

GB Electricity Market Summary

Q1-2022

January to March

Issued: 11/04/2022

Generation and Contribution by Fuel Type

Renewables:	34.12TWh (+6%)	Gas:	24.6TWh (-7%)	Nuclear:	11.7TWh (+1%)
Renewables excl biomass:	27.12TWh (+10%)	Coal:	1.88TWh (+53%)	Net Imports:	5.2TWh (+13%)

% changes stated with respect to values in the previous quarter

Contents

1	Executive Summary	3
	Demand.....	4
	Generation.....	4
	Prices	4
2	System Demand	5
	Statistics	6
3	Generation Activity Overview	7
	Fossil Fuel Generation.....	7
	Nuclear Generation.....	9
	Imports.....	9
	Statistics	10
4	Renewables	12
	Wind	12
	Statistics	14
5	Generation Margin	15
6	Wholesale and System Prices	16
	Wholesale prices.....	16
	System prices.....	17
	Statistics	18
7	Notes on the Report	19

1 Executive Summary

The dominant story in the electricity sector this quarter was the Russian military action in Ukraine. Due to Europe's reliance on Russian commodities, the invasion resulted in gas and coal prices escalating to new all-time highs. Although GB does not import as much coal and gas from Russia as some other countries, the interconnected nature of European markets means that the GB system has felt the effects of the limitations in fuel supplies keenly. These high fuel prices fed into wholesale and system prices, resulting in the historic high prices of the previous quarter being maintained, despite an increase in renewable generation.

More wind generation was seen in this quarter than any other quarter on record and consequently gas generation fell by 7% compared to the Q4 2021. Record fuel prices meant this was one of the most expensive quarters in the GB market's history.

The key points from the quarter are:

- The Russian invasion of Ukraine resulted in uncertainty over supply of fossil fuels and gas and coal prices rose to their highest ever levels, resulting in the least efficient coal units being more cost effective to run than most efficient CCGT units for extended periods
- System prices saw an all-time high level on an average basis across a whole quarter, though the peak price in an individual settlement period fell ~£2/MWh short of the all-time high peak system price seen in Q3 2021
- More wind generation was seen this quarter than any other quarter on record
- Nuclear generation was higher than in Q1 2021 despite Hunterston B nuclear power station being retired
- Gas-fired generation was lower than any quarter since Q2 2020, though it was still the individual fuel with the largest contribution to the GB generation mix, narrowly beating wind by 1.36TWh
- Less coal generation was seen than in any other Q1 on record, despite coal units seeing lower breakeven costs than CCGT units for extended periods reflecting the declining role of coal in the GB generation mix

Demand

Demand was marginally higher than in Q1 2021 but lower than in Q1 2020, indicating that the overall trend of decreasing transmission demand seen in the last decade is continuing. Both Q1 2022 and Q4 2021 saw a total transmission level demand of 66.4TWh. However, when embedded generation is included, which is not considered in transmission level demand, this quarter saw 73.4TWh against 72.0TWh in the previous quarter, showing that embedded generation and overall demand has increased. This was aided primarily by the high embedded wind generation.

Generation

The gas-fired CCGT fleet remained the largest contributor to the fuel mix of any fuel type with a total generation of 24.6TWh despite high gas prices following the Russian military activity in Ukraine. This was a substantial decrease of 13% from the 28.4TWh seen in Q1 2021. In fact, this quarter saw less CCGT generation than any other quarter since Q2 2020 when demand was significantly reduced by the first outbreak of COVID-19 in GB.

Wind generation, on the other hand, saw 23.3TWh of generation, making Q1 2022 the quarter with the highest wind generation on record, beating the previous record of 23.0TWh seen in Q1 2020. The reduction in CCGT generation and the increase in wind generation meant that CCGT generation was just 1.36TWh above the wind fleet. The gap between these two fleets has not been this close since Q1 2020 when there was only 0.15TWh more gas generation than wind.

Prices

Prices this quarter remained at the very high levels seen in Q4 2021 despite the increased wind generation, making this by far the most expensive Q1 on record. This was due to the uncertainty in supply of fossil fuels following the invasion of Ukraine that fed into wholesale and system prices.

2 System Demand

Total demand (at transmission system level) across this quarter was 66.4TWh, the same level as that of Q4 2021. This is a very minor 0.5% increase on the 66.1TWh of Q1 2021 and a decrease from the 67.7TWh of Q1 2020.

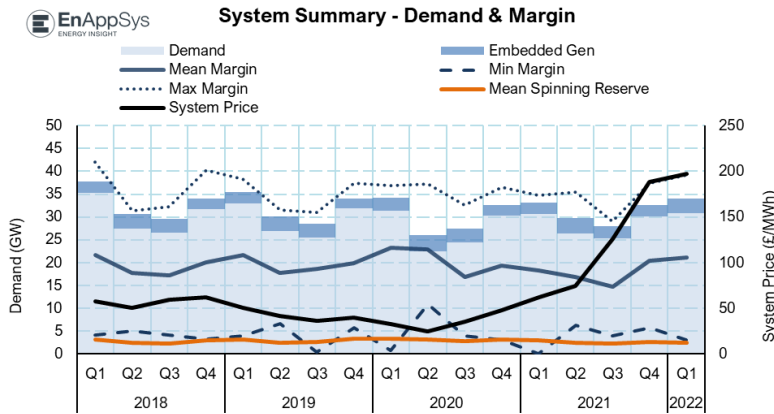


Figure 1: Average quarterly demand and embedded generation, plus average margin levels, spinning reserve and system price

The increase from 72.0TWh in Q4 2020 indicates the increasing levels of embedded generation within the GB system during the quarter.

Transmission System and Full Demand in Q1 2011 to 2022

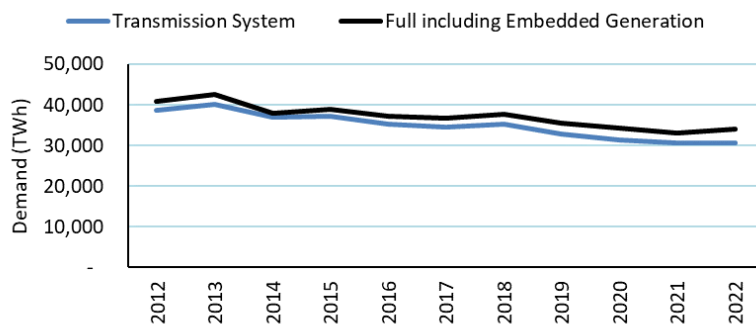


Figure 2: Total transmission system and full demand in Q1 from 2012 to 2022.

Transmission system demand includes the impact of embedded generation (which offsets some demand at the embedded level thereby reducing offtake required from the transmission network). However, when the effect of embedded generation is removed, total demand for the quarter increases to 73.4TWh, the highest of any quarter since Q1 2020.

Statistics

The table below shows key statistics on generation in the quarter and all previous quarters over the last two years.

MW demand values are averages, whilst TWh demand values are totals across the quarter:

Table 1: Quarterly demand summary Q1 2020 to Q1 2022

*GB Only (Excludes Northern Ireland)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Transmission System Demand (MW average)	31,343	22,431	24,380	30,303	30,593	26,323	25,258	30,075	30,738
Demand Incl. Embedded Gen. (MW average)	34,280	26,023	27,443	32,515	33,148	29,719	28,023	32,630	33,968
Transmission System Demand (TWh total)	67.7	49.0	53.8	66.9	66.1	57.5	55.8	66.4	66.4
Demand Incl. Embedded Gen. (TWh total)	74.0	56.8	60.6	71.8	71.6	64.9	61.9	72.0	73.4

The table below shows key statistics in the quarter and the same quarter in the previous eight years:

Table 2: Year-on-year comparison of Q1 demand

*GB Only (Excludes Northern Ireland)	Q1 2014	Q1 2015	Q1 2016	Q1 2017	Q1 2018	Q1 2019	Q1 2020	Q1 2021	Q1 2022
Transmission System Demand (MW average)	36,852	37,109	35,335	34,613	35,203	32,936	31,343	30,593	30,738
Demand Incl. Embedded Gen. (MW average)	38,053	38,836	37,214	36,786	37,725	35,493	34,280	33,148	33,968
Transmission System Demand (TWh total)	79.6	80.2	76.3	74.8	76.0	71.1	67.7	66.1	66.4
Demand Incl. Embedded Gen. (TWh total)	82.2	83.9	80.4	79.5	81.5	76.7	74.0	71.6	73.4

3 Generation Activity Overview

Q1 2022 saw 27.1TWh of renewable generation (not including the dispatchable biomass generation¹), which is more than the 26.5TWh of fossil fuel generation (including gas and coal). Aggregate renewables exceeding aggregate fossil fuel generation for a calendar quarter has only ever happened once before in Q1 2020, indicating that renewables are, on average, increasing their share of the GB generation mix year-on-year.

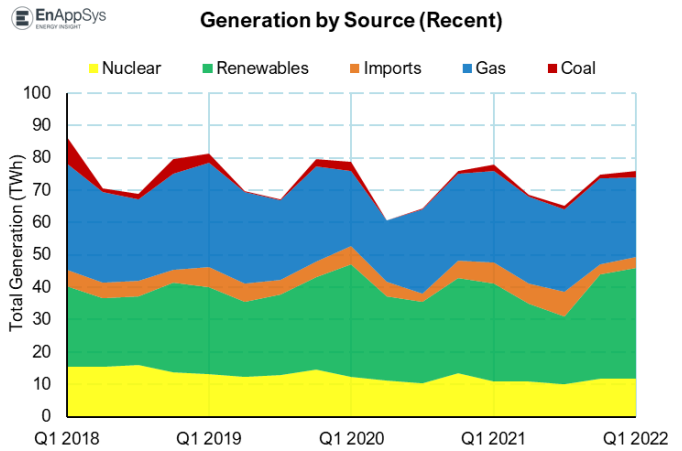


Figure 3: Stacked total quarterly generation by the main fuel groups

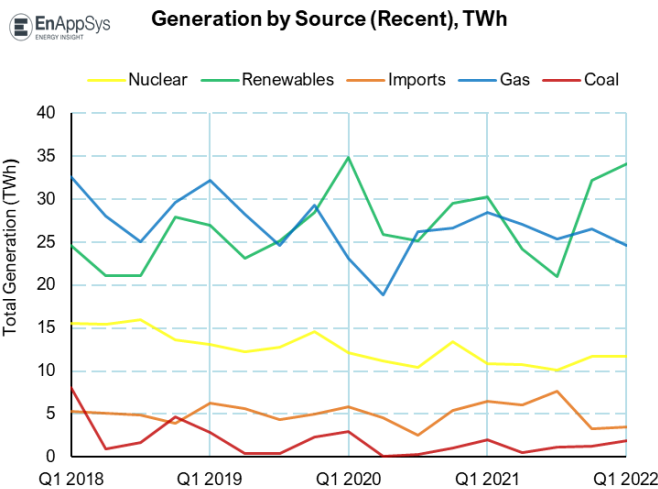


Figure 4: Total quarterly generation by the main fuel groups

Fossil Fuel Generation

The gas-fired CCGT fleet remains the highest contributor to total generation of all individual fuel types (i.e. not grouped into fossil fuel or renewable categories) with a 31.8% share. Despite being the largest contributor, this percentage share is a dramatic reduction from the 36.4% seen in Q1 2021. Aside from Q2 2020 which was affected by the initial outbreak of COVID-19, this is the lowest percentage of the fuel mix

¹ Biomass and hydro values for the reporting quarter contain estimates based on the same quarter last year as this data is published at a lag of ~3 months by BEIS at <https://www.gov.uk/government/statistics/energy-trends-section-6-renewables/Renewables-obligation-certificates-and-generation-monthly-Excel>. In recent quarters, embedded hydro has contributed ~40% of the hydro total and embedded biomass ~35% of the biomass total.

occupied by the gas-fired fleet in any Q1 since Q1 2015. This was in part due to the increase in wind generation (itself brought about by an ever-increase wind generation capacity in GB).

In Q4 2021, gas prices climbed to an all-time high of £155.29/MWh. This was a result of low European gas reserves from the previous winter that were not replaced during a summer of low wind generation. At the beginning of Q1 2022, however, prices had begun to stabilise and on the 1st January the gas price was £71.79/MWh, less than half of the peak in the previous quarter. However, on 24th February, Russia invaded Ukraine which prompted widespread uncertainty as to the supply of fossil fuels, including gas. Consequently, gas prices peaked again, this time to £204.76/MWh on 8th March and the cost of ETS allowances also rose. This caused gas units to have an increased cost of generation, pushing them out of merit compared to coal-fired units, despite the higher efficiencies and lower carbon intensity applicable to CCGT units.

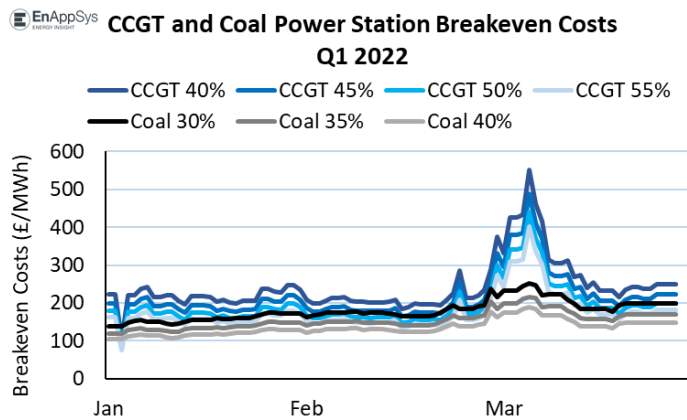


Figure 5: Breakeven costs for coal- and gas-fired units across Q1 2022.

The coal fleet saw a total generation of 1.88TWh, a reduction of 8% from the 2.05TWh seen in Q1 2021 but a substantial increase of 53% compared to the 1.23TWh seen in Q4 2021. Less coal generation was seen this quarter than in any other Q1 on record, despite the prevailing economics, as coal capacity is limited in the GB market and unable to displace gas-

fired generation to any significant extent. Approximately 77% of settlement periods saw some coal-fired generation in the GB generation mix.

Nuclear Generation

Nuclear generation was again the third highest contributor to total generation with 11.74TWh of generation, comprising 15.5% of the total across all fuel types. This was an increase on both the 10.9TWh seen in Q1 2021 and the 11.7TWh in Q4 2021, despite Hunterston Generator 8 shutting down and removing 500MW of nuclear capacity from the system at the beginning of January. Hunterston Generator 7 had shut down in November 2021, meaning that the whole station is now offline.

Imports

This quarter saw 5.20TWh of imports, a reduction of 19% from the 6.44TWh in Q1 2021. This is generally due to the increase in wind generation seen this quarter that decreased emphasis on imports, as well as the high prices in Europe following the invasion of Ukraine. Imports had reached record highs during 2021 due to low wind generation in GB, so this decrease represents a return to values closer to the average. North Sea Link saw the largest change compared to the previous quarter of any interconnector, increasing its total imports by 0.3TWh to 1.7TWh. A greater level of imports were observed this quarter than in Q1 2021, in part due to the greater amount of interconnected capacity now that North Sea Link has come online.²

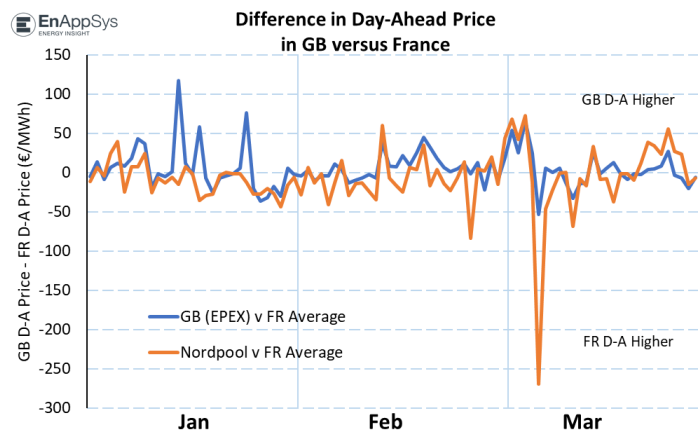


Figure 6: Average daily difference in day-ahead prices in GB and France across Q1 2022. Positive values mean the GB day-ahead price is higher, whilst negative values mean the French day-ahead price is higher.

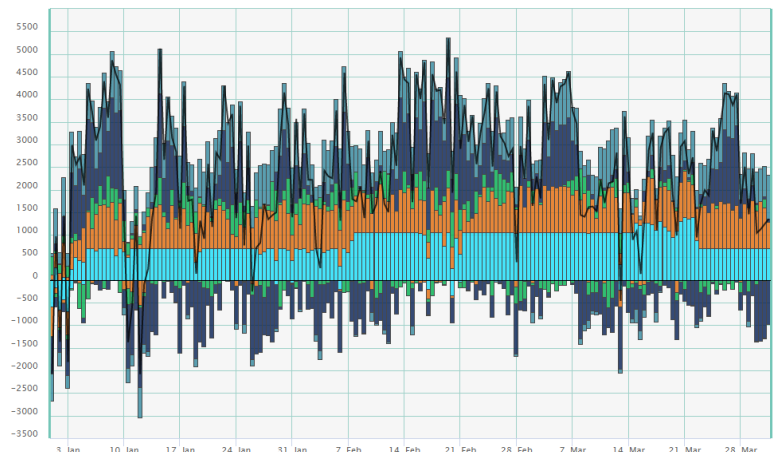


Figure 7: GB physical flows by country for Q1 2022. Orange=NL, Dark Blue=FR, Grey=BE, Green=ISEM, Light Blue=NO

² Charts from EnAppSys platform:

<https://app.enappsyst.com/#gb/elec/inter/bycountry/chart&start=202201010000&end=202204010100>

Statistics

The table 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 BEIS³:

Table 3: Quarterly generation summary (TWh)

*GB Only (Excludes Northern Ireland)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
TOTAL GENERATION BY FUEL (TWh)									
Coal	2.92	0.11	0.27	1.06	2.05	0.55	1.15	1.23	1.88
Gas	23.15	18.85	26.18	26.67	28.42	27.10	25.36	26.57	24.63
Imports	5.80	4.59	2.51	5.40	6.44	6.09	7.67	4.62	5.20
Nuclear	12.17	11.22	10.43	13.43	10.85	10.79	10.09	11.66	11.74
Biomass	7.38	7.05	6.35	7.12	7.64	7.04	6.23	7.58	7.00
Wind	23.00	12.59	13.68	19.01	19.25	11.48	10.41	21.29	23.27
Solar	1.95	5.06	3.86	1.16	1.69	4.53	3.75	1.25	1.98
Hydro	2.46	1.19	1.21	2.24	1.71	1.09	0.61	2.10	1.87
RENEWABLES (Biomass, Wind, Solar & Hydro)	34.79	25.89	25.09	29.52	30.29	24.14	21.00	32.23	34.12
NON-DISPATCHABLE RENEWABLES (Wind, Solar & Hydro)	27.41	18.84	18.75	22.40	22.65	17.10	14.77	24.65	27.12
FOSSIL FUELS (Gas & Coal)	26.07	18.96	26.44	27.72	30.46	27.65	26.51	27.80	26.51
TOTAL	78.83	60.66	64.47	76.07	78.04	68.68	65.27	76.31	77.59
Fossil Fuel Percentage	33%	31%	41%	36%	39%	40%	41%	36%	34%
Clean Percentage (Renewable & Nuclear)	60%	61%	55%	56%	53%	51%	48%	58%	59%
Renewable Share of Clean Power	74%	70%	71%	69%	74%	69%	68%	73%	74%
SHARE OF GENERATION (%)									
Coal	3.7%	0.2%	0.4%	1.4%	2.6%	0.8%	1.8%	1.6%	2.4%
Gas	29.4%	31.1%	40.6%	35.1%	36.4%	39.5%	38.8%	34.8%	31.8%
Imports	7.4%	7.6%	3.9%	7.1%	8.2%	8.9%	11.7%	6.1%	6.7%
Nuclear	15.4%	18.5%	16.2%	17.6%	13.9%	15.7%	15.5%	15.3%	15.1%
Renewables (Biomass, Wind, Solar & Hydro)	44.1%	42.7%	38.9%	38.8%	38.8%	35.2%	32.2%	42.2%	44.0%

Table 4: Quarterly generation summary (Average GW)

*GB Only (Excludes Northern Ireland)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
AVERAGE GENERATION BY FUEL (GW)									
Coal	1.4	0.0	0.1	0.5	0.9	0.3	0.5	0.6	0.9
Gas	10.7	8.6	11.9	12.1	13.2	12.4	11.5	12.0	11.4
Imports	2.7	2.1	1.1	2.4	3.0	2.8	3.5	1.5	1.6
Nuclear	5.6	5.1	4.7	6.1	5.0	4.9	4.6	5.3	5.4
Biomass	3.4	3.2	2.9	3.2	3.5	3.2	2.8	3.4	3.2
Wind	10.6	5.8	6.2	8.6	8.9	5.3	4.7	9.6	10.8
Solar	0.9	2.3	1.7	0.5	0.8	2.1	1.7	0.6	0.9
Hydro	1.1	0.5	0.6	1.0	0.8	0.5	0.3	1.0	0.9
RENEWABLES (Biomass, Wind, Solar & Hydro)	16.1	11.9	11.4	13.4	14.0	11.1	9.5	14.6	15.8
NON-DISPATCHABLE RENEWABLES (Wind, Solar & Hydro)	12.7	8.6	8.5	10.1	10.5	7.8	6.7	11.2	12.6
FOSSIL FUELS	12.1	8.7	12.0	12.6	14.1	12.7	12.0	12.6	12.3
TOTAL	36.5	27.8	29.2	34.5	36.1	31.4	29.5	33.9	35.1

The table below shows key statistics in the quarter and the same quarter in the previous eight years:

Table 5: Year-on-year comparison of Q1 generation output (TWh and %)

³ <https://www.gov.uk/government/statistics/energy-trends-section-6-renewables/Renewables> obligation: certificates and generation (monthly - Excel)

*GB Only (Excludes Northern Ireland)	Q1 2014	Q1 2015	Q1 2016	Q1 2017	Q1 2018	Q1 2019	Q1 2020	Q1 2021	Q1 2022
TOTAL GENERATION BY FUEL (TWh)									
Coal	32.61	28.70	13.55	9.67	8.12	2.84	2.92	2.05	1.88
Gas	18.06	19.66	29.63	33.27	32.65	32.18	23.15	28.42	24.63
Imports	4.56	4.69	5.92	3.18	5.36	6.24	5.80	6.44	5.23
Nuclear	15.40	16.91	15.97	16.46	15.53	13.05	12.17	10.85	11.74
RENEWABLES (Biomass, Wind, Solar & Hydro)	14.46	15.14	14.89	18.29	24.65	26.98	34.79	30.29	34.12
FOSSIL FUELS	50.67	48.36	43.18	42.95	40.77	35.02	26.07	30.46	26.51
TOTAL	85.09	85.09	79.95	80.88	86.31	81.29	78.83	78.04	77.61
Fossil Fuel Percentage	60%	57%	54%	53%	47%	43%	33%	39%	34%
Clean Percentage	35%	38%	39%	43%	47%	49%	60%	53%	59%
Renewable Share of Clean Power	17%	18%	19%	23%	29%	33%	44%	39%	44%
SHARE OF GENERATION (%)									
Coal	38.3%	33.7%	16.9%	12.0%	9.4%	3.5%	3.7%	2.6%	2.4%
Gas	21.2%	23.1%	37.1%	41.1%	37.8%	39.6%	29.4%	36.4%	31.7%
Imports	5.4%	5.5%	7.4%	3.9%	6.2%	7.7%	7.4%	8.2%	6.7%
Nuclear	18.1%	19.9%	20.0%	20.4%	18.0%	16.1%	15.4%	13.9%	15.1%
RENEWABLES (Biomass, Wind, Solar & Hydro)	17.0%	17.8%	18.6%	22.6%	28.6%	33.2%	44.1%	38.8%	44.0%

4 Renewables

Combined renewable generation was 34.1TWh (including embedded estimates⁴), the second highest of any Q1 behind Q1 2020 which had seen 34.8TWh. Wind contributed to the total renewable generation more than in any other quarter on record. When the dispatchable biomass component is removed, the wind, solar and hydro renewable sum was 27.1TWh. This is higher than the total for any quarter in 2021 and 2020 save for Q1 2020 which had seen 27.4TWh.

Wind

With 23.3TWh of generation, this quarter saw the highest amount of total wind generation in any quarter on record. Consequently, the wind fleet comprised 68.2% of all renewable generation, another all-time high.

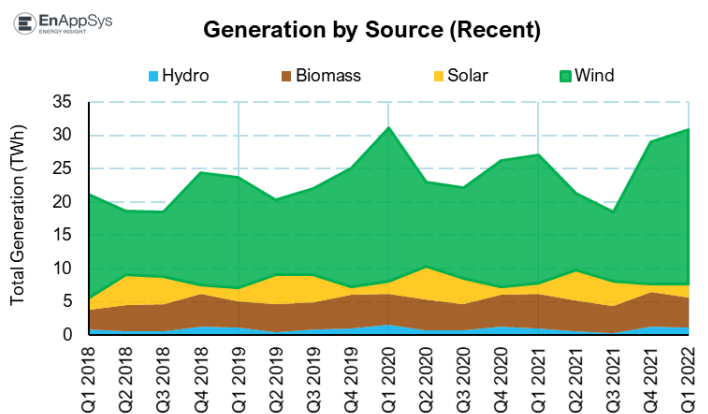


Figure 8: Stacked total quarterly generation by the renewable fleets

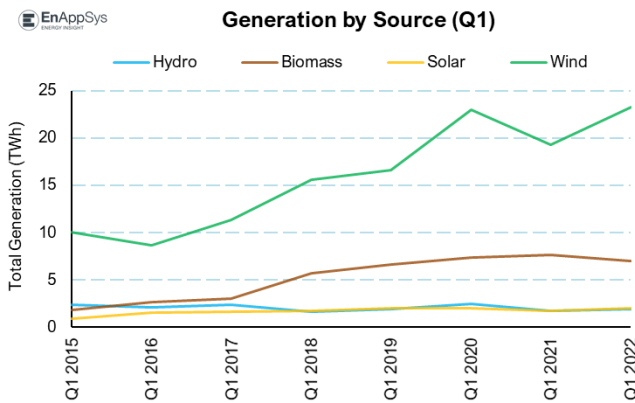


Figure 9: Total quarterly generation by the renewable fleets since Q1 2015

The high values seen this quarter are more than double the lowest values seen during Q3 2021 when total wind generation dipped to 10.4TWh. Since 2016, each Q1 has seen more wind generation than the last, save for Q1 2021 in which a decrease from 23.0TWh to 19.3TWh was observed. The increase this quarter is in line with the historical trend that shows an expanding wind capacity resulting in increased generation.

⁴ . Biomass and hydro values for the reporting quarter contain estimates based on the same quarter last year as this data is published at a lag of ~3 months by BEIS at [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)). In recent quarters, embedded hydro has contributed ~40% of the hydro total and embedded biomass ~35% of the biomass total.

Solar and hydro

The solar and hydro fleets comprised seasonally normal low proportions of total renewable generation this quarter, with solar seeing 1.98TWh (5.8%) and hydro seeing 1.87TWh (5.5%).

While the solar generation was less than half of the level it had peaked at previously in the year (4.53TWh in Q2 2021), it was 17% higher than the 1.69TWh seen in Q1 2021. March 2022 was noted to be the sunniest recorded since 1929 and contributed to this level of output. Similarly, hydro, having peaked at 2.10TWh in Q4 2021, dipped by 11% to 1.87TWh this quarter, though this was a 9% increase on the 1.71TWh seen in Q1 2021.

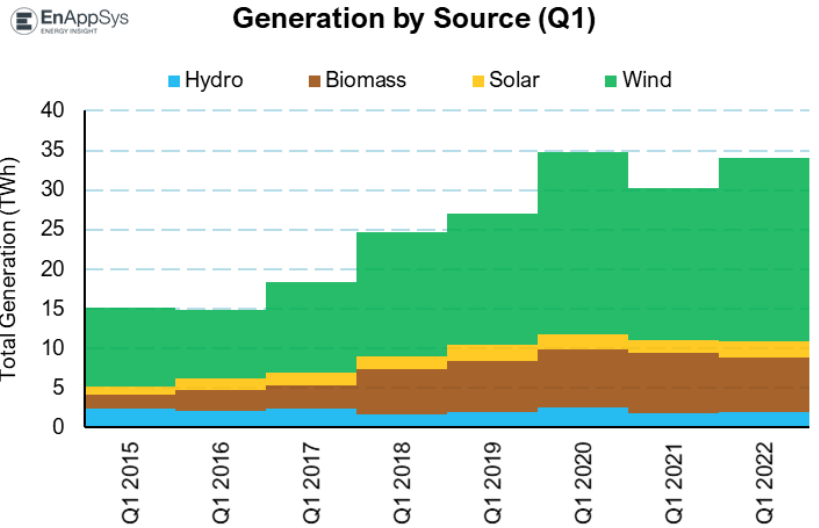


Figure 10: Total Q1 generation by the renewable fleets since 2015

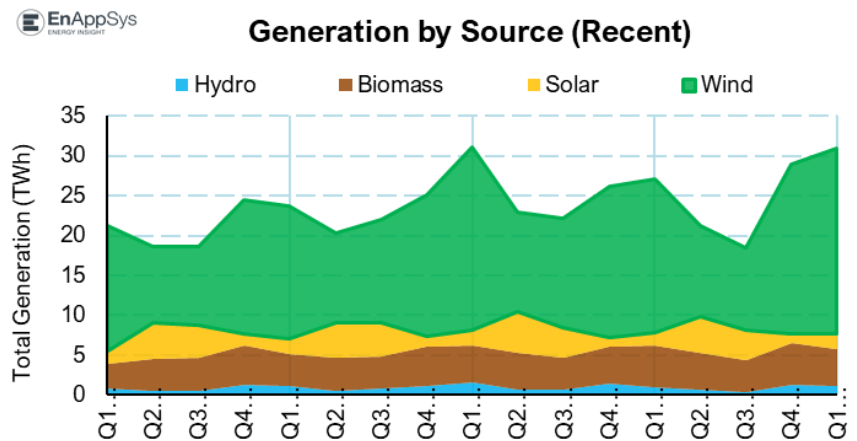


Figure 11: Total generation by the renewable fleets for each quarter since 2018

Statistics

The table below shows key statistics on renewable electricity output during 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 these fleets, based on the same quarter last year as this data is published at a lag of ~3 months by BEIS⁵:

Table 6: Quarterly renewable generation TWh and %

*GB Only (Excludes Northern Ireland)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
TOTAL GENERATION BY FUEL (TWh)									
Biomass	7.38	7.05	6.35	7.12	7.64	7.04	6.23	7.58	7.00
Hydro	2.46	1.19	1.21	2.24	1.71	1.09	0.61	2.10	1.87
Solar	1.95	5.06	3.86	1.16	1.69	4.53	3.75	1.25	1.98
Wind	23.00	12.59	13.68	19.01	19.25	11.48	10.41	21.29	23.27
TOTAL RENEWABLES	34.79	25.89	25.09	29.52	30.29	24.14	21.00	32.23	34.12
								24.65	27.12
SHARE OF RENEWABLE GENERATION (%)									
Biomass	21.2%	27.2%	25.3%	24.1%	25.2%	29.2%	29.7%	23.5%	20.5%
Hydro	7.1%	4.6%	4.8%	7.6%	5.6%	4.5%	2.9%	6.5%	5.5%
Solar	5.6%	19.5%	15.4%	3.9%	5.6%	18.8%	17.9%	3.9%	5.8%
Wind	66.1%	48.6%	54.5%	64.4%	63.5%	47.6%	49.6%	66.1%	68.2%
SHARE OF TOTAL GENERATION (%)									
Biomass	9.4%	11.6%	9.8%	9.4%	9.8%	10.3%	9.5%	10.1%	9.2%
Hydro	3.1%	2.0%	1.9%	2.9%	2.2%	1.6%	0.9%	2.8%	2.5%
Solar	2.5%	8.3%	6.0%	1.5%	2.2%	6.6%	5.7%	1.7%	2.6%
Wind	29.2%	20.8%	21.2%	25.0%	24.7%	16.7%	16.0%	28.4%	30.7%
LARGEST RENEWABLE SOURCE	WIND	WIND	WIND	WIND	WIND	WIND	WIND	WIND	WIND

The table below shows key statistics in the quarter and the same quarter in the previous eight years:

Table 7: Year-on-year comparison of Q1 renewable output TWh and %

*GB Only (Excludes Northern Ireland)	Q1 2014	Q1 2015	Q1 2016	Q1 2017	Q1 2018	Q1 2019	Q1 2020	Q1 2021	Q1 2022
TOTAL GENERATION BY FUEL (TWh)									
Biomass	2.05	1.84	2.60	2.99	5.70	6.56	7.38	7.64	7.00
Hydro	2.48	2.36	2.11	2.38	1.65	1.87	2.46	1.71	1.87
Solar	0.51	0.91	1.51	1.59	1.68	2.00	1.95	1.69	1.98
Wind	9.42	10.04	8.66	11.34	15.62	16.55	23.00	19.25	23.27
TOTAL RENEWABLES	14.46	15.14	14.89	18.29	24.65	26.98	34.79	30.29	34.12
SHARE OF RENEWABLE GENERATION (%)									
Biomass	14.2%	12.1%	17.5%	16.4%	23.1%	24.3%	21.2%	25.2%	20.5%
Hydro	17.2%	15.6%	14.2%	13.0%	6.7%	6.9%	7.1%	5.6%	5.5%
Solar	3.5%	6.0%	10.1%	8.7%	6.8%	7.4%	5.6%	5.6%	5.8%
Wind	65.2%	66.3%	58.2%	62.0%	63.4%	61.3%	66.1%	63.5%	68.2%
SHARE OF TOTAL GENERATION (%)									
Biomass	2.4%	2.2%	3.3%	3.7%	6.6%	8.1%	9.4%	9.8%	9.2%
Hydro	2.9%	2.8%	2.6%	2.9%	1.9%	2.3%	3.1%	2.2%	2.5%
Solar	0.6%	1.1%	1.9%	2.0%	2.0%	2.5%	2.5%	2.2%	2.6%
Wind	11.1%	11.8%	10.8%	14.0%	18.1%	20.4%	29.2%	24.7%	30.7%
LARGEST RENEWABLE SOURCE	WIND	WIND	WIND	WIND	WIND	WIND	WIND	WIND	WIND

⁵ <https://www.gov.uk/government/statistics/energy-trends-section-6-renewables/Renewables> obligation: certificates and generation (monthly - Excel)

5 Generation Margin

Generation margin is the volume of available generation capacity above that already generating. When demand is high, margin volume tends to be lower as more units are already online resulting in a tighter system and the cost of the margin that is available tends to increase, as it is composed of units that are low in the merit stack and/or have large start-up costs and so higher offer on/up prices.

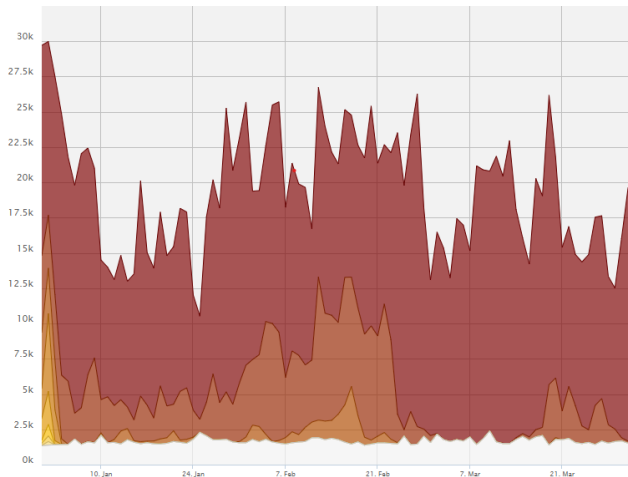


Figure 12: System Margin Summary for Q1 2022. The red band indicates margin priced as £250/MWh or above and white indicates margin prices between £0-50/MWh.

This is shown in the charts in figures 11 and 12 which show the volume of margin available in different BM offer price bands, from £0-50/MWh (white) to £250/MWh plus (dark red) for Q1 2022 and Q1 2021. The majority of margin available this quarter was priced as £250/MWh or above which is in stark contrast to the margin in Q1 2021 in which only a small proportion was priced above £250/MWh. The pattern of expensive margins was also seen in Q4 2021 and this has been sustained into this quarter.⁷

The average margin across the quarter on a time-weighted basis across all periods⁶ was 21.2GW, an increase from the 20.3GW of the previous quarter and the 18.4GW of Q1 2021. However, due to the increase in underlying fuel prices and therefore the cost of generation and offer prices, the cost of available margin was substantially increased compared to that for Q1 2020.

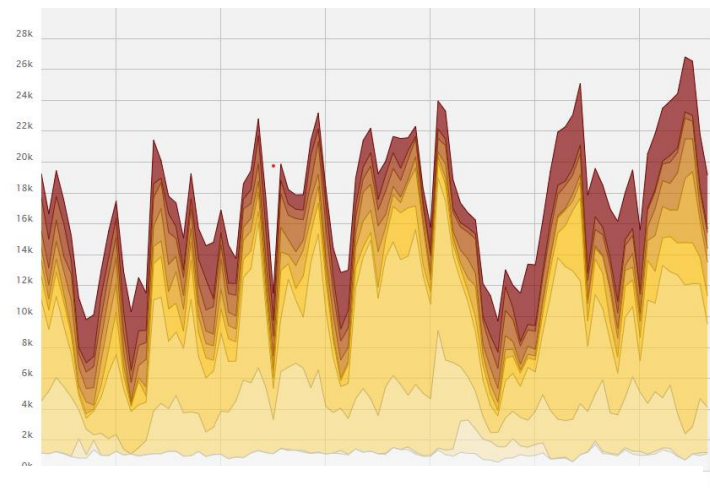


Figure 13: System Margin Summary for Q1 2021. The same scale as Figure 3 above applies.

⁶ i.e. this includes all settlement periods including overnight periods of low demand when margin is much greater than during periods of peak demand

⁷ Charts on this page can be found here on the EnAppSys platform:
https://enbm.netareports.com/#systemmarginoverall?country=uk&start=201401010000&end=202204110000&series_to_plot=fuel&filter=none&none=null&plotas=0

6 Wholesale and System Prices

Due to escalating fuel prices feeding into wholesale and system prices, this quarter was the most expensive Q1 on record. Day-ahead, within-day and system prices all saw averages more than three times what they were in Q1 2021 and more than six times what they were in Q1 2020. The prices were generally comparable in magnitude to those seen in Q4 2021, albeit average day-ahead prices were slightly lower and system prices slightly higher.

Wholesale prices

Day-ahead prices maintained the very high levels seen in Q4 2021 this quarter. Therefore, compared to Q1 2021, the prices were substantially higher. The average EPEX day-ahead price this quarter was £200.80/MWh and the corresponding Nordpool price was £199.63/MWh. These are more than triple the average prices in the same auctions for Q1 2021 which were £63.67/MWh for both auctions.

However, on average, the day-ahead prices for both the EPEX and Nordpool auctions decreased slightly compared to the previous quarter, with both auctions observing a 2% decrease from Q4 2021 and never exceeding the previous all-time high.

These high electricity prices, due to very high underlying gas prices, sustained from those seen in the previous quarter. However, unlike with Q4 2021, coal prices saw a similar peak to gas prices, peaking at £50.21/MWh since there was similar uncertainty regarding coal supplied as there was with gas following the invasion of Ukraine. High fossil fuel prices were the primary factor in keeping day-ahead prices at similar levels to the previous quarter despite increased wind generation.

Unlike day-ahead prices, within-day prices increased by 2%, driven primarily by the increase in fuel costs mentioned above as well as the general uncertainty and instability in the market. Compared to Q1 2021, within-day prices more than tripled with a 226% increase being observed from £59.62/MWh in 2021 to £194.30/MWh this quarter.

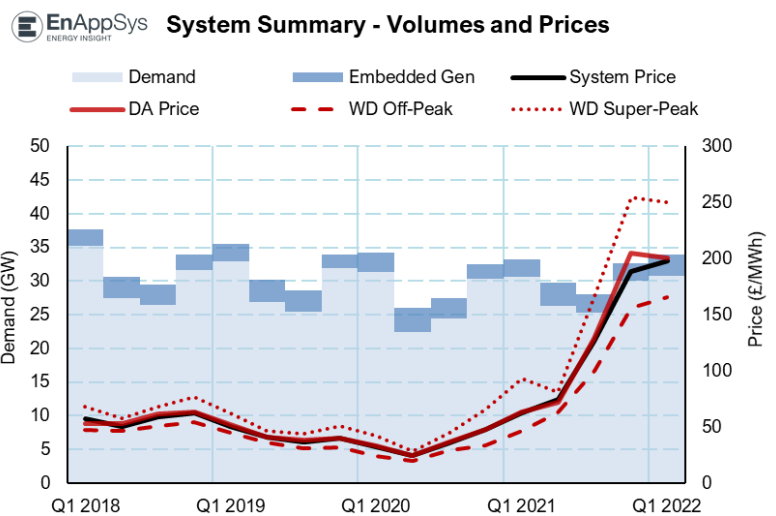


Figure 14: Average quarterly demand and embedded generation, plus average system price, day-ahead price, plus off-peak and super-peak within-day prices since Q1 2018.

Although this quarter saw an increase in average within-day prices compared to Q4 2021, they did not peak above the all-time high of £1815.37/MWh which was seen in that quarter.

System prices

System prices increased by 5% this quarter compared to the previous quarter, rising from £188.62/MWh to £197.64/MWh. Unlike day-ahead and within-day prices, however, system prices reached a peaked above that seen in Q4 2021, reaching £4,035.98/MWh. This is higher than the peak of £3,916.28/MWh from last quarter, but beneath the all-time high peak of £4,037.80/MWh seen in Q3 2021.

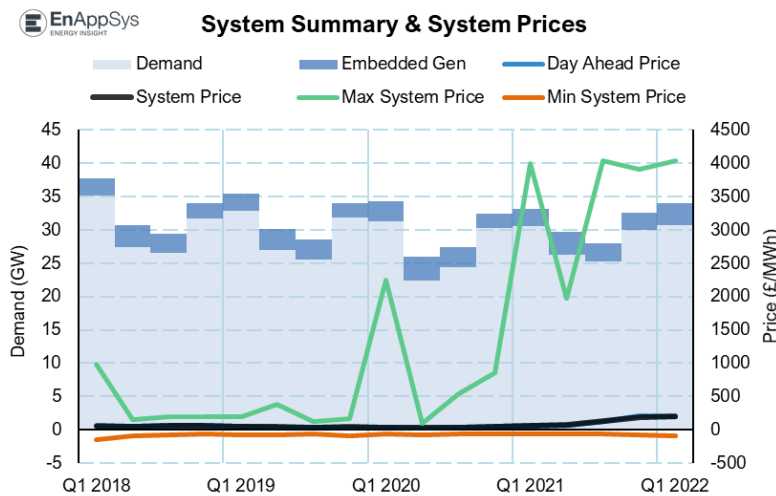


Figure 15: Average quarterly demand and embedded generation, plus average system price, day-ahead price, plus off-peak and super-peak within-day prices since Q1 2018.

The dramatic increase in underlying fuel prices also fed into system prices, with the average system price being 219% higher than the £62.04/MWh seen in Q1 2021 and 512% higher than the £32.30/MWh seen in Q1 2020. This therefore, has been the Q1 with the highest average system prices on record.

Statistics

The table below shows key statistics on generation 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 minimum, average and maximum values⁸.

Table 8: Quarterly price summary Q1 2020 to Q1 2022

*GB Only (Excludes Northern Ireland)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
WHOLESALE PRICES (£/MWh)									
EPEX Day-Ahead Price	32.70	24.25	36.42	47.51	63.67	72.20	128.59	205.27	200.80
Nordpool Day-Ahead price	32.70	24.25	36.42	47.51	63.67	73.02	129.23	203.17	199.63
Within Day Price (MIDP)	30.95	23.49	35.33	45.42	59.62	71.80	125.19	191.25	194.30
WITHIN DAY PRICE BREAKDOWN (£/MWh)									
Off-Peak Hours	24.42	19.59	28.82	33.49	46.19	62.71	100.21	156.55	165.99
Peak Hours (excl Superpeak)	32.08	24.66	36.77	47.55	58.89	75.06	129.48	195.78	196.87
Superpeak Hours	41.95	28.21	45.11	65.25	93.27	81.01	166.34	254.87	249.86
SYSTEM PRICE (£/MWh)									
Maximum	2242.31	100.00	540.22	849.82	4000.00	1971.59	4037.80	3916.28	4035.98
Average	32.30	24.76	35.54	47.49	62.04	74.85	126.14	188.62	197.64
Minimum	-66.25	-70.49	-60.00	-63.93	-61.00	-59.95	-66.73	-70.97	-90.32
Transmission System Demand (MW average)	31,343	22,431	24,380	30,303	30,593	26,323	25,258	30,075	30,738
Demand Incl. Embedded Gen. (MW average)	34,280	26,023	27,443	32,515	33,148	29,719	28,023	32,630	33,968
Transmission System Demand (TWh total)	67.7	49.0	53.8	66.9	66.1	57.5	55.8	66.4	66.4
Demand Incl. Embedded Gen. (TWh total)	74.0	56.8	60.6	71.8	71.6	64.9	61.9	72.0	73.4

The table below shows key statistics in the quarter and the same quarter in the previous eight years:

Table 9: Year-on-year comparison of Q1 prices

*GB Only (Excludes Northern Ireland)	Q1 2014	Q1 2015	Q1 2016	Q1 2017	Q1 2018	Q1 2019	Q1 2020	Q1 2021	Q1 2022
WHOLESALE PRICES (£/MWh)									
EPEX Day-Ahead Price	45.04	40.84	34.63	47.96	52.72	51.83	32.70	63.67	200.80
Nordpool Day-Ahead price	45.04	40.84	34.63	47.96	52.72	51.83	32.70	63.67	199.63
Within Day Price (MIDP)	45.45	40.47	34.25	47.23	54.16	50.39	30.95	59.62	194.30
WITHIN DAY PRICE BREAKDOWN (£/MWh)									
Off-Peak Hours	36.87	33.62	28.62	40.53	47.28	44.39	24.42	46.19	165.99
Peak Hours (excl Superpeak)	46.93	41.09	33.89	47.14	54.62	50.88	32.08	58.89	196.87
Superpeak Hours	59.99	53.91	48.26	62.85	68.24	62.35	41.95	93.27	249.86
SYSTEM PRICE (£/MWh)									
Maximum	179.70	173.71	517.55	292.55	990.00	195.00	2242.31	4000.00	4035.98
Average	51.96	46.46	36.66	46.34	57.41	50.63	32.30	62.04	197.64
Minimum	0.00	3.65	-63.02	-14.00	-150.00	-70.24	-66.25	-61.00	-90.32
Transmission System Demand (MW average)	36,852	37,109	35,335	34,613	35,203	32,936	31,343	30,593	30,738
Demand Incl. Embedded Gen. (MW average)	38,053	38,836	37,214	36,786	37,725	35,493	34,280	33,148	33,968
Transmission System Demand (TWh total)	79.6	80.2	76.3	74.8	76.0	71.1	67.7	66.1	66.4
Demand Incl. Embedded Gen. (TWh total)	82.2	83.9	80.4	79.5	81.5	76.7	74.0	71.6	73.4

⁸ 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.

7 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 Northern Ireland is separate from GB and is more closely linked to the electricity grid of the Republic of Ireland.

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 databased matching of 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 APX day-ahead prices.

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

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

