

State of the European Renewable Energy Market

2024



Carl Contraction

by Schneider Electric



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Executive Summary

The State of the European Renewable Energy Market Report, developed in collaboration with market experts, offers a comprehensive analysis of the European renewable energy landscape, encompassing market trends, challenges, and potential opportunities for stakeholders. This report serves as a resource for industry players seeking to navigate the evolving renewable energy market.

This latest report explores:

- Guarantees of Origin (GOs) and their widespread utilization in the Europea market to validate the generation of renewable electricity.
- The rising interest in Aggregated Power Purchase Agreements (APPAs).
- The potential reforms in the UK's energy sector, particularly in the context of the Contract for Difference (CfD) scheme and the capacity market.
- The challenges encountered by the UK public sector in managing Power Purchase Agreements (PPAs).
- Indicative pricing in the European PPA market and renewable energy developments in emerging European markets.

The European renewable energy market is experiencing significant transformations propelled by decreasing prices, technological advancements, and regulatory shifts. This surge in renewable electricity procurement has led

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	to a notable increase in participation in initiatives such as RE100/CDP and the Science Based Targets initiative (SBTi), driving efforts to reduce Scope 2 and Scope 3 emissions associated with purchased electricity.
9	Schneider Electric's proactive initiatives and strategic partnerships underscore its dedication to maintaining a leading position in the dynamic renewable energy market, a key player driving sustainable energy solutions in Europe.
an of	The combination of Schneider Electric's top-tier renewable energy advisory services and the innovative suite of Zeigo digital solutions, offer a proactive approach in the renewable sector, harnessing the power of advanced software solutions and leading consulting services. By integrating Zeigo's software expertise with Schneider Electric's consultancy services, the aim is to expedite the transition from renewable energy planning to implementation for our customers. This is achieved by streamlining processes with digital tools and facilitating access to favorable deals.

Guide: Building a Legacy of Change with Renewable Energy

Explore the wide spectrum of renewable energy options to drive long-term impacts across your organization and beyond.

Download this guide









Guarantees of Origin in Europe's Renewable Market Understanding Guarantees of Origin (GOs) is crucial for companies to transparently communicate their renewable energy sourcing, align with sustainability goals, build trust with stakeholders, make informed energy choices, and track environmental impact effectively.

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Guarantees of Origin (GOs) in Europe's Renewable Market

The commercial, industrial, and institutional sector (C&I) has experienced a surge in renewable electricity procurement driven by technological advancements and strong commitment to sustainability. Initiatives like RE100/CDP and the Science Based Targets Initiative (SBTi) have seen a substantial rise in participants, reflecting the sector's commitment to reduce their Scope 2 and Scope 3 emissions.

Energy Attribute Certificates (EACs) are widely embraced as a common method for procuring renewable electricity globally and are essential elements of any comprehensive clean energy or decarbonization plan.

Guarantees of Origin are widely used throughout Europe, especially in the European Union's markets, which are among the oldest and most significant users of this system. GOs are used to verify the generation of 1 MWh of renewable electricity and are traded and tracked internationally through the Association of Issuing Bodies (AIB) and standardized under the AIB's European Energy Certificate System (EECS).

While GOs serve a similar purpose to North American RECs, GOs are particularly suited for addressing C&I operational electricity consumption throughout the interconnected European region. Buyers considering GOs should carefully evaluate their sustainability goals and consult with experts to ensure their procurement aligns with their overall environmental strategy.

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To learn more about EACs and GOs, download our guide.



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Market Insights

Market Trends Over Time

- skyrocketing to €8-10/MWh and over in 2022. Prices slightly stabilized in 2023 and have experienced a downward trend since H2 2023.
- With the end of the disclosure period for 2023 GOs on March 31, 2024, the market is now focusing on 2024 GOs.
- Projections suggest Nordic hydro reservoir levels will approach 70% by the end of Q2, with 2024 reservoirs expected to remain above the norm and exceed both 2022 and 2023 levels for at least the end of Q2 2024. With hydro reservoirs approaching higher levels, this could potentially keep the prices trading at a stable low level given there is more supply available in the European market.

Current Market Trends: 2024

The market is bearish due to several factors:

- Brexit has led to the UK's cessation of GO imports, resulting in a surplus within the EU market.
- Auction volumes have accumulated, and the sell price has fallen below the market average.
- Economic challenges have impacted industrial output, leading to reduced electricity demand and, consequently, lower demand for GOs.
- Favorable weather conditions in 2023 increased renewable energy production, creating an oversupply by the year's end and resulting in favorable reservoir levels for 2024.

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• GOs represent an increasingly increasingly-large and rapidly-evolving market that is expected to continue to grow with estimates projected to reach €3.7B by 2030 and GO cancellations expected to increase by > 80% since 2022. The market initiated in 2001 has experienced significant volume growth as well as significant price volatility over the past years. The prices stayed below €1/MWh for many years but have been following an upward trend over the years, with prices



EU AIB Renewable Prices (Indicative, EUR/MWh)

Internal data based on trading activity and information gathered from the market



Aggregated PPAs

Aggregated Power Purchase Agreements (APPAs) offer many benefits, such as enhanced bankability, increased investment, and support for small-to-mid-sized companies to enter the PPA market, while also acting as a hedge against market volatilities. But, is now the time to act?

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Aggregated PPAs, is the time finally now?

In recent years, the European energy industry has faced a whirlwind of change, with extreme price fluctuations and supply chain challenges underscoring the importance of price hedging. This has kept Corporate Power Purchase Agreements (CPPAs) in the spotlight, despite PPA prices exceeding long-term power price forecasts.

As the PPA markets continue to mature, aggregated PPAs (also known as multi-buyer or 'basket' PPAs) are gaining more and more attention. These structures allow buyers that were traditionally too small to enter PPAs as a solo offtaker to participate through a buyer cohort. As small-to-mid-sized companies are crucial to meeting climate targets, APPAs increase market demand for long-term renewable energy and provide the associated price hedging and additionality benefits to a more diversified set of offtakers.

Indeed, APPAs enable small-to-medium-sized buyers to meet the volume required from a seller's perspective, enhancing their buying power and potential to reduce emissions. There are two main structures for entering an APPA: one with a lead 'anchor' buyer who negotiates on behalf of the group, and another where a consortium of businesses bundles their energy demand without a lead buyer. Both structures offer medium-to-large corporates the chance to diversify their energy mix and reduce risk, while providing smaller companies with a route to entry.

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For renewable energy developers and generators, the benefits of aggregation mirror those of a standard PPA, where a long-term power contract provides the bankability needed for debt financing. A diversified set of energy buyers also democratizes demand for renewable projects, encouraging further investment. While some developers may prefer the simplicity of single-offtaker PPAs, others are keen to engage in

the simplicity of single-offtaker PPAs, others are keen to engage in aggregated negotiations to support smaller to medium buyers' entry into the PPA market.

We're also witnessing a trend where large corporate buyers, capable of entering PPAs alone, are leveraging their influence to support their supply chain's decarbonization efforts by acting as anchor tenants in PPA negotiations. This approach not only advances decarbonization but also supports small-to-mid-sized suppliers during energy market fluctuations – protecting suppliers and therefore the supply chain.

However, APPAs come with their own set of challenges, such as potential conflicts in motivations, priorities, and timelines that can slow



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In conclusion, while APPAs offer a promising avenue for various buyers to enter the PPA market, their success depends on strategic alignment and cooperation among buyers. By presenting a unified front and simplifying contractual complexities, buyers can enhance their collective bargaining power and present a strong business case to sellers. However, the effectiveness of an APPA ultimately relies on the careful selection of cobuyers and the establishment of shared objectives, ensuring all parties work together towards a sustainable and mutually-beneficial energy future.



European PPA Market Insights

Power Purchase Agreements (PPAs) have gained momentum in the European energy market as a way to support renewable energy expansion and promote sustainability. PPA pricing in Europe varies by region and is influenced by market dynamics, regulations, and renewable energy resource availability.

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SECTION HIGHLIGHTS

Indicative Pricing & Observations

Observations

- Stable Demand: Demand for different types of PPAs remains steady due to environmental commitments, with strong interest in both virtual and direct (physically delivered) PPAs from corporates and their supply chains, both in-country and across Europe.
- Declining Prices: PPA prices continued to decrease across most European markets in H1 2024, with a variety of alternative price structures on offer in the most mature PPA markets.
- Solar Growth: Solar energy continues to grow across Europe, representing over 80% of H1 2024 offers.
- Country Diversification: There is high demand for country diversification, leading to increased consideration for less mature and emerging PPA markets in Central and Eastern Europe.
- Iberian Markets: Despite record low wholesale electricity prices and project development delays due to regulatory changes last year, Spain remains one of the most attractive markets for corporates seeking pan-European PPAs. Portugal is also becoming a competitive option at a Pan-European level with an increase in project availability and activities.
- **UK Market:** High REGO prices are making the business case for local PPAs more appealing, but persistent grid connection issues are affecting the availability of viable projects. Corporate buyers and solution providers are closely following progress in the governmental auction.
- German & French Markets: The business case for PPAs remains less compelling compared to other countries, but with a significant decline in PPA prices, the financials of German and French projects are improving. Corporate interest in incountry PPAs, driven by environmental and/or hedging reasons, is increasing as a result.

Notes

- The H1 2024 data set that informs this report considers corporate request for proposal (RFP) responses across VPPA gathered between January and June 2024, representing almost 1,600 offers across 13 countries.
- Price ranges displayed represent the 25th to 75th percentile of offers received in H1 2024.
- Prices displayed have been rounded to the nearest whole number.
- Both wind and solar technologies are considered.
- Prices should be considered within the context of the local market.

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* Price range observed is from the H2 2023 data set

** Price range observed is from the H1 2022 data set

*** Price range observed is from the H2 2022 data set

Renewable Energy Onsite Solar Developments in Energy **Emerging Markets**





By €/MWh

Exploring the UK Renewable Market

A Focus on REMA and **Public Sector Challenges**

The UK's Review of Electricity Market Arrangements (REMA) offers new pathways to adaptation and growth for organisations within the public sector, but also poses specific challenges as those same organisations seek to embrace renewable energy.

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Review of the UK's Electricity Market Arrangements (REMA)

The United Kingdom's Department for Energy Security and Net Zero (DESNZ) initiated a second consultation on potential changes to the UK Energy Markets just before the election. These changes could significantly affect all energy market participants, including generators, suppliers, PPA holders, and investors. Considering the level of upheaval and uncertainty in the UK energy sector over the past couple of years, we have written out a summary of REMA and what buyers and generators should be aware of.



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Proposed Reforms & Key Challenges

DESNZ is seeking input on potential reforms to the Contract for Difference (CfD) scheme and the capacity market, alongside considerations for enhancing flexibility and implementing zonal pricing. The key areas on which DESNZ has structured their guidance center around four key challenges facing electric markets:



According to Schneider Electric's Zeigo Energy Markets team, REMA should also consider the interactions between these challenges given the need for an integrated, whole-system approach, and assessing each based on five criteria: value for money, deliverability, investor confidence, whole-system flexibility, and adaptability.

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Investing to create a renewables-based system

Operating and **optimising**





Future-Proofing the CfD Scheme

The consultation period seeks insights on how to future-proof the CfD scheme, exploring options like shifting from output-based payments to deemed payments or capacity-based CfDs, reference price reform, and limiting CfD capacity coverage.

CPPA Market and Capacity Market Retention

While REMA maintains a watch on the Corporate Power Purchase Agreement (CPPA) market, it invites discussion on its growth potential and risk/benefit sharing. The Capacity Market (CM) is proposed to be retained for ensuring capacity adequacy, with improvements sought to maintain its effectiveness.

 The consultation aims to gather input on incentivising electricity demand reduction, strengthening price signals in electricity and retail markets, and concludes by seeking opinions on how these initiatives interact with existing legacy arrangements.

Zonal Pricing and Market Incentives

REMA is also exploring the significant change of zonal pricing and solicits opinions on incentivizing electricity demand reduction and strengthening price signals within the markets.

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Implications for Industry Players

The potential changes introduce a degree of change and uncertainty across the industry:

- **Developers:** Must understand and evaluate the implications of CfD changes on their projects, considering the timing of implementation.
- **Developers and Corporates with CPPAs:** Anyone with CPPAs will possibly end up triggering their Change In Law clauses, depending on what the outcome on zonal pricing is. This will necessitate work and costs to resolve.
- **Investors:** Will need to understand the new and changed energy landscape and the risks (in CfD and merchant). This could lead to caution from investors until the new landscape is clear slowing renewables development in the short term even in the long term it provides greater confidence and investment.
- **Suppliers:** Face the challenge of adapting to and operationalising these changes.
- **Consumers:** Ultimately bear the financial burden of these transitions.

In short, the REMA consultation represents a pivotal moment for the UK energy sector, with the potential to reshape market dynamics and accelerate the transition to renewable energy. While the proposed changes aim to address the pressing challenges of decarbonization and system resilience, they also bring about a period of uncertainty that will require careful navigation by all stakeholders.



The Challenges to UK Public Sector PPAs

The Public Procurement Act has been consolidated into one Act, replacing the existing overarching principles with new objectives:



The New Public Sector Procurement Bill is set to go live in October 2024, and aims to simplify the procurement process, increase transparency, and facilitate small to mid-sized companies' participation. There will also be an emphasis on social value and policy goals related to sustainability, climate change, and social inclusion. However, how does this align with PPAs in the public sector?



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Treating suppliers the same

The public sector has three main challenges in dealing with PPAs:

- 1 Committing long term and the accounting treatment of any CPPA
- 2 The complexity of the procurement process and lack of resources to do it
- 3 Decarbonising now vs. later

Developments in **Emerging Markets**

Energy



Committing long term and the accounting treatment of any CPPA

The Public Sector (like the Private Sector) has to carefully consider the impacts of the accounting treatment of any PPA. Is it viewed as debt? Could it be lease accounting? Is it a derivative or own use? And of course there will be restrictions both on budgets and the types and natures of agreement that any Public Sector organisation can enter into.

Whilst a CPPA gives a consistent price – how does that fit with budget?

Understanding the impacts early allows a confident approach to procurement.

The complexity of the procurement process and lack of resources to do it

Changes to the Procurement Act are not likely to help here, as they need to be understood and adhered to. A competitive tender and market engagement can be a long-winded and resource-intensive process. The use of existing purchasing frameworks can simplify the process but need to be considered carefully in terms of value and ensuring the right knowledge, advice, and plan is in place is crucial.

Decarbonising now vs. later

There can be complex / diverse locations – and it has often been easier to start with highest carbon emission sites. But when approaching this, different strategies need to be considered. On-site decarbonisation through on-site renewables or energy efficiency have a place but may reach limitations in energy intense (or critical) locations. Options such as existing CHP leases and the general greening of the grid and supplies also come into play, along with the uncertainty of future energy prices. Each situation might need a different PPA and approach to decarbonisation.

Locality may be a desirable factor, and whilst it may have challenges, it may also work favourably both socially and economically.

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Renewable Energy Developments in Emerging Markets

In emerging European markets, the advancements in renewable energy are reshaping the region's energy landscape. As nations increasingly embrace sustainable energy sources, the focus turns to the evolving opportunities and complexities within this dynamic sector. From technological innovations to regulatory adaptations, the renewable energy sphere in emerging European markets unfolds as a compelling narrative of progress and potential, warranting a closer examination of the transformative forces at play.

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Renewable Energy Developments in Emerging European Markets

Renewable energy developments in emerging European markets are gaining momentum, particularly in the area of Corporate Power Purchase Agreements (CPPAs) and market visibility.

Southeast Europe has been categorized based on Pan-European or cross-border PPA feasibility, GOs certification by AIB, and legislative complexity. This has resulted in different market readiness levels for new European energy-related initiatives or project feasibility and PPAs in the region.

Countries such as Hungary, Greece, Croatia, Czech Republic, and Serbia are deemed ready for new European feasibility and PPAs, with Hungary and Greece showing promising potential for virtual or physical PPAs in solar and wind energy. Notably, Greece aims to achieve 65% renewable energy by 2030, with an ambitious 80% target set in its national energy and climate plan. However, challenges in obtaining grid connections and the obligation for corporates to have a physical load are barriers in Greece.

In Hungary, the limited availability of new energy projects and the government's decision to halt new solar projects due to reaching 2030 goals pose challenges. Despite this, opportunities for wind and battery storage projects are being explored to double solar capacity by 2030. Croatia, Czech Republic, and Serbia are in the early stages of developing PPAs, with spot markets indexed to other European energy markets.

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Countries to watch include Poland, Bulgaria, and Romania, which are considered bigger markets with larger volumes, with potential for virtual and physical PPAs, high solar and wind potential, and varying levels of market maturity.

Poland has seen a substantial number of corporate PPAs signed, but the introduction of the cap and regulatory changes have led to negative NPVs, reduced attractiveness, and increased uncertainty. In terms of (AIB) membership, Bulgaria and Poland are in an advanced stage of the application process and Romania is also working towards becoming a member, which would facilitate cross-border PPAs and improve market conditions. For the time being, however, only in-country solutions will be possible.

Overall, while some emerging European markets show readiness and promising potential for renewable energy developments, challenges such as grid connections, project availability, and regulatory changes impact the overall attractiveness and investment certainty. Despite uncertainties in timelines and market conditions, evaluating opportunities and targets in these emerging markets remains crucial for businesses aiming to transition towards renewable energy.

As renewable energy developments continue to unfold in these markets, it is essential for stakeholders to stay informed about evolving regulatory landscapes, market conditions, and potential investment opportunities.

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Market Potential vs. Cross-border Feasibility





Onsite Solar Energy: Benefits, Regulations, and Implementation

As the interest in onsite solar energy continues to surge, it's essential to grasp the multifaceted benefits, regulations, and practical steps for successful implementation. In the upcoming section, we will delve into the compelling advantages of onsite solar energy, the latest key trends and regulations in the European solar energy landscape, and we will provide actionable steps for implementing onsite solar projects.

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Onsite Solar Energy Highlights

Benefits of Onsite Solar Energy

Onsite solar energy systems are gaining attention as a compelling option for those seeking sustainable and cost-effective energy solutions. These systems offer energy independence and resilience, enabling businesses to produce their own electricity and reducing dependence on the grid. This not only provides better control over energy usage but also shields against price fluctuations, while enhancing energy resilience and security when paired with energy storage.

Furthermore, onsite solar systems lead to substantial cost savings and increased control over energy expenses, making them an attractive and sustainable investment. In addition to financial benefits, these systems significantly reduce environmental impact by generating clean, renewable energy, thereby lowering carbon emissions, air pollution, and reliance on fossil fuels. This contributes to the crucial efforts of climate change mitigation and environmental preservation, while also demonstrating a strong commitment to sustainability and corporate social responsibility.

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Key Trends and Regulations

Last year, there was a significant increase in onsite solar installations in the EU, with 56 GW of solar PV installed, mainly on rooftops. This growth is seen as a positive way to empower consumers and protect them from high energy prices. However, the solar energy market can be complex, with both incentives and limiting measures in place.

While some incentives are available, certain challenges have emerged, such as Hungary's 'Robin Hood Tax', which has made it difficult for some to pursue PPAs. Additionally, outdated grid systems have struggled to keep up with the increased solar energy load, leading to the removal of some incentive programs.

In summary, there is a strong interest in onsite renewables in Europe. By Despite these challenges, various forms of support for solar energy projects navigating regulations, incentives, and obligations carefully, onsite solar still exist in Europe. These incentives fall into three categories: Tax Incentives, energy can be an economically and environmentally viable option to Investment Incentives, and Feed-In Tariffs, offering support based on system reduce emissions. size, industry, and company size. Some countries provide significant tax



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reductions and VAT exemptions for solar installations, along with grants, subsidies, and feed-in tariffs to encourage solar energy adoption. In addition to incentives, some countries have introduced mandatory regulations to promote renewable energy adoption. For instance, Belgium's Flanders region mandates the installation of solar panels on private buildings consuming over 1 GWh annually by 2025, with non-compliance leading to fines. Similarly, the Energy Performance of Buildings Directive (EPBD) aims to fully decarbonize the EU building stock by 2050, with mandatory rooftop solar implementation in new and existing non-residential buildings.











Key Steps for Implementing Onsite Solar

Implementing onsite solar involves several key steps. Here are some actionable steps for a company:

- 1 Energy Audit: Conduct an energy audit to understand current energy usage and identify opportunities for solar integration.
- **Feasibility Study:** Assess the site for solar potential, considering factors like space, orientation, and shading.
- **3 Financial Analysis:** Evaluate the costs, available incentives, and potential savings to determine the financial viability of the project.
- 4 **Regulatory Compliance:** Understand local regulations, permits, and interconnection requirements for solar installations.
- 5 Vendor Selection: Research and select reputable solar vendors or partners to design, install, and maintain the system.
- 6 Internal Alignment and Contract Signature: Secure support and commitment from key stakeholders within the organization before proceeding with the contract signing.
- 7 Implementation Plan: Develop a detailed plan for installation, including timelines, resources, and any necessary infrastructure upgrades.
- **Monitoring and Maintenance:** Establish protocols for monitoring system performance and implementing regular maintenance.

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