



EnAppSys
- part of **MONTEL GROUP**

European Electricity Market Summary

Q4-2023

October to December

Generation and Contribution by Fuel Type

Renewables: 351.6TWh

Fossil Fuels: 203.8TWh

Nuclear: 166.5TWh

1 Quarterly Review of European Electricity Market Q4 2023

This report follows from the EnAppSys European Electricity Market Summary for Full Year 2023 published on 10th January 2024 which can be found here:

[EnAppSys Annual Electricity Market Summary Reports](#)

The contents of this report focusses on the fourth quarter of 2023 and as such it covers much of the same content as the annual report above. Therefore this report is to be viewed in conjunction with the annual report.

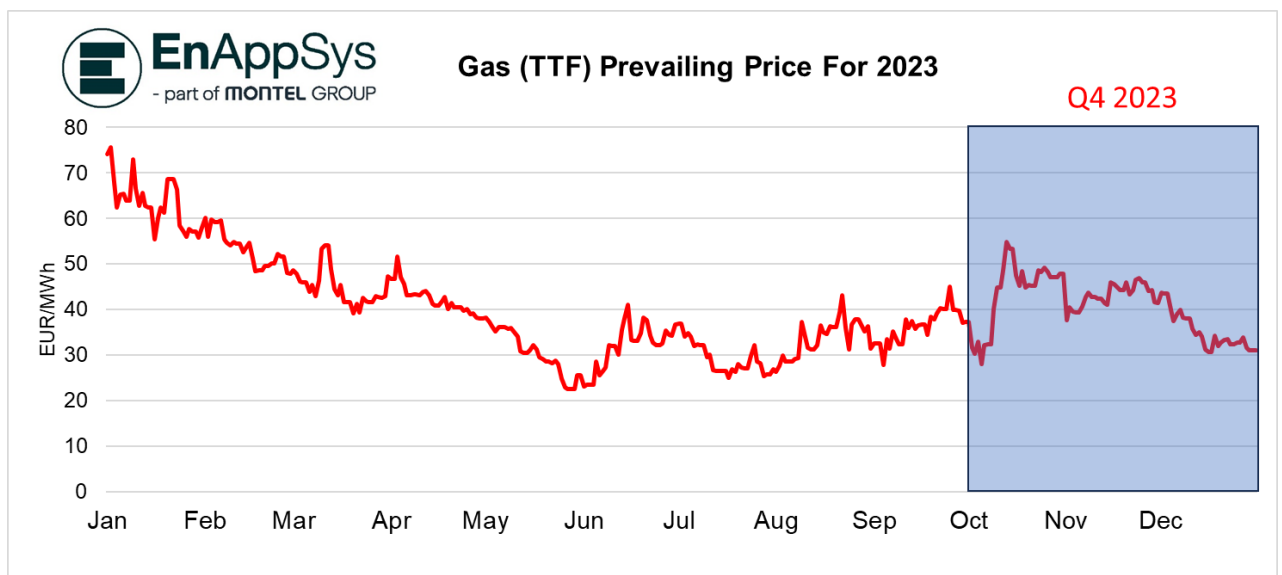
A summary of the key points of the quarter is given below:

- **Significant drop in fossil fuel output:** In Q4 2023, fossil fuel generation dropped to be lower than any recent Q4, being 23% lower than in Q4 2022 and 30% lower than in Q4 2021. Italy and France saw the largest declines in fossil fuel output, with total fossil fuel generation declining by ~11.2TWh in Italy and ~7.0TWh in France compared to in Q4 2022.
- **Record high renewable outturn:** Renewables outturn was higher than in any quarter on record at ~352TWh, breaking the previous record of ~334TWh in Q1 2023. Germany had a substantial contribution to this, with average German wind output increasing by ~6.5GW, to be 41% higher than the average for Q4 2022. In France and Italy, total hydro output, aggregated across run-of-river and reservoir sources, increased by ~3.0TWh and ~2.9TWh, respectively.
- **Demand destruction continues:** Not only was renewable generation higher than any previous quarter, but demand also decreased by ~11.8TWh compared to Q4 2022. The ongoing demand destruction pattern seen since the pandemic and the energy crisis of 2022 has persisted into this quarter, with total demand being ~67.4TWh lower than in Q4 2021. Aside from a cold snap around the start of December, this quarter has seen much milder weather than most historical Q4 periods, and the reduced heating load, as well as lower industrial demand, have resulted in demand dropping to levels below historic averages.
- **Gas prices rise on Q3, but remain lower than 2022:** With demand for fossil fuel generation being so much lower than in recent years, and regasification capacity being boosted across Europe to allow for greater volumes of LNG from overseas to replace Russian imports, gas prices this quarter were less than half of the value in Q4 2022 on average with a mean price of ~€41/MWh being seen in the TTF trading hub. However, this price represents an increase

from the ~€33/MWh average in Q3 2023. The primary driver for this was the outbreak of the Israel-Hamas war in October, which prompted a sharp rise in gas prices from ~€30/MWh to over €50/MWh in under two weeks. While this caused some concern in the market, with LNG imports via the Suez Canal potentially being at risk, the overall impact on gas prices was limited and by November prices were trending downward again. The cold spell in December provided some bullish signals to the market, but these proved only transient and by the end of the year prices were ~€30/MWh again.

- Coal-to-gas fuel switching:** A consequence of the lower gas prices compared to 2022 was the coal-to-gas fuel switching phenomena which was observed across the year and continued into Q4. Due to declining gas prices, the short-run marginal cost of gas generators dropped to be beneath that of coal units, meaning that gas-fired assets were more often dispatched ahead of coal-fired ones. This was most evidently seen in Germany where total coal generation decreased by 38% compared to the total in Q4 2022, while gas output increased by 60%.

Figure 1: TTF gas prices across 2023 (EUR/MWh)



2 Day-Ahead Price Trends

Table 1 below shows key statistics on pricing in the quarter and all previous quarters since 2015. The EPEX day-ahead prices shown are averages across the quarter.

Table 1: EPEX day-ahead quarterly average prices (EUR/MWh)

	BE	DE	DK (Ave)	ES	FR	GB	IT (Ave)	NL	NO 1-2-5	NO 3-4	SE 3-4	SE 1-2
Q1 2015	47.0	33.0	28.1	45.9	45.2	39.6	51.9	43.2	27.3	28.0	27.7	27.7
Q2 2015	41.4	28.3	23.0	48.4	32.6	42.0	47.6	39.1	20.0	20.9	20.8	20.8
Q3 2015	45.8	32.8	19.9	55.7	35.8	41.4	56.6	40.2	11.0	13.8	14.7	14.7
Q4 2015	44.8	33.2	23.8	51.2	40.6	37.6	52.5	37.9	21.2	20.8	21.6	21.6
Q1 2016	28.4	25.2	22.9	30.7	28.8	34.7	39.3	27.7	22.7	22.9	23.1	23.1
Q2 2016	27.1	24.8	25.7	29.5	25.9	35.1	36.3	28.4	22.8	24.1	26.4	26.4
Q3 2016	32.6	28.3	28.9	41.7	32.3	39.6	42.1	31.4	22.4	27.3	29.5	29.5
Q4 2016	58.1	37.6	34.6	56.5	59.8	52.4	53.1	41.4	33.7	33.1	36.7	36.7
Q1 2017	51.7	41.3	31.0	55.6	55.0	48.0	55.3	42.8	31.0	28.7	31.7	31.7
Q2 2017	35.7	29.8	28.7	47.0	33.9	40.0	46.4	34.6	27.1	26.2	28.5	28.5
Q3 2017	34.2	32.7	33.8	48.4	34.5	43.0	52.1	35.4	27.6	25.6	33.0	33.0
Q4 2017	56.8	33.0	30.6	58.0	56.5	50.2	61.0	44.5	29.9	30.0	30.2	30.2
Q1 2018	44.9	35.5	36.8	48.1	43.8	52.7	54.2	45.1	37.8	38.3	38.9	38.9
Q2 2018	44.1	36.0	39.7	52.0	36.8	52.7	55.0	46.1	38.7	39.7	38.5	38.5
Q3 2018	60.7	53.5	53.2	65.8	57.2	61.3	70.3	58.1	49.7	50.2	51.8	51.8
Q4 2018	71.1	52.6	50.4	63.0	62.7	63.0	68.3	60.6	46.8	47.1	47.4	47.4
Q1 2019	48.6	40.9	43.0	55.0	47.2	51.8	59.3	48.6	48.0	46.1	46.0	46.0
Q2 2019	34.5	35.8	36.9	48.7	34.9	41.3	52.3	39.1	37.0	35.3	33.0	33.0
Q3 2019	35.0	37.4	38.0	46.2	35.5	38.5	52.9	37.9	33.2	34.7	35.3	35.3
Q4 2019	39.4	36.6	38.9	41.0	40.3	40.1	48.5	39.3	39.0	37.7	37.5	37.5
Q1 2020	30.1	26.6	21.2	34.9	29.4	32.7	40.4	30.5	15.1	15.4	15.6	15.6
Q2 2020	18.5	20.3	20.5	23.2	18.0	24.3	25.2	20.9	4.5	5.6	8.2	8.2
Q3 2020	36.5	36.1	33.9	37.5	39.0	36.4	43.9	35.3	4.8	5.7	18.6	18.6
Q4 2020	42.3	38.8	31.0	40.1	42.2	47.5	49.5	42.1	12.6	10.0	15.1	15.1
Q1 2021	51.0	49.6	49.1	45.2	53.0	72.5	58.8	50.6	46.8	35.5	37.5	37.5
Q2 2021	62.3	60.3	58.7	71.8	63.9	83.8	77.2	62.1	47.2	30.0	33.1	33.1
Q3 2021	97.3	97.1	96.0	117.8	96.6	150.3	126.2	101.5	77.8	45.1	54.8	54.8
Q4 2021	204.3	178.9	147.1	211.0	221.4	241.9	237.4	196.0	126.4	41.5	44.5	44.5
Q1 2022	208.0	184.6	152.6	229.4	232.2	240.2	246.0	207.5	151.4	20.1	24.8	24.8
Q2 2022	193.9	187.0	179.6	182.8	226.0	183.4	247.0	195.5	167.1	18.6	51.7	51.7
Q3 2022	372.3	375.8	347.9	146.3	429.7	344.9	461.6	365.4	309.7	22.4	49.0	49.0
Q4 2022	202.6	192.8	176.5	113.2	214.1	197.3	236.3	198.0	164.8	71.3	115.6	115.6
Q1 2023	127.4	115.8	103.1	96.4	130.4	144.5	152.9	121.4	107.8	47.4	53.4	53.4
Q2 2023	92.8	92.3	83.8	80.3	91.6	101.9	114.8	89.4	77.9	29.9	42.3	42.3
Q3 2023	87.1	90.8	78.7	96.5	85.7	90.8	113.2	87.1	30.8	16.1	20.5	20.5
Q4 2023	82.3	82.2	71.0	75.4	80.5	95.0	123.4	85.9	69.0	43.8	44.0	44.0

3 Generation Activity Overview

Table 2: Quarterly generation summary

	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023
TOTAL GENERATION BY FUEL (TWh)									
Biomass	25.5	23.9	21.3	22.9	23.5	23.9	19.0	19.4	22.1
Coal/Lignite	132.6	126.2	101.5	118.5	124.7	113.2	71.9	76.1	93.9
Gas	153.1	148.8	122.7	143.0	137.6	124.0	98.9	111.1	106.5
Hydro	110.5	109.3	107.3	91.4	103.4	118.7	115.6	103.6	126.2
Nuclear	194.5	190.7	149.5	146.0	158.8	172.5	143.7	151.1	166.5
Oil	3.6	3.2	1.9	2.2	2.7	3.7	2.2	2.1	2.5
Peat	1.4	1.5	1.1	0.5	0.9	1.1	0.4	0.2	0.8
Solar	19.9	29.5	63.9	63.3	23.3	31.4	74.7	76.0	28.2
Waste	4.2	4.2	3.8	3.8	3.8	3.7	3.9	4.4	4.2
Wind	135.4	153.6	97.9	84.0	137.2	161.2	98.5	96.7	170.8
FOSSIL FUELS	290.6	279.8	227.2	264.1	265.9	241.9	173.4	189.5	203.8
NUCLEAR	194.5	190.7	149.5	146.0	158.8	172.5	143.7	151.1	166.5
RENEWABLE (INCLUDES WASTE)	295.5	320.5	294.2	265.3	291.2	338.9	311.7	300.2	351.6
TOTAL	780.7	791.0	670.9	675.5	715.9	753.3	628.8	640.9	721.9
PERCENTAGE									
Fossil Fuel Percentage	37%	35%	34%	39%	37%	32%	28%	30%	28%
Clean Percentage	63%	65%	66%	61%	63%	68%	72%	70%	72%
Renewable Share of Clean Power	60%	63%	66%	65%	65%	66%	68%	67%	68%
SHARE OF GENERATION (%)									
Biomass	3.3%	3.0%	3.2%	3.4%	3.3%	3.2%	3.0%	3.0%	3.1%
Coal/Lignite	17.0%	16.0%	15.1%	17.5%	17.4%	15.0%	11.4%	11.9%	13.0%
Gas	19.6%	18.8%	18.3%	21.2%	19.2%	16.5%	15.7%	17.3%	14.7%
Hydro	14.2%	13.8%	16.0%	13.5%	14.4%	15.8%	18.4%	16.2%	17.5%
Nuclear	24.9%	24.1%	22.3%	21.6%	22.2%	22.9%	22.9%	23.6%	23.1%
Oil	0.5%	0.4%	0.3%	0.3%	0.4%	0.5%	0.4%	0.3%	0.4%
Peat	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%
Solar	2.5%	3.7%	9.5%	9.4%	3.3%	4.2%	11.9%	11.9%	3.9%
Waste	0.5%	0.5%	0.6%	0.6%	0.5%	0.5%	0.6%	0.7%	0.6%
Wind	17.3%	19.4%	14.6%	12.4%	19.2%	21.4%	15.7%	15.1%	23.7%
FOSSIL FUELS	37.1%	35.2%	33.7%	39.0%	37.0%	32.0%	27.5%	29.5%	28.1%
NUCLEAR	24.9%	24.1%	22.3%	21.6%	22.2%	22.9%	22.9%	23.6%	23.1%
RENEWABLE (INCLUDES WASTE)	37.9%	40.5%	43.9%	39.3%	40.7%	45.0%	49.6%	46.8%	48.7%

Table 3: Year-on-year comparison of Q4 generation (TWh and %)

	Q4 2018	Q4 2019	Q4 2020	Q4 2021	Q4 2022	Q4 2023
TOTAL GENERATION BY FUEL (TWh)						
Biomass	24.5	25.4	25.4	25.5	23.5	22.1
Coal/Lignite	160.7	121.6	115.8	132.6	124.7	93.9
Gas	135.6	152.7	146.5	153.1	137.6	106.5
Hydro	109.8	122.7	128.6	110.5	103.4	126.2
Nuclear	205.3	203.6	195.5	194.5	158.8	166.5
Oil	3.0	3.4	3.1	3.6	2.7	2.5
Peat	1.9	1.8	1.3	1.4	0.9	0.8
Solar	13.9	14.3	16.4	19.9	23.3	28.2
Waste	4.1	4.1	3.9	4.2	3.8	4.2
Wind	107.3	120.5	128.3	135.4	137.2	170.8
FOSSIL FUELS	301.1	279.5	266.7	290.6	265.9	203.8
NUCLEAR	205.3	203.6	195.5	194.5	158.8	166.5
RENEWABLE (INCLUDES WASTE)	259.8	287.0	302.6	295.5	291.2	351.6
TOTAL	766.2	770.1	764.9	780.7	715.9	721.9
Fossil Fuel Percentage	39%	36%	35%	37%	37%	28%
Clean Percentage	61%	64%	65%	63%	63%	72%
Renewable Share of Clean Power	56%	59%	61%	60%	65%	68%
CHANGE SINCE Q4 2018 (%)						
Biomass		4%	4%	4%	-4%	-10%
Coal/Lignite		-24%	-28%	-17%	-22%	-42%
Gas		13%	8%	13%	1%	-21%
Hydro		12%	17%	1%	-6%	15%
Nuclear		-1%	-5%	-5%	-23%	-19%
Oil		14%	5%	21%	-10%	-15%
Peat		-6%	-33%	-28%	-50%	-56%
Solar		3%	17%	42%	67%	103%
Waste		-1%	-6%	2%	-8%	2%
Wind		12%	20%	26%	28%	59%
FOSSIL FUELS		-7%	-11%	-3%	-12%	-32%
NUCLEAR		-1%	-5%	-5%	-23%	-19%
RENEWABLE (INCLUDES WASTE)		10%	16%	14%	12%	35%

4 Notes on the Report

The figures used in the report refer to data provided through ENTSO-E for the period from 2015 which have been aggregated by EnAppSys into a European total. This data does sometimes suffer from outages or gaps in reporting, but it is considered generally complete. This report is based on the most recently available data as at quarter and year ends. National Grid data is used for GB demand.

Included Countries

Albania	Germany	Norway
Austria	Great Britain	Poland
Belgium	Greece	Portugal
Bosnia & Herzegovina	Hungary	Romania
Bulgaria	I-SEM	Serbia
Croatia	Italy	Slovakia
Czech Republic	Latvia	Slovenia
Denmark	Lithuania	Spain
Estonia	Montenegro	Sweden
Finland	Netherlands	Switzerland
France	North Macedonia	

EnAppSys offers incredibly detailed market insights and consultancy services for companies in the energy industry.

*This report has been created using our pan-European **market data platform**, which has flexible configurable screens and automated data feeds. If you would like to gain more detailed information and insight, please contact us to arrange trial access to the platform via: sales@enappsys.com*

To find out more about EnAppSys contact us via: info@enappsys.com or visit our website at: www.enappsys.com



EnAppSys Ltd.

Blenheim House, 1 Falcon Court, Stockton On-Tees, TS18 3TS, U.K.
Company Registration No.: 04685938

EnAppSys B.V.

Oostelijk Bolwerk 9, 1st Floor, 4531 GP, Terneuzen, The Netherlands
Company Registration No.: 67992358

