

How can PPAs successfully stabilize your energy prices?

The interest in Power Purchase Agreements (PPAs) has grown recently, capturing the attention of many electricity consumers - a trend that aligns well with the uncertainties of today's energy market. Having a fixed electricity price in times when prices are volatile can be a great advantage. In 2024, the European market observed a 30% increase in first-time corporate buyers of PPAs as well as more than a doubling of multi-technology PPAs, i.e., incorporating both solar and wind. Let's deep dive into the topic of PPAs, what contract types exist as well as benefits and risks.

Power Purchase Agreements are not a new contract type; they have been on the market since the 1980s. However, they have gained significant traction over the past decade as renewable energy has grown. PPA contracts can be beneficial to both the offtaker in terms of electricity price stability and securing renewable energy, as well as to the seller, providing a stable income stream to facilitate investment decisions and project financing. Companies such as Arla, Axfood, H&M and Borealis have already contracted PPAs to secure their electricity prices. By entering a PPA, organizations can secure stable electricity prices for many years, ensuring predictable and efficient energy costs.

What is a PPA?

A PPA is a long-term, 5-20 years, contract between a seller of electricity and a consumer, often called the offtaker. The offtaker can be anyone consuming a considerable amount of electricity, like a utility, industrial company, data center, retail company or government. PPAs enable buyers to achieve energy price stability while supporting the development and expansion of clean energy technologies. PPAs are often signed for wind farms and solar parks, but they also exist for electricity sources such as biobased combined heat and power plants (CHP), nuclear and hydro power plants.

What is happening on the European and Nordic PPA market today?

The European PPA market is currently going through a transition marked by a notably rise in deal activity, but with smaller volumes, according to Pexapark. While more stable price volatility over the past 1,5 year helped drive activity, new risks emerging last year have affected growth. Risks have included increasing negative electricity price hours and low capture rates, complex pricing challenges, and geopolitical instability. Despite these challenges, the Nordic PPA market remains a buyer's market, offering favorable conditions for purchasers.

Capture rate

The capture rate indicates the rate between the average revenue earned by the seller and the average system spot price, providing insight into the success of renewable energy in monetizing its production.

Types of PPAs: Understanding your options

Delivery based PPA contract types

There are three main types of delivery-based contracts; **baseload**, **pay-as-produced** and **pay-as-forecasted**. The **baseload** contract always supplies the customer with a guaranteed level of electricity, either continuously or according to a specified schedule, no matter the actual electricity production. In this structure, the seller is responsible for meeting the delivery obligations, which may require utilizing energy storage solutions or supplementary sources to account for any fluctuations. Baseload PPAs are preferred when the offtaker needs a consistent and predictable supply of electricity. However, this contract type has not been as favorable for wind and solar over the last couple of years due to volatile electricity prices, increasing the risk for sellers.

The **pay-as-produced** contract type is better suited for variable generation assets such as wind and solar farms due to their production patterns. In this structure, the offtaker agrees to purchase electricity as it is generated, accommodating natural fluctuations influenced by weather and other factors. Offtakers looking to maximize their renewable energy sourcing, and who are comfortable managing some level of intermittency, often find these contracts more advantageous.

In a **pay-as-forecasted** contract, the seller presents a schedule of forecasted electricity generation, typically one day or one week ahead. The seller is responsible for delivering the

forecasted amount, managing discrepancies by buying or selling on the intraday market, with possible penalties for shortfalls depending on contract terms and conditions. Sellers sometimes utilize hybrid assets comprising both generation technology and energy storage, such as batteries, to enhance output consistency.

The **choice between baseload, pay-as-produced and pay-as-forecasted** contracts will depend on the generation type offered by the seller and the specific energy needs and risk tolerance of the buyer. The market has seen a shift towards more sophisticated PPA structures during the last years, such as multi-technology PPAs. This growing preference reflects how combining technologies like wind and solar helps buyers gain more predictable energy delivery, while sellers benefit from stronger pricing thanks to improved overall market alignment.

Physical vs financial PPA

A **physical PPA** involves the direct delivery of electricity to the customer through the grid, allowing for direct integration of renewable energy into their operations. In contrast, a **financial PPA** (or virtual PPA), is a financial arrangement where the customer doesn't receive electricity directly from the seller. Instead, they receive financial settlements based on the difference between a fixed price and the market price of electricity. A Contract for Difference (CfD) is often a component within a financial PPA, serving as the pricing mechanism that ensures the seller receives a fixed price for electricity while settling the difference between that fixed price and the market price financially. This allows offtakers to support renewable projects and achieve sustainability objectives without physical delivery.

Why choose a PPA?

Entering into a power purchase agreement as an offtaker involves careful consideration of both benefits and risks, and the main aspects are described in this section.

Benefits

Power purchase agreements provide offtakers a range of **financial and sustainability benefits**. From a financial perspective, PPAs provide **long-term price stability** by allowing organizations to lock in electricity rates, effectively hedging against market fluctuations. This certainty is particularly valuable in volatile energy markets. When structured

successfully, these fixed-price arrangements can translate into significant **cost savings**, especially if wholesale electricity prices increase over the duration of the contract. For those engaged in financial PPAs, there is also the potential to generate **additional revenue** if the market spot price surpasses the agreed strike price.

On the sustainability side, PPAs enable companies to source renewable energy, which directly contributes to **reducing their carbon footprint** and supports broader environmental initiatives. For organizations focused on sustainability, entering a PPA may also foster **additionality**, meaning the renewable asset is constructed specifically because of their commitment, further advancing their sustainability profile. Additionally, PPA contracts can include provisions for **Guarantees of Origin (GoOs)**, empowering companies to verify and publicly demonstrate their commitment to procuring renewable energy.

Challenges

While power purchase agreements (PPAs) offer significant advantages, certain considerations should be kept in mind to ensure a successful outcome. For pay-as-produced contracts, working with variable renewable energy sources such as wind and solar means the volume of **electricity delivered may fluctuate** and not always align perfectly with consumption needs. This inherent variability can be challenging, but it may also encourage the adoption of adaptive energy management strategies to better match supply and demand.

In the case of pay-as-forecasted contracts, offtakers may encounter **limitations in obtaining Guarantees of Origin (GoOs)** as the seller must balance forecast deviations by sourcing electricity from the grid via intraday trades.

Another challenge is the level of **contractual commitment** required by PPAs. These agreements often involve long-term obligations, which can restrict an offtaker’s ability to modify their energy procurement strategy or adopt new technologies as they become available. While locking in a fixed electricity price offers price stability, it also presents a potential financial risk—if spot market prices decrease in the future, the offtaker might miss out on possible cost savings.

With thoughtful planning, these challenges can be navigated to support both financial and sustainability objectives. In the table below, benefits and challenges are summarized.

Benefit / Challenge	Description
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Benefits	Price stability: Long-term price certainty and protection against market volatility
	Cost savings: Potential for reduced costs if market prices rise above the fixed PPA rate
	Potential revenue: Possibility to profit if spot price exceeds the PPA (strike) price in financial PPAs
	Reduced carbon footprint: Supports sustainability goals and regulatory compliance
	Contribution to additionality: Facilitates new renewable projects, enhancing sustainability profile
	Guarantees of Origin (GoOs): Provides verification and demonstration of renewable energy sourcing
Challenges	Volume and generation variability: For pay-as-produced, actual electricity delivered may not match consumption, requiring adaptive management
	GoOs limitations: For pay-as-forecasted, obtaining GoOs may be restricted by the need to balance forecast deviations with grid-sourced electricity
	Limited flexibility: Long-term contractual commitment can limit future energy strategy changes or technology adoption
	Financial implication: Fixed prices over time may prevent benefits from potential future drops in market prices

Want to learn more?

If you are interested in learning more about PPAs, we invite you to listen in to PwCs webinar on Power Purchase Agreements on October 30th. After the session you will have the opportunity to ask questions to PwCs energy expert team. The link to register for the webinar can be found [here](#). We look forward to seeing you there!

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