

PPA Insights

Price and market developments in Europe

Market Analysis Team

KYOS Energy Analytics

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KYOS price assessments (2025-2034)



KYOS baseload and PPA price assessments (EUR/MWh)

Since our last update in February 2024: Our 10-yr baseload power price forecasts for the main European markets increased between 2 €/MWh and 5 €/MWh since the last release, driven by the increase of gas, coal and carbon forward prices. On power demand, the industrial consumption is still below pre-crisis levels and only showing timid signs of recovery. The growth of sales in electric vehicles in the main European economies slowed down so far in 2024.



Western Europe

	Baseload	Solar	Wind onshore
Great Britain	86.7	76.5 (61.2)	75.9 (60.7)
Ireland	75.0	73.0 (58.4)	54.4 (43.5)
Netherlands	76.9	42.0 (32.6)	58.6 (46.9)
Belgium	85.1	53.9 (43.1)	75.6 (60.5)
Germany	75.5	40.1 (32.1)	61.3 (49.0)
France	84.4	59.6 (47.7)	78.8 (63.1)
Switzerland	89.0	66.2 (52.9)	88.9 (71.1)
Austria	80.7	57.0 (45.6)	77.7 (62.2)

In North Western Europe, Germany and the Netherlands are the markets where we expect the lowest capture prices for solar. However, this development hasn't translated into a slow-down of PV additions. In fact, Germany added 7.5 GW of solar in the first half of 2024.

Looking at wind PPA transactions, we note an uptick in deals made in the Irish market, driven by the appetite of data center firms to get renewable electricity. Greencoat Renewables agreed to a 10-year supply deal with Keppel for instance. We estimate the deal price at 43.5 €/MWh.

Note:

The capture prices in brackets include a conservative 20% risk discount, that we believe sellers are willing to give away to secure long-term deals. The resulting price is an equivalent estimation of the P25 price.

Since the start of the year, the market fundamentals in Finland lead to a situation where day-ahead prices regularly settle below 0 €/MWh (361 hours), more often than in DK1 (245 hours) or than in the Netherlands (300 hours) for instance. This is a fairly new market situation that PPA negotiators are now likely to factor into their PPA deal structures.

The Swedish market remains one of the most active for wind PPAs. Recently, Alpiq signed a long-term PPA deal with the aluminium producer Norsk Hydro to supply 60 GWh annually of wind power. Our price estimate of this transaction in the SE3 market zone is 44.30 €/MWh.



Northern Europe

	Baseload	Solar	Wind onshore
Denmark DK1	70.4	42.1 (33.7)	50.1 (40.1)
Denmark DK2	70.7	47.7 (38.2)	47.9 (38.4)
Norway NO1	69.1	54.6 (43.7)	61.8 (49.4)
Norway NO2	63.6	51.0 (40.8)	56.8 (45.5)
Norway NO3	58.1	52.6 (42.1)	43.9 (35.1)
Norway NO4	46.1	47.9 (38.3)	39.2 (31.4)
Norway NO5	69.3	59.3 (47.4)	65.1 (52.0)
Sweden SE1	36.2	35.2 (28.1)	21.8 (17.4)
Sweden SE2	39.8	36.1 (28.9)	27.2 (21.8)
Sweden SE3	65.7	48.9 (39.1)	55.3 (44.3)
Sweden SE4	69.1	47.1 (37.7)	54.4 (43.5)
Finland	51.1	46.9 (37.5)	28.2 (22.5)

KYOS price assessments (2025-2034)

KYOS baseload and PPA price assessments (EUR/MWh)

The Southern Europe PPA market has been very active lately, driven by a lot of developments in Italy, who is expected to add between 8 to 9 GW of renewable energy by the end of 2024. The Fer X auctioning decree is auctioning 40 GW of solar and 16.5 GW of wind capacity at a starting price of 85 €/MWh. Although this is expected to lower the available volumes for PPAs, at the moment the latest reported solar PPA contracts have been signed around 60 €/MWh or lower, in line with our expectations.

Similarly, Spain keeps deploying renewable energy at a fast pace. This, despite the low spot prices seen on the last months and the highly saturated environment for producers which pushes PPA prices under the 40 €/MWh. Also Greece is catching up with its high renewable energy potential, after the record number of connections last year and still many projects in the pipeline for the next two years which could see over 6 GW of renewable energy additions. The example of Mytilineos signing a 210 MW solar PPA in Greece, points to a maturing market in the region.



Southern Europe

	Baseload	Solar	Wind onshore
Portugal	68.0	44.3 (35.5)	58.6 (46.9)
Greece	85.9	57.8 (46.2)	83.3 (66.6)
Spain	66.7	36.7 (29.4)	58.5 (46.8)
Italy (NORD)	96.5	82.5 (66.0)	97.7 (78.2)
Italian (CNOR)	95.5	80.6 (64.5)	97.0 (77.6)
Italy (CSUD)	92.7	71.3 (57.0)	92.0 (73.6)
Italian (SUD)	87.3	57.9 (46.3)	84.4 (67.5)
Italy (CALA)	88.1	61.0 (48.8)	85.4 (68.3)
Italy (SARD)	84.4	49.0 (39.2)	79.9 (63.9)
Italy (SICI)	88.0	61.3 (49.1)	86.1 (68.9)



Central-Eastern Europe

	Baseload	Solar	Wind onshore
Czech Rep.	84.4	54.0 (43.2)	82.1 (65.7)
Slovakia	82.5	55.5 (44.4)	77.7 (62.2)
Hungary	82.5	56.0 (44.8)	78.4 (62.7)
Poland	99.4	72.6 (58.1)	90.2 (72.1)
Romania	73.8	49.6 (39.6)	68.6 (54.9)
Bulgaria	90.3	70.6 (56.5)	90.0 (72.0)
Serbia	67.3	53.3 (42.7)	66.1 (52.9)
Croatia	84.9	62.8 (50.2)	83.4 (66.7)
N. Macedonia	81.6	53.3 (42.7)	81.4 (65.1)

Note 1: The capture prices in brackets include a conservative 20% risk discount, that we believe sellers are willing to give away to secure long-term deals. The resulting price is an equivalent estimation of the P25 price.

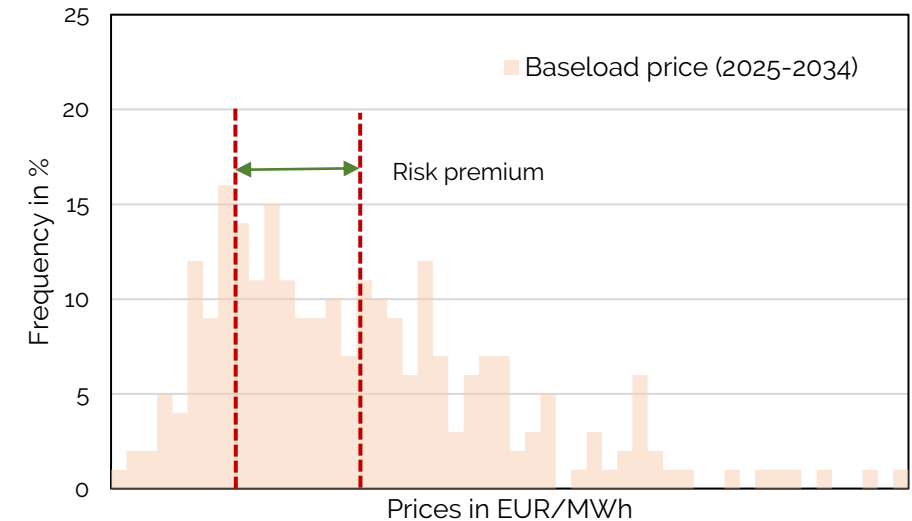
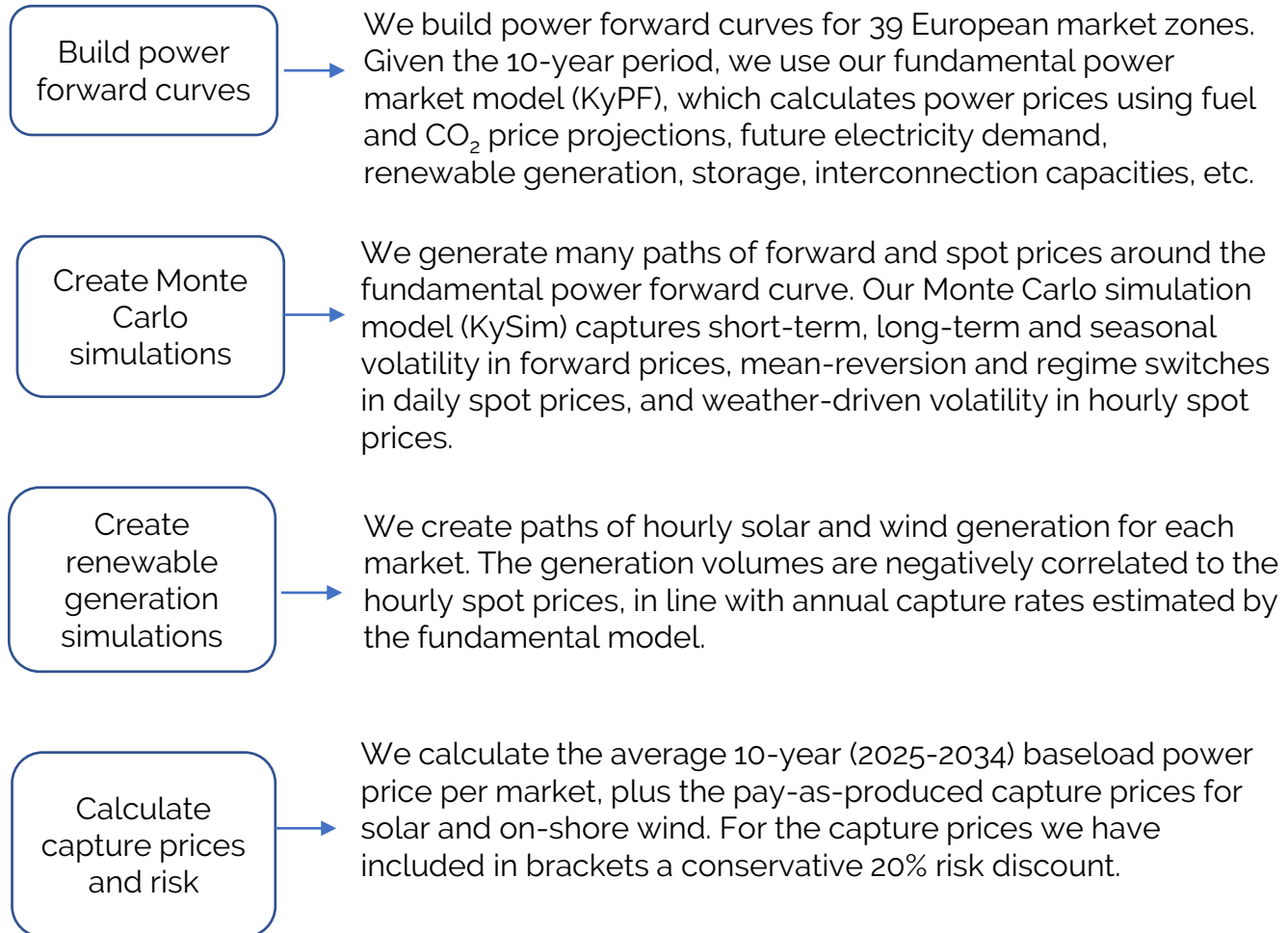
At the end of July 2025 Romania will publish the list of successful applicants of the first auction for renewables CfDs tariffs launched in April this year. This follows up from the EU 3 billion euros budget approval to support Romanian renewable power. It is expected that this mechanism will bring over 5 GW of renewable capacity additions by the end of 2025, and even when the CfD participants are allowed to trade only in the market, the spillover effect will help to mature parallel renewable mechanisms in the region.

On a different avenue, Poland kept relying on PPA contract to increase its renewable capacity, where over one quarter of the total capacity (~30 GW) has been added in the last year. Poland is in line to finish the year with more than 7 TWh of contracted PPAs (~6 GW), almost 2 TWh more than at the beginning of the year, making it one of the most active PPA markets in the region.

KYOS methodology to assess 10-year PPA prices



The diagram below shows the methodology employed by KYOS to assess the development of PPA prices in Europe.



Fixed-price PPAs are often concluded below the long-term capture price forecast. The risk premium is the discount for a fixed-price guarantee on a 10-year PPA. It offers compensation for the buyer to manage fixed-price PPA exposures and costs.

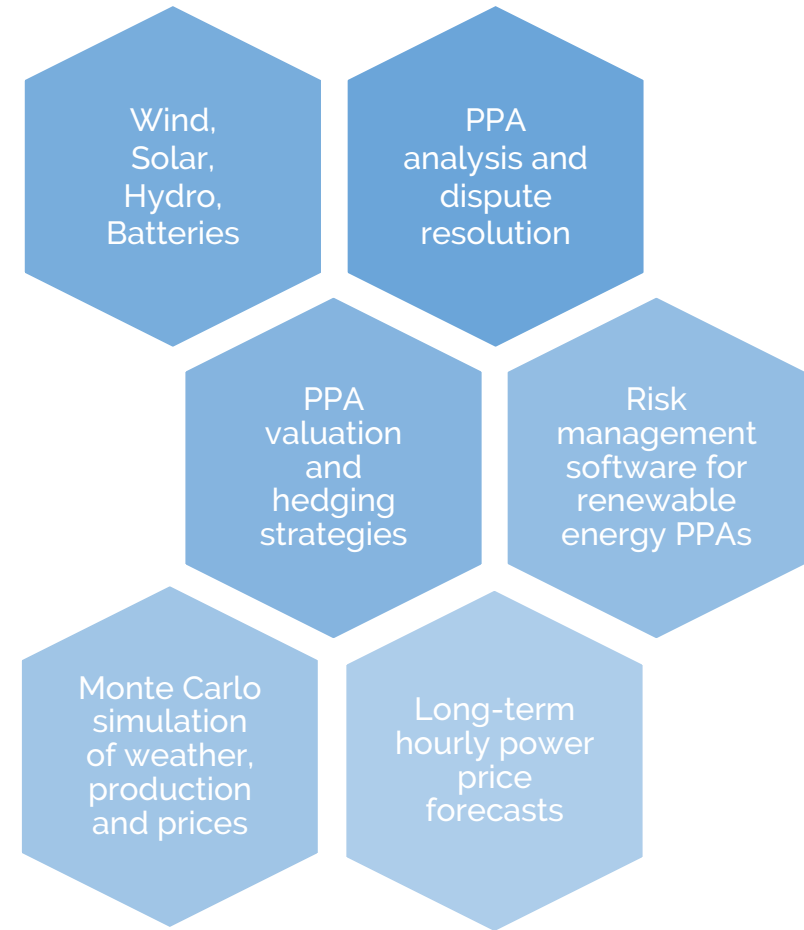
KYOS Analytical Platform



KYOS PPA valuation

PPAs often include complex pricing structures, e.g. price floors, risk sharing elements and specific reconciliation mechanisms. To capture all of this, KYOS offers:

- A fundamental power market model (KyPF) to create long-term electricity price forward curves. This is important given the long duration of many PPAs.
- Software modules to simulate price and volume risks. These are necessary to assess future earnings and hedging strategies.
- The ability to calculate capture rates using historical data, long-term fundamental curves, or user-defined.
- A flexible tool that breaks down PPA valuations into different components (e.g. price risk, cannibalization risk, etc.) With this tool, it is also possible to define own pricing structures.
- The option to evaluate and monitor the risk of one or more PPAs or as part of a larger portfolio, with or without hedging strategies.



KYOS Renewable Risk Management

The KYOS renewable risk management system is part of the KYOS Analytical Platform, a cloud-based software solution. This system provides a complete picture of a renewable power portfolio with PPA contracts and hedges. Reporting includes: volumetric position, mark-to-market value, value-at-risk and earnings-at-risk.

The system also allows users to analyze the effect of applying different hedging strategies to lock-in value of e.g. a specific renewable project. Strategies range from basic static hedges to advanced stack and roll strategies. If the project is in a market with limited liquidity, our system will show the effectiveness of proxy hedging the exposure in other markets, even by using other commodities than electricity.

We offer five different modules/packages to assess renewable power portfolios:

KYOS PPA Modules



Advanced	Module D: Single project / PPA valuation Monte Carlo simulations	Module E: Portfolio management Monte Carlo simulations
	PFC builder KyCurve or KyPF	PFC builder KyCurve or KyPF
	Price data services – market prices	Price data services – market prices
Intermediate	Module B: Forward curves builder KyCurve Market curves	Module C: Forward curves builder KyPF Fundamental power curves
	Price data services – market prices	Price data services – market prices
Basic	Module A: Price data services – market prices	

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