

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 August 2024: Forward electricity prices increased in most European markets on the back of higher fuel and carbon prices. This has translated into higher solar PPA prices. However, the evaluation of PPA prices for wind has decreased by 2.5 percentage points on average compared to our previous report, driven by an improvement in the fundamental modeling of wind power. It now relies on meteorological datasets compared to historical production.



Western Europe

	Baseload	Solar	Wind onshore
Great Britain	79.2	74.7 (59.8)	62.6 (50.1)
Ireland	70.1	71.0 (56.8)	47.6 (38.1)
Netherlands	78.8	46.5 (37.2)	57.2 (45.8)
Belgium	83.8	59.7 (47.8)	70.0 (56.0)
Germany	76.7	43.7 (35.0)	58.2 (46.6)
France	78.8	60.7 (48.6)	72.4 (57.9)
Switzerland	91.6	76.1 (60.9)	91.2 (73.0)
Austria	87.3	69.8 (55.8)	84.0 (67.2)

Europe is on track for record PPAs volumes in 2024, with 11 GW signed so far, just above the whole 2023 volumes.

Germany remains the market where the solar cannibalization effect is the largest as the country is close to reach 100 GW of installed capacity. On the contrary, solar assets in the UK capture a much higher share of the baseload price. To demonstrate its sustainability commitment, the giant retailer Tesco agreed to the UK's largest PPA deal for power supplied from a 373 MW solar plant and a 150 MW battery project. KYOS estimates the baseload solar PPA price at 59.80 EUR/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.

In the Nordics, spot and forward prices declined in the past few months and are currently trading at the lowest levels since 2021. This makes it harder for renewable producers to find PPA buyers as procurement on the forward market is so cheap.

Nevertheless, the interest from corporates to secure long-term prices is there and is illustrated by transactions that have been recently recorded: The packaging company Faerch signed a deal for 38 GWh/yr of solar power to cover their operational need in Finland for the next 10 years. KYOS estimates this price deal at 43 EUR/MWh. In Denmark, it is the financing of a 14 MW solar plant that was supported by a PPA transaction between the retailer Reel Energy and a group of private companies.



Northern Europe

	Baseload	Solar	Wind onshore
Denmark DK1	71.1	50.9 (40.7)	48.9 (39.1)
Denmark DK2	69.5	51.7 (41.3)	44.1 (35.2)
Norway NO1	73.1	63.5 (50.8)	63.8 (51.1)
Norway NO2	66.2	59.9 (48.0)	55.0 (44.0)
Norway NO3	59.5	55.2 (44.2)	46.9 (37.5)
Norway NO4	48.8	48.4 (38.8)	39.1 (31.3)
Norway NO5	61.0	57.3 (45.8)	51.9 (41.5)
Sweden SE1	39.0	37.9 (30.3)	25.8 (20.7)
Sweden SE2	43.1	40.2 (32.1)	31.4 (25.1)
Sweden SE3	69.6	56.2 (45.0)	55.0 (44.0)
Sweden SE4	72.2	54.8 (43.9)	52.0 (41.6)
Finland	58.6	53.7 (43.0)	34.3 (27.4)

KYOS price assessments (2025-2034)

KYOS baseload and PPA price assessments (EUR/MWh)

Spain is well positioned to remain one of the market leader for PPAs as its abundant, cheap and clean electricity supply is attracting new demand from hydrogen projects and data centers, underlined by Amazon's announcement earlier this year of massive investments its Spain's cloud infrastructure. Since our last report, market prices recovered and the PPA market environment improved compared to the first half of the year, when spot price averaged 39.19 EUR/MWh in H1-2024 and where large energy users could benefit from many near-zero prices in the spot. This discouraged consumers to contract long-term PPAs and sellers struggled to make competitive offers.

On the Italian market, the utility A2A recently announced the offtake of electricity from a 25 MW wind farm in the Liguria region from the Fera group, which KYOS assesses at 78.30 EUR/MWh. The timing of the renewable auctions via the long-awaited FER-X scheme has not been revealed yet and large energy consumers still avoid contracting long-term PPAs as these corporates expect prices to drop then.



Southern Europe

	Baseload	Solar	Wind onshore
Portugal	67.7	48.2 (38.6)	54.2 (43.3)
Greece	86.3	62.1 (49.7)	79.4 (63.5)
Spain	67.2	41.2 (33.0)	53.2 (42.5)
Italy (NORD)	96.5	85.5 (68.4)	97.9 (78.3)
Italian (CNOR)	95.9	84.0 (67.2)	96.4 (77.1)
Italy (CSUD)	90.9	70.4 (56.3)	89.2 (71.3)
Italian (SUD)	83.9	55.8 (44.7)	75.2 (60.2)
Italy (CALA)	85.2	59.3 (47.5)	79.5 (63.6)
Italy (SARD)	83.5	50.1 (40.1)	75.3 (60.3)
Italy (SICI)	85.2	59.4 (47.5)	78.4 (62.7)



Central-Eastern Europe

	Baseload	Solar	Wind onshore
Czech Rep.	89.3	70.8 (56.6)	84.8 (67.8)
Slovakia	86.9	71.0 (56.8)	82.2 (65.8)
Hungary	87.0	71.5 (57.2)	83.7 (67.0)
Poland	100.9	83.4 (66.8)	90.4 (72.3)
Romania	82.6	68.4 (54.7)	78.2 (62.5)
Bulgaria	99.0	89.0 (71.2)	99.0 (79.2)
Serbia	74.2	67.1 (53.7)	72.0 (57.6)
Croatia	88.0	74.6 (59.7)	85.9 (68.7)
N. Macedonia	86.6	68.2 (54.6)	84.9 (67.9)

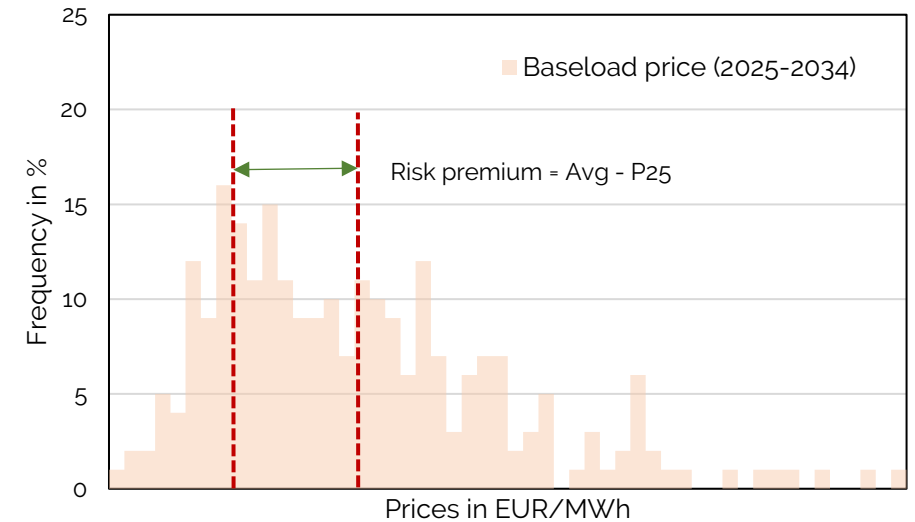
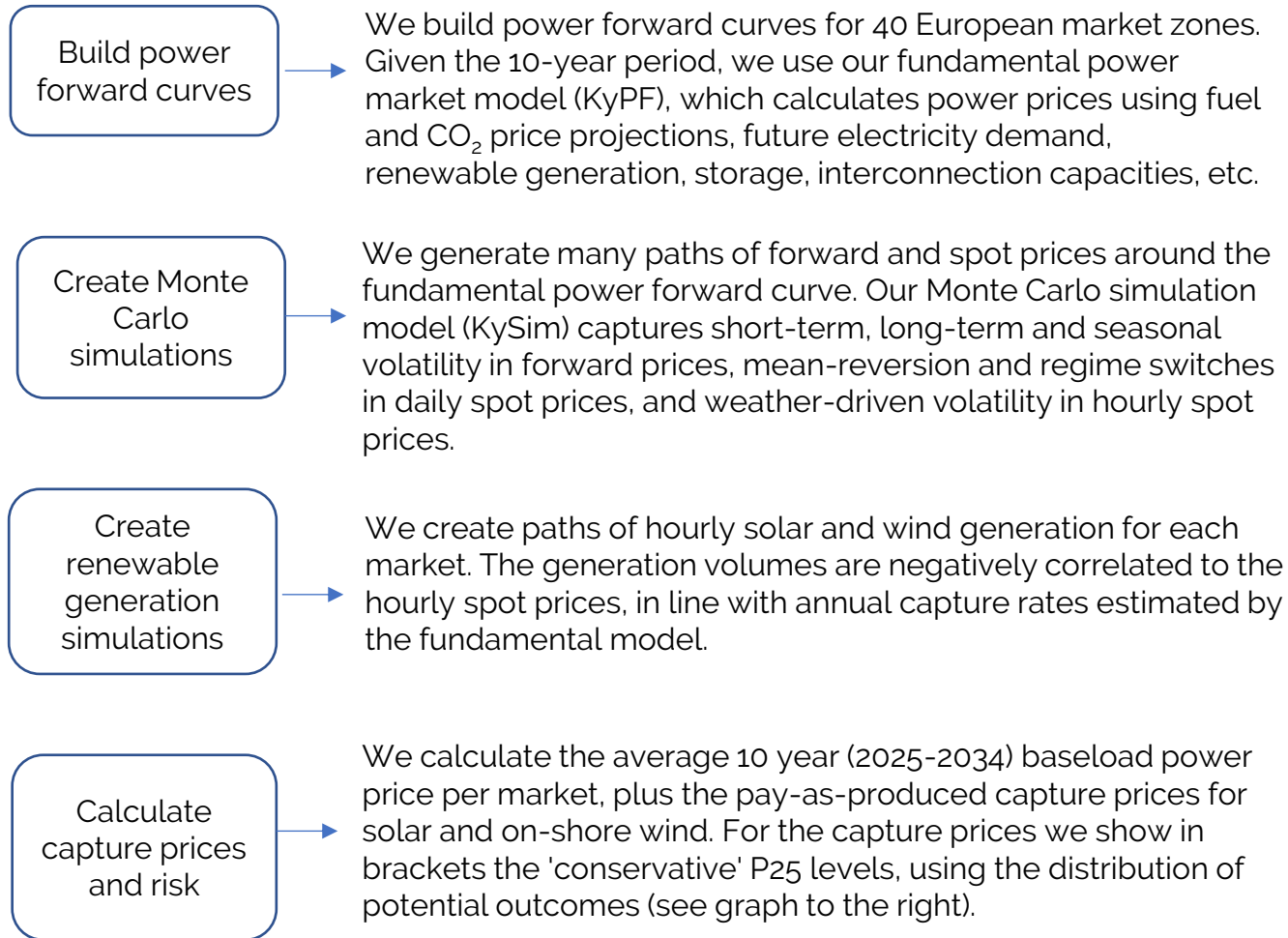
Note: The capture prices in brackets include a conservative 20% risk discount, that we believe sellers are willing to give away to secure long-term deals. The resulting price is an equivalent estimation of the P25 price.

In Central-Eastern European markets, Poland remains one of the most active market for PPAs, where such contracts do not only facilitate the financing of new solar and wind projects, but also enable to efficiently market existing renewable assets. This has recently been underlined with Axpo agreeing to the offtake of electricity from RWE's whole wind and solar fleet in Poland, with a total installed capacity of 628 MW.

Activities in Bulgaria has been growing fast where about 1.5 GW of solar additions are expected in 2024 to reach an installed capacity of 4.5 GW. The recent PPA deal between Eney and 3 corporates offtakers of the 113 MW Tsenovo solar plant contributed to this effort. KYOS estimates the price transaction at 71.20 EUR/MWh.

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. The actual risk premium varies per market, technology, counterpart and PPA structure. In this report, we estimate it at the P25 (lower) level of the distribution of capture prices. We use this estimate across all markets.

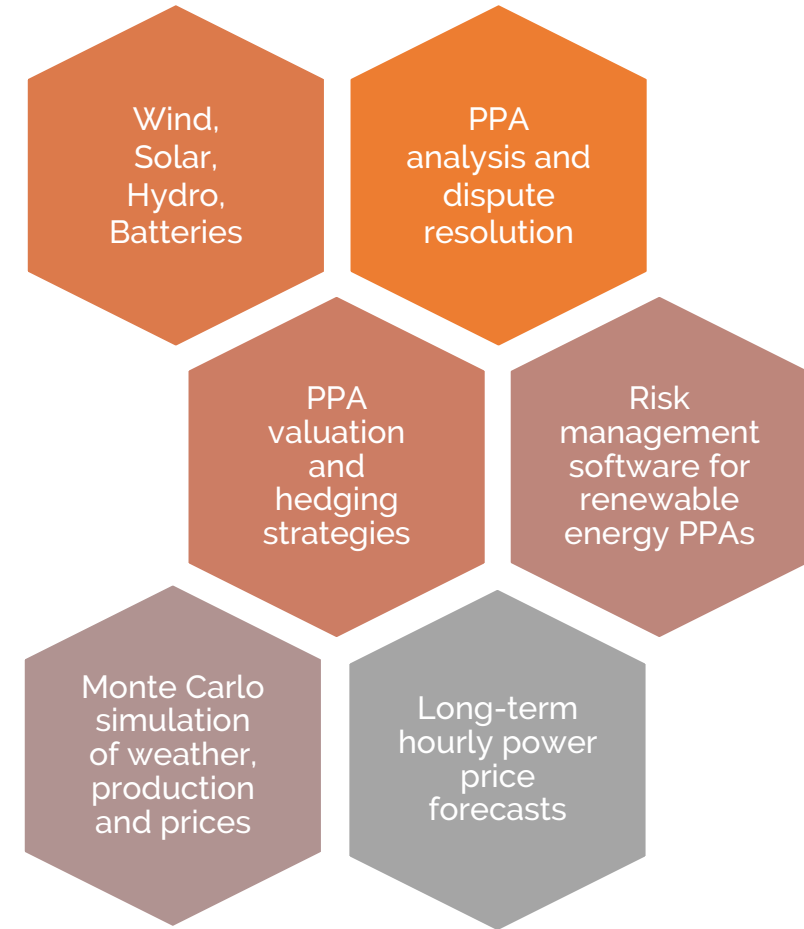
KYOS Analytical Platform



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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