

GB Electricity Market Summary

Q4-2022

October to December

Generation and Contribution by Fuel Type

Renewables:	34.29TWh (+38%)	Gas:	27.67TWh (-10%)	Nuclear:	10.75TWh (+6%)
Renewables excl. biomass:	28.49TWh (+54%)	Coal:	0.95TWh (-16%)	Net Imports:	-1.21TWh (-74%)

% changes stated with respect to values in the previous quarter

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1 Quarterly Review of GB Electricity Market Q4 2022

Electricity market prices through Q4 2022 were driven by prevailing gas prices. Following the all-time high gas prices earlier in the year, Q4 2022 saw gas prices fall to the lowest levels since Q2 2022. This was due to a combination of factors, including unseasonably warm weather, high levels of European gas storage and large volumes of LNG imports. However, the low gas prices did not last throughout the quarter. In early December, a cold snap dramatically increased demand and gas prices climbed in the first half of the month as a result. This increase fed through into wholesale power prices, with day-ahead prices being consistently at similarly high levels to those seen during summer 2022 for several weeks in December before declining again over the holiday period. The highest day-ahead price for the quarter was £2585.80/MWh and was seen in the EPEX auction at 17:00 on 12th December. This was a period of very low wind generation in which demand was high and both GB and France were set to be very tight which gave rise to high prices. This peak was substantially higher than the ~£170/MWh average of day-ahead prices across the quarter.

The key takeaways from this quarter are:

- **Demand reduction:** Due to demand reduction in both industrial and consumer sectors as well as extended periods in which temperatures were warmer than usual, Q4 2022 saw average demand significantly lower than any recent year. This was despite a high level of exports that boosted transmission level demand which in turn increased gas generation in GB to a total of 27.7TWh, higher than any Q4 since 2019 despite the low demand and high wind generation.
- **Gas storage and prices:** Levels of gas storage increased across Europe, including in GB. This, along with the reduced demand, resulted in gas prices dropping to their lowest levels since spring 2022 throughout October and November. Following this, a period in which temperatures were lower than average was seen in December. Demand increased very sharply as a result and gas prices peaked at ~£375/MWh in mid-December feeding through into wholesale electricity prices with an average day-ahead price of ~£310 being seen on that day.
- **Breakeven cost of generation:** The increase in gas prices caused the breakeven range for gas units to rise above that of coal units (i.e. the marginal cost of generation for gas-fired units was higher than those for coal-fired units). The Ratcliffe-on-Soar coal units were heavily utilised during December as a result.

- **Interconnector exports / imports:** Overall, GB continued to be a net exporter of power across the quarter, as prices were generally higher on the continent, particularly in France who received the highest export volume. Net export volumes were ~1.2TWh. Over the Christmas holiday period, demand decreased again, bringing wholesale power prices down. However, prices were lower still on the continent, resulting in GB seeing the highest import volumes since March 2022 during this period.
- **French nuclear outages:** The high level of export volumes was also driven by a high level of demand in France as a consequence of ongoing availability issues in the French nuclear fleet with units being out of service whilst stress-corrosion cracking problems were addressed.
- **Wind generation** totalled ~25.0TWh, the highest of any quarter on record in GB. On 30th December, daily wind generation averaged 20.9GW, the highest ever recorded in GB.
- **Winter Contingency Contracts** were put in place by National Grid with Drax, West Burton, and Ratcliffe-on-Soar units to provide a mechanism under which the units will not be available in the open market and will only be dispatched at the request of the system operator.

Demand

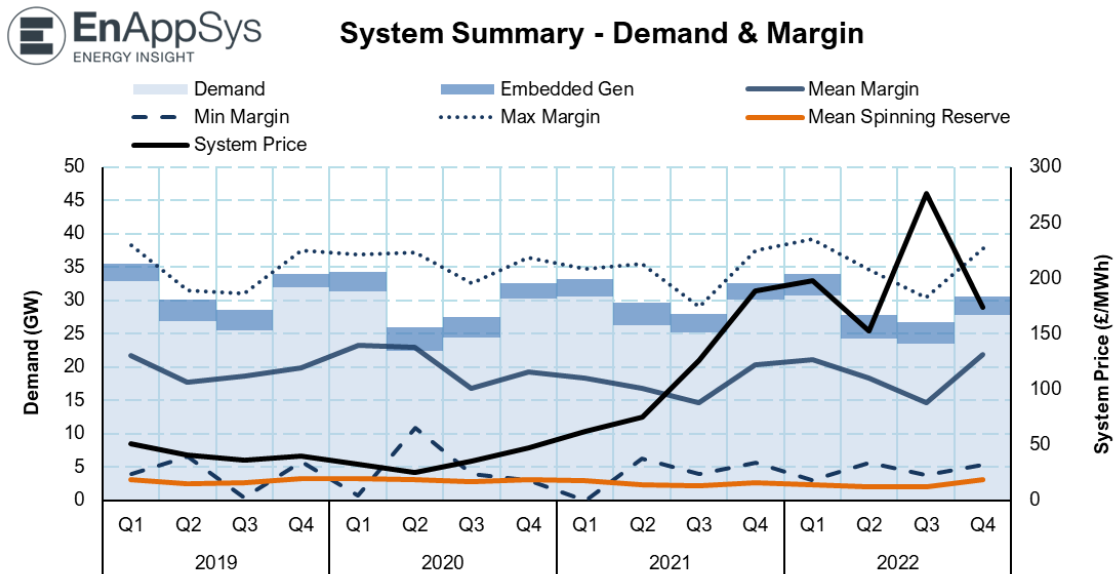


Figure 1: Total system summary – demand & margin across Q1 2019 – Q4 2022

Demand reduction was widespread this quarter, with high wholesale power prices and the cost of living crisis encouraging industry and consumers to lower demand. National Grid also introduced the Demand Flexibility Service, an initiative by which consumers were incentivised to voluntarily reduce their demand. The service was deployed in tests early in the quarter and was tested during the evening of 12th December, a particularly tight day during a cold snap in which the day-ahead price in the EPEX auction reached above £2500/MWh.

Demand was also kept low by a period of mild weather that lasted from October through to late-November. However, this period was followed by a cold snap in which temperatures in GB dropped substantially. With the additional heating load, demand increased over late-November through to mid-December, resulting in rising gas prices and high wholesale power prices. Demand peaked at ~44GW during the evening periods of several days in December, the highest levels since January 2022. Despite the cold weather, the total monthly demand for December 2022 was less than in December 2021 (25.8TWh in 2022 against 26.4TWh in 2021), highlighting the extent of demand reduction in GB.

Generation

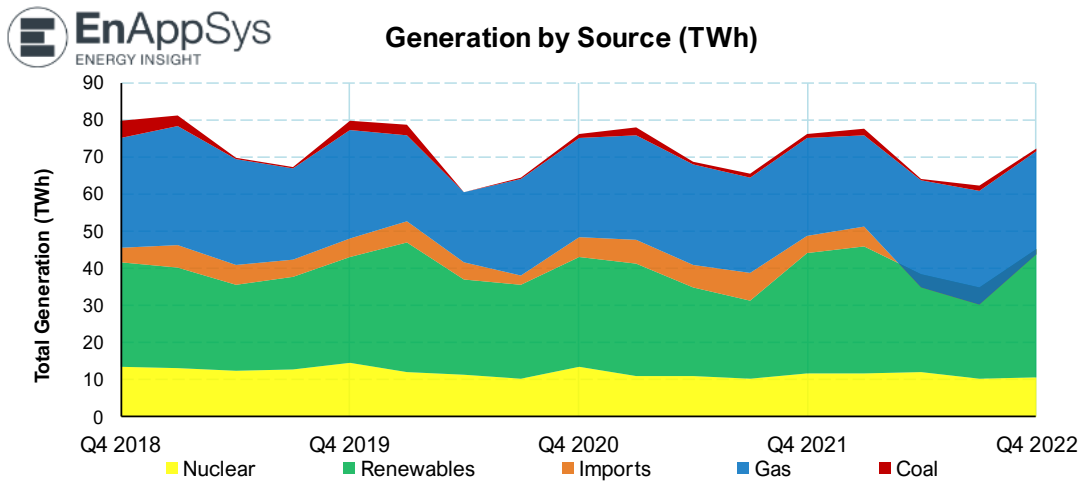


Figure 2: Stacked total quarterly generation by the main fuel groups

Total wind outturn over the quarter was 25.0TWh, more than any other quarter on record. Although there were some notable dips to beneath 1GW in late November and early December, wind generation was higher than has been seen in previous Q4 periods with an average of 11.2GW.

Despite this and the low demand, thermal generation was high this quarter and more gas-fired generation was seen than any Q4 since Q4 2019. A total of 27.7TWh of gas generation was produced this quarter against 26.6TWh in Q4 2021. The coal fleet, however, saw the lowest total generation of any Q4 on record, producing 0.95TWh against 1.23TWh in Q4 2021. Coal utilisation was highest during the cold snap that lasted from late-November through to mid-December. Ratcliffe-on-Soar 2, 3 and 4 were all heavily utilised during this period, giving a total generation of ~1.3GW.

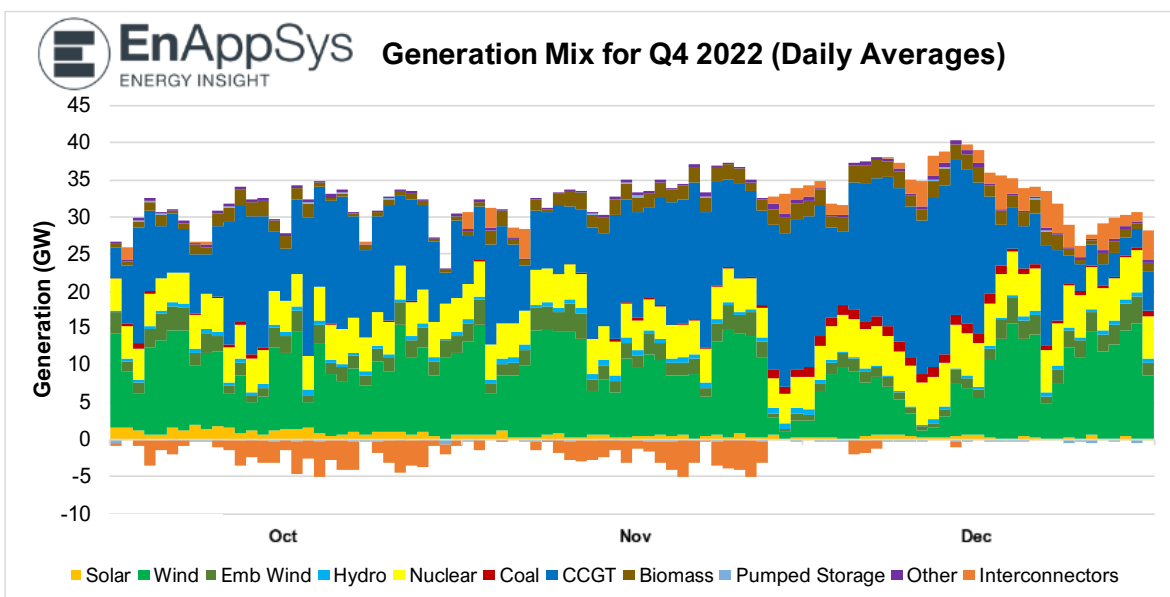


Figure 3: Stacked total quarterly generation by generation type for Q4 2022

Renewable generation

Total wind generation, meanwhile, was the highest for any quarter on record at 25.1TWh, beating the previous record of 21.3TWh in Q4 2021. On 30th December, wind generation also reached a new all-time high peak of 20.9GW, a consequence of a continuing build-out of installed wind capacity across the country.

Solar generation was also higher than in any Q4 on record at 1.44TWh, narrowly surpassing the Q4 2018 level of 1.42TWh.

Prices

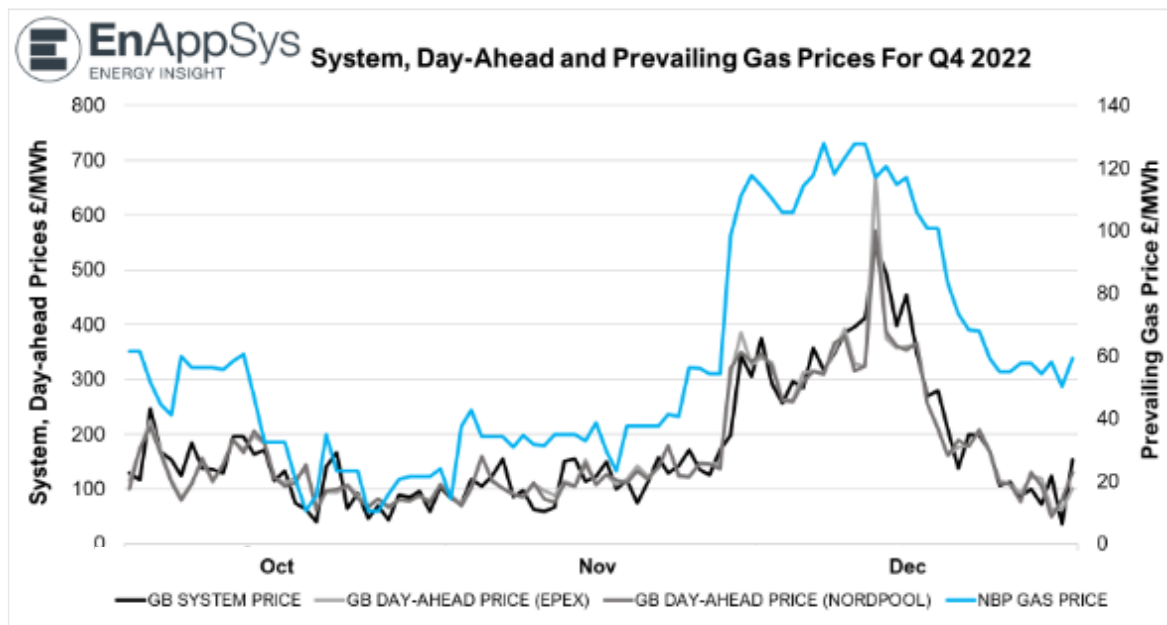


Figure 4: GB system, day-ahead and gas prices for Q4 2022.

The pattern of pricing this quarter was generally split into two halves. From October through to late-November, prices were low due to low demand and large quantities of gas imports and high storage levels. The arithmetic average of the EPEX and Nordpool day-ahead prices in GB was ~£130/MWh from October to November. However, in December, when demand increased, the average day-ahead price was ~£250/MWh, almost double what it had been previously in the quarter. Some extreme pricing was seen during periods of low temperatures and wind generation. On 12th December, day-ahead prices in the EPEX auction reached over £2500/MWh during the evening demand peak. While this was the most extreme pricing seen this quarter, it was common that week to see peak daily prices ~£500/MWh, where prices between £100-£200/MWh were more common during October.

Interconnectors

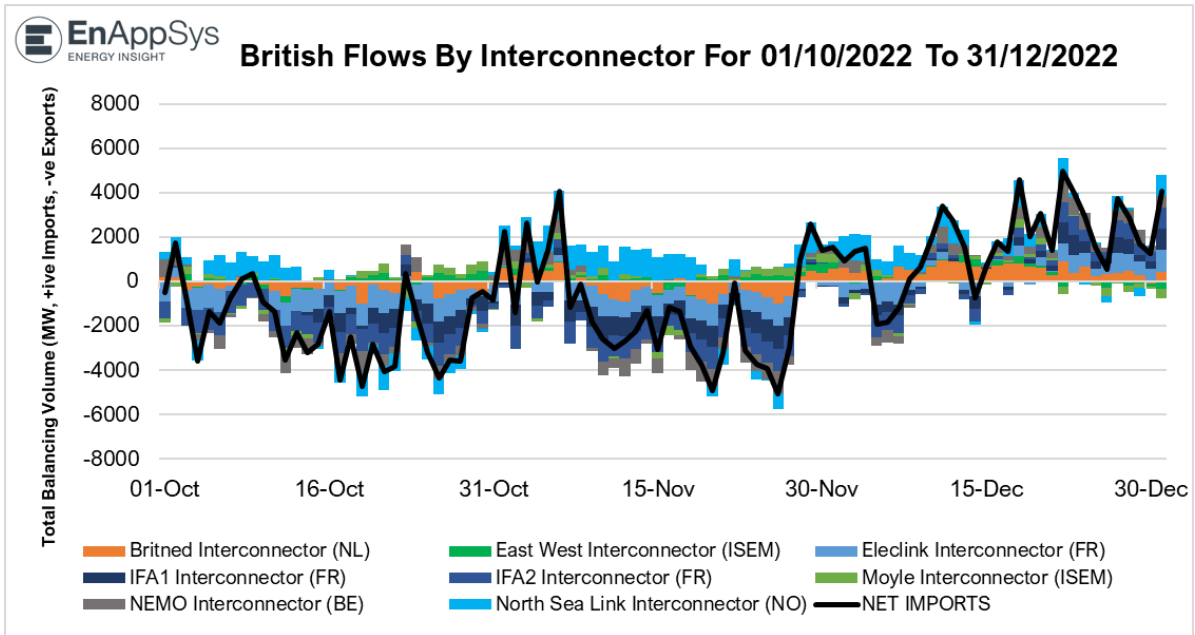


Figure 5: GB physical flows by country for Q4 2022

GB continued to be a net exporter of power for the third consecutive quarter. The total net export was 1.2TWh, and France was again the largest recipient. However, the total net export volume was lower than in either of the previous two quarters, largely due to a period from mid-December to the end of the year in which GB became a net importer. While low demand kept prices down following the end of the cold snap in GB, prices were lower still on the continent where high levels of gas storage and low draw-down rates resulted in day-ahead power prices lower than those seen in GB. High wind generation in this period and some instances of increased French nuclear availability also helped reduce gas consumption and allowed for imports into GB.

Overall, however, the quarter as a whole still saw net exports from GB, mainly due to the low gas prices in GB in the autumn, caused by large volumes of LNG imports and demand that was lower than usual.

Appendix: Supporting Tables

The tables below shows key statistics on generation in the quarter and all previous quarters over the last two years. Biomass and hydro values for the reporting quarter contain estimates for the embedded portion of the fleet, based on the same quarter last year as this data is published at a lag of ~3 months by BEIS¹. Note that all percentages are given as a percentage of total generation including imports.

Table 1: Quarterly generation summary Q4 2022 (TWh)

*GB Only (Excludes Northern Ireland)	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
TOTAL GENERATION BY FUEL (TWh)									
Coal	1.06	2.05	0.55	1.15	1.23	1.88	0.33	1.12	0.95
Gas	26.67	28.42	27.10	25.36	26.57	24.63	28.70	30.63	27.67
Imports	5.40	6.44	6.09	7.74	4.62	5.23	-3.64	-4.59	-1.21
Nuclear	13.43	10.85	10.79	10.09	11.66	11.74	12.14	10.17	10.75
Biomass	7.12	7.65	7.05	6.32	7.71	7.00	5.03	6.34	5.79
Wind	19.01	19.25	11.48	10.41	21.29	23.27	15.91	13.46	25.09
Solar	1.16	1.69	4.53	3.75	1.25	1.98	4.46	4.25	1.44
Hydro	2.24	1.71	1.09	0.63	2.05	1.92	1.03	0.74	1.96
RENEWABLES (Biomass, Wind, Solar & Hydro)	29.53	30.29	24.16	21.11	32.30	34.18	26.43	24.79	34.29
NON-DISPATCHABLE RENEWABLES (Wind, Solar & Hydro)	22.40	22.65	17.11	14.79	24.59	27.18	21.40	18.45	28.49
FOSSIL FUELS (Gas & Coal)	27.72	30.46	27.65	26.51	27.80	26.51	29.04	31.76	28.62
TOTAL GB GENERATION (excl. Imports)	70.67	71.61	62.60	57.72	71.76	72.43	67.60	66.72	73.66
TOTAL GB CONSUMPTION (incl. Imports)	76.07	78.05	68.70	65.45	76.37	77.67	63.96	62.13	72.45
Fossil Fuel Percentage	36%	39%	40%	41%	36%	34%	45%	51%	40%
Clean Percentage (Renewable & Nuclear)	56%	53%	51%	48%	58%	59%	60%	56%	62%
Renewable Share of Clean Power	69%	74%	69%	68%	73%	74%	69%	71%	76%
SHARE OF GENERATION (%)									
Coal	1.4%	2.6%	0.8%	1.8%	1.6%	2.4%	0.5%	1.8%	1.3%
Gas	35.1%	36.4%	39.5%	38.7%	34.8%	31.7%	44.9%	49.3%	38.2%
Imports	7.1%	8.2%	8.9%	11.8%	6.0%	6.7%	-5.7%	-7.4%	-1.7%
Nuclear	17.6%	13.9%	15.7%	15.4%	15.3%	15.1%	19.0%	16.4%	14.8%
Renewables (Biomass, Wind, Solar & Hydro)	38.8%	38.8%	35.2%	32.3%	42.3%	44.0%	41.3%	39.9%	47.3%

Table 2: Year-on-year comparison of Q4 generation output (TWh and %)

*GB Only (Excludes Northern Ireland)	Q4 2014	Q4 2015	Q4 2016	Q4 2017	Q4 2018	Q4 2019	Q4 2020	Q4 2021	Q4 2022
TOTAL GENERATION BY FUEL (TWh)									
Coal	27.06	16.53	7.96	7.73	4.63	2.32	1.06	1.23	0.94
Gas	22.17	22.50	37.68	32.60	29.58	29.26	26.67	26.57	27.38
Imports	4.86	4.60	1.56	1.53	3.97	5.02	5.40	4.62	-1.20
Nuclear	13.34	17.45	17.51	15.58	13.58	14.61	13.43	11.66	10.64
RENEWABLES (Biomass, Wind, Solar & Hydro)	13.87	14.76	14.30	23.51	27.92	28.42	29.53	32.30	33.92
FOSSIL FUELS	49.24	39.03	45.65	40.32	34.21	31.57	27.72	27.80	28.31
TOTAL GB GENERATION (excl. Imports)	76.44	71.23	77.46	79.41	75.72	74.60	70.67	71.76	72.87
TOTAL GB CONSUMPTION (incl. Imports)	81.31	75.83	79.03	80.94	79.69	79.62	76.07	76.37	71.67
Fossil Fuel Percentage	61%	51%	58%	50%	43%	40%	36%	36%	40%
Clean Percentage	33%	42%	40%	48%	52%	54%	56%	58%	62%
Renewable Share of Clean Power	17%	19%	18%	29%	35%	36%	39%	42%	47%
SHARE OF GENERATION (%)									
Coal	33.3%	21.8%	10.1%	9.5%	5.8%	2.9%	1.4%	1.6%	1.3%
Gas	27.3%	29.7%	47.7%	40.3%	37.1%	36.7%	35.1%	34.8%	38.2%
Imports	6.0%	6.1%	2.0%	1.9%	5.0%	6.3%	7.1%	6.0%	-1.7%
Nuclear	16.4%	23.0%	22.2%	19.2%	17.0%	18.3%	17.6%	15.3%	14.8%
Renewables (Biomass, Wind, Solar & Hydro)	17.1%	19.5%	18.1%	29.0%	35.0%	35.7%	38.8%	42.3%	47.3%

¹ [https://www.gov.uk/government/statistics/energy-trends-section-6-renewables/Renewables obligation: certificates and generation \(monthly - Excel\)](https://www.gov.uk/government/statistics/energy-trends-section-6-renewables/Renewables%20obligation%3A%20certificates%20and%20generation%20(monthly%20-%20Excel))

Table 3 below shows key statistics on pricing in the quarter and all previous quarters over the last two years. The wholesale and within-day prices shown are averages across the quarter, whilst the system prices are given with minimum, average and maximum values². Note that the values for domestic demand in Table 3 does not include interconnector demand.

Table 3 Quarterly price summary Q4 2020 to Q4 2022

*GB Only (Excludes Northern Ireland)	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
WHOLESALE PRICES (£/MWh)									
EPEX Day-Ahead Price	47.51	63.67	72.20	128.59	205.27	200.80	155.32	294.75	171.15
Nordpool Day-Ahead price	47.51	63.67	72.20	128.59	205.27	199.63	153.40	294.79	168.79
Within Day Price (MIDP)	45.42	59.62	71.80	125.19	191.25	194.30	149.28	282.00	165.86
WITHIN DAY PRICE BREAKDOWN (£/MWh)									
Off-Peak Hours	33.49	46.19	62.71	100.21	156.55	165.99	136.51	249.17	135.38
Peak Hours (excl Superpeak)	47.55	58.89	75.06	129.48	195.78	196.87	152.53	286.26	172.22
Superpeak Hours	65.25	93.27	81.01	166.34	254.87	249.86	166.86	334.87	207.91
SYSTEM PRICE (£/MWh)									
Maximum	849.82	4000.00	1971.59	4037.80	3916.28	4035.98	494.23	890.00	1650.00
Average	47.49	62.04	74.85	126.14	188.62	197.64	152.31	276.40	173.31
Minimum	-63.93	-61.00	-59.95	-66.73	-70.97	-90.32	-69.49	-68.53	-78.00
Domestic Demand (MW average)	30,303	30,593	26,323	25,258	30,075	30,738	24,224	23,572	27,884
Domestic Demand incl. Embedded Gen (MW average)	32,515	33,148	29,719	28,023	32,630	33,968	27,866	26,782	30,571
Domestic Demand (TWh total)	66.9	66.1	57.5	55.8	66.4	66.4	52.9	52.0	61.6
Domestic Demand Incl. Embedded Gen. (TWh total)	71.8	71.6	64.9	61.9	72.0	73.4	60.9	59.1	67.5

Table 4: Year-on-year comparison of Q4 prices

*GB Only (Excludes Northern Ireland)	Q4 2014	Q4 2015	Q4 2016	Q4 2017	Q4 2018	Q4 2019	Q4 2020	Q4 2021	Q4 2022
WHOLESALE PRICES (£/MWh)									
EPEX Day-Ahead Price	45.21	37.56	52.20	50.23	62.97	40.09	47.51	205.27	171.15
Nordpool Day-Ahead price	45.21	37.56	52.20	50.23	62.97	40.09	47.51	205.27	168.79
Within Day Price (MIDP)	44.60	37.32	50.43	49.61	61.45	38.64	45.42	191.25	165.86
WITHIN DAY PRICE BREAKDOWN (£/MWh)									
Off-Peak Hours	35.04	29.72	37.24	43.42	53.89	31.62	33.49	156.55	135.38
Peak Hours (excl Superpeak)	45.48	37.97	48.23	50.27	62.08	39.83	47.55	195.78	172.22
Superpeak Hours	63.20	52.37	87.81	61.41	76.66	50.39	65.25	254.87	207.91
SYSTEM PRICE (£/MWh)									
Maximum	429.10	419.50	1528.72	178.00	191.37	160.00	849.82	3916.28	1650.00
Average	52.78	42.15	51.26	49.38	62.24	39.86	47.49	188.62	173.31
Minimum	6.45	-73.48	-153.89	-69.17	-68.40	-88.00	-63.93	-70.97	-78.00
Domestic Demand (MW average)	34,774	33,184	33,552	32,476	31,702	31,896	30,303	30,075	27,884
Domestic Demand incl. Embedded Gen (MW average)	36,114	34,744	35,330	34,623	33,956	33,989	32,515	32,630	30,571
Domestic Demand (TWh total)	76.8	73.3	74.1	71.7	70.0	70.4	66.9	66.4	61.6
Domestic Demand Incl. Embedded Gen. (TWh total)	79.7	76.7	78.0	76.4	75.0	75.0	71.8	72.0	67.5

² Peak is 08:00 – 16:00 and 19:30 – 00:00; Super Peak is 16:00 – 19:30; Off-Peak is 00:00 – 08:00.

2 Notes on the Report

The figures used in the report refer to GB only, unlike those reported by BEIS that refer to GB and Northern Ireland. This selection has been made since the Northern Ireland electricity market is separate from the GB electricity market and is part of the Ireland all-island I-SEM market.

Generation levels by fuel from 2009 onwards are based upon National Grid FUELHH data, which give the operationally metered totals by fuel, down to a 5-minute resolution.

Prior to 2009, individual plant data has been aggregated from our database matching the National Grid fuel-type relationships.

To account for embedded wind and solar, the National Grid forecasts for these generators have been used as if they were output figures. Embedded hydro and biomass have been accounted for using analysis of Ofgem data on certificate awards. This embedded hydro and biomass data is published at a lag of approximately three months, so the reporting quarter will not have actual data for this section of these two fleets, instead values are estimated from the respective quarter the previous year.

Within this report, levels of offshore wind have not been separated from the wind total. This is because this can only be reliably done using metered volumes at a generating unit level. This is not a publicly available data stream and figures can only be estimated. Final Physical Notifications (FPNs) at wind farms do not correlate well with metered volumes and so cannot be used reliably.

Price and demand data primarily come from Elexon (as does the FUELHH data), with the exception of the EPEX day-ahead prices.

Availability levels are calculated by totalling levels of recorded availability at all plants in the market.

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*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*

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