

# 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 September 2023:** Our 10-year price forecasts are now based on the period 2025-2034. Our 10-yr baseload power price forecasts for European markets decreased by 33 EUR/MWh on average (30%) driven by a mild winter and lower EUA carbon and gas prices. In fact, after the energy crisis a lot of premiums vanished from the market. Strong nuclear production in France and large hydro stocks in the Alps also contributed to the bearish trend. Consequently, our PPA price assessments fell a comparable 36% and 32% for solar and wind onshore respectively.



### Western Europe

	Baseload	Solar	Wind onshore
Great Britain	85.0	80.0 (64.0)	74.4 (59.6)
Ireland	68.3	68.2 (54.6)	50.9 (40.7)
Netherlands	74.2	52.8 (42.2)	61.3 (49.0)
Belgium	79.7	60.3 (48.2)	70.3 (56.2)
Germany	74.3	56.6 (45.3)	62.8 (50.2)
France	78.9	59.9 (47.9)	72.7 (58.2)
Switzerland	90.2	74.6 (59.7)	90.7 (72.6)
Austria	84.7	65.2 (52.2)	82.6 (66.1)

In the French market, retail groups like Auchan and les Mousquetaires signed long-term deals in the past months with onshore wind farms. February started strong with a 478 MW PPA signed between Google and Dutch wind farms (Shell and Eneco). Also early this month EDF-UK and Ib Vogt signed a 116 MW PPA for a portfolio consisting of a 50 MW battery and a 66 MW solar farm in the south of England evidencing a trend of hybrid contracts with co-located batteries.

Most Nordic PPA transactions have been concluded in Finland and Sweden in the past months. Surprisingly, solar PPAs dominated the market in southern Sweden, highlighted by the agreement between Svea Solar to supply the Arla dairy firm with solar power for 10 years.

On the other hand, some wind farm operators in Sweden have been in extreme financial difficulties recently, close to bankruptcy and seeking to get out of long-term PPAs. In fact, suppliers didn't manage to deliver the agreed volumes to customers such as Norsk Hydro and the mining company Boliden and had to buy the electricity back from the market.



### Northern Europe

	Baseload	Solar	Wind onshore
Denmark DK1	73.6	57.0 (45.6)	60.2 (48.1)
Denmark DK2	69.1	52.6 (42.1)	53.2 (42.6)
Norway NO1	69.9	51.5 (41.2)	66.5 (53.2)
Norway NO2	65.3	49.2 (39.4)	63.2 (50.6)
Norway NO3	51.5	41.9 (33.5)	44.4 (35.5)
Norway NO4	39.1	36.3 (29.0)	37.8 (30.2)
Norway NO5	69.1	54.8 (43.8)	68.0 (54.4)
Sweden SE1	36.5	36.4 (29.1)	28.7 (23.0)
Sweden SE2	38.4	36.1 (28.9)	31.7 (25.3)
Sweden SE3	69.0	52.5 (37.2)	57.2 (45.7)
Sweden SE4	69.7	50.2 (36.2)	56.2 (44.9)
Finland	47.7	43.4 (34.7)	33.0 (26.4)

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Despite the growth in German PPA contracts, Spain remains the country with the largest amount of contracted solar capacity via PPAs. Deals in the pipeline could deliver over 1 GW of contracts during the first quarter of this year. However, this market saturation seems to have lowered the amount of available projects, which could see a slow down of contracts later in the year.

Italy, has a lot of solar potential, however, a mixture between poor processing of permits, and high hedging zonal risks has slowed the development of solar projects in the country. Nevertheless, this didn't stop Edison to sign a 5-year PPA contract for 20 MW of wind onshore with Fera Group in Savona at the end of 2023.



### Southern Europe

	Baseload	Solar	Wind onshore
Portugal	74.5	55.9 (44.7)	66.8 (53.5)
Greece	89.6	71.3 (57.0)	89.3 (71.4)
Spain	72.3	46.9 (37.5)	65.1 (52.1)
Italy (NORD)	93.5	81.3 (65.0)	94.8 (75.8)
Italian (CNOR)	93.7	82.3 (65.8)	94.8 (75.9)
Italy (CSUD)	91.6	77.5 (62.0)	91.6 (73.3)
Italian (SUD)	85.7	63.9 (51.1)	84.6 (67.7)
Italy (CALA)	86.2	65.7 (52.5)	85.0 (68.0)
Italy (SARD)	84.6	58.8 (47.0)	82.6 (66.1)
Italy (SICI)	85.8	65.6 (52.5)	85.6 (68.5)



### Central-Eastern Europe

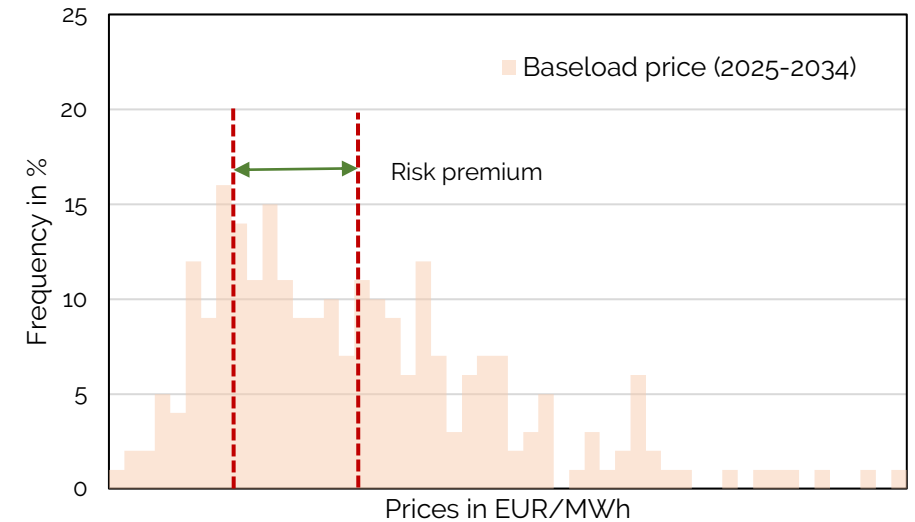
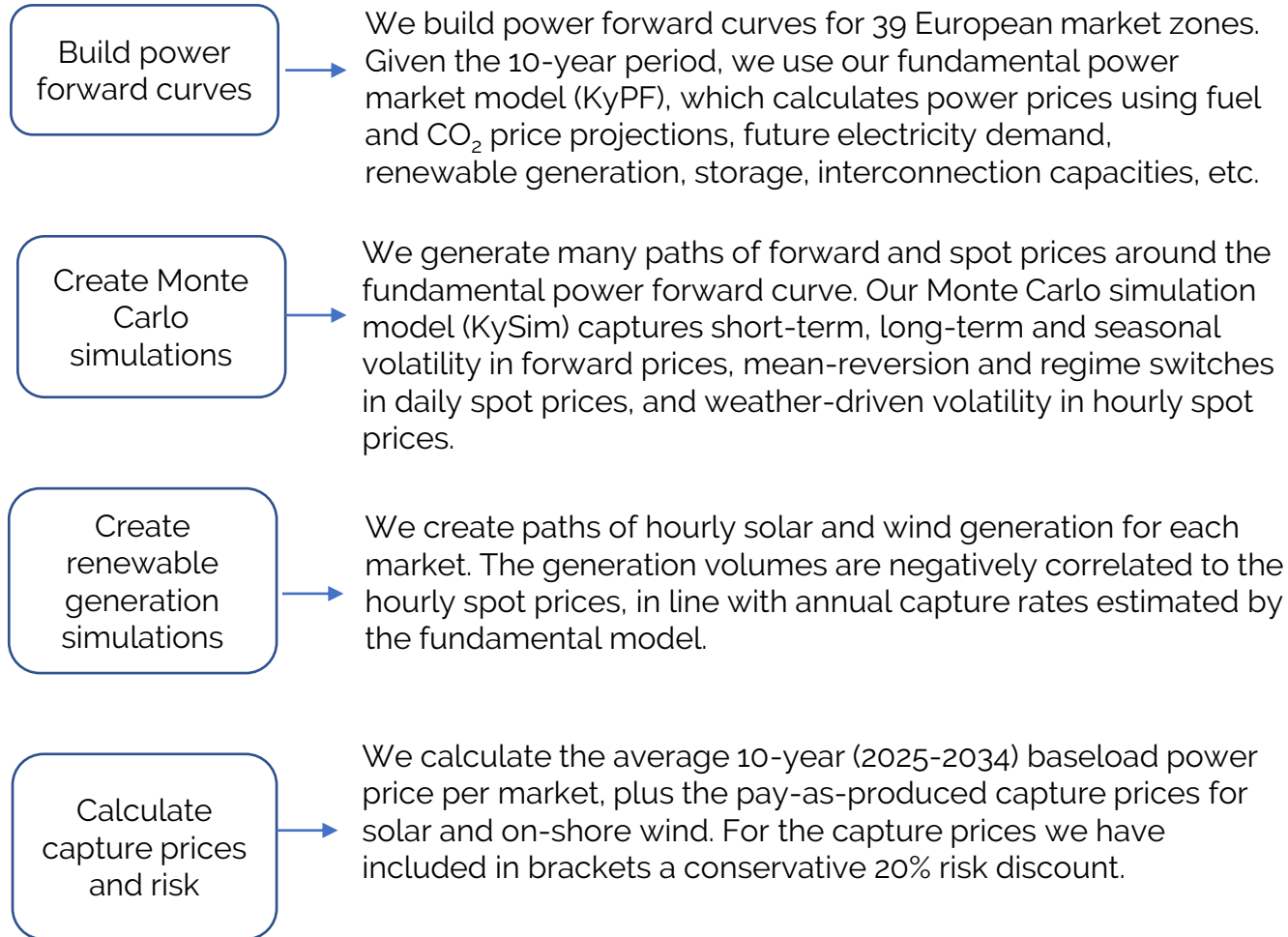
	Baseload	Solar	Wind onshore
Czech Rep.	86.1	64.8 (51.8)	85.1 (68.1)
Slovakia	85.3	66.4 (53.2)	83.1 (66.5)
Hungary	85.5	66.1 (52.9)	82.7 (66.2)
Poland	86.2	67.4 (53.9)	83.4 (66.7)
Romania	88.9	73.5 (58.8)	85.7 (68.6)
Bulgaria	93.2	77.4 (62.0)	94.2 (75.4)
Serbia	83.9	70.8 (56.7)	82.8 (66.3)
Croatia	90.9	71.7 (57.3)	86.4 (69.1)
N. Macedonia	89.8	72.3 (57.8)	90.4 (72.3)

In Central Europe, Poland is the undisputed leader in PPA contracts of the region, with over 63 deals since 2018 for a total of over 4 GW of renewable capacity. Just in the last month Golden Peaks Capital and Boryszew agreed on a 10-year PPA to supply 24 GWh/year of solar energy. Similarly, at the beginning of February, Polenergia and Orange telecom signed a two-year PPA for 28 MW of wind capacity from their Krzecin and Puck farms.

Romania is another country that has seen a lot of activity on the last months. Orange Romania, signed a virtual cross-border PPA with Enerly (in Austria) for 70 GWh per year. In Prundu Bârgăului, Romania, a 25-years PPA for 7.4 MW of solar was signed in November between RAAL and nextE after a year of negotiations.

# 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.

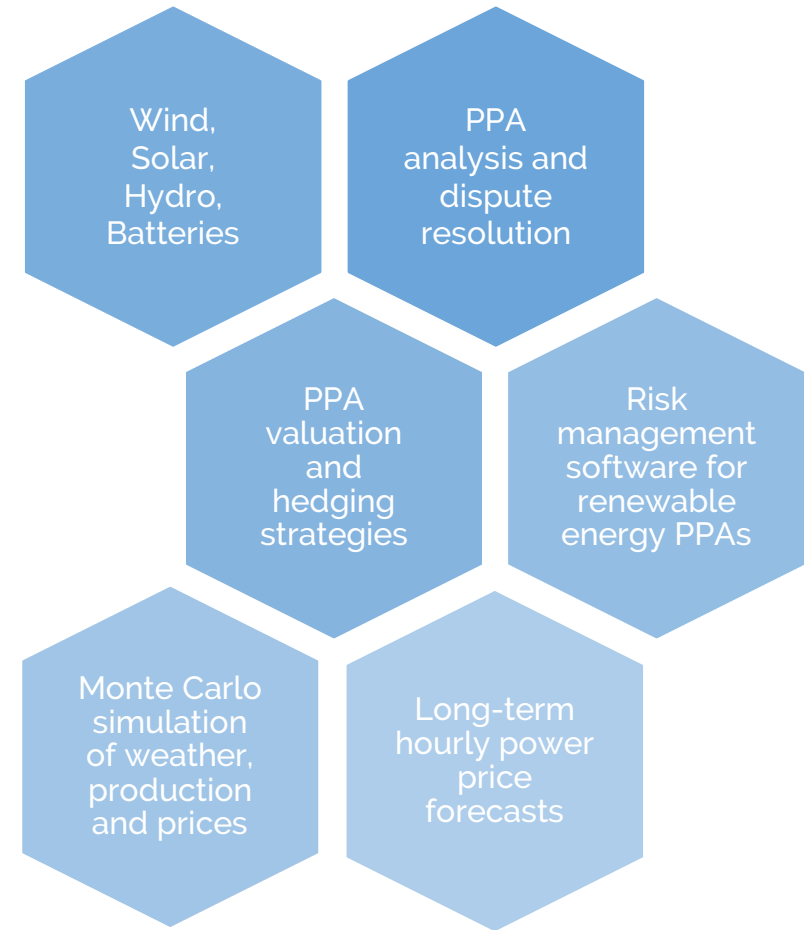
# KYOS Analytical Platform



# 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	<b>Module D:</b> Single project / PPA valuation Monte Carlo simulations	<b>Module E:</b> 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	<b>Module B:</b> Forward curves builder KyCurve Market curves	<b>Module C:</b> Forward curves builder KyPF Fundamental power curves
	Price data services – market prices	Price data services – market prices
Basic	<b>Module A:</b> Price data services – market prices	



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