair value price assessment. Due to the current situation, utilities were marking up their discounts in unprecedented manners of up to 40% or halting risk-taking all together.

### **Long-term corporate offsets gain in value**

– As utilities and corporates have different risk profiles, since corporates are procuring electricity for their own use and do not have to manage price risks daily, corporates may outbid utilities for offtake agreements with quality projects. We define the difference in risk profiles as liquidity cost. The differential between the two types of offtakers has reached high single-digit EUR/MWh in key markets. For corporates, the gains of signing are higher than their risks, and are ideally willing to pay a higher PPA price.

### **Dealing with Baseload PPAs requires dedicated energy risk management approaches**

– The increase in discounts of Pay-as-Produced (PAP) PPAs kept increasing demand for Baseload PPAs. Such volume structure brings a steep shift not only from the typical risk profile used for traditional renewables investment, but also in the day-to-day operating model of the asset. Changes in daily capture price and lower than expected production volumes led to cash outflows and losses in markets such as Sweden. Sustained and continuous high volatility of capture rates makes Baseload PPAs more uncertain, leading to a need for new energy risk management approaches.

### **De-coupling of Swedish price zones made solar investment attractive**

– Having started in 2020, in 2021 the de-coupling of wholesale prices across Sweden's four pricing zones (SE1 and SE2 in the north, SE3 and SE4 in the south), challenged investment models that focused solely on wind in the north. The significantly higher prices in the south are making solar investment profitable, and a plethora of players already announced their moves.

### **State intervention on merchant renewables reminded investors that political risk is still lingering**

– In light of the energy pricing crisis across Europe, member-states took emergency policy measures to shield consumers from distressing electricity and gas prices. Spain went a step further, with measures addressing the generation side, heavily affecting merchant

renewables backed by indexed PPAs. The move triggered severe reactions from the industry, leading the Government to publish clarifications that calmed the market. The incident reminded of the role political intervention still plays even in subsidy-free markets.

### **Romania and Poland were the new frontier PPA markets**

– The dash to invest and realise new projects has come back to Romania where we have seen tremendous interest from investors in realising new subsidy-free renewable projects. The Government is taking a step back from overly complicated market rules and interventions, giving room for a market-driven PPA market to flourish. Poland continues its up and coming trajectory in its own way. Corporates are now explicitly seeking additionality and the enabling of new clean capacity, offering an interesting complementary route-to-market model for developers, next to the country's auction scheme.

## **Our Predictions:**

### **The squeezing of the 10-year PPA Market**

– We believe that the total long-term PPA market will languish in absolute numbers. We expect that availability and pricing for long-term PPAs in many markets will be tested due to the maturity of some markets and the pricing impact of the recent market turmoil, for utilities for example. Even though corporates have an edge at the moment, we have observed that many corporate PPAs are structured for 'sunny weather' conditions, giving rise to more risks for sellers.

A possible scenario could prolong the life of the 10-year PPA market, though. As utilities are born intermediaries, the two offtake types ideally would complement each other, like they have already done. Suppose a utility can de-risk its stack-and-roll hedging programme with a few long-dated corporate offset deals. In that case, a multiple of the offset volumes could be unleashed in long-term PPA volumes with investors to enable additional renewable build out.



**The rise of the next generation utilities –**

Our expectation is that a series of large new renewable investment funds will pursue next-generation utility-like business models.

Short-term PPAs and Baseload structures are pushing investors to upgrade their operating model, with origination teams, portfolio management capabilities and risk management infrastructure. Take a step back, and you can see that these investors are becoming the next generation utilities.

Especially large funds, are starting to turn the implicitly given diversification into quantifiable, real diversification benefits by managing their assets on a portfolio basis. We predict the launch of new large funds out of the renewable investment capitals such as Hamburg, London and Copenhagen. Such players will bring the risk management skills of a trading house to the table, targeting to capture higher returns from investing and operating on a portfolio

level. We believe that in terms of volume, such investment could eclipse the classical long-term PPA market.

**The ascent of the mega corporate buyer class –**

Our view is that where rules allow, offshore wind capacity offtake contracting will be with a corporate out of the mega buyer class.

Mega buyers, such as global data centre behemoths, large chemical companies and consumers planning P2X facilities, have gargantuan energy needs. The sheer volume needs lead to the only renewables asset class able to generate such volumes, that is offshore wind. Due to competition, equity may also be required to secure such large volumes. Our inspiration – as well as aspiration – comes from a truly one-of-its-kind deal that took place in 2021, when BASF acquired a 49.5% stake in Vattenfall's 1.5GW Hollandse Kust Zuid offshore wind farm in the Netherlands.



## 2. INTRODUCTION

### Plunging into the growth zone

No matter which segment of the value chain you are, chances are there are few reasons not to be excited about being in renewables right now. At Pexapark, we live and breathe next generation operating models and tools for merchant renewables, creating a level playing field for players joining the dance of the energy markets realities. Therefore, 2021 hands down kept us busy for good, and 2022 is set to follow suit.

The year 2021 will possibly remain in history as a living example of how challenging the transition to an investment and operating model exposed to more price risk can be for renewables. Electricity is a very special commodity, with the highest volatility rate compared to others. After recovering the excessive low of spot prices the year before, Q4 of 2021 brought the opposite extreme side of volatility to the fore. If we could sum up our market observations in one phrase,

that would be that ‘change is the only thing that remains constant’.

Traditional business models have been tested for a good few years now. But the headwinds that 2021 brought made even the most reluctant to change players bite the bullet and see that long-term PPAs were only the first step, but not enough, to thrive in the post-subsidy world.

Following last year’s success, we are thrilled to present our “European PPA Market Outlook 2022” report with our analysis of an eventful year and how its major events define our 2022 expectations. We are looking forward to starting some sharp discussions on how the renewables market evolves. Feel free to let us know your thoughts at [hello@pexapark.com](mailto:hello@pexapark.com)!

Enjoy the dive, it will be intense!

### PEXAPARK TEAM



#### LUCA PEDRETTI

**Chief Operations Officer (COO) & Co-founder**

Luca has 15 years’ hands-on experience in energy risk management for renewables in open markets – valuating, structuring, negotiating and managing PPA transactions across Europe. He likes Stracciatella ice cream, a lot.



#### MARITINA KANELLAKOPOULOU

**Insights Analyst**

Maritina has 6 years’ experience in research and analysis of clean energy trends, having provided market insights on Europe’s renewables landscape to financiers, project sponsors, and advisors through B2B publications.

**Contributors:** Michael Waldner, Co-founder & CEO | Dr Werner Trapesinger, Head of Quantitative Products  
Rommero Carillo, Head of Corporate PPAs | Lama Bou Akl, Advisory Team

### **3. SPOTLIGHT ON THE EUROPEAN PPA MARKET**

The year 2021 will stay in history as the year that encountered the ultimate extreme of price volatility. But there are many more things to remember it for. Before we get into the details of what this means for the market, first things first: let's review how PPA deal-making performed.

➤ **Note: Pexapark's PPA Tracker methodology**

Not all PPAs are equal, and Pexapark knows first-hand. Our PPA Tracker includes agreements that meet certain criteria. Pexapark's primary criterion lies in a PPA carrying price risk. We aim to record PPAs that have genuinely enabled the financing of new, subsidy-free capacity to come online. In our view, this is the original purpose and thrilling aspect of the nascent PPA boom: every deal to advance the energy transition.

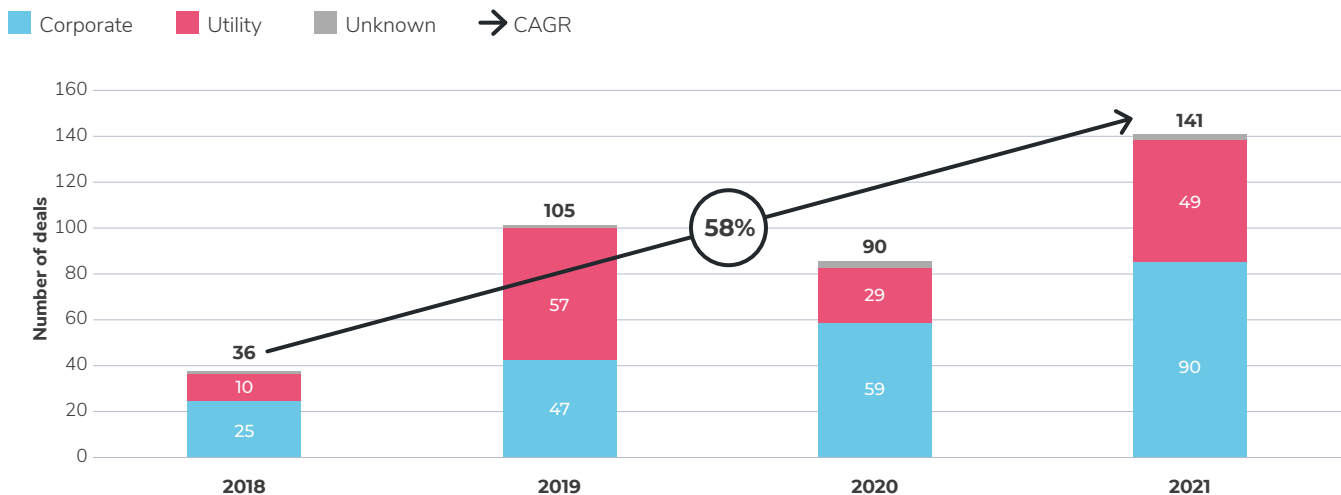
For this reason, Route-to-market (RTM) or balancing services PPAs do not make it to our database, even if they are concluded for long periods (such as for projects under the UK CfD scheme that may need PPAs to market their power, while it's the UK government that takes the price risk by offering a floor price). Post-subsidy PPAs, such as post-EEG in Germany enabling to keep alive projects that would go offline otherwise, need to have a tenor longer than 5-years. We calculate the volume of the deal flow based on the PPA Size and not the Project Size. Whenever there's no information on the contracted capacity and is not straightforward to calculate, the PPA Size is left blank.

You can find our PPA Tracker on Pexapark's PPA price reference platform [PexaQuote](#), alongside more information on our methodology. For these stringent rules, you might see much different deal data than the ones covered elsewhere. We go the extra mile in reviewing PPA activity, to only include deals that advance the energy transition. Finally, we also count on more than 5'000 users on PexaQuote that point us continuously to new deals closed and announced through the 'Report a PPA Deal' function.

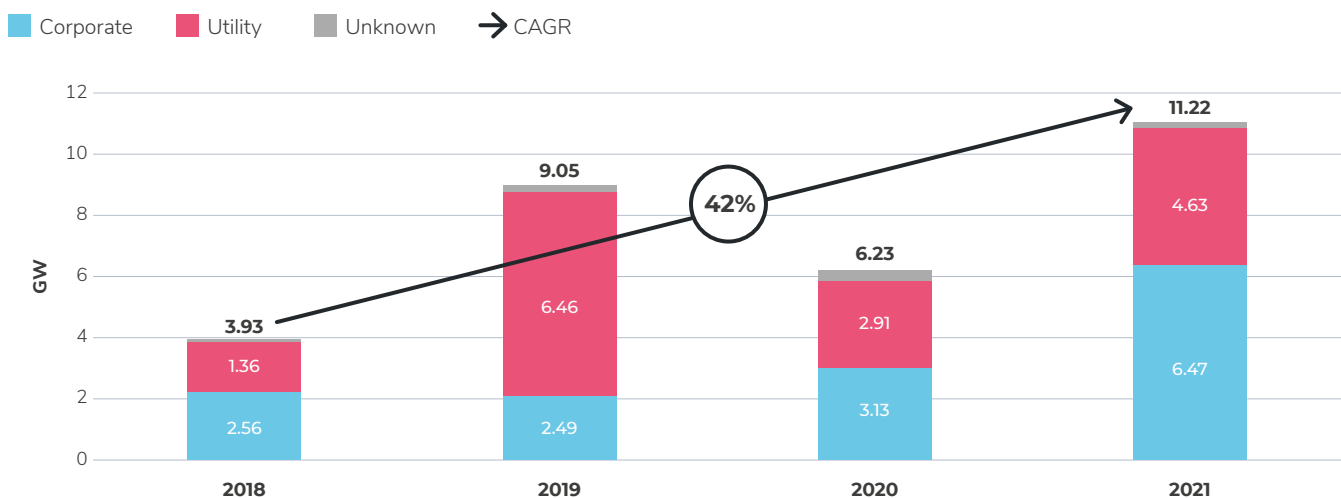
## 3.1 YEAR-ON-YEAR PPA DEAL FLOW, 2018-2021: A NEW CHAMPION EMERGED

Despite the ongoing pandemic, accompanied by an unprecedented price surge and volatility shock, the PPA market in 2021 hit new records. In terms of deal count, in 2021, we tracked a total of 141 deals supporting more than 11.2GW of new capacity to come online.

### PPA deal count, 2018- 2021



### PPA size, 2018- 2021 (GW)



Source: [PexaQuote](#)

You will notice a steep drop in 2020 volumes compared to our data last year. This is because we decided not to include a very large deal of 3GW announced by an oil major. According to our criteria, the price risk was not transferred to a 3rd party but instead stayed within the same corporate structure (intra-group PPA).



For the European PPA market, 2019 was a clear milestone; the tipping point that defined where the industry was heading. But then, in 2020 a global pandemic happened, briefly pushing prices to extremely low levels, making both sellers and buyers – especially utility and trader buyers – re-evaluate their long-term contracting appetite. The slowdown in PPA activity was anticipated – although corporate PPA activity blinked an eye giving an early sign of what would follow.

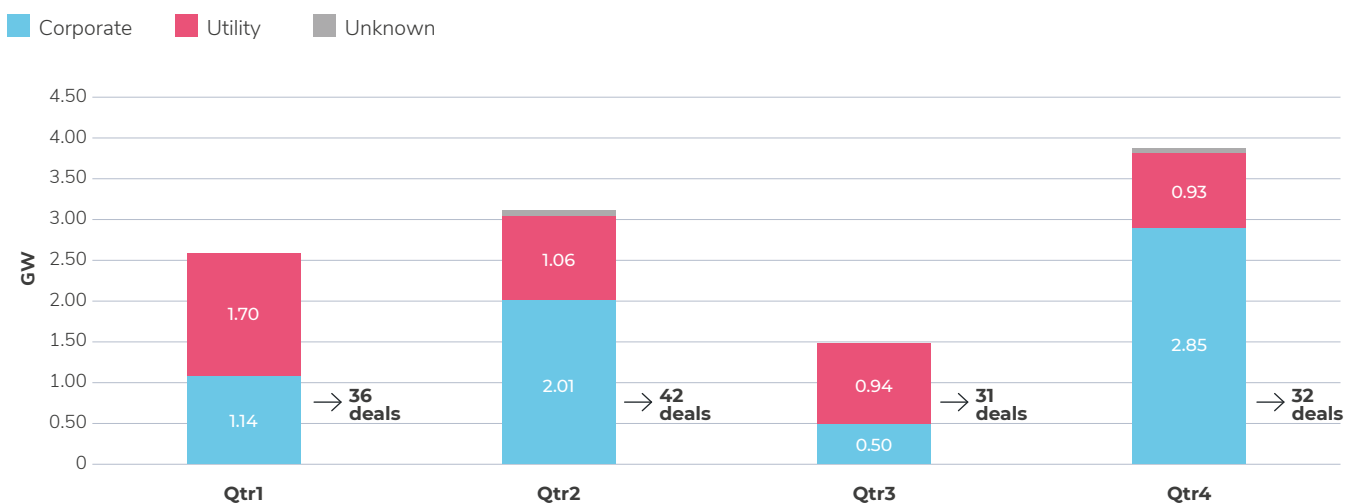
In 2021, deal flow met our original expectations. That's a remarkable accomplishment, because initially we feared that the pandemic and price shocks would permanently harm deal growth. But our 2021 data illustrate that the PPA market has witnessed an impressive 58% compound annual growth rate (CAGR) in deal count since 2018, and a 42% CAGR growth in contracted capacity.



## 3.2 PUTTING 2021 UNDER THE MICROSCOPE: THE DATA

The recovery of PPA deal flow from the pandemic already commenced in Q4 2020. The first half of 2021 continued the growth trajectory sending positive signals to the market that the recovery is here to stay and market participants have learned to deal with the 'new normal'. However, another unexpected event made its appearance, leading volatility to rear its ugly head. H2 2021 was characterised by an energy crisis that led wholesale electricity prices and price volatility to unprecedented high levels across Europe. The corporate PPA market retained its momentum both driven by large buyers and a supportive environment pushing more corporates to explore the PPA route as proven, relatively fast and effective route to decarbonise part of the supply chain or operations.

### Quarterly PPA activity, 2021



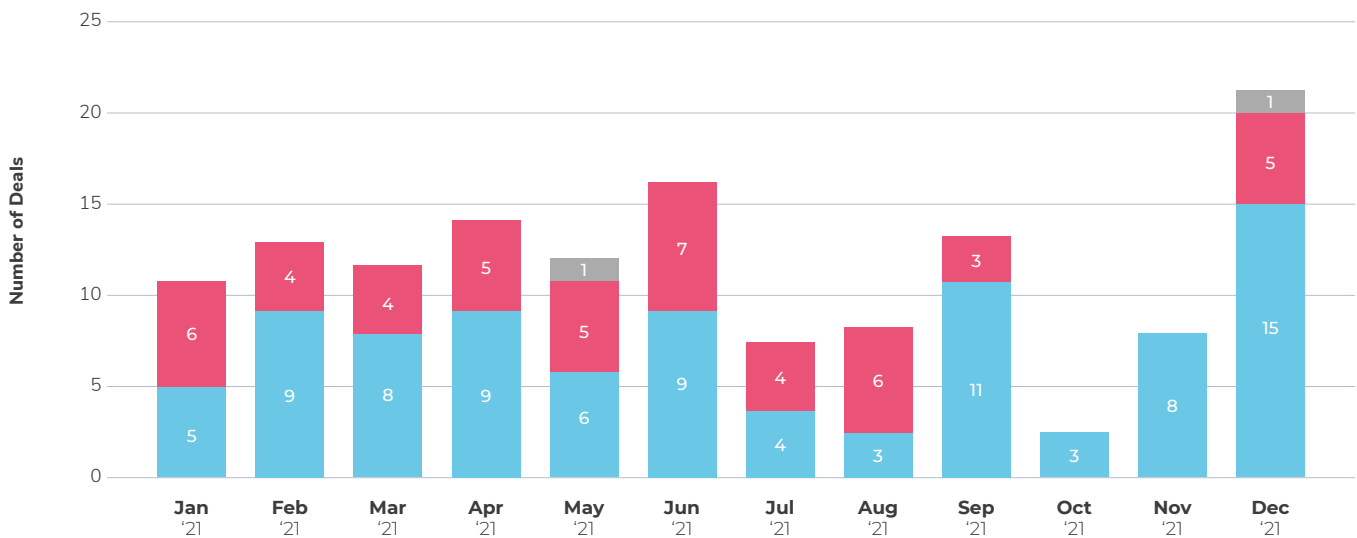
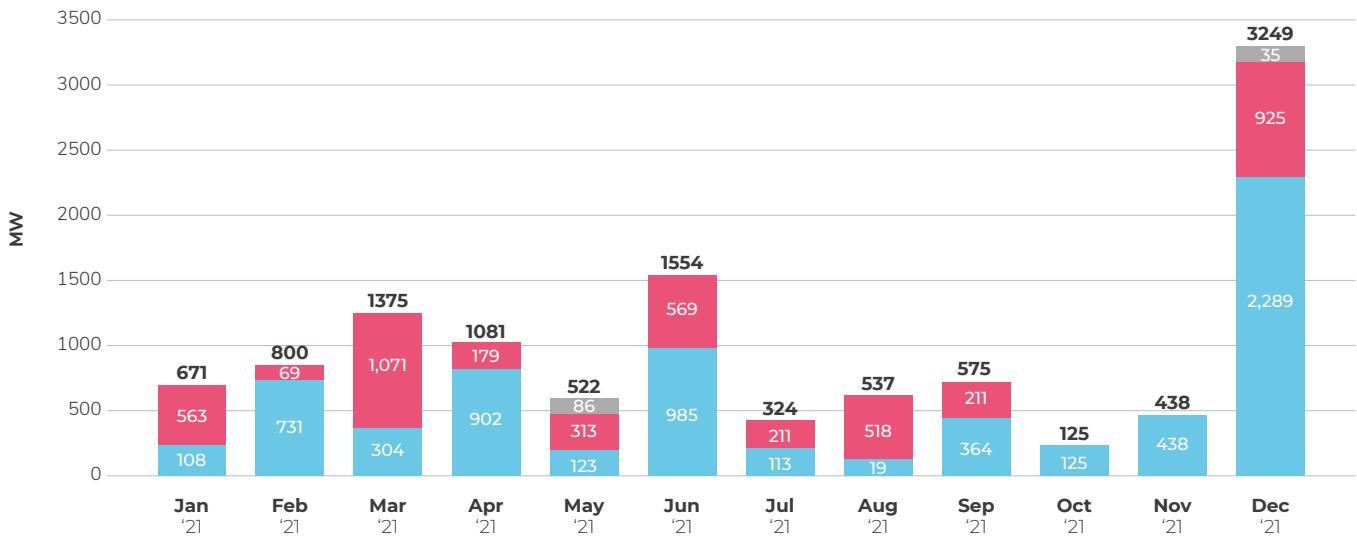
Source: [PexaQuote](#)

The slowest quarter both in terms of deal count and contracted capacity was Q3. Deal count alone shows relatively even activity throughout the year, but contracted capacity does stand out in Q4.

PPA deal making came to a near standstill in October as advanced negotiations of market players were disrupted by the sudden price volatility. Most of the transactions ultimately closed, as shown by the large surge in deal closing before the year end. The extensive closing activity in Q4 2021 aligns with what we have seen in previous years, with December often being the most vivid month. It's nevertheless notable given the difficult market environment.

### Monthly PPA activity, 2021

■ Corporate ■ Utility ■ Unknown



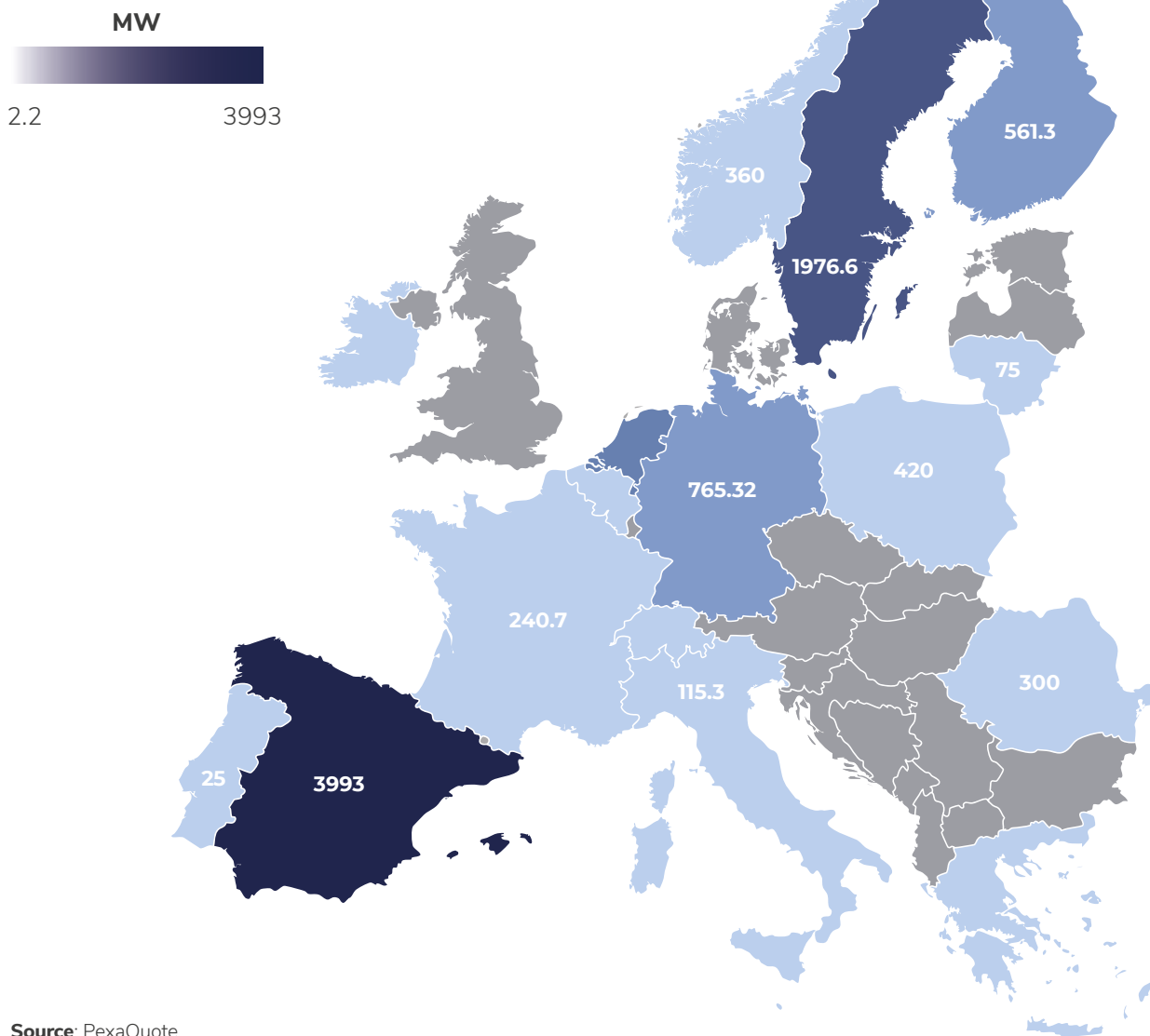
Source: [PexaQuote](#)

One could expect that rising prices are good for deal flow: investors are able to secure higher revenues, corporate buyers eager to close deals and hedge against further price increases. The opposite is though true – active and continuous deal flow flourishes when price changes are moderate.

The long-term impact of the price surge will be seen in the first half of 2022 and is heavily discussed further below. The possibility of corporates outbidding utilities for PPAs will also be analysed.

# GEOGRAPHICAL ACTIVITY

## Top 10 countries by contracted capacity, 2021



Source: [PexaQuote](#)

Spain dominates deal flow for yet another year, with a total of almost 4GW disclosed contracted capacity – **one-third** of the year's accumulated capacity – across 34 PPAs that made our Tracker. The country surpassed its 2019 record levels, with a notable trend being that the difference with the second position is decreasing. In our last outlook, we expected Germany to move up the ranks and secretly hoped that Italy would finally unleash its solar potential. While Germany is on the ascent, permitting backlogs are still not being resolved on a systematic manner in Italy. We were positively surprised to see Sweden roaring back given the difficult pricing conditions prevalent throughout most of the year.

### ➤ A snapshot into structures

While there is not much data published on PPA structures, Pexapark noted a clear preference towards Baseload PPA structures especially in mature markets that have already seen a large amount of PPA transactions with a set of offtakers. There is no natural respectively traded market to hedge renewable cannibalization risks so that saturation for that type of risks can occur. While market participants are already used to baseload type PPA for wind investments in the Nordic price zones for years, it was a new phenomenon for investors into solar projects in Spain during 2021. For upcoming PPA markets in Germany and Italy, risk appetite is still given and investors can still de-risk their long-term revenues at acceptable costs from future revenue [cannibalization](#).

On the Corporate PPA side, we noted two clear trends. Firstly, European industrials are procuring their total European electricity needs in aggregate through virtual (financial) PPAs (of which many in Spain), accepting significant levels of country spread risks. Secondly, we noted noticeable qualitative differences between many industrial PPAs and utility PPAs. On the one hand, many contracts concluded with industrial offtakers contained price adjustment clauses to the benefit of the industrial offtaker. On the other, such PPAs often entailed significantly lower credit risk protection compared to PPAs with utilities.

### Evolution of Top 5 countries by contracted capacity (2018-2021)

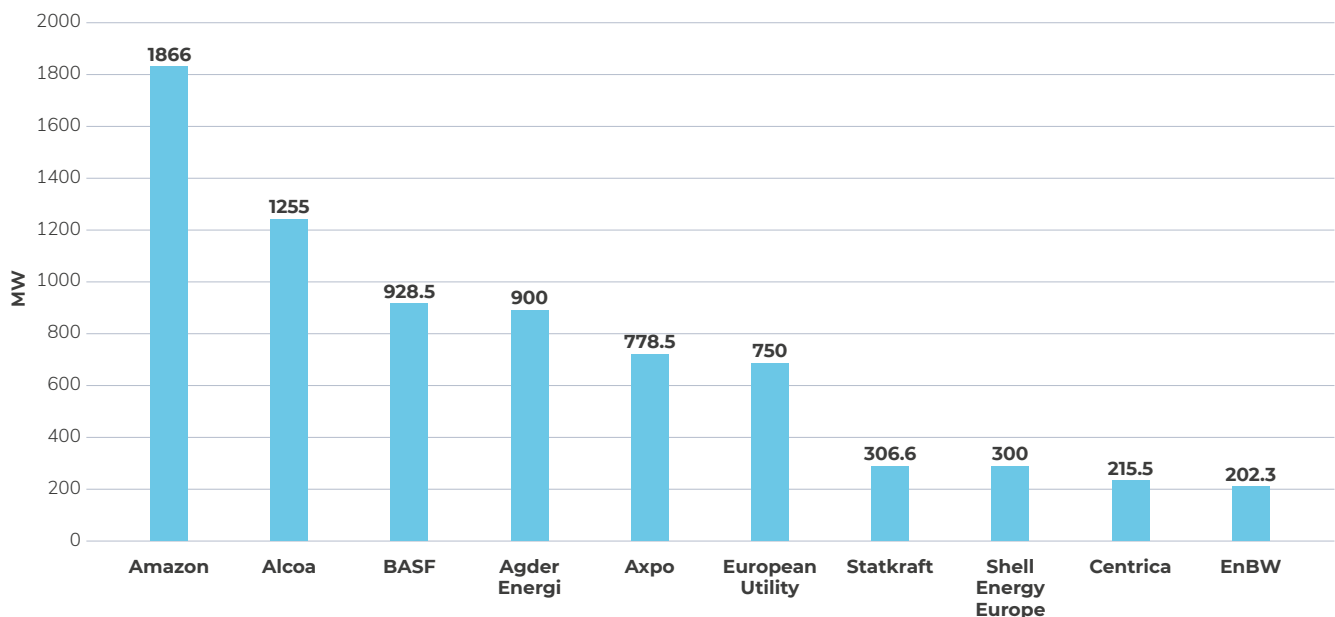
COUNTRY	2021	RANK	2020	RANK	2019	RANK
Spain	3.9GW	1	1.9GW	1	3.3GW	1
Sweden	1.9GW	2	0.4GW	5	1GW	3
Netherlands	1.2GW	3	0.2GW	(not Top5)	0.9GW	4
Germany	0.75GW	4	1GW	2	0.41GW	(not Top5)
Great Britain	0.62GW	5	0.76GW	3	1.6GW	2

# TOP BUYERS AND SELLERS

**Amazon** clearly comes out on top when reviewing the top buyers – mixed corporates, utilities and traders. The data centre unit of the global retail behemoth is on an unprecedented procurement spree. The PPAs added on Tracker were only the ones where the project was disclosed, meaning that the total procured capacity may be higher. The 1.8GW linked to projects comprise 16% of the total contracted volume in 2021, and a powerful **30% of European corporate PPAs**.

The top 3 positions are occupied by corporates, while seven utility offtakers take the remaining spots.

## Top buyers (mixed) by contracted capacity, 2021

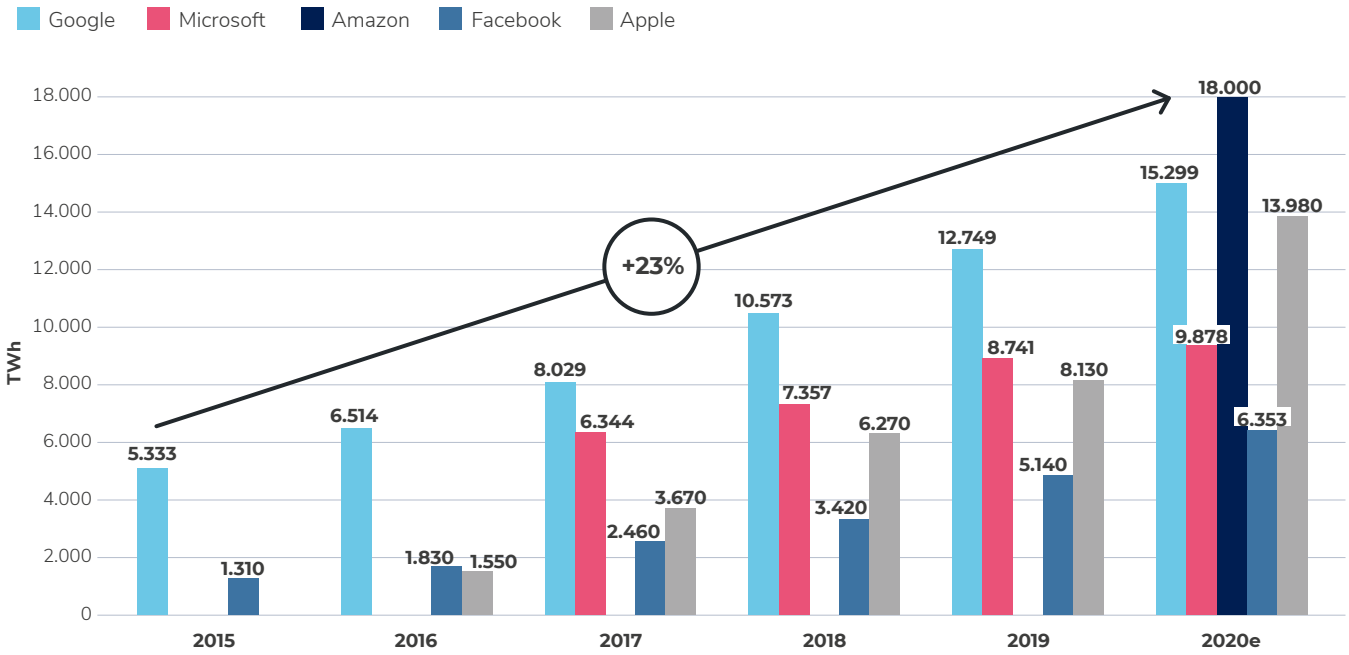


Source: [PexaQuote](#)

Breaking down corporate offtake activity, **Information Technology (IT)** comes to the top spot as the most prolific energy buyer, with more than 2GW of disclosed PPAs across Europe. In all likelihood, it will be difficult for other industrial segments to claim the top renewable buyer spot, given the industry's track record of 20% year-on-year growth in electricity consumption.

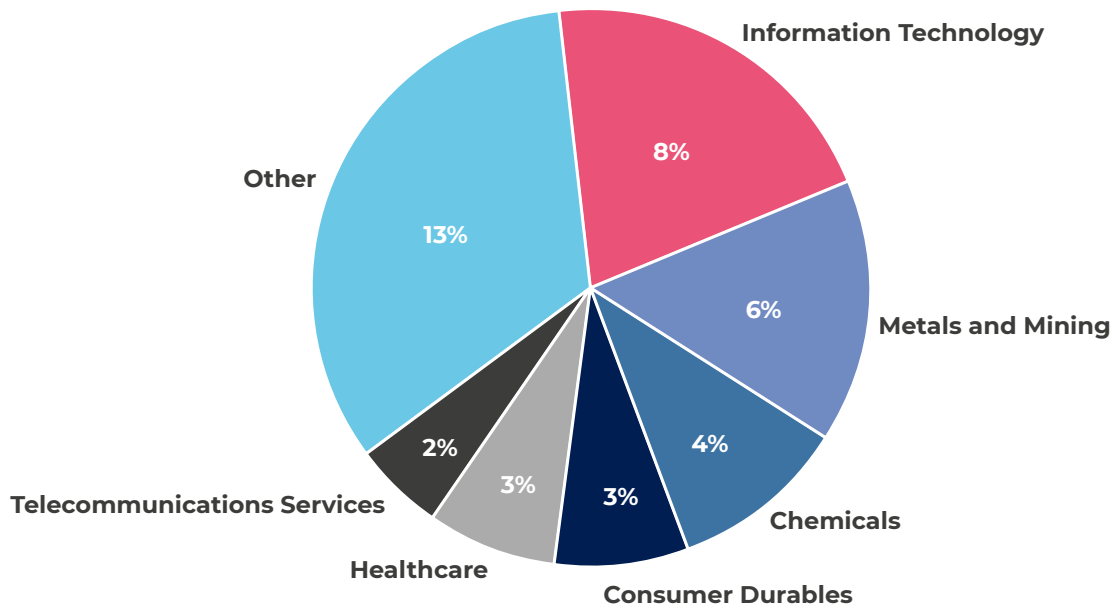


### Global electricity consumption of large tech companies



Source: Sustainability Reports 2020 of Facebook and Apple, statista.com; sustainability.aws.com; nature.com; eurostat.com; Pexapark research. Chart made by available yearly data for each company.

### Division of Corporate PPAs by industry, 2021 (% of MW)



Source: PexaQuote

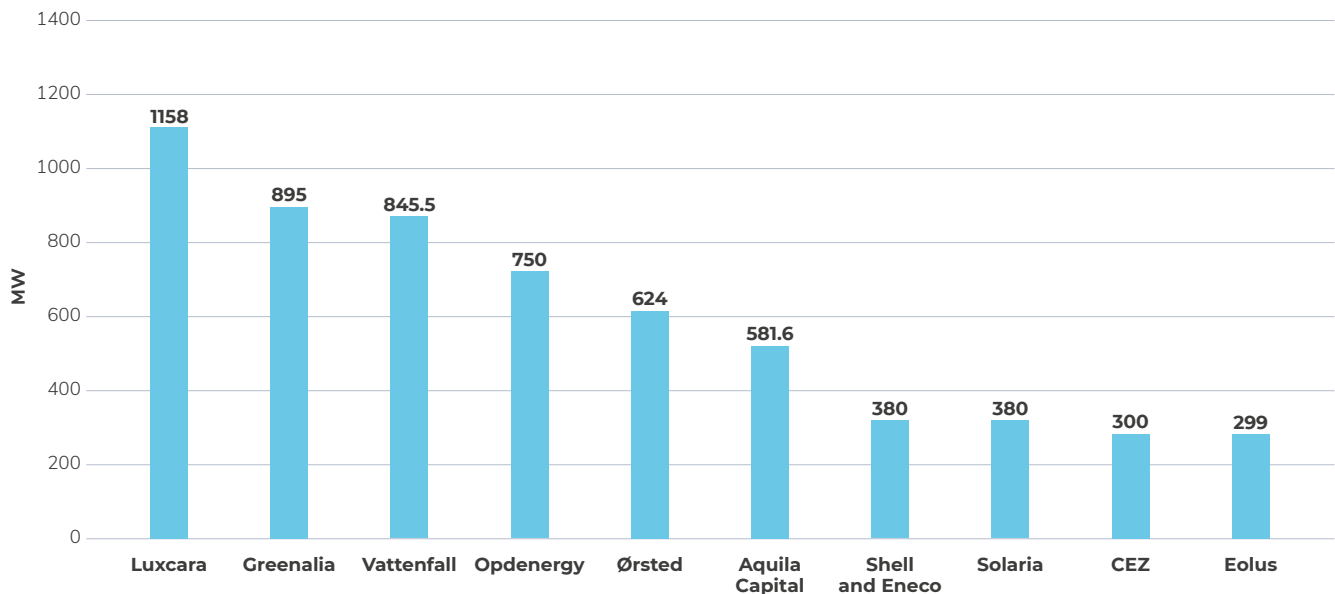
'Other' category comprises: Consumer Staples, Financials, Public Sector, Automobiles and Components, Transportation, Energy, Professional Services

The **Metals and Mining** sector comes second, with a total of 1.34GW of PPAs. Alcoa bought the lion's share of the sector's capacity, with a total of 1.25GW. Other buyers include Górazdze Cement, Sidenor, and ArcelorMittal. **Chemicals** comes third, with a total of 1.18GW. A single buyer again is dominating the sector's share, that is BASF, with a total of around 1GW of disclosed capacity across three deals.

> **Note**

While the procurement sprees of tech giants grab most of the headlines, the clear Pexapark favourite goes to the landmark deal driven by BASF's uniquely determined and trailblazing procurement strategy which combines equity investment, large scale PPAs and a dedicated renewable energy procurement and trading unit to support the daily management of balancing and country spreads. We elaborate more on the move in following parts of our report.

**Top sellers by disclosed contracted capacity, 2021**

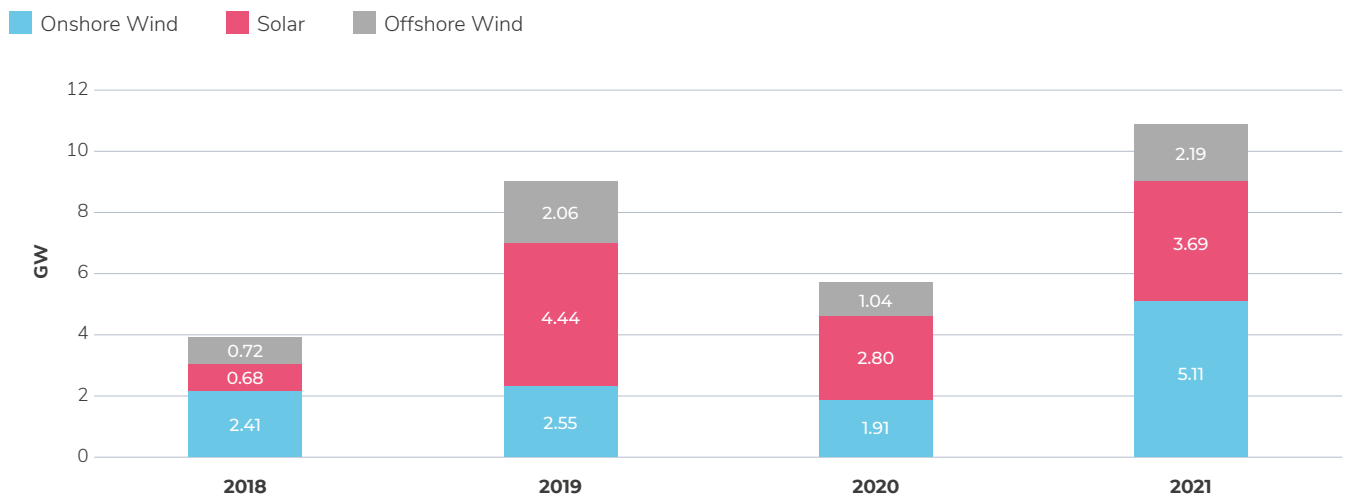


Source: [PexaQuote](#)

# TECHNOLOGIES

Despite offshore wind PPAs having attracted the majority of the attention as the newer kid on the block, onshore PPAs dominated deal flow by far – both in terms of contracted capacity and deal count. This is because much of the newly planned offshore capacity is still a few years ahead and not yet contractable. 2021 saw a total of 63 onshore wind deals, 63 solar and 13 offshore wind ones.

## Evolution of top technologies, 2018-2021



Source: [PexaQuote](#)



## 4. PROMINENT EVENTS THAT WILL IMPACT THE EVOLUTION OF 2022

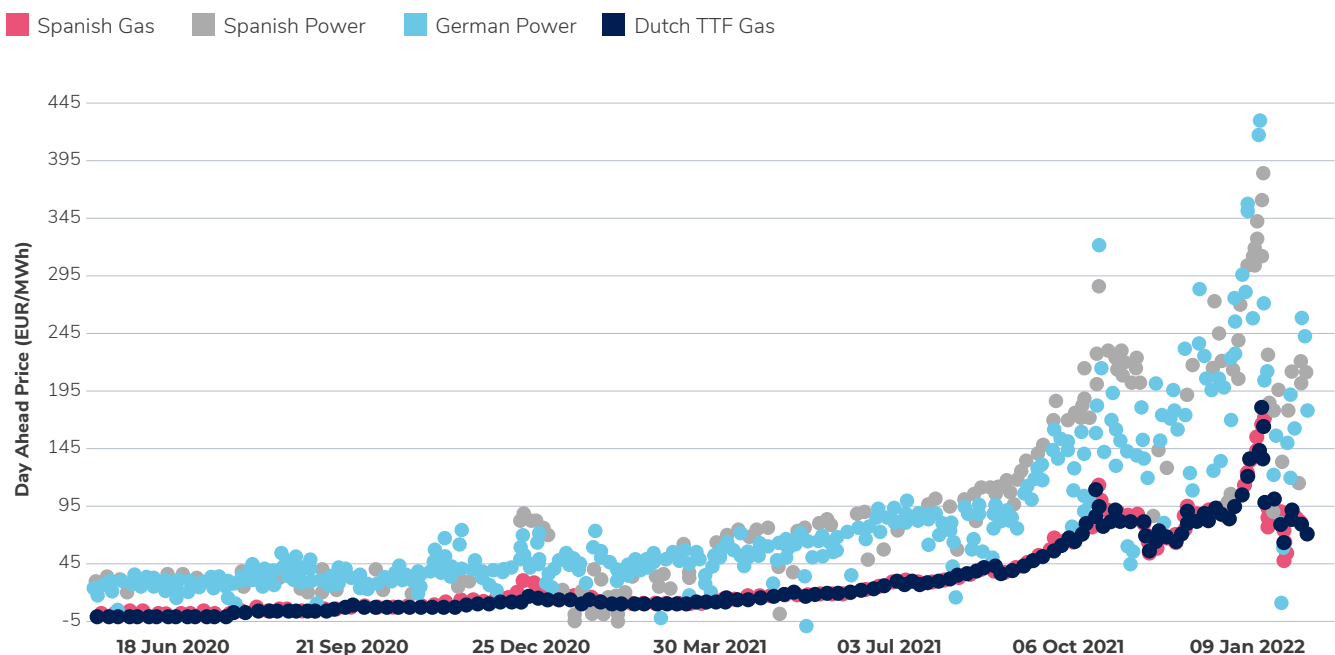
Based on the data and our qualitative observations of the European PPA market, here's our selection of the things that happened in 2021 that will define our expectations for the new year.

### 4.1 MARKET-WIDE OBSERVATIONS

#### ➤ Price surge in Q4

The pricing environment we experienced in the fourth quarter of 2021 will be remembered for many years to come and its true impacts will start to show in 2022. A series of increases in energy-related commodities such as gas, coal and carbon credits, drove up electricity and therefore PPA prices to new highs. Numerous bullish events led to such increases, such as multi-year low European gas storage levels and a gas to coal demand shift increasing carbon credits value.

#### Gas and Power prices in Europe, 2020- Jan 2022



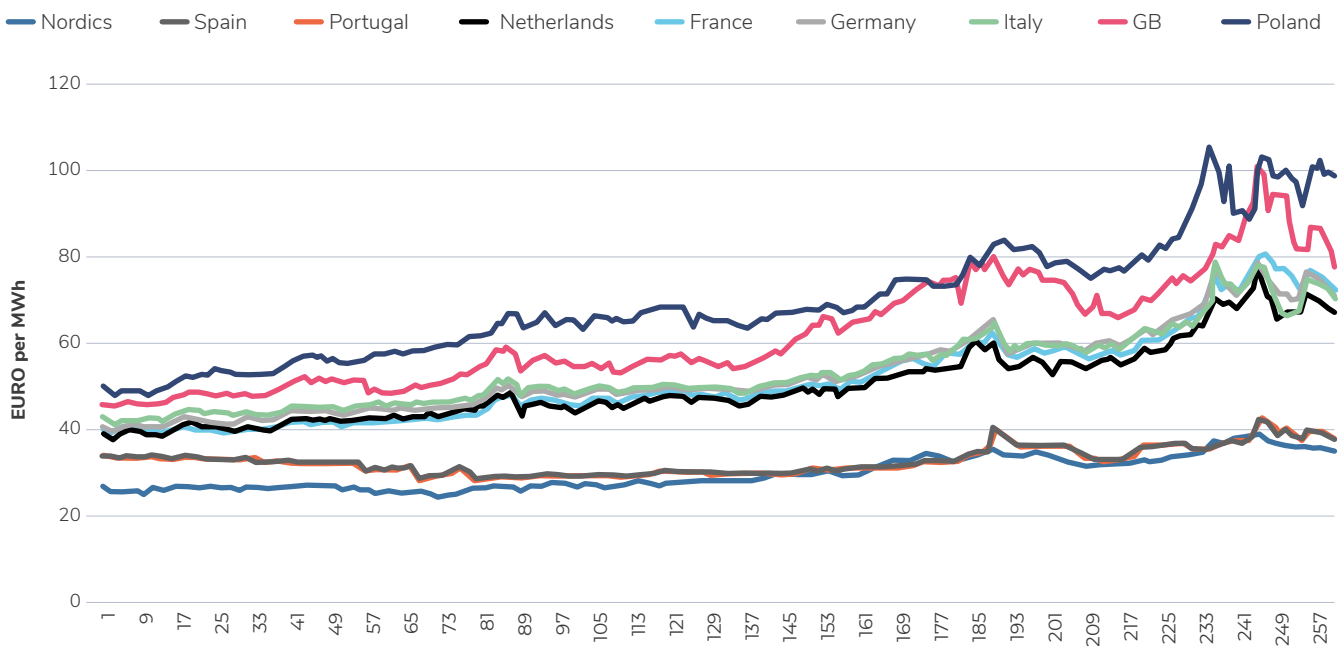
Source: Omie, Powernext, Mibgas, Epex, Pexapark analysis

### EU ETS price evolution in 2021



Source: Ember

### Evolution of Pexapark's country indices, 2021



Source: PexaQuote

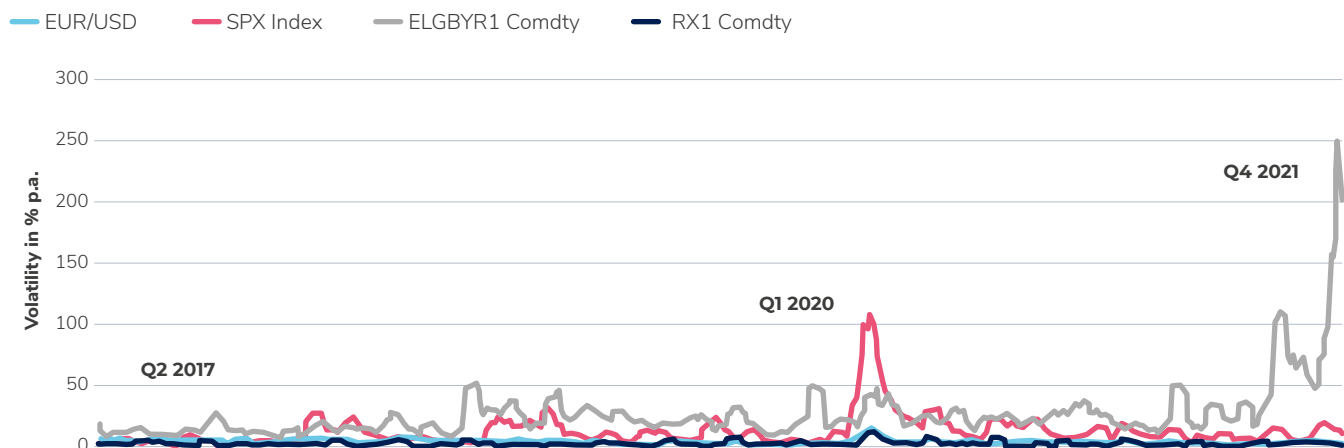
## ➤ Volatility strikes again

PPA prices derive from forward curves which themselves are determined from traded forward contracts. Therefore, prices are continuously subject to fluctuations, which are measured via volatility. Volatility is keenly monitored by utilities and trading houses, as it is central to how they assess and manage financial risk. Annualised volatilities of front year contracts were moving at 15-35% levels for extended periods and were considered a normal level of risk.

A perfect storm of events, such as the quicker than expected economic recovery from lockdowns, a surging carbon market and geopolitical uncertainty propelled volatilities to previously inconceivable levels. Distress for utilities immediately ensued, in the form of mark-to-market losses and margin calls, in some cases even necessitating liquidity injections to be able to meet margin calls.

Prices of German front calendar year contracts – which are used as a reference point for European prices in many instances – briefly **reached realised volatility levels of up to 250%**. The figure is **five times** the level of usual spikes of up to 50%, which have been seen throughout the years.

### Annualised realised volatility, 2017-2021



“ The impact of this episode on PPA markets remains to be seen. However, it is certain that some players were forced to reassess the cost-benefits of their PPA business model.

Should higher volatilities persist, the ensuing risk and funding implications of running PPA books may impact the provision of long-term PPA negatively in terms of pricing and availability.

— Werner Trapesinger, Head of Quantitative Products at Pexapark

December 2021 may have been a foreboding to this, as a few incumbents temporarily suspended their PPA activities.



## REALITY CHECK:

### Decoding the impact of price surge and volatility for utility offtakers

In order to understand why Q4'21 was so disruptive to some PPA players, we need to take a closer look into the process of risk managing PPA books. Utilities commonly manage the price risk on renewables books by selling aggregate PPA long positions into traded markets – a process known as stack and roll hedging. With liquidity in traded contracts typically confined to the first two years, this means that the utility performs the task of “tenor transformation”, retaining all risks relating to the PPA vs hedge tenor mismatch.

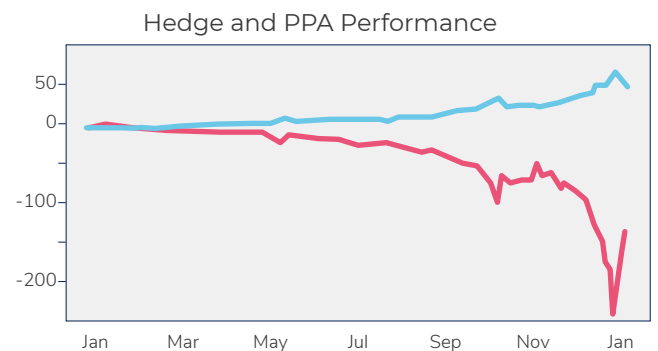
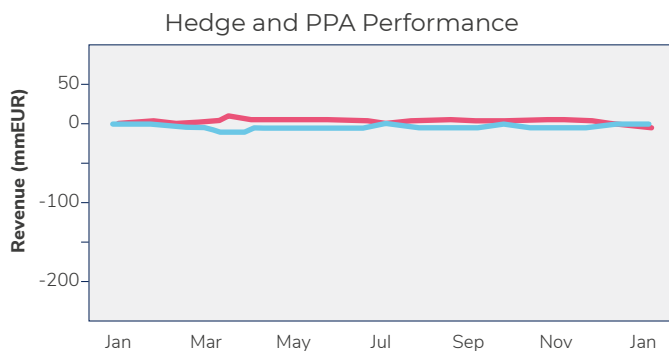
Such hedging works well when there is high correlation of price moves along the entire forward curve and when the magnitude of daily price moves is modest. Historically, this has been the case. Up until Q4 2021.

**Price correlation between hedges and PPAs has effectively broken down, as the front end of the price curve moved up rapidly, whereas the backend underwent substantially smaller price moves.** The figure below illustrates how dramatic the resulting mark-to-market losses would have been from a utility offtaker’s perspective. Whereas the economic performance of hedges and PPA contracts was largely offsetting in 2020 – which is exactly how the two are meant to perform – Q4 2021 saw that the losses of the hedge position dramatically exceeded the PPA gains, giving rise to losses in excess of EUR100 million.

### Comparison of hedge and PPA performance [10-year BLA, 100GWh p.a]

2020

2021



Such price moves have precipitated substantial cash drains on margin payments needed to cover credit risk. While the occurrence of such cashflows is routinely part of the PPA business from a utility offtaker's perspective, the size in Q4 has been distressing.

Cases of large utilities having to borrow billions of euros to respond to such margin calls and reporting billions in losses due to unrealised revenues in their books were reported in Q4 of last year.

PPAs, normally, do not entail daily margining but other credit instruments (the positions to hedge a PPA) are often built on exchange traded contracts which undergo daily margining as a credit instrument.

### ➤ Utility offtakers recalibrating their risk model

These cashflow and valuation moves constitute an extreme manifestation of risk – and risk is the single most important thing that the PPA market is all about. Said risks are incorporated in the discount part of the PPA Price.

$$\text{PPA Price} = \text{Fair Value} - \text{Discount}$$

The discount illustrates the price adjustments made by utilities to cover the cost of hedging and the warehoused risks. Typically they are determined via risk models minus stack and roll hedging performance. **Due to the current situation, we have seen utilities and trading houses marking up their discounts in unprecedented manners of up to 40% on their bids or halting risk taking all together.**

### Discount vs Fair Value Over Time



Price points Pexapark observed for the same project across the year

**It came therefore as no surprise that offtakers acted significantly more cautious than they would have been a year ago, as illustrated by increasingly higher observed discounts of PPA bids to fair value pricing.**

➤ **Corporate offtakes could be a more efficient redistribution of risks**

Utilities and corporates have different risk profiles. Corporates are procuring electricity for their own consumption, and do not need to manage price risks on a daily basis. For that reason, corporates may have a comparative advantage right now to outbid utilities for offtake agreements with quality projects. At Pexapark, we have defined this difference as 'liquidity cost'. Over the past months, the differential has increased significantly, reaching high single digit EUR/MWh in key PPA markets. This results in odds tilting towards corporate buyers in closing deals, as their gains are higher than their risks, and ideally they are willing to pay a higher price.

➤ **Tip**

Find out more about Werner Trabesinger's analysis on the current market turmoil, by re-playing his webinar extensively examining its impacts on PPAs [here](#).



## ➤ Baseload PPAs require new approach to risk management

As already noted, long-term Pay-as-Produced (PAP) have the tendency to become more expensive for the sellers and rarer in mature markets. The most notable observation of such a trend occurring during 2021 took place in Spain, where project owners and investors found it significantly more difficult to source and close a PAP volume structure. And whenever the option was available, it came at significant discounts for sellers compared to alternative PPA structures. This increase in discounts of PAP PPAs led to a surge in interest and demand for Baseload type PPAs (BL).

Baseload PPAs refer to the agreement's volume structure. In such types of PPAs, a fixed volume is agreed for every hour of a period – either monthly or annually.

### ➤ Pro Tip

In the trading lingo, the term baseload refers to a constant output delivery over 24 hours. Baseload PPAs do exactly that; they create the illusion of turning a plant's generation into a constant output.

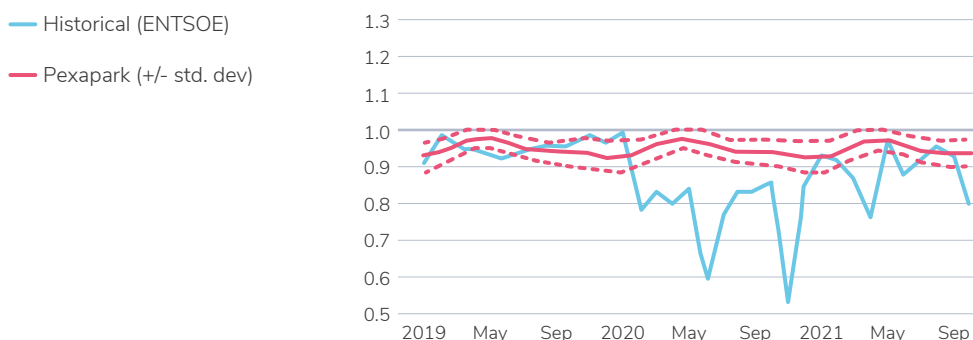
Shorter term and baseload type PPAs already mark a steep change from the typical risk profile used for traditional renewable investment. What is equally important is the changes ushered in on the day-to-day operating model for assets. When the residual open position starts to become significant and baseload PPAs form part of the hedging strategy, revenues need to be actively monitored and managed.

This became evident when sudden and massive changes to monthly realised capture prices of renewable technologies coincided with unexpectedly low production causing eye popping cash outflows and losses.

This is what happened in many markets during 2021, with a notable example being Sweden. High pricing levels observed in the Swedish price zones struck badly many wind operators as the majority of the PPA transactions were concluded on baseload basis in the past years. In a Baseload PPA, the open position (the delta between a plant's production and the contracted baseload volume) is settled against market prices. When production is lower than what a seller has committed to deliver, operators will need to buy that shortage in the market. In a high pricing environment, this can become very costly. **Sustained and continuous high volatility of capture rates volatility makes baseload PPAs more uncertain.**

## Evolution of Capture Factors in Sweden's SE3 for onshore wind

Comparison of realised capture factors Vs Pexapark's estimations



All historic capture factors since 2015 will be available on PexaQuote in March 2022.



Such incidents brought high to the agenda the fact that PPAs are not merely a replacement for government backed Feed-in Tariffs (FiTs), and they shouldn't be viewed this way.

“ FiTs were a price hedge that left no – or very little – price risk with the producer. Therefore, they used to be the perfect hedging structure.

In the open market, such 'perfect hedges' are normally not available, especially after the scarcity of PAP structures, which mirrored FiTs the closest. In reality, PPAs represent an investment and operation model shift, requiring the development of energy risk management skills and tools to manage open positions in a portfolio.

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— Michael Waldner, Co-founder & CEO at Pexapark



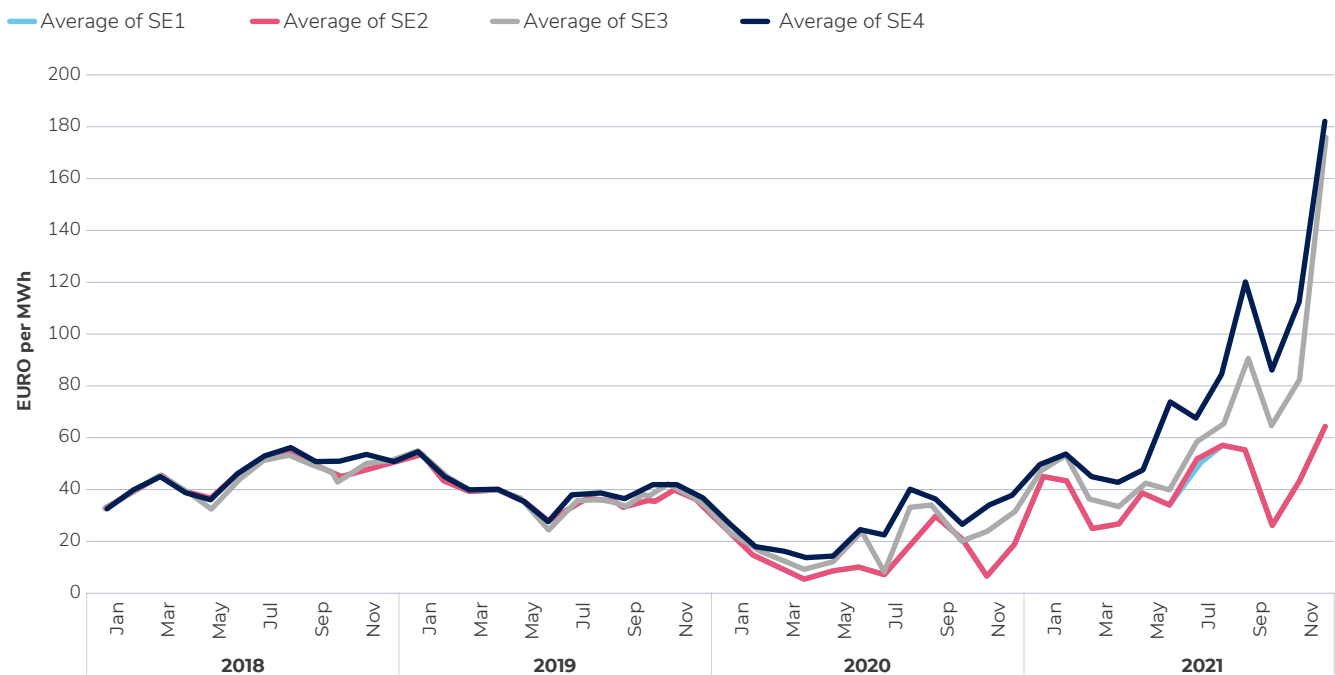
## 4.2 REGION-SPECIFIC OBSERVATIONS

### ➤ De-coupling of Swedish price zones

A trend that started in 2020, and became more evident in 2021 is the de-coupling of wholesale prices across Sweden's four pricing zones (SE1 and SE2 in the north, SE3 and SE4 in the south). The phenomenon challenged renewables investment models established for years. Such models have been in favour of almost exclusive investment in onshore wind, taking advantage of the country's strong wind resources resulting in strong returns.

Solar has been a laggard in Sweden – similar to other parts of the Nordics region – but this is rapidly changing. In Q4 2021, many major players announced plans for solar in the country, specifically in the SE3 and SE4 areas, where higher prices make solar PPAs significantly more attractive. There is a high likelihood that the levels of pricing discrepancies between the various price zones will continue in 2022.

### Monthly average day-ahead prices for SE1-SE4 price zones, 2018-2021



Read more on our analysis on the Swedish solar landscape in our PPA Times January 2021 issue [here](#).

### ➤ The Spanish state intervention on merchant renewables

In light of the energy pricing crisis across Europe, many countries took emergency policy measures to shield consumers from onerous electricity and gas prices. Spain went a step further, by introducing the contested 17/2021 Royal Decree-Law with a set of measures that addressed the generation side. In short, Spain implemented a price cap (the 'clawback mechanism') to reduce 'excessive remuneration of assets selling to the spot market. This came to a renewables industry which was battered in the beginning of 2021 by ever lower prices for long-term PPAs and growing difficulty to place pay-as-produced PPAs, and relished in the increase of PPA prices on the back of rapidly increasing forward market prices.



The design of the decree was such, that subsidy-free wind and solar projects realised under new indexed PPAs would have been hit hardest. While the policy was meant to cap windfall profits, the consequences for many renewable projects would have been that revenue for sold volumes would have been capped whereas buy backs required to manage their intermittency would have been exposed to uncapped spot prices.

After initial reactions, which included major market players 'freezing' investment activities in the country, the government published some clarifications that calmed the market.

The initially very drastic state intervention reminded investors again of the very political underpinning of energy markets even for subsidy-free projects.

### ➤ **New markets: Central and Eastern Europe (CEE)**

In 2021, we saw tremendous interest in the CEE region, notably in countries such as Romania and Poland.

Romania is one of the newest kids on the PPA block. The dash to invest and realise projects has come back to the country which spooked renewable investors only a few years ago with myriad interventions and overly complicated market rules. The merchant landscape has been changing rapidly, offering increased routes to market for interested shareholders. In September 2020, the country's National Energy Regulatory Authority issued a milestone order to allow the signing of directly negotiated bilateral PPAs outside its previous centralised model – something that had been banned in 2012. The promise is large, with excellent wind and solar resources and the largest industrial sector in the region.

Poland continues its up and coming trajectory in its own way. Since 2020, the country has been experiencing a boom in its solar market through auction models. Our PPA Tracker data illustrate that corporate interest is advancing rapidly, with a noted change in the nature of the corporate PPA segment. Whereas the first wave of headline-grabbing deals were on the back of existing wind parks financed through the now closed Green Certificates systems, corporate buyers are now explicitly seeking additionality and the enabling of new clean capacity. We believe that PPAs both with utilities and corporates will have a fair chance in Poland to grab market share and establish an interesting, complementary route to market model as the new auction rules will allow investors to combine auction bids with private PPAs.



## 5. OUR PREDICTIONS

As the PPA markets are maturing, 2022 may be seen in a few years as the onset of a new phase for the energy transition.

On the back of much higher renewable penetration rates in many markets and the phase out of firm and programmable baseload capacity, we expect generally a higher level of price uncertainty and challenges to legacy investment and operating business model for renewables.

Investment appetite seems strong, but many investors are still grappling with upgrades required to their operating model. Below is our take of the three major up and coming PPA markets, derived from a sum up of the trends and their impacts we explained above.

### ➤ Prediction 1 – The Squeezing Of The 10-Year PPA Market:

The total long-term PPA market will languish in absolute numbers

We expect that availability and pricing for long-term PPAs in many markets will be tested due to both the maturity of some markets as well as the pricing impact of the recent market turmoil. Hence, the first prediction is that we might see a downturn in the number of PPA transactions done on the basis of the “classical” 10-year pay-as-produced contract model. As explained above, the discount from offtakers is growing, and the true impacts will be seen in 2022. Considering the lag time between negotiations and deal announcements, the new levels of utility appetite will become evident onwards.

When it comes to the corporate segment, despite the growing appetite, we have observed that many cPPAs beyond the top buyer segments were structured for more ‘sunny weather’ conditions. For example, we have seen deals with exit clauses and little to no credit protection. Also, a significant share of the concluded PPAs entailed the corporates taking country spread risk.

“Corporates have an edge under current market conditions. This may change if credit events were to occur or buyers face remorse given unexpected high costs due to divergences of country price levels, for those having concluded virtual cross-border PPAs where the buyer carries the country price spread risk.

Hence we are slightly bearish that the sector will be able to sustain growth in the segment of classical long-term 10-year PPAs.

— Romero Carillo, Pexapark's Head of Corporate PPAs

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Finally, we wanted to make a point that no matter which type of offtaker is scoring higher volumes, the competition should not be seen antagonistic. In an ideal scenario, the two types of offtakers would complement each other – like they have successfully done so far as well – to allow for much larger PPA transaction volumes especially in the long-term PPA segment.

How? Utilities and trading houses are born intermediaries and risk managers while corporate offtakers have a natural own-use need. **Intermediation allows higher risk taking on the utility side.** In other words, if a utility can de-risk its stack-and-roll hedging programme with a few long-dated corporate offset deals, then a multiple of the offset volumes could be unleashed to enable additional new long-term utility PPA.

### ➤ Prediction 2 – The Rise Of The Next Generation Utilities:

A series of large new renewable investment funds will pursue next generation utility business models

Higher discounts on longer-dated PPA contracts are pushing investors to shorter term (up to 5 years) and baseload type of PPAs. To manage the higher uncertainty of renewable revenues under such hedging arrangements, those players are investing heavily into new personnel, systems and tools, building own origination teams, portfolio management capabilities and energy risk management infrastructure.

**Take a step back and you can see that these investors are building the next generation utilities.** They have become participants to the wholesale market, exposed to more price risk and actively managing energy risk, thereby capturing back risk premia and transaction costs and gaining the ability to react upon new market opportunities.

The next frontier for those next generation utilities is already unfolding, as they are starting to turn the implicitly given diversification into quantifiable, real diversification benefits by managing their assets on a portfolio basis.

Our prediction is that, out of the leading renewable investment capitals of Hamburg, London and Copenhagen, we will witness the launch of new large funds. Such players will be explicitly set up as new multi-country, multi-technology investment platforms and will be able to cover the entire energy risk management value chain of a typical trading house with the clear-cut aim to capture the full value of active renewable portfolio management. Same as with classical utilities and the oil majors which are muscling themselves into the sector, scale, diversification and state of the art renewable energy risk management will be critical to success.

Ultimately, we believe that the shorter-term renewable PPA activities of those next generation utilities will overshadow the existing long-term PPA market in terms of volume. **Freeing the industry from the requirement of long-term PPA for financing will remove a key bottleneck to future growth.** As those investors are embracing the most efficient hedges in terms of liquidity costs, we further believe that this might also unleash the true potential for corporate PPAs, namely shorter term corporates PPAs that pay a premium for new build renewable capacity. Most corporates don't need 10-year de-risking but want to genuinely enable green procurement that fulfils stringent additionality criteria.

### ➤ Prediction 3 – The Ascent Of The Mega Corporate Buyers:

Where the rules allow, offshore capacity offtake contracting will be with a corporate out of the mega buyer class

Last year, the industry witnessed a truly one-of-its-kind deal, when German multinational chemicals BASF acquired a 49.5% stake, associated with a highly structured, large-scale offtake and hedging arrangement, in Vattenfall's 1.5GW Hollandse Kust Zuid offshore wind farm in the Netherlands. The equity investment from an energy-intensive consumer might be a harbinger move of where one crucial part of the PPA market is heading.

Mega energy buyers such as global data centre behemoths; clusters of chemical companies transforming some of their core production process to electricity-based ones; and new planned P2X facilities will not be able to procure PPAs as corporates did over the last years. Those gargantuan green procurement needs are approached differently. First, procurement on a mere PPA basis is insufficient and equity investments in the underlying PPA assets may be required to secure volumes. Secondly, the sheer volumes requirement will make those buyers gravitate to the only renewable asset class that can produce equally gargantuan scale volumes of power: offshore wind parks.

This heralds a bright future for non-subsidy large scale offshore wind parks as they present paramount opportunities for such deals because they tick all the boxes: they are big enough to support growing energy demand and they need financing partners making the equity participation not only impactful – therefore marking high on the 'additionality' element – but a great investment opportunity as well.

The offshore build out is further down the time axis so this trend will take some years to unfold. Clearly though, we would be surprised if the planned non-subsidy projects in Europe would not be transacted with some of the aforementioned class of mega buyers.





## **6. CONCLUSION**

The PPA boom is part of a much wider, far reaching energy transition. While a few years ago, “PPAs” were merely a replacement for FiTs, the market has quickly evolved and we are now seeing the contours of a new renewables investment and operating model arising out of the noise of frenetic deal making activity. The market is maturing and investors and operators of renewables will become bigger, more diversified across technologies and markets and masters of energy risk management.

This is becoming a core new skillset needed to deal with the higher exposure to price risk and the requirement to deal on day-to-day basis with the energy markets. It is a welcome development as the energy transition is at a decisive conjunction and renewables penetration reaches critical levels, while old firm capacity is phased out and system inherent volatility increases. This phase needs strong, capable players that have the balance sheet and skills to take on these new challenges.



## **ABOUT PEXAPARK**

Founded in 2017, Pexapark is a rapidly growing, award-winning renewable enterprise software company. At Pexapark, we are passionate about the global growth of green energy to create a more sustainable world. Our solutions were established to support market participants manage the industry shift from operating renewable assets under subsidy schemes to becoming fully merchant and mitigating their exposure to pricing and profile risks. In this new post-subsidy era, **we provide the Operating System for renewables industry players to buy, sell, and manage energy.**

**We create pricing transparency**, helping buyers and sellers to understand the fair market price for green energy.

**We provide analytics and support for deal transactions**, guiding customers to transact deals with the best reward to risk ratio and we offer the best software foundation for renewables participants to optimise their portfolio, revenue and risk management.

Pexapark's expertise comes from supporting more than 20,000 MW of renewable PPA transactions and 5,000+ MW of risk reporting services across 18 markets and growing. Supporting over 120 renewables market players, it has become the one-stop source for software solutions and advisory services in the fastest-growing part of the renewable energy market.

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