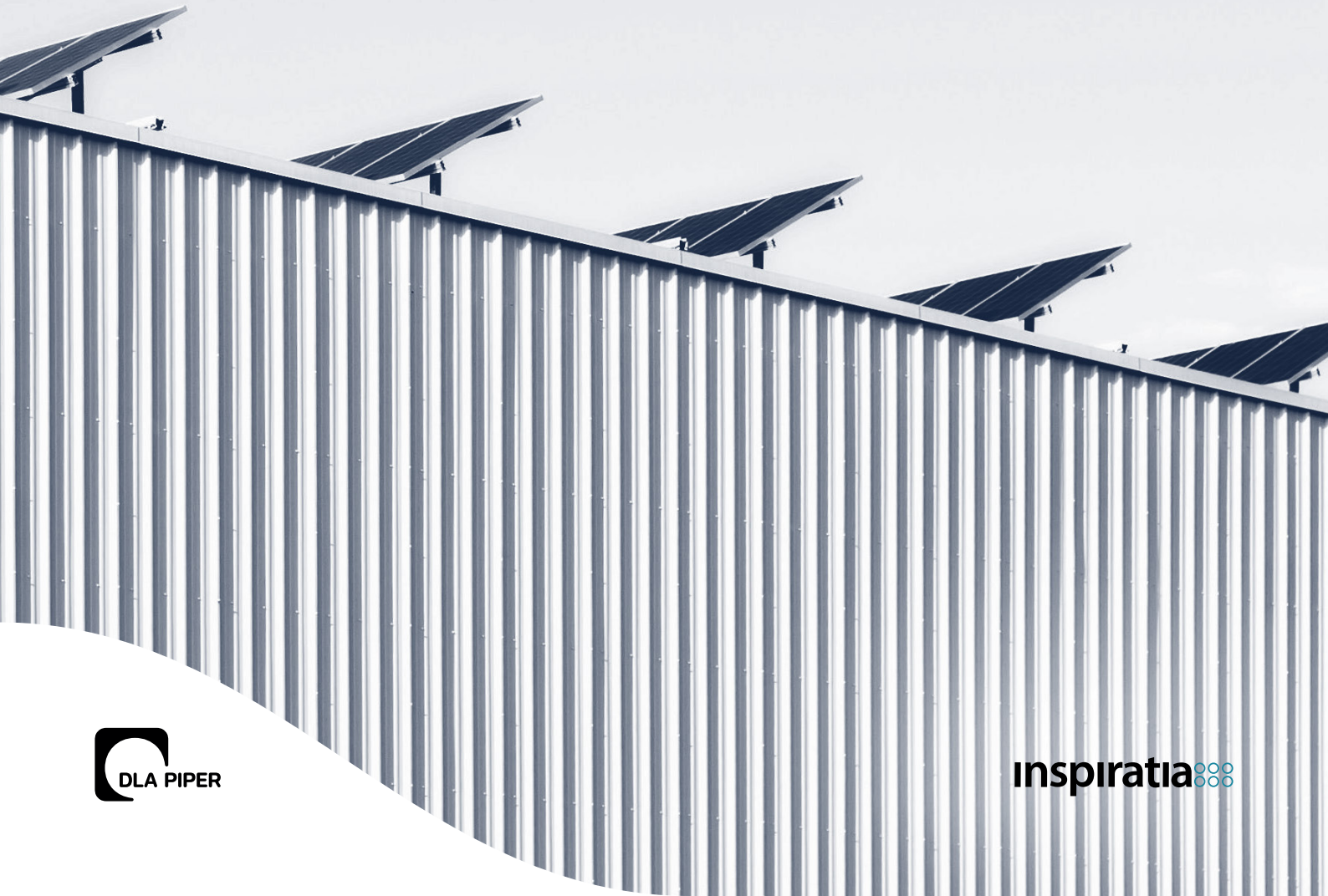
Europe's Subsidy-free Transition – the road to grid parity

DLA PIPER



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Foreword

The European renewable energy landscape is undergoing a fascinating change. With almost all countries now having transitioned to competitive auctions, government subsidies play an increasingly less significant role in driving renewable energy deployment. Market parity is already a reality in some countries, zero-subsidy bids are materialising in auctions and subsidy-free development is becoming the new norm.

As a result, for the most part, the baton has now passed to the private sector to drive the next phase of the clean energy transition across Europe, which introduces increased merchant exposure but also provides immense opportunities. Private power purchase agreements (PPAs) have emerged as the principal price hedging tool for both project sponsors and private offtakers, with the latter role typically filled by corporates, traders or utilities.

Region-specific dynamics have resulted in different uptake among European countries. Until recently, the Nordics were dominating deal flow, with the UK slowly but steadily following next. Over the past 12 months, Spain and Italy have entered the PPA sphere and vigorously accelerated the volume of activity across the European market, while other countries are beginning to show promising dynamics. It is also exciting to observe how different types of corporate offtakers are entering the market, such as retailers, pharmaceuticals and the public sector, taking advantage of the roadmap set by the pioneering IT conglomerates.

In this report, we are excited to have partnered with *inspiratia* to shed light on the drivers, bottlenecks and prospects across Europe, lessons learned from countries at the vanguard of the transition, and to forecast the next wave of PPA trends.

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1. Europe's subsidy-free transition

1.1. The road to grid-parity

Renewable energy projects have blossomed around the world driven primarily by government subsidies. However, this phase of the transition to renewables is set to come to an end, as capital costs have declined sufficiently to enable such projects to be economically viable on the basis of grid-parity with fossil fuels in several European markets. Indeed, Europe has been at the forefront of this energy transition, accounting for 36% of the global share of renewable energy capacity, with some 536GW of total installed capacity by the end of 2018.

In the aftermath of the financial crisis, the macroeconomic landscape has been characterised by the availability of cheap capital, the phasing-out of subsidies and their replacement by competitive auctions in most European countries, as technological advancements have driven down capital costs, all of which have caused investors to reassess the balance of risks and rewards that they are taking in this sector.

Figure 1: European renewable energy capacity, 2009-2018

Source: IRENA- Renewable Energy Statistics 2019, inspiratia, 2019

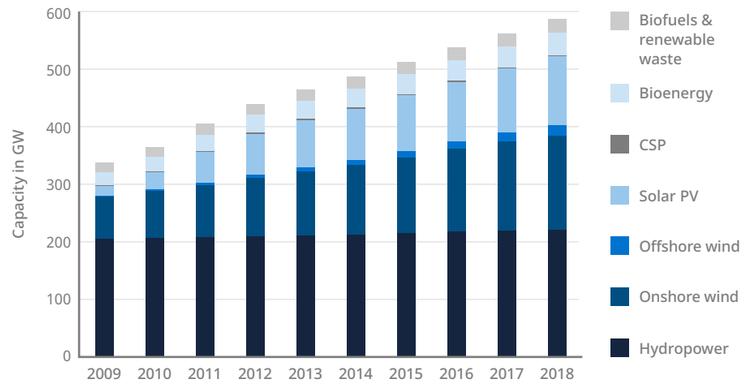
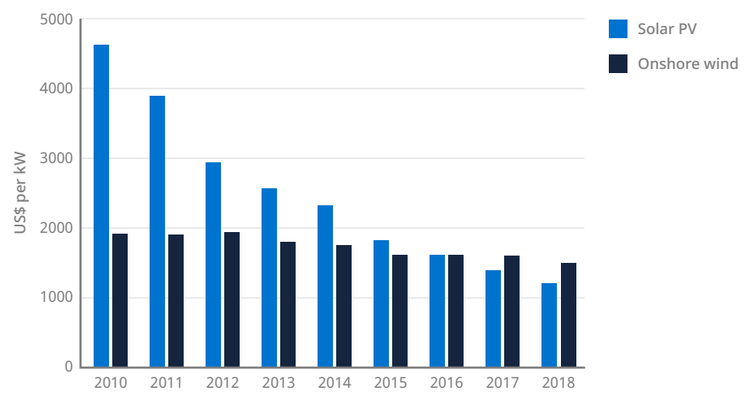


Figure 2: Global weighted average installed costs for solar PV and onshore wind

Source: IRENA- Renewable Energy Generation Costs in 2018, inspiratia, 2019



Solar PV is the most notable success story regarding the role that capital cost reductions have played in decreasing the levelised cost of energy (LCOE) of this sector.

Some countries have achieved cost reductions of more than 80% and as a result, grid-parity is close to becoming a reality. In Spain, large-scale subsidy-free solar PV developments such as the 300MW Talasol solar PV project are successfully showcasing the viability of new merchant business models. Further success stories can also be seen in other, less mature, technologies such as offshore wind in the North Sea. Vattenfall is developing a 1,520MW subsidy-free offshore wind farm off the coast of the Netherlands, while three projects for a combined 1,380MW are being developed without government incentives by EnBW and Orsted in Germany.

1.2. Understanding merchant risk and the role of PPAs

The end of subsidies brought merchant risk back into the spotlight. Renewable energy investors can no longer rely upon the cash flow certainty offered by feed-in-tariffs (FiTs) or contracts-for-difference (CfD), and instead will need to get comfortable with increasing exposure to price fluctuations in wholesale electricity markets.

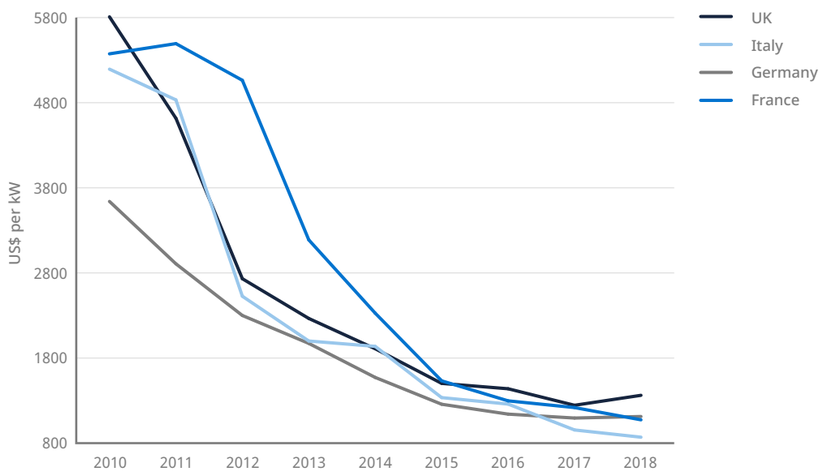
In this respect, one of the most successful price-hedging tools are private power purchase agreements (PPAs), a direct agreement to mitigate price-risk entered into by a developer and an offtaker. The developer is looking to reduce and/or eliminate future electricity price uncertainty, whereas the offtaker is looking to achieve a fixed price cost of electricity to fulfil its energy needs.

While the energy transition towards renewables has been enabled by governments through support mechanisms such as feed-in-tariffs, the baton has now, for the most part, passed into the hands of the private sector. Corporates across the globe have been under increasing pressure from consumers and investors to make their businesses and supply chains "green" leading them to radically change the way they purchase electricity and making them enter the renewables market either as signatories of PPAs or even in many cases, such as Google, as owners of renewable energy plants. Green energy procurement is undertaken on a global basis, with the aggregate energy demand for a corporate with many energy-intensive geographic locations being met by a mix of corporate PPAs and own-energy generation, in those markets offering the best contractual conditions. This trend is set to increase with corporate sustainability mandates and value from energy procurement cost savings making compelling propositions for energy-intensive corporations, such as technology, manufacturing, mining and retail giants.

The US has been the leader in corporate PPAs, with some 4.34GW signed in 2018, or 78% of the global total. Much of this has also occurred as a result of the

Figure 3: Utility-scale solar PV total costs in selected European countries

Source: IRENA- Renewable Energy Generation Costs in 2018, inspiratia, 2019



incentives mechanisms being tax driven (i.e. Investment and Product tax credits). However, as European governments come under increasing budgetary pressure, the microscope has also fallen on renewable energy incentives and one-by-one countries have eliminated FiTs for large-scale projects. The presence of global corporates has allowed many of the North American pioneers such as Microsoft and Google and to enter into PPAs in Europe and thus help start snowball the market. However, Europe itself is home to a number of large-scale energy intensive industries who are pioneers in sustainability and have also been pioneers globally, such as IKEA.

1.3. Deal flow boom

Since 2013, *inspiratia*'s proprietary database has recorded more than 18GW of subsidy-free projects, which have either signed a PPA with a utility/energy trader, or with a corporate. This report analyses how the transition to subsidy-free was led by Sweden, Norway and the UK who are now being closely followed by promising deal flow over the past 12 months by Spain and Italy. Countries such as Portugal, Germany and France, are at an earlier phase of activity.

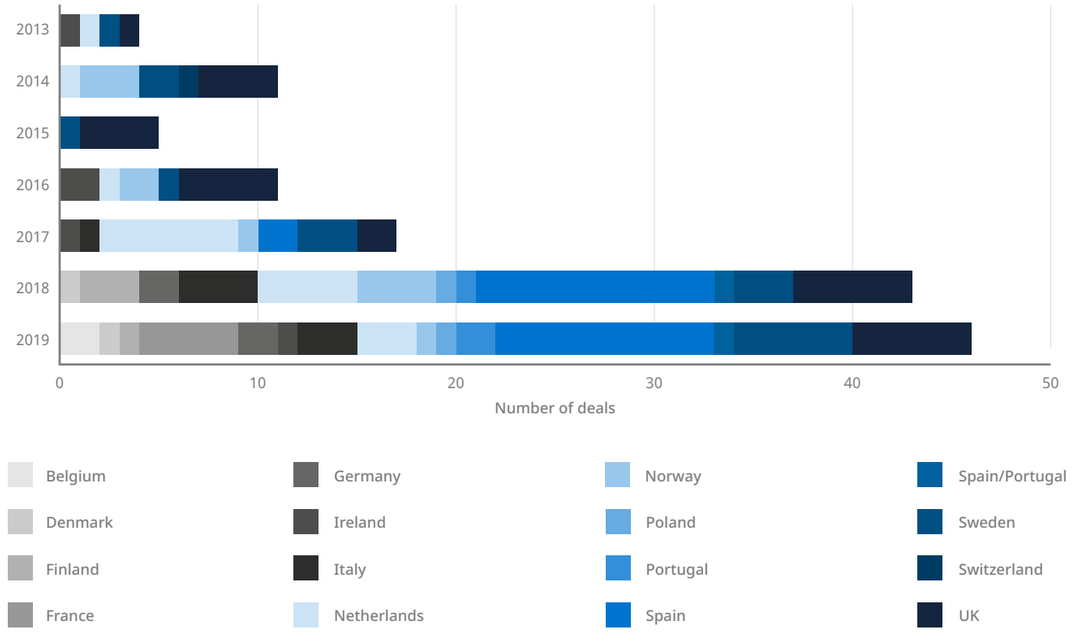
During the past 12 months, there have been a series of landmark deals including several first-of-a-kind. In March 2019, Orsted and Northumbrian Water signed the UK's first offshore wind corporate PPA.

In May 2019, Italy and France both took their maiden step into corporate PPAs. Italy's first corporate seven-year PPA was signed between energy trader DTX Commodities, developer FERA and steel producer Duferdofin Nucor. French retailer Boulanger signed a 25-year PPA with developer Voltalia for a 5MW solar PV project to be commissioned in 2022.

The transition to subsidy-free projects is nevertheless specific in each jurisdiction. *inspiratia* analyses a selection of active markets in the following chapter.

Figure 4: European PPA deal flow

Source: inspiratia | dataLive, July 2019



2. The pioneers

2.1. Norway & Sweden: the corporate PPA leaders

The Nordics, and more specifically Sweden and Norway, have been the frontrunners in Europe's corporate PPA space. These markets have mainly been driven by technology and industry conglomerates pursuing a green energy procurement strategy to power their global operations in a stable regulatory environment with plentiful wind energy, while renewable energy developers were on the hunt for creditworthy offtakers for their projects with little or no prospects for FiTs.

Deal flow

The first deal took place in Sweden in June 2013 between developer OX2 and Google, with OX2 being advised by DLA Piper. Building on its experience with similar PPAs in Sweden – such as a 10-year PPA with developer Eolus in 2014 – the technology giant entered Norway's corporate PPA market in 2016, when it signed a 12-year PPA with developers Zephyr and Norsk Vind for the 160MW Tellenes wind farm to power its European data centres.

Sweden has higher electricity taxes than Norway, but the two countries' interconnected electricity markets allow Google to source its electricity requirements from either country.

Facebook entered the Nordics in 2018, signing a 15-year PPA for the 294MW Bjerkreim cluster of wind farms.

Aluminium company Norsk Hydro entered into their first deal with Alcoa in 2017. Google and Facebook are the main corporate offtakers by total capacity in the region, with Norsk Hydro taking the lion's share, with approximately 58% of PPA contracts in Sweden and Norway, according to inspiratia's database. DLA Piper advised Credit Suisse Energy Partners AG on the Fosen Vind (1000MW) and Tonstad (208MW) projects in Norway, both with Norsk Hydro offtake and DekaBank Deutsche Girozentrale on the Kvitfjell/Raudfjell (total c. 300MW), both with Alcoa offtake (wrapped by GIEK under Norway's special support regime for the power intensive industry).

Key drivers & bottlenecks

Both the Norwegian and the Swedish markets are driven by strong environmental and economic factors that have attracted demand from the likes of Google, Facebook, Alcoa and Norsk Hydro. In particular, strong and consistent wind resources coupled with abundance of land allow the Nordics to achieve economies of scale.

Figure 5: Nordic corporate PPA deal flow by capacity, 2013-2019

Source: inspiratia | dataLive, July 2019

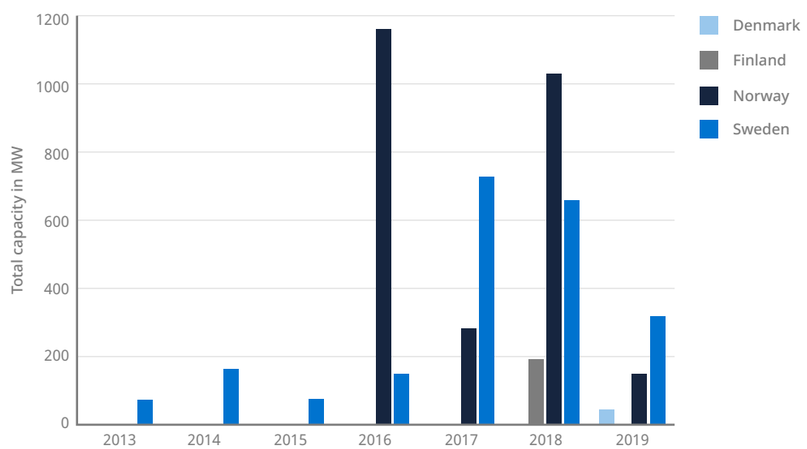
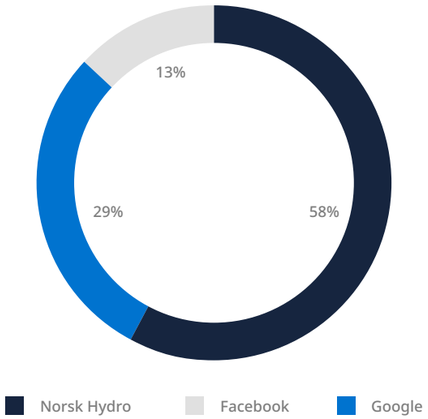


Figure 6: Share of Nordic corporate PPA capacity by offtaker

Source: inspiratia | dataLive, July 2019

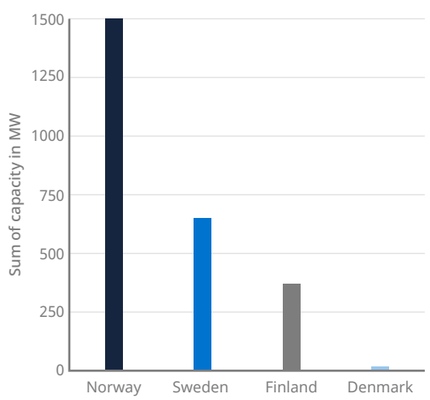


"The Fosen Vind transaction constituted a true pathfinder deal; notably in the highly structured and complex PPAs with Norsk Hydro and Agder Energi, alongside an innovative funds side financing structure."

Fredrik Lindblom, DLA Piper

Figure 7: Nordics subsidy-free pipeline by capacity, 2017-2019

Source: inspiratia | dataLive, July 2019



PPA-backed deals grew out of the devaluation of Sweden and Norway's joint electricity (El) certificate scheme, and a volatile merchant pricing environment. The subsidy scheme awards one tradeable certificate to renewable developers for every megawatt hour (MWh) of clean energy produced over 15-years.

The original value of the certificates was meant to make up the difference between the power price and the marginal cost of the project. However, because the El certificate is a traded product in oversupplied energy markets in both countries, the certificates lost their value very quickly – falling from €50/MWh in 2013 to €30/MWh by 2017 – and at that rate could no longer guarantee revenues for project owners.

So, although projects enjoy a form of subsidy, PPAs became essential to make projects bankable within the Nordic market.

For example, this was a major concern for the landmark 1GW Fosen Vind project in Norway, where Statkraft was on the verge of cancelling the project, citing lack of revenue guarantees. A 20-year PPA with Norsk Hydro convinced investors and lenders to reconsider the project, resulting in the financial close of the €1.1 billion (£850.5m, US$1.2bn) project in 2016.

In addition to reducing capital costs to make their projects economically viable, developers in the region must also find offtakers that are both creditworthy and willing to enter into long term arrangements to ensure that they can attract project finance debt.

DLA Piper has advised DekaBank Deutsche Girozentrale as lender to a 254MW wind park located in Örnsköldsvik municipality, Sweden. The project will comprise 62 turbines supplied by Siemens Gamesa Renewable Energy and is scheduled to reach commercial operation date by the fourth quarter of 2021. DLA Piper was also directly involved in PPA negotiations with the offtakers, Google and Swedish industrial, Holmen.

Commenting on the deal, DLA Piper's Global Co-Chair of Energy and Natural Resources, Natasha Luther-Jones, said: "We are proud to have been involved in another great example of the innovative PPA structures that are coming out of the Nordics. The offtake solution for the project has been structured with two very different offtakers – Google and Holmen, and through this structure DekaBank and Prime have secured land rights and long term price security, together with a diversified PPA risk structure with fantastic counterparties."

Pipeline & outlook

The 2019 pipeline for Nordic subsidy-free projects stands at over 1.8GW at the time of writing.

In particular, Norway's pipeline is set to be the largest for fully-merchant onshore wind projects in the European continent. Norwegian developer Norsk Vind Energi announced plans for a 1.5GW onshore wind farm in Hordavind, expected to cost €1.2–1.4 billion (£1.1–1.3bn, US$1.4–1.6bn). Norsk Vind Energi is awaiting approval for the license for this project and expects construction to start by 2023.

Subsidy-free activity is also observed in other parts of the Nordics. Like Norway, Finland plans to scrap subsidies for onshore wind in 2020. Despite that, Finland has several subsidy-free projects in its pipeline with the likes of Google and IKEA as PPA offtakers and is expected to see 3GW of wind capacity rolled-out on a subsidy-free basis in the short term.

Denmark is due to commission its first subsidy-free project, a 17MW onshore wind farm located in the Port of Hirtshals, by the end of 2019. The project reached financial close in March 2019 with a PPA secured with Energi Danmark. No definitive date has been given for the end of subsidies in Denmark, but intentions are set to run competitive auctions alongside an emerging subsidy-free market.

2.2. UK: on the road to subsidy-free

Market overview

The UK has quite a long tradition in corporate PPAs, with the first recorded in December 2008 when retailer Sainsbury's signed a 10-year PPA to buy energy from a 6MW Ventus Funds-backed onshore wind farm in Scotland. The subsidy-free PPA market is dominated by private-wire deals, with the market anticipating more merchant projects looking for offtakers.

Deal flow

To date, *inspiratia*'s project finance database has recorded a total of 26 deals in the UK. The overwhelming majority of the PPAs signed are with corporate counterparties, including BT, HSBC, Unilever, McDonalds and, more recently, Tesco.

Two of these deals are with either a utility or an energy trader. Specifically, Shell Energy, Shell's energy trading business, signed a five-year PPA for the output of a developer's British Solar Renewables (BSR) 69.8MW project in January 2018, and trader Dankse Commodities signed a 20-year PPA with Equinor's 30MW offshore wind Hywind project in June 2019.

Interestingly, however, 18 of these deals are signed with existing projects benefitting from the Renewables Obligation (RO) support framework scheme. A notable trend in the UK has been the emergence of subsidy-free private-wire PPAs, where large energy consumers are contracting renewable energy generation onsite.

Developer Lightsource BP has a rich history in private-wire PPAs with large corporate consumers, including utility corporate Thames Water, carmaker Bentley Motors and glass corporate NSG, advised by DLA Piper.

The country's first non-private wire corporate PPA with what would be the closest to a subsidy-free asset was recorded in May 2018, when developer Energiekontor announced the financial close of its 8.2MW Withernwick II extension onshore wind project after it signed a PPA with an unnamed consumer goods brand. DLA Piper advised the lender and Energiekontor on the PPA. Nonetheless, in December 2018, Lightource BP announced a deal with beer brewer AB InBev for a 100MW PPA constituting the largest subsidy-free PPA-backed renewable energy development in the country; another interesting deal where DLA Piper acted, and what we believe to be the largest synthetic deal in the UK to date.

Market drivers & bottlenecks

The main driver behind the uptake of corporate PPAs in the UK is the number of large corporates pledging to use 100% renewable energy in their operations. The market became comfortable with sleeved PPAs – the most popular structure both in the UK and the EU in total, where the energy received by the offtaker is sleeved by a utility not requiring the offtaker to be in proximity of the plant – resulting in rapid growth of the market. Once a project has secured a minimum revenue stream from its RO accreditation, a corporate offtaker is more comfortable to provide a revenue guarantee.

However, the focus of corporate PPAs is now shifting, with corporates going beyond green purchasing schemes and instead enabling new capacity to come online, for example facilitating the financing of a subsidy-free greenfield project that would otherwise not have been built. Commonly known as 'additionality'.

Nonetheless, some of the reasons why subsidy-free developments in the UK have remained limited are higher LCOEs in relation to other jurisdictions, as well as a more complex permitting procedure after the government passed the final say for planning permissions to local authorities in 2015.

According to the UK Solar Trade Association, the LCOE estimate for solar PV in 2019 is somewhere between £44-70/MWh and this is set to fall to between £38-£54/MWh by 2025. Decreasing LCOEs, in tandem with rising electricity prices, creates a promising environment for the spread of many new subsidy-free projects.

Pipeline & outlook

Over the past two years, *inspiratia* has recorded a pipeline of over 2.2GW of subsidy-free renewable energy projects in the UK, the majority of which are solar PV, including more than 600MW of onshore wind across six projects.

In March 2019, British renewable energy developer Tribus Energy unveiled plans for a 500MW subsidy-free solar development in Cambridge and Suffolk. German developer Wirsol is also in the process of developing a 350MW solar and energy storage subsidy-free scheme in Cleve Hill, North Kent – the first subsidy-free development to be reviewed as a Nationally Significant Infrastructure Project (NSIP). In May 2019, developer RES sold its first subsidy-free 25MW onshore wind farm to Italian energy company ERG, while expecting another 200MW of its subsidy-free pipeline to reach financial close by 2020.

UK-based solar developer Lightsource BP has announced it has more than 300MW of PPA-backed utility-scale solar projects in the pipeline, citing increased demand from buyers – especially C&I consumers – following concerns over long-term power prices and price volatility.

Figure 8: UK PPA deal flow and contracted capacity

Source: inspiratia |dataLive, July 2019. Note: excludes capacity of the Orsted and Northumbrian Water deal, which is 100GWh per year

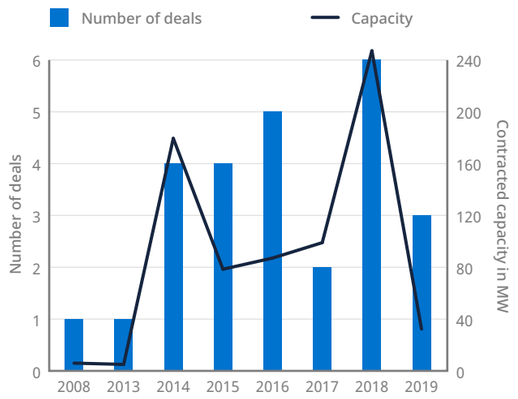


Figure 9: Breakdown of UK PPAs by subsidy-free or RO-backed

Source: inspiratia |dataLive, July 2019

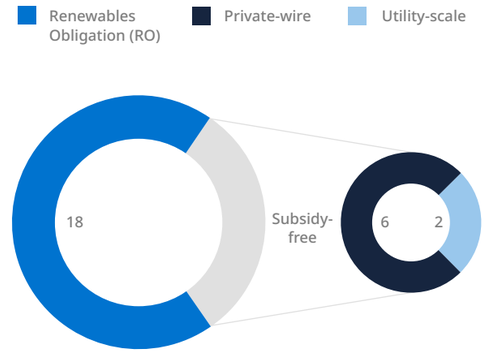


Figure 10: UK onshore wind applications between 2017 and Q1 2019

Source: UK Government – Renewable Energy Planning Database, inspiratia, 2019

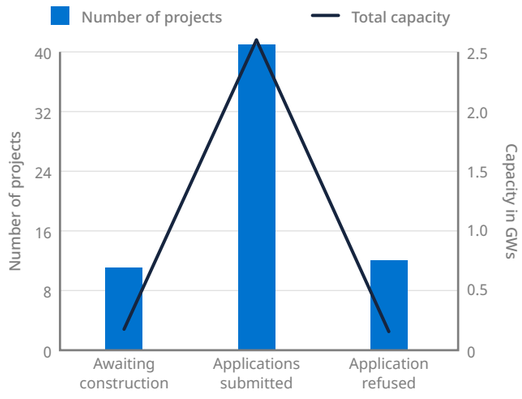
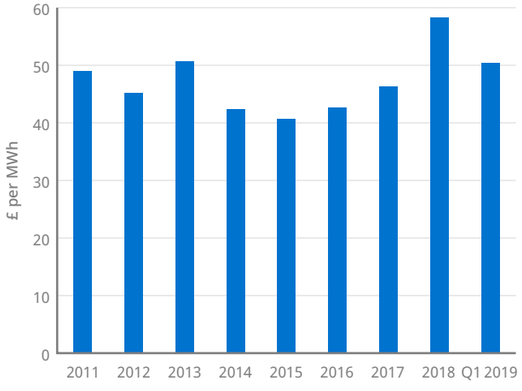


Figure 11: UK's average annual wholesale electricity prices

Source: Ofgem, inspiratia, 2019



During the latest CfD auctions that took place in September 2019 offshore wind cleared 5.4GW of capacity across six projects. With bids having reached record-low levels of £39.65/MWh, it is also expected that project sponsors will seek additional hedging of the output through private PPAs. Winners include SSE, Equinor and Innogy.

2.3. Spain: the unexpected champion

Market overview

Although Spain is a relative newcomer to the global corporate PPA scene, during the past 12 months the market has experienced a dramatic boom, with *inspiratia*'s database recording more than 24 deals over this period. At the time of writing, projects featuring PPAs have exceeded 3.5GW. The market is dominated by PPAs, primarily with utilities – acting both as sellers and offtakers – and energy traders. However, the involvement of corporates is continuingly increasing.

Key drivers & bottlenecks

Spain has been one of the first European countries to embrace the shift to subsidy-free. As investor confidence in the country's regulatory environment has not fully recovered from 2013 tariff cuts, several project sponsors, determined to take advantage of the country's favourable conditions, started exploring subsidy-free routes to market, including fully merchant and PPA-backed projects.

The country has some of Europe's highest electricity prices. With LCOEs of solar and onshore wind at approximately €40/MWh levels, the gap between current electricity prices at above €50/MWh is a key driver for subsidy-free projects. Price visibility for the next five years is also said to be relatively clear, with 5-year forecasts predicting prices to be in the range of €45 to €55/MWh over the period to 2022.

Figure 12: Spain's PPA deal flow

Source: inspiratia | dataLive, July 2019

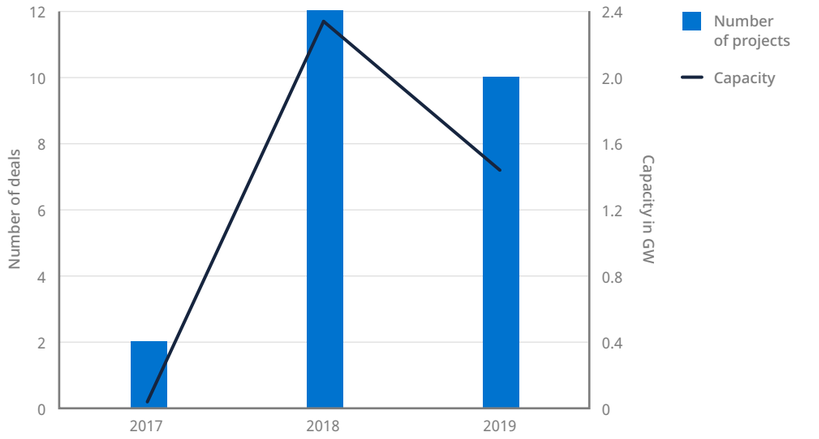
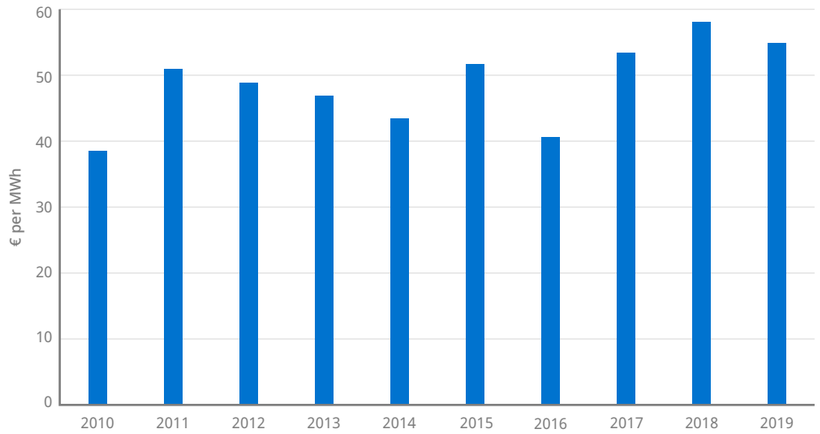


Figure 13: Spain's average annual electricity prices

Source: Red Electrica España (REE), inspiratia, 2019



Along with low land costs due to the country's abundant space and with solar irradiance levels reaching up to 1800kWh/m^2 annually, the economics of subsidy-free solar PV are compelling.

Pipeline & outlook

The Spanish market benefits not only from 3.9GW of solar PV and 4.1GW of onshore wind capacity that has been auctioned and is expected to be commissioned by the end of 2019 and will no doubt set in motion frenetic M&A activity, but also an increasingly deep market for merchant and PPA-backed projects that will significantly increase the country's installed capacity.

According to *inspiratia*'s database, by the end of 2019 subsidy-free solar PV capacity of 660MW is expected to come online and another 1.5GW by 2020. The pipeline includes Iberdrola's landmark 391MW Núñez de Balboa subsidy-free development in Badajoz – which is already backed by three corporate offtakers so far – and Cox Energy's 495MW solar developments across the country which have secured a long-term PPA with Spanish utility Audax.

The PPA market is also expected to open up to small and medium-sized enterprises (SME), with lenders getting more comfortable with smaller corporates. A set of incentives for SMEs to engage in corporate PPAs is also in the making through the country's upcoming National Energy and Climate Plan. Nonetheless, with PPAs having reached very competitive prices, the next big wave of subsidy-free projects is expected to maintain a significant merchant tail.

2.4. Italy: following Spain's steps

Market overview

Italy may be another newcomer to the PPA market, but it boasts a significant amount of deal flow over the past 12 months, the majority of which is for subsidy-free assets. Deals with utilities and traders dominate the market, with the first genuine corporate PPA signed only in May 2019.

Deal flow

Italy's first subsidy-free foray took place in July 2017, when UK-based renewable investment firm Octopus Energy signed a two-year PPA with EGO Group's subsidiary Green Trade for the output from its first 63MW subsidy-free solar PV portfolio. The PPA was renewed for another five years in December 2018.

In fact, December 2018 marked a landmark month for the Italian subsidy-free renewables market, as the signing of four PPAs brought the country again into the spotlight. In December, Octopus signed a five-year deal with Shell Energy Europe for a 70.5MW project, developer Canadian Solar signed Italy's first 10-year PPA with trader Trailstone, while fund manager Glennmont signed a PPA with utility Centrica for an existing 315MW onshore wind portfolio – the only subsidy-backed PPA in the country.

While short-term products have been the main trend for a while, the recent deals including 10 and 15-year durations indicate that medium and long-term agreements represent viable options too.

Market drivers & bottlenecks

The main push behind the recent growth in subsidy-free deals in Italy came from players that took a proactive approach, filling the gap left by the market's paralysis after the suspension of government auctions, eyeing PPAs to offset upstream risks.

High electricity prices – which, according to the expectations of market participants, are likely to further increase over the next two years – are a significant driver of project development.

Declining LCOEs for renewable technologies – for instance, utility-scale solar PV LCOE declined by 80% between 2010–2018 – coupled with competitive PPA prices could act as a catalyst for the development of high-quality projects in the coming years.

A FOCUS ON FERA, DXT, DUFERDOFIN NUCOR (DUFERCO) PPA

Italy's first corporate PPA was signed in May 2019 between steel producer Duferco – which operates four steel production plants in the country – developer FERA, and Swiss-based commodity trader DXT for a total of 200GWh.

The three-party seven-year sleeved PPA agreement will see FERA selling electricity from one of its wind farms in northern Italy to DXT. The latter will then "sell the electrons" produced from the project – sleeved with the help of an unspecified utility – to Duferco.

Based on market experience considerations, it can be argued that once a model is proven and has been delivered within the market, buyer demand tends to increase. The milestone deal is both Italy's first wind and first corporate PPA, demonstrating the viability of onshore wind PPAs in the country.

However, the expected auctions under the Decreto FER 1 draft could slow PPA growth over the medium-term. The plan, which was signed by the Italian government in July 2019, contains incentives of €10 billion and auctions for 8GW of new capacity between 2019–2021.

One of the major challenges that needs to be addressed is the streamlining of the planning and authorisation process, which has been burdensome due to the highly fragmented regional procedures and different levels of support from local authorities, especially in some of the regions that boast the highest levels of solar irradiation.

Pipeline & outlook

Auctions under the FER1 Decree are expected to add 8GW of capacity. However, Italy will need to add approximately 40GW to meet its 2030 targets, of which the auctioned projects represent a mere 15%.

The 70.5MW solar project contracted by Octopus and Shell in December 2018 is currently under construction and should be completed in 2019, just like the 300MW solar farms negotiated by European Energy and Axpo for a portfolio of projects located in Sicily and Apulia.

Italy is expected to create opportunities especially for small and medium utility-scale projects, contrary to the mammoth-sized projects currently being developed in Spain.

Market participants anticipate that, over the next 18-months, Italy is set to experience a deal flow similar to the levels at the moment experienced by Spain.

"Large solar plants on agricultural areas cannot qualify for the auctions and are using the first PPAs. Wind will follow later."

Giulio Maroncelli, DLA Piper

Figure 14: Italy's PPA deal flow

Source: inspiratia | dataLive, July 2019

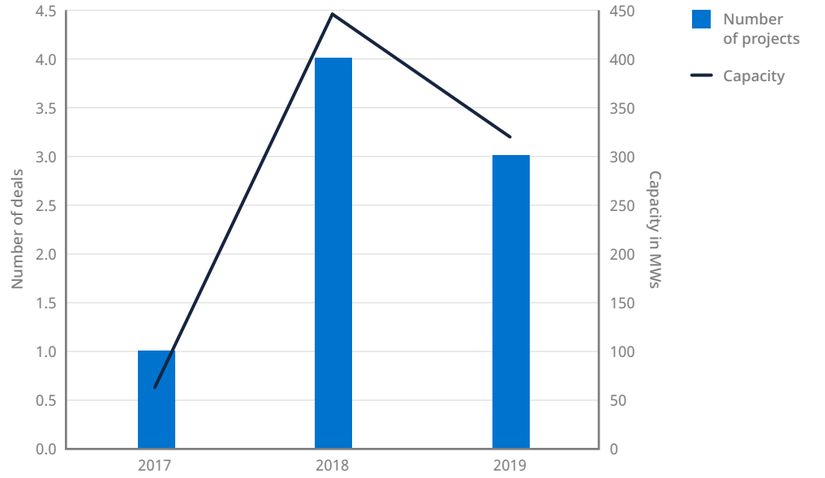


Figure 15: Italy's average annual electricity prices

Source: Gestore Mercati Energetici (GME), inspiratia, 2019

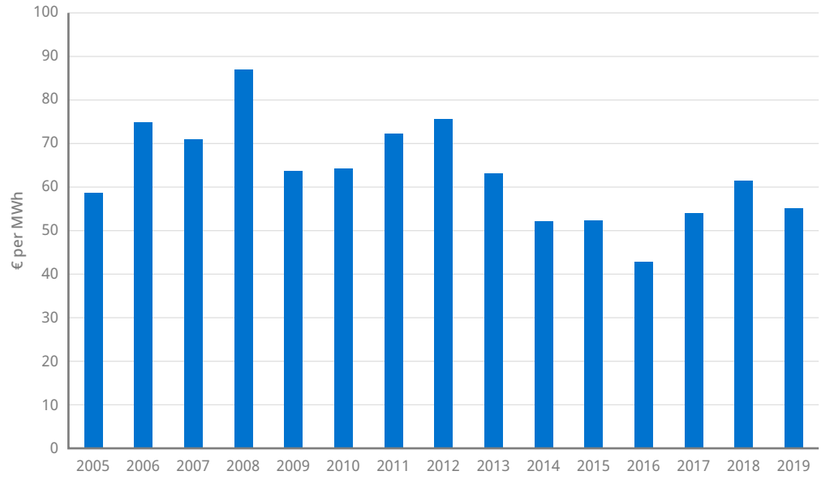
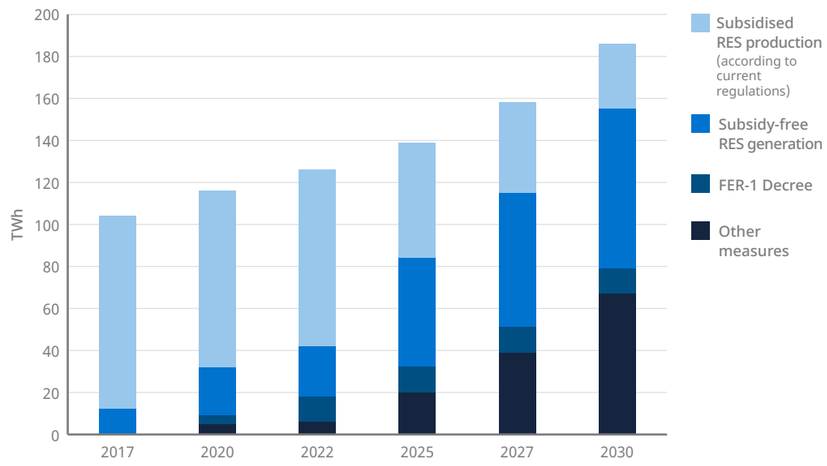


Figure 16: Outlook of Italy's renewable electricity production until 2030

Source: Gestore Servici Energetici (GSE), inspiratia 2019



3. The next wave

3.1. Portugal

Portugal is a nascent PPA market, particularly thanks to cross-border projects with Spain. The deal flow is dominated by utilities or traders acting as offtakers, with corporates expected to join soon.

PPA activity

Portugal's first subsidy-free asset reached financial close in May 2018. The 10-year PPA between developer Hyperion and power distributor Axpo Ibéria signed in January of that year paved the way for a new era in the country.

Thanks to the Iberian peninsula's interconnected grid system, it has been possible for Spain and Portugal to sign cross-border PPAs that source and deliver the electricity from and to both countries. In March 2018, developer Cox Energy and Iberian utility Audax signed an offtake agreement for a portfolio of 660MW. Almost a year later, in March 2019, Audax signed a further PPA with WeLink and Allianz Capital Partners for the output of a planned 708MW solar PV portfolio – the world's largest PPA to date.

Outlook & pipeline

Portugal's renewable energy industry is undergoing revival after a long-term hiatus. The country held a solar licensing auction in July 2019, awarding 1.2GW that is set to attract an investment of over €1 billion. The auctioned capacity will operate either a fixed-price ceiling or on a pure merchant basis. The structure is envisioned to satisfy different investment appetites, as the government has stated that it aims to facilitate the signing of private PPAs either way. The country aims to hold two auctions per year, reaching 6–7GW of solar PV capacity in total by 2027.

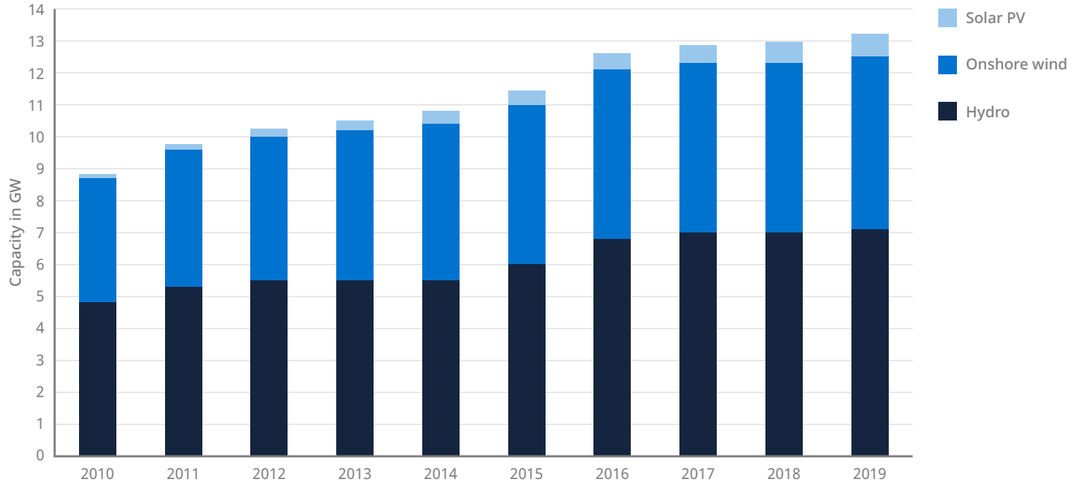
"With increasing PV auctions and large-scale solar parks on the agenda, Portugal is gathering all the required conditions to be a reference European market for PV generation."

Mafalda Ferreira, DLA Piper

Spanish solar developer Solaria has announced its plans to deploy 3.3GW of new capacity in Spain and Portugal by 2023. Some of the capacity is expected to come from auctions, and the rest to be developed on a purely subsidy-free basis.

Figure 17: Portugal's renewables capacity

Source: Direção-Geral de Energia e Geologia(DGEG), inspiratia, 2019



3.2. Germany

Although Germany is lagging behind some of its peers for PPA dealflow, Europe's renewable energy leader has substantial potential for growing PPA activity in the upcoming years.

The existing subsidy scheme for renewables installations remains attractive and thus currently still reduces the appetite for subsidy-free greenfield projects. This especially holds true in light of the fact that the length of permitting processes and related administrative and court proceedings have slowed down the expansion of renewables and in fact endangers the fulfilment of the German statutory expansion targets. This resulted in recent auctions being undersubscribed and in awards providing substantial statutory support payments for sponsors. In light of this, sponsors, investors and banks still seem to be reluctant to take the increased risk profile associated with subsidy-free greenfield projects.

Still, for projects reaching the end of their statutory 20-years support period, PPAs are already now becoming increasingly attractive.

PPA activity

Germany's first PPA was signed in September 2018 between wind turbine manufacturer Enercon and the power pool of the Association of German Cold Storage and Cooling Logistics Companies (VDKL). Enercon will supply the association with power from four existing onshore wind farms with a total capacity of 10.6MW, which are reaching the end of their subsidies. Two months later, Statkraft and Mercedes-Benz made the headlines after the sealing of a similar end-of-life PPA for six community-owned onshore wind farms with a total capacity of 46MW.

Furthermore, confidence in merchant solar PV projects is also emerging. In February 2019, developer Energiekontor signed a 15-year PPA with utility EnBW for an 85MW planned subsidy-free plant in Northern Germany. In May, the developer signed another PPA with Innogy for a second subsidy-free project.

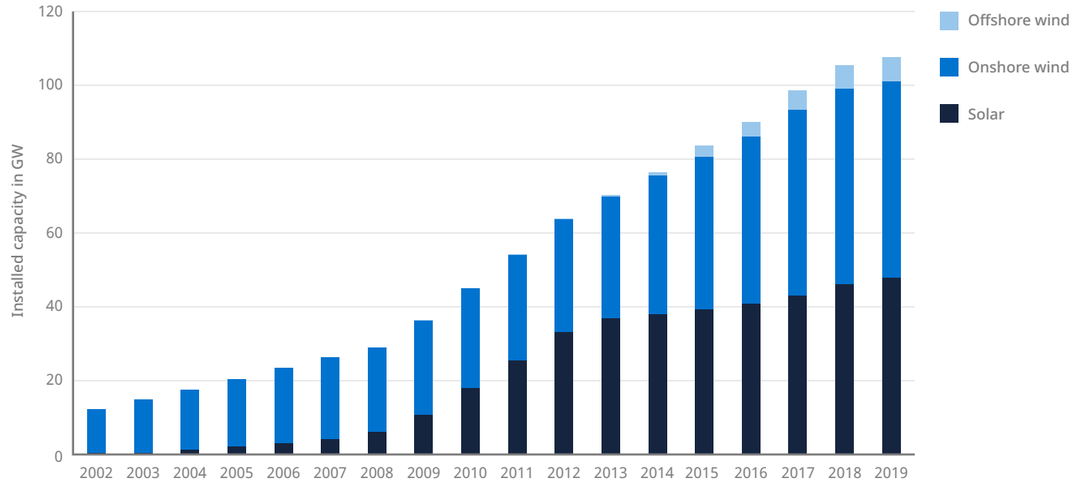
In May 2019, developer BayWa announced that it is developing its first subsidy-free solar PV park – the 8.8MW Barth V project – building on its experience with the landmark 174MW Don Rodrigo subsidy-free asset in Spain. The developer has revealed it is negotiating a PPA with an industrial offtaker.

Outlook & pipeline

As a pioneer in renewable energy, it should come as no surprise that the first end-of-life PPA was signed in Germany in September 2018. Between 2021 and 2025, some 16GW of Germany's onshore wind capacity commissioned under the 2000 Renewable Energy Act will come to the end of their subsidy support schemes,

Figure 18: Germany's renewable energy capacity

Source: Fraunhofer ISE, inspiratia, 2019



with tens of GWs set to follow. Preventing existing energy assets from going offline is seen as equally beneficial as enabling the addition of new capacity.

With such deals, the operator is able to invest in refurbishment and extend the life of existing farms that would otherwise be decommissioned. Most importantly, because such contracts usually entail lower risk – assuming that the debt has been fully amortised – and offer higher flexibility as they can afford shorter-term tenors, they can attract new players that would not be able to commit in the longer-term.

Besides, once the permitting processes for new installations are shortened, auctions are again fully subscribed and support payments, as a result, are again reduced, it is to be expected that PPAs become more regular also for greenfield projects.

"In light of the continued problems around the permitting of new installations, the challenging statutory expansion targets for renewables in Germany must be considered impossible to reach. Undersubscribed auctions lead to reduced competition and higher statutory support payments. The continued attractiveness of the German statutory support scheme therefore effectively slows down the development of substantial PPA activity. This is only different for end-of-life PPAs."

Michael Cieslarczyk, DLA Piper

3.3. France

France signed its first PPA in January 2019 and has since shown promising signs of activity. However, significant market barriers require sellers and offtakers to be bold and innovative.

PPA activity

Paris' Charles de Gaulle Airport and state-owned French national railway company SNCF were the first corporate offtakers to seek an alternative to nuclear-based long-term private PPAs. Both entities issued invitations to bid in 2018. In June 2019, French IPP Voltalia signed a 25-year IPP for an impressive 143MW subsidy-free solar PV capacity with SNCF, the first of a series of PPAs the railway operator has pledged to sign.

In 2019, retailer Boulanger also signed a 5MW 25-year PPA with Voltalia. The country's PPA portfolio also features an end-of-life PPA, after cash and carry business Metro France signed a 3-year agreement with EDF's Agregio to source power from the 20MW Eure-et-Loir wind farm that comes to the end of its subsidies.

Outlook & pipeline

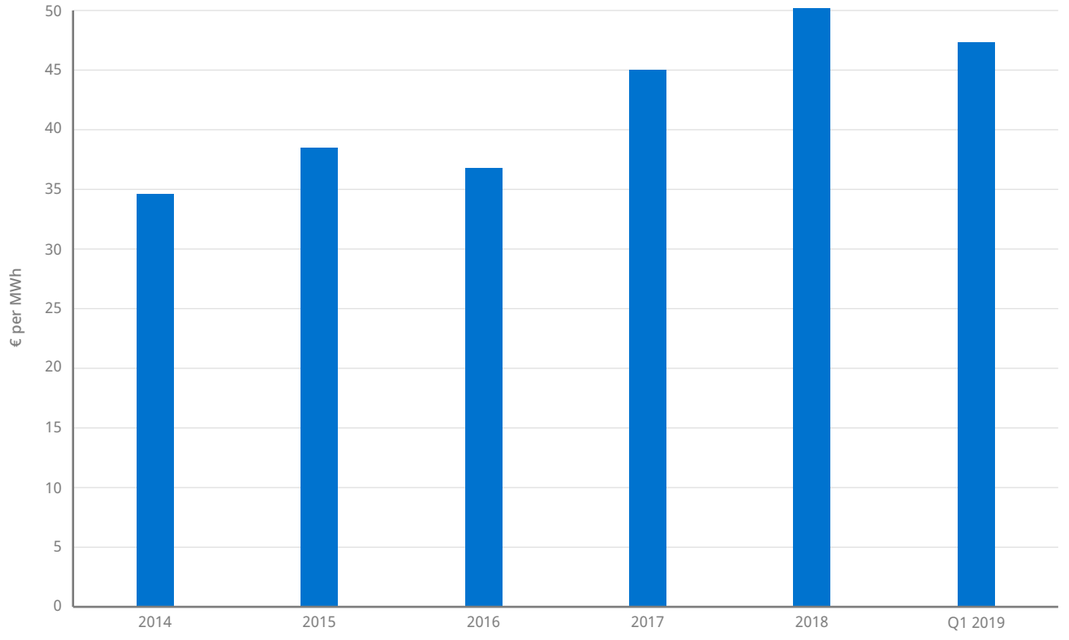
Historically low electricity prices due to the predominance of nuclear power in the country's energy mix constitute one of the main challenges for the take-off of subsidy-free projects in the country. Nonetheless, price increases observed in the past years is set to favour parity with renewable energy technologies.

In addition, readily available alternative routes to market may hinder the attractiveness of subsidy-free project and consequently the signature of corporate PPAs. According to the government's draft Programmation Pluriannuelle de l'Energie (PPE) plan, the country aims to double its renewable energy capacity – currently standing at 15.1GW onshore wind, 8.5GW solar PV and 25.5GW hydro – by 2029.

The aim is to award approximately 2.9GW of solar PV and onshore and offshore wind power every year for the next ten years. However, given the bureaucratic and technical constraints associated with public auctions, developers are increasingly looking at the subsidy-free route, particularly for solar PV.

Figure 19: France's medium annual wholesale electricity prices

Source: RTE- France, European Commission, inspiratia, 2019



3.4. The best of the rest

Poland

The first PPA agreement in Poland was signed in July 2018 between project developer VSB and Mercedes-Benz, for the private offtake of the electricity produced from VSB's 45.1MW Taczalin wind farm. The deal represented an opportunity for industrial consumers to contribute towards the greening of the country's coal-dominated grid, enhancing the added value of a PPA with a renewable energy project. In May 2019, the state-owned power conglomerate PGE and two Polish chemical companies – Grupa Azoty Kopalnie i Zaklady Chemiczne Siarki Siarkopol S.A. and Grupa Azoty – took a step forward by signing a letter of intent for the construction of a 5MW solar PV plant across the former industrial site of Siarkopol. The plant is set to be constructed outside the national auction scheme, hence it may be one of the first subsidy-free renewable energy schemes in the country.

Although the country has enjoyed low electricity prices in the past, over 2018 spot prices in the Polish Power Exchange increased 58%, mostly due to rising carbon and coal prices. Average prices in January 2018 were below 150PLN/MWh (€35.2/MWh), but they reached a peak of more than 270PLN/MWh (€63.4/MWh) in September. In May 2019, average monthly prices were at over 250PLN/MWh (€58.7/MWh). The increase was so steep that the Polish government passed legislation to freeze power prices, enabling large consumers to receive compensation. Uncertainty over future prices, the presence of significant industrial activity in the country, and the opportunity for corporates to make a big impact on a "dirty" grid make Poland a market with vast potential.

"We strongly believe that the future of Polish renewables is as much in PPAs as in the subsidiary state programs. When you take into consideration the forecast for energy prices, businesses will more and more be looking at PPAs as a solution for 100% supply."

Łukasz Jankowski, DLA Piper

PPAs are becoming increasingly popular in Poland. In November 2019, German developer Innogy signed a 10-year PPA with Polish brewer Kompania Piwowarska. Innogy will supply clean electricity from its 73MW Nowy Staw onshore wind farm to cover 40% of the corporate's electricity needs. However, Innogy plans to expand the plant to 84MW in order to meet the brewer's 100% electricity needs, making the deal the first onshore wind PPA in Poland to enable new subsidy-free capacity.

Finland

Even though Finland's market is still nascent, the country shows great signs of subsidy-free activity with an increasing amount of capacity expected to seek corporate offtakes over the next 12 to 18-months. Google was the first corporate to be active in the Finnish PPA market, as a natural progression from its experience in the Nordics. The company signed three subsidy-free onshore wind deals with a total 190MW output in September 2018 to power its data centre in Hamina, in the south of the country. In February 2019, asset manager Luxcara acquired a 100MW subsidy-free wind development from ABO Wind underpinned with a PPA with an undisclosed party. In September 2019, Google announced that it has entered into a PPA to buy 130MW output from the 250MW Mutkalampi wind farm in Central and Northern Ostrobothnia, Western Finland.

An innovative deal took place between developer OX2 and IKEA, after the home furniture giant invested directly in the largest subsidy-free farm in the Nordics, of a total 107.4MW capacity, as part of its global strategy to become energy independent by 2020. Developer Valorem and Octopus are also embarking on the country's subsidy-free scene, currently developing a 71.4MW onshore wind farm. In July 2019, Finnish IPP Taaleri bought the 91MW subsidy-free Oltava wind farm.

The country transitioned from its feed-in tariff system to an auction mechanism in 2018. The Finnish Energy Authority published the first tendering round in November 2018, where projects – exclusively onshore wind despite the auction being technology-neutral – were awarded a tariff ranging from €1.27/MWh to €3.97/MWh on top of a premium in case wholesale prices fall below €30/MWh. Low levels of government support for renewable technologies, coupled with market expertise in Sweden and Norway, are expected to boost PPA activity in the country. Finland's wholesale electricity market is directly connected with Sweden, Norway and Estonia, presenting opportunities for cross-border PPAs.

4. Outlook

4.1. The role of policymaking in a grid-parity world

At first glance it may appear that the role of policymaking would take a back seat with a subsidy-free and market-driven environment. Whilst merchant risk has indeed taken the place of regulatory risk as a key risk for renewable projects, the role of a favourable regulatory framework is still vital to create a supportive long-term investment environment.

For example, regulators still have the power to affect investment decisions through market design, tax framework and grid legislation. An indicative example is Ofgem's Targeted Charging Review (TCR) that started in November 2018 and is still ongoing, which aims to update the charges of generators using the transmission and distribution grid. Estimates indicate that changes in charges could increase the LCOE of renewables from £4.45 to £5.5/MWh, affecting both existing and future projects. Future uncertainty creates extra complexity when it comes to financial modelling, especially for developers working on merchant projects.

Another notable example is the role of the government in the permitting and planning process. Support for renewables is needed both from the national and regional government in order to remove barriers that do not allow projects to get off the ground. For example, permitting risk persists in countries such as Italy, where regional governments can slow down or even halt project developments.

In March 2019, the UK offshore wind industry secured the first renewable energy technology government sector deal sending positive long-term signals to the industry.

In addition, in spite of the fact that national governments are not directly involved in bilateral agreements such as PPAs, policymakers can stimulate the market by creating a series of incentives – such as tax incentives – for corporates and other third players to get involved.

Spain is already working on a set of incentives for corporates, which the government is expected to include in its National Energy and Climate Plan. Italy has also drafted similar incentives in its FER Decree, signed by the country's government in July 2019, by proposing the creation of a market platform where parties can negotiate long-term offtake agreements for subsidy-free assets.

Last but not least, many industry players argue that PPAs with either utilities, traders or corporates will not be enough to deliver Europe's climate objectives. Despite the PPA market's unprecedented growth, national governments are the best-placed to manage price and timing risk allocation instead of developers, corporates, utilities or banks, through a minimum price-stabilisation mechanism.

4.2. Future trends

The next 6–12 months

INNOVATIVE STRUCTURES – BASELOAD PPAS

It has been observed that the PPA market is now transitioning into more ingenious pricing structures. For example, baseload (also known as firm) PPAs are becoming increasingly popular, as they provide a more balanced long-term protection against the price movement for both the seller and the offtaker. Specifically, with baseload PPAs, profile and imbalance risk are managed by the producer, rather than the offtaker.

Traditionally, the most common PPA structure was pay-as-produced, where the energy producer was not concerned about when or how much it will produce (profile risk), since the offtaker would pay a fixed price for any MWh produced anytime. Corporates would usually need to work with their electricity suppliers to align the output of the PPA with their baseload demand, for an extra fee.

In a baseload PPA, the intermittent generation is turned into a baseload block, and the balancing responsibility is allocated to the producer. Baseload PPAs are priced higher, since the developer is responsible for the profile risk for managing this risk with a third party.

"Pure baseloads have, so far, only been seen in the Nordics with the large industrials. What we are seeing elsewhere is that PPAs have moved from the old style pay as produced to placing more risk on the generator with availability, warranties, performance requirements, LDs and other incentives for ensuring certain generation is met."

Nathasha Luther-Jones, DLA Piper

Since returns for the developers are higher, these structures are becoming more popular in the competitive PPA market. The challenge is that financiers often prefer to minimize risk exposure. However, the market is expected to adapt to structures with more merchant risk.

PUBLIC SECTOR PPAS

Even though the emergence of private PPAs was driven by corporates with a robust sustainability agenda, the public sector is becoming increasingly interested. The main drivers behind the involvement of public sector bodies such as local authorities, universities, housing groups or hospitals are both the need to meet climate targets and also the ability to reduce costs, as opposed to corporate PPAs, which were initially sparked by corporate social responsibility (CSR) initiatives more so than by any cost saving.

Most importantly, public organisations usually present a trustworthy counterparty for developers and other sellers. They are typically creditworthy, have access to cheap capital and have the ability to take long-term investment decisions, making the commitment to long-term PPAs more feasible. However, there are significant challenges of engaging with the public sector, primarily their inexperience in dealing with complex energy procurement arrangements and the long decision-making process requiring the approval of multiple departments. Such deals could also be partly exposed to political risk, being vulnerable to electoral cycles.

The UK is so far leading the public sector PPA trend. In February 2019, Warrington Borough Council made a direct investment of £63m in a 60.4MW solar PV plus 34.7MW storage project. It was a landmark development since the council went beyond signing a PPA with a developer and instead invested directly in the project. The deal is expected to bring the council revenues of £150m over the 30 years of the project's life. In July 2019, the City of London Corporation issued an expression of interest (EOI) for a 15-year physical PPA for a newly constructed subsidy-free asset.

In October 2019, twenty universities in the UK have struck a 10-year aggregated PPA to buy energy from Statkraft's onshore wind farms in the country. The deal was facilitated through public buying organisation The Energy Consortium and renewable energy supplier Squeaky Clean Energy which is providing balancing services.

The next 18–24 months

AGGREGATION & SMES

The engagement of SMEs could potentially accelerate the wider adoption of corporate PPAs, which is currently limited to large corporations. The bundling of smaller companies acting as one offtaker could offer a solution to one of the biggest challenges of the corporate PPA sphere: the imbalance between suppliers and offtakers and the limited availability of creditworthy offtakers.

Aggregate PPAs could take multiple forms, depending on the creativity of structuring advisers and the negotiation capacity of the parties. The aggregation could be driven by buyers, by organising consortia themselves, or it can be offered as a service from suppliers.

The Netherlands is the European pioneer in the next form of corporate PPA. In November 2016, the 102MW Windpark Krammer onshore wind farm signed a PPA with the Dutch wind consortium including chemical company AkzoNobel, health and nutrition company DSM, Google and Philips.

Anchor offtakers, which are usually more experienced and creditworthy corporates, allow the inclusion of smaller corporates that are making their maiden move into renewable energy procurement. This solution has multiple benefits including the elimination of the sellers' credit risk and the ability for a smaller party to share in the transaction costs, rather than having to foot the entire bill. In August 2018, tech giant Apple acted as a lead buyer for a 290MW PPA in Chicago, enabling cloud computing company Akamai, online retailer Etsy and re-insurance company Swiss Re to participate in the deal.

At the same time, such innovation often comes at an expense. Bringing multiple parties into the negotiation can often create additional and time-consuming complexities. For example, the creation of the Dutch wind consortium took more than two years of negotiations. Additionally, when it comes to consortia of SMEs, the ability for all parties to assume joint and several liabilities can be a risk for smaller members.

Therefore, the role of deep-pocketed utilities as intermediaries can offer a better solution as they are better equipped to manage the multiple risks. In July 2019, Norway's Statkraft signed a baseload PPA with Spanish utility Audax Renovables for 525GWh annually. Audax is one of the country's largest suppliers of electricity to SMEs and is expected to create long-term pricing products for SMEs.

RENEWABLES-PLUS-STORAGE PPAS

PPAs with storage could also be another solution to buyers looking at baseload output with a low risk profile. In the Americas, the industry has already seen such deals. In June 2019, EDF Renewables North America signed a PPA with local utility NV Energy for its 200MW solar PV plus 75MW five-hour storage system, enabling the plant to deliver its output during peak hours. In the same month, Portuguese IPP EDPR signed a 20-year PPA with California-based utility East Bay Community Energy for its 100MW solar PV plus 30MW storage project.

However, the profitability of such arrangements is dependent on the arbitrage potential, that is the value of time-shifting the output to when it is needed. In other words, the investment in storage should be less than what the buyer would have spent in sleeving fees. Despite technological cost reductions, the model poses profitability challenges. However, as costs come down and long-term storage technology becomes more economically viable, the model is expected to be replicated across Europe in the future.