

GB Electricity Market Summary

Q2-2020

April to June

Generation and Contribution by Fuel Type

Renewables:	25.6TWh (-28%)	Gas:	18.8TWh (-20%)	Nuclear:	11.2TWh (-9%)
Imports:	4.6TWh (-22%)	Coal:	0.1TWh (-96%)		

% changes stated with respect to values in the previous quarter

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1 Executive Summary

Demand

The second quarter of 2020 – (April - June) saw demand at its lowest quarterly level since before 2009. Demand has been steadily decreasing over the past 10 years or so, but as a result of the Covid-19 induced lockdown measures, there was a sharper 25% decrease in Q2: an average of 21.6GW in Q2-2020 down from 28.8GW in Q1-2020.

The Covid-19 induced lockdown continued into the quarter, with demand dropping to consistently low levels; 20% lower on average than those seen in Q2-2019. As GB gradually comes out of lockdown, demand levels may rise again, though no significant increase has been seen so far.

Generation

Despite the levels of wind generation decreasing from last quarter's record-breaking levels, renewables remained the greatest contributor to the fuel mix (42.5%) followed by gas (31.2%).

The decrease in the wind generation can be attributed in part to the need for wind to be bid down in the BM on several occasions in order to bring synchronous generation on to maintain inertia in the system for stability reasons. 0.6TWh of wind bids were accepted in the BM during Q2 representing 5% of potential output.

Solar output recorded a record quarterly level of 5TWh. As with the last quarter, renewable generation also exceed that of total fossil fuel generation (i.e. gas plus coal).

Coal generation has been decreasing gradually year by year, but this quarter saw a record-breaking 67 days and 16 hours without coal generation as part of the fuel mix. This is the longest GB has been without coal in the fuel mix since coal was first used to generate electricity continuously in London by Thomas Edison in 1882. This run started on the 9th of April at 23:30 when Drax 5 came offline and came to an end when Drax 6 turned on a boiler in mid-June for routine maintenance. Since then, no further coal generation has been seen. Drax 5 and 6 were the only coal units to generate in the quarter, amounting to just 0.2% of the total quarterly fuel mix.

Drax Units 5 & 6 are due to close in March 2021, West Burton A in September 2021, and finally Ratcliffe on Soar in 2024. For the foreseeable future, coal is only expected to generate in colder

months and when in merit. The current landscape of low demand and high renewables is not favourable for coal.

Nuclear generation saw its lowest quarterly output since before 2002, lower even than Q2-2008 at the time of the financial crisis. Total nuclear generation was 11.2TWh, down from the 11.6TWh of Q1-2020. In May 2020, National Grid extended a contract with EDF to reduce output from the Sizewell B nuclear station, in a bid to keep the system stable over summer. This is part of the strategy to balance the network through the period of exceptionally low demand due to Covid-19. This deal will be worth between £34m and £46m to EDF, depending on market prices, and is due to last until August.

In addition, the older reactors have been seeing increasing levels of downtime as they move towards the end of their operational life.

Prices

The second quarter of the year generally saw low to very low prices and very low demand levels, as the impacts of the Coronavirus lockdown were in full effect.

Aside from the changing demand profiles, the quarter saw the continued decline in prices which appeared to plateau by the end of the quarter, aside from some spikes of very low prices. System prices are expected to continue to be low into the next quarter due to low levels of economic activity, but as economic activity picks up, prices may rise again.

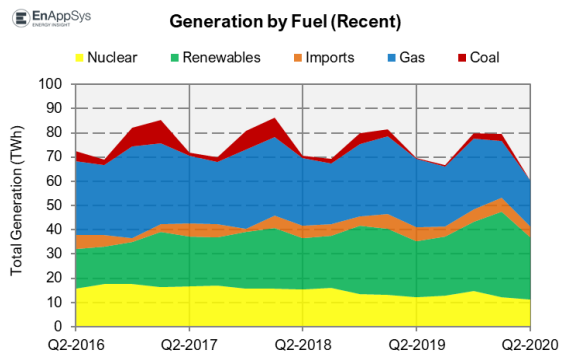
In the markets, while no extreme peaks were seen this quarter, some very low prices occurred, notably £-70.49/MWh on 22/05/2020 at 05:30 and £-65.94 on 28/06/2020 at 08:00, with prices often remaining negative for hours at a time. On both occasions, the price seems to be a product of a well-supplied system combined with very low demand and so bids were required to reduce generation.

In the quarter, 42.5% of power generation came from renewable projects, 31.2% from gas-fired plants, 18.6% from nuclear plants, 7.6% from power imports and 0.2% from coal plants.

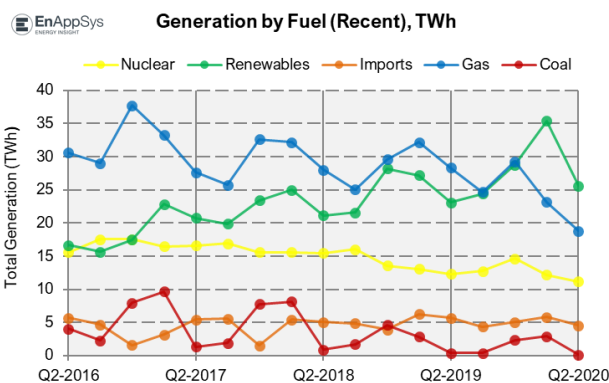
2 Fuel Activity Overview

The second quarter of 2020 saw renewables remain the largest proportion of the fuel mix for a second consecutive quarter, and also the largest by total generation. Total generation as a whole

decreased by 25% from 79.4TWh in Q1-2020 to 60.3TWh in Q2-2020, due to reduced demand as a result of the lockdown restrictions taken to mitigate the Covid-19 pandemic. All fuel types in the adjacent graph saw a decrease in generation from last quarter; coal seeing the largest decrease of 96%, and nuclear the smallest at 9%. Coal was only in merit at the beginning of the quarter¹ and Drax 5 and 6 were the only coal units to generate at all.



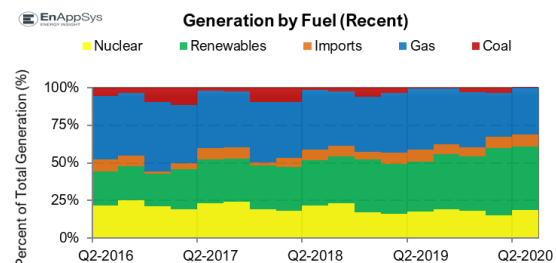
Solar generation steadily increased throughout the summer months reaching a record quarterly high of 5TWh and wind levels remained relatively high, often making up the majority of the fuel



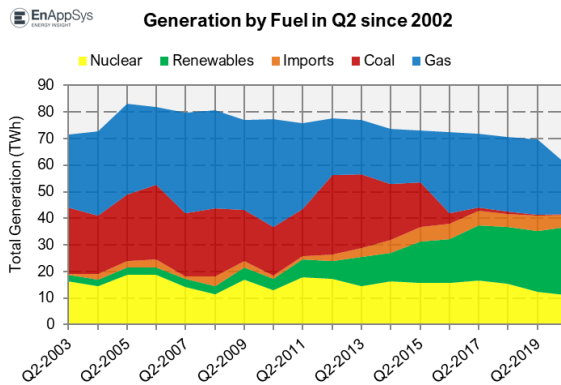
mix near the middle of the day. The flexibility of the gas fleets was pushed, and the interconnectors often reversed, leaving a landscape that coal could not compete with.

In the longer term view of historical Q2s, total generation has seen a general downward trend since 2005, with a markedly steeper decrease occurring in Q2-2020. Previous trends have continued, with renewable generation increasing while Gas, Coal and Nuclear continue decreasing.

Power output from coal plants was at its lowest quarterly level since before 2002. The only coal plants that remain active are Drax 5 and 6, West Burton A and Ratcliffe, but only Drax 5 and 6 generated this quarter. Drax 5 and 6 and West Burton A are planned to close in 2021 and Ratcliffe in 2024.

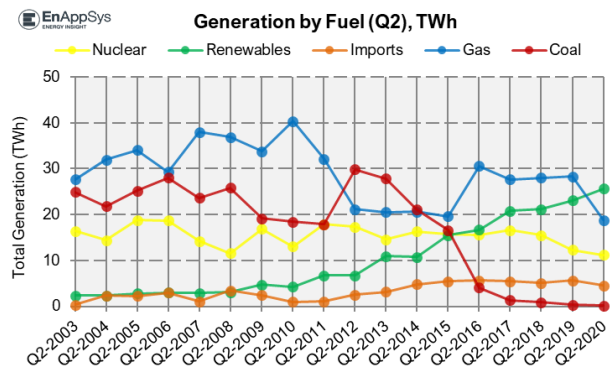


¹ Though Drax 6 did run for maintenance reasons in late June

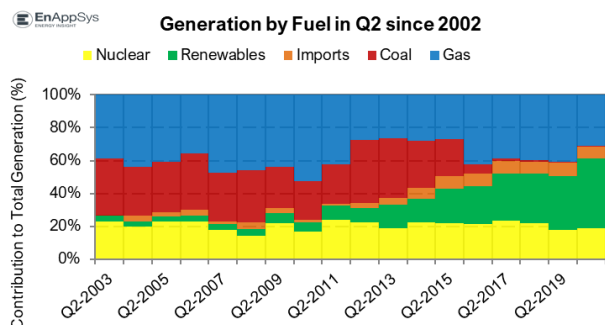


The third largest source of electricity generation after renewables and gas-fired generation continues to be from nuclear power output, but with nuclear plants starting to see declining levels of generation as the frequency of outages increases as the plants move towards the end of their operational lives.

This saw 11.2TWh of generation come from nuclear plants in the quarter, with this being the lowest total generation volume in a quarter since before 2002. A large factor was the extension of the Sizewell B contract by national grid, allowing it to reduce the output of the power station to keep the system stable over the period of unusually low demand. As a result, the quarter closed having seen no generation from Sizewell B since the 7th of May. This represents a loss of 1.31 TWh from the generation mix had the station been generating continuously. This would have increased the total generation from nuclear up from 11.2 TWh to 12.5 TWh, a 12% increase.



Levels of nuclear generation are set to continue to decline as plants are scheduled to close with this expected to be offset by any new nuclear builds and increased levels of renewable / gas generation.



Levels of electricity imports totalled 4.6TWh in the quarter, which is lower than usual for this time of year, as well as being a 22% decrease from the previous quarter. There were extended periods of exports during periods of low demand and high renewable generation.

In the quarter, 42.5% of power generation came from renewable projects, 31.2% from gas-fired plants, 18.6% from nuclear plants, 7.6% from power imports and 0.2% from coal plants.

Statistics

The following tables contain some of the key statistics relating to generation in the quarter:

*GB Only (Excludes Northern Ireland)	Q2-2018	Q3-2018	Q4-2018	Q1-2019	Q2-2019	Q3-2019	Q4-2019	Q1-2020	Q2-2020
TOTAL GENERATION BY FUEL (TWh)									
Coal	0.92	1.71	4.63	2.85	0.36	0.41	2.32	2.92	0.11
Gas	27.99	25.08	29.60	32.21	28.31	24.67	29.26	23.15	18.80
Imports	5.06	4.86	3.93	6.24	5.67	4.33	5.02	5.80	4.57
Nuclear	15.48	16.02	13.59	13.06	12.28	12.78	14.61	12.17	11.19
Renewables (Biomass, Wind, Solar & Hydro)	21.16	21.56	28.19	27.22	23.06	24.41	28.75	35.40	25.62
FOSSIL FUELS	28.91	26.79	34.24	35.05	28.67	25.08	31.58	26.06	18.91
TOTAL	70.60	69.23	79.94	81.58	69.67	66.60	79.97	79.43	60.28
Fossil Fuel Percentage	41%	39%	43%	43%	41%	38%	39%	33%	31%
Clean Percentage (Renewable & Nuclear)	52%	54%	52%	49%	51%	56%	54%	60%	61%
Renewable Share of Clean Power	58%	57%	67%	68%	65%	66%	66%	74%	70%
SHARE OF GENERATION (%)									
Coal	1.3%	2.5%	5.8%	3.5%	0.5%	0.6%	2.9%	3.7%	0.2%
Gas	39.6%	36.2%	37.0%	39.5%	40.6%	37.0%	36.6%	29.1%	31.2%
Imports	7.2%	7.0%	4.9%	7.6%	8.1%	6.5%	6.3%	7.3%	7.6%
Nuclear	21.9%	23.1%	17.0%	16.0%	17.6%	19.2%	18.3%	15.3%	18.6%
Renewables (Biomass, Wind, Solar & Hydro)	30.0%	31.1%	35.3%	33.4%	33.1%	36.7%	36.0%	44.6%	42.5%

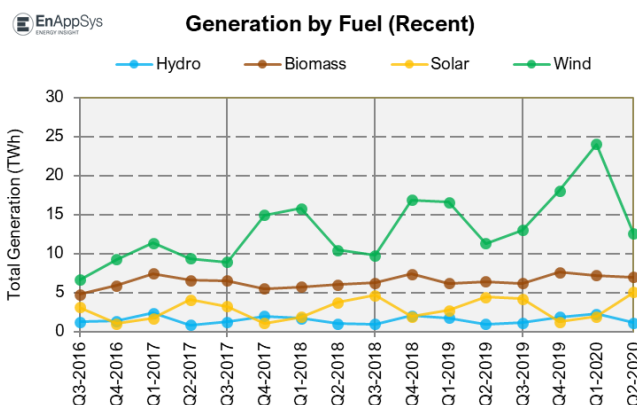
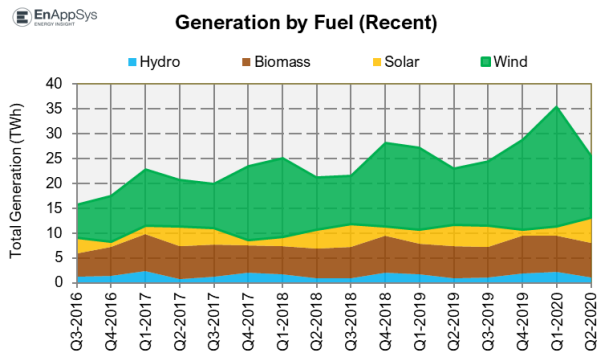
*GB Only (Excludes Northern Ireland)	Q2-2018	Q3-2018	Q4-2018	Q1-2019	Q2-2019	Q3-2019	Q4-2019	Q1-2020	Q2-2020
AVERAGE GENERATION BY FUEL (GW)									
Coal	0.4	0.8	2.1	1.3	0.2	0.2	1.0	1.4	0.0
Gas	12.8	11.4	13.4	14.9	13.0	11.2	13.3	10.7	8.6
Imports	2.3	2.2	1.8	2.9	2.6	2.0	2.3	2.7	2.1
Nuclear	7.1	7.3	6.2	6.0	5.6	5.8	6.6	5.6	5.1
Renewables (Biomass, Wind, Solar & Hydro)	9.7	9.8	12.8	12.6	10.6	11.1	13.0	16.4	11.7
FOSSIL FUELS	13.2	12.1	15.5	16.2	13.1	11.4	14.3	12.1	8.7
TOTAL	32.3	31.4	36.2	37.8	31.9	30.2	36.2	36.8	27.6

*GB Only (Excludes Northern Ireland)	Q2-2012	Q2-2013	Q2-2014	Q2-2015	Q2-2016	Q2-2017	Q2-2018	Q2-2019	Q2-2020
TOTAL GENERATION BY FUEL (TWh)									
Coal	29.89	27.88	21.11	16.60	4.05	1.30	0.92	0.36	0.11
Gas	21.14	20.49	20.67	19.63	30.58	27.65	27.99	28.31	18.80
Imports	2.50	3.20	4.79	5.48	5.67	5.41	5.06	5.67	4.57
Nuclear	17.31	14.55	16.30	15.81	15.57	16.59	15.48	12.28	11.19
Renewables (Biomass, Wind, Solar & Hydro)	6.70	10.95	10.79	15.54	16.66	20.77	21.16	23.06	25.62
FOSSIL FUELS	51.02	48.38	41.78	36.22	34.63	28.95	28.91	28.67	18.91
TOTAL	77.53	77.07	73.66	73.06	72.53	71.72	70.60	69.67	60.28
Fossil Fuel Percentage	66%	63%	57%	50%	48%	40%	41%	41%	31%
Clean Percentage	31%	33%	37%	43%	44%	52%	52%	51%	61%
Renewable Share of Clean Power	9%	14%	15%	21%	23%	29%	30%	33%	42%
SHARE OF GENERATION (%)									
Coal	38.5%	36.2%	28.7%	22.7%	5.6%	1.8%	1.3%	0.5%	0.2%
Gas	27.3%	26.6%	28.1%	26.9%	42.2%	38.6%	39.6%	40.6%	31.2%
Imports	3.2%	4.1%	6.5%	7.5%	7.8%	7.5%	7.2%	8.1%	7.6%
Nuclear	22.3%	18.9%	22.1%	21.6%	21.5%	23.1%	21.9%	17.6%	18.6%
Renewables (Biomass, Wind, Solar & Hydro)	8.6%	14.2%	14.6%	21.3%	23.0%	29.0%	30.0%	33.1%	42.5%

3 Renewables

The quarter saw a 28% decrease from the record high levels of renewable generation seen last quarter, at 25.6TWh down from 35.4TWh. Despite this, renewables remained the greatest contributor to the generation mix for the second quarter in a row and were at the 5th highest levels of all time. Renewables made up 42.5% of the generation mix, the second highest of any quarter after Q1-2020.

This generally high level of renewables was primarily due to a combination of decent wind generation as well as the highest quarterly solar output of all time at 5.0TWh during a period of extended sunny weather.



Total wind output was 12.55TWh, a sharp 48% decrease from the record levels last quarter, but still in the usual range as seen in previous years. Despite this, from the level in Q2-2019, this quarter's wind output was 11% higher, up from 11.32TWh. The decrease in the wind generation can be attributed in part to the need for wind to be bid down

in order to bring synchronous generation on to maintain inertia in the system for stability reasons. This was due to the lower demand coming as the Covid-19 induced lockdown continued into this quarter. 0.7TWh of wind bids were accepted in the BM during Q2.

The next highest share of renewable generation came from biomass plants, which generated 7.0TWh (down from 7.2TWh in Q1-2020). This amounted to 27% of overall renewable generation levels.

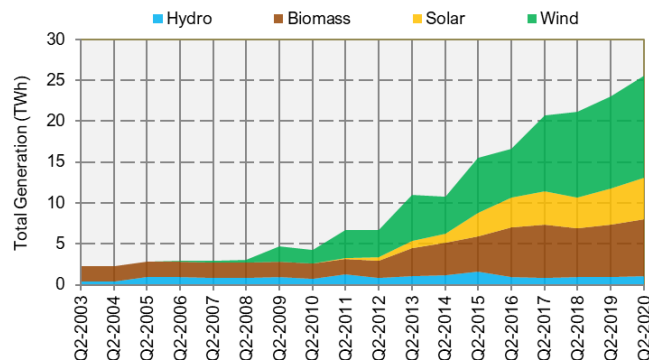
The next largest share of renewable generation came from solar plants, seeing their quarterly all time high of 5.0TWh. Quarters 2 and 3 usually have higher solar output, and compared to previous

Q2s, an upward trend in solar generation levels continued as a consequence of increased solar capacity and an extended period of consistently sunny weather.

The smallest share of renewable generation came from hydro plants which generated 1.1TWh in the quarter. This is relatively low, both compared to recent quarters and historical Q2 levels.

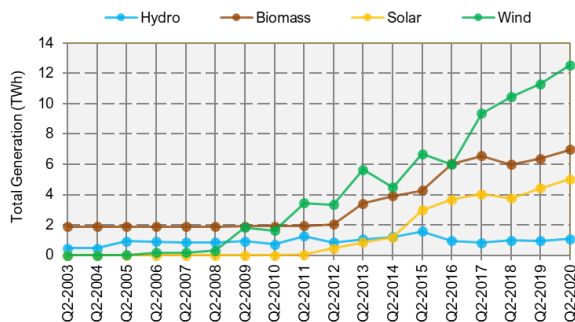
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Generation by Fuel (Q2)



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Generation by Fuel (Q2)



In the quarter, wind farms generated 49.0% of all renewable generation, biomass 27.2%, solar farms 19.6% and hydro 4.2%. As a percentage of total generation, wind farms produced 20.8%, biomass 11.6%, solar farms 8.3% and hydro 1.8%.

Statistics

The following tables contain some of the key statistics relating to renewable electricity output during the quarter:

*GB Only (Excludes Northern Ireland)	Q2-2018	Q3-2018	Q4-2018	Q1-2019	Q2-2019	Q3-2019	Q4-2019	Q1-2020	Q2-2020
TOTAL GENERATION BY FUEL (TWh)									
Biomass	5.98	6.26	7.38	6.20	6.38	6.15	7.61	7.19	6.96
Hydro	0.98	0.92	2.04	1.74	0.95	1.09	1.86	2.27	1.09
Solar	3.76	4.62	1.91	2.72	4.42	4.20	1.22	1.91	5.02
Wind	10.44	9.77	16.87	16.56	11.32	12.97	18.07	24.03	12.55
TOTAL RENEWABLES	21.16	21.56	28.19	27.22	23.06	24.41	28.75	35.40	25.62
SHARE OF RENEWABLE GENERATION (%)									
Biomass	28.3%	29.0%	26.2%	22.8%	27.7%	25.2%	26.5%	20.3%	27.2%
Hydro	4.6%	4.2%	7.2%	6.4%	4.1%	4.5%	6.5%	6.4%	4.2%
Solar	17.8%	21.4%	6.8%	10.0%	19.1%	17.2%	4.2%	5.4%	19.6%
Wind	49.4%	45.3%	59.8%	60.8%	49.1%	53.1%	62.8%	67.9%	49.0%
SHARE OF TOTAL GENERATION (%)									
Biomass	8.5%	9.0%	9.2%	7.6%	9.2%	9.2%	9.5%	9.0%	11.6%
Hydro	1.4%	1.3%	2.5%	2.1%	1.4%	1.6%	2.3%	2.9%	1.8%
Solar	5.3%	6.7%	2.4%	3.3%	6.3%	6.3%	1.5%	2.4%	8.3%
Wind	14.8%	14.1%	21.1%	20.3%	16.2%	19.5%	22.6%	30.3%	20.8%
LARGEST RENEWABLE SOURCE	WIND	WIND	WIND	WIND	WIND	WIND	WIND	WIND	WIND

*GB Only (Excludes Northern Ireland)	Q2-2012	Q2-2013	Q2-2014	Q2-2015	Q2-2016	Q2-2017	Q2-2018	Q2-2019	Q2-2020
TOTAL GENERATION BY FUEL (TWh)									
Biomass	2.05	3.41	3.92	4.28	6.04	6.56	5.98	6.38	6.96
Hydro	0.85	1.05	1.21	1.58	0.95	0.81	0.98	0.95	1.09
Solar	0.45	0.85	1.18	2.98	3.68	4.05	3.76	4.42	5.02
Wind	3.35	5.64	4.48	6.70	5.98	9.35	10.44	11.32	12.55
TOTAL RENEWABLES	6.70	10.95	10.79	15.54	16.66	20.77	21.16	23.06	25.62
SHARE OF RENEWABLE GENERATION (%)									
Biomass	30.6%	31.2%	36.3%	27.6%	36.3%	31.6%	28.3%	27.7%	27.2%
Hydro	12.7%	9.6%	11.2%	10.2%	5.7%	3.9%	4.6%	4.1%	4.2%
Solar	6.7%	7.7%	11.0%	19.2%	22.1%	19.5%	17.8%	19.1%	19.6%
Wind	50.0%	51.5%	41.5%	43.1%	35.9%	45.0%	49.4%	49.1%	49.0%
SHARE OF TOTAL GENERATION (%)									
Biomass	2.6%	4.4%	5.3%	5.9%	8.3%	9.1%	8.5%	9.2%	11.6%
Hydro	1.1%	1.4%	1.6%	2.2%	1.3%	1.1%	1.4%	1.4%	1.8%
Solar	0.6%	1.1%	1.6%	4.1%	5.1%	5.6%	5.3%	6.3%	8.3%
Wind	4.3%	7.3%	6.1%	9.2%	8.2%	13.0%	14.8%	16.2%	20.8%
LARGEST RENEWABLE SOURCE	WIND	WIND	WIND	WIND	BIOMASS	WIND	WIND	WIND	WIND

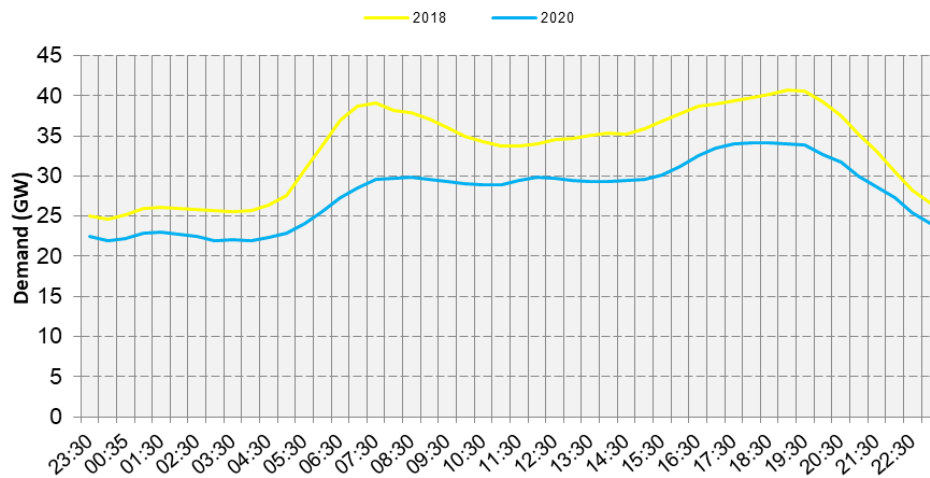
4 Demand and Prices

The second quarter of the year generally saw very low prices and demand since the Coronavirus lockdown was in full effect.

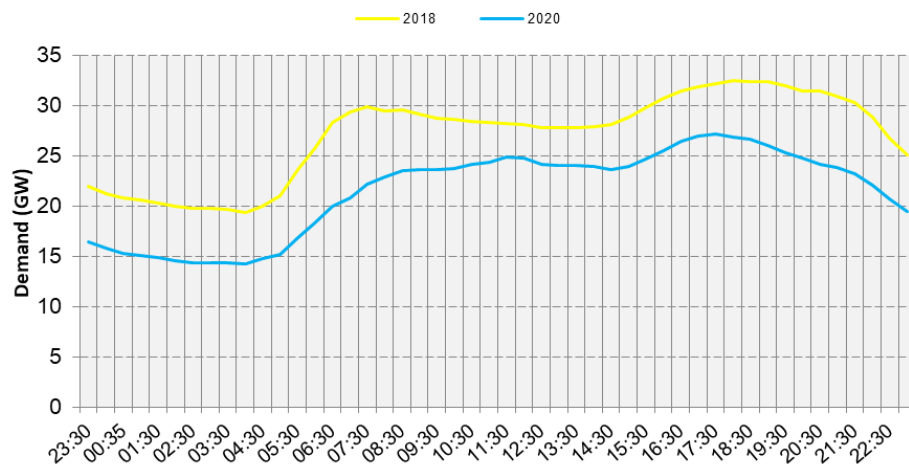
During this quarter, the demand profile retained the new shape that was seen towards the end of Q1-2020, with comparison of similar historic days showing a clear reduction in morning demand as demand within working hours dropped off. While evening peaks remained, they were less clearly defined, spreading out from a clear 5:00pm apex to a 5:00pm - 10:00pm general high. The evening cooking / lighting peak still occurred, but due to socioeconomic factors, this was not over as narrow a time range as is usual. There was a divergence from the usual levels of demand at the end of Q1 that persisted by the end of Q2. The two charts below show this.



Demand - Last Monday in March 2018 and 2020



Demand - Last Monday in June 2018 and 2020

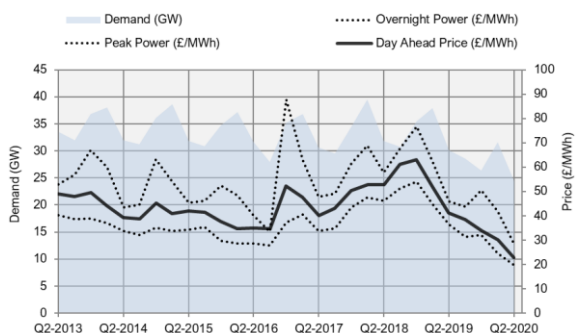


Aside from the changing demand profiles, the quarter saw a continued decline in prices, with the Covid-19 lockdown and economic activity playing a key role in this.

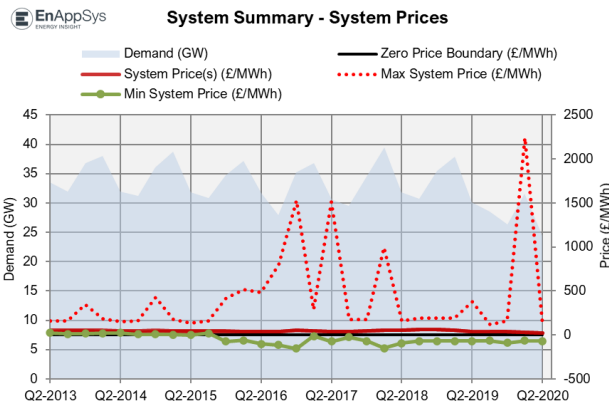
This reduction in prices is also in part driven by the growth in renewables which reduces the



System Summary - Volumes and Prices



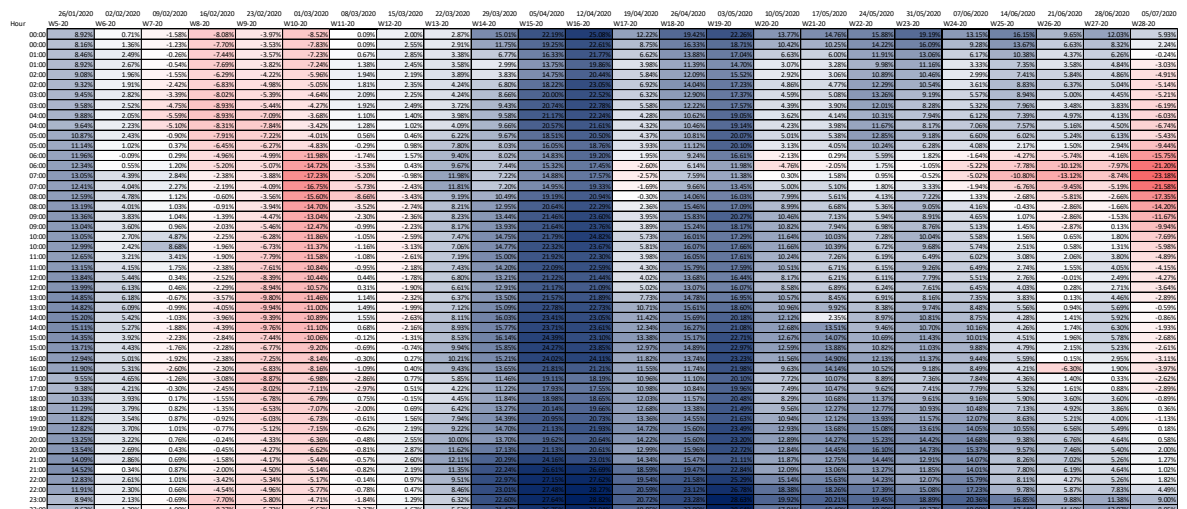
demand for commodities such as gas and coal below their historic levels (at least within European markets).



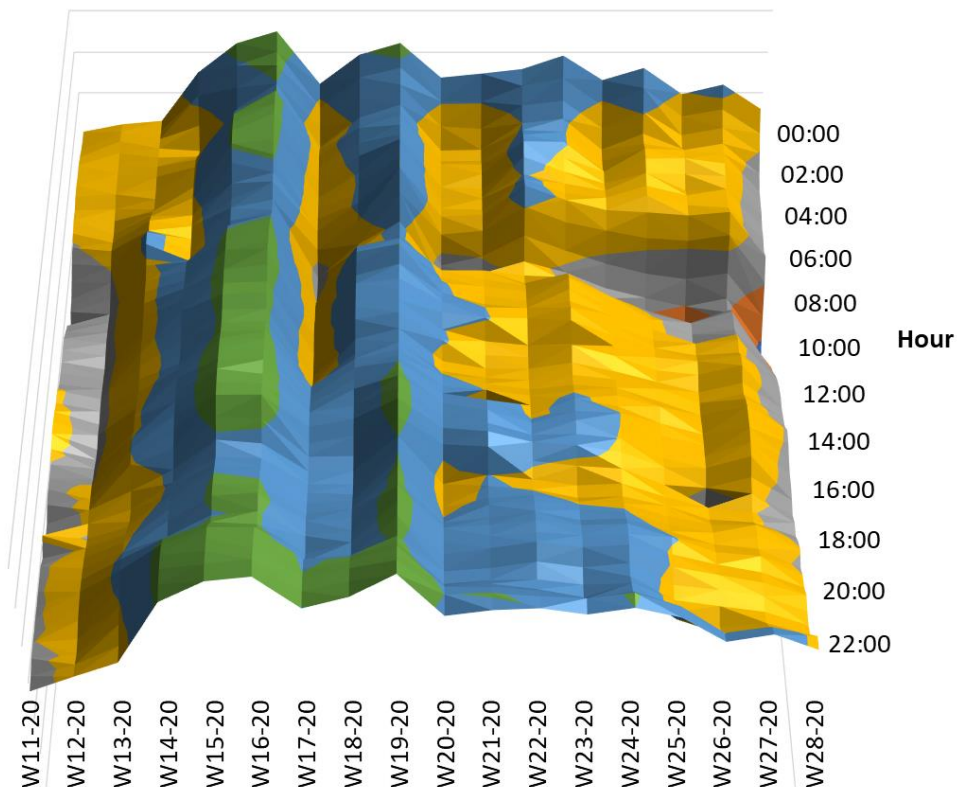
While no extreme peaks were seen this quarter, some very low prices occurred, notably £-70.49/MWh on 22/05/2020 at 05:30 and £-65.94 on 28/06/2020 at 08:00, with prices often remaining negative for hours at a time. On both occasions, the price seems to be a product of a well-supplied system combined with very low demand and so bids were required to reduce generation.

A detailed week by week analysis was carried out of 2020 v 2019 to look at the changing demand as we progressed through lockdown and to a post lockdown 'normal'. The following graphics show the result of this analysis on a weekly basis from January through to 1st week of July. The vertical axis is time of day. Blue is a reduction and red is an increase over the same period in 2019.

It shows the drastic reduction in demand mid March during the lockdown but shows increased demand coming out of lockdown on a like for like basis. Prior to lockdown the increase in demand was due to a cold spell in 2020 versus the same period in 2019 and post lockdown the increase will be related to weather but there is an indication that businesses returning to operation is producing an increase in demand over the old 'normal'.



The same data presented as a relief chart shows the period of lockdown and the emergence from lockdown.



Statistics

The following tables contain some of the key statistics relating to renewable electricity output during the quarter:

*GB Only (Excludes Northern Ireland)	Q2-2018	Q3-2018	Q4-2018	Q1-2019	Q2-2019	Q3-2019	Q4-2019	Q1-2020	Q2-2020
WHOLESALE PRICES (£/MWh)									
Day Ahead Price	52.66	61.25	62.98	51.82	41.18	38.50	34.00	30.00	22.80
Within Day Price (MIDP)	51.65	59.73	61.67	50.83	40.99	37.25	39.00	27.00	23.13
WITHIN DAY PRICE BREAKDOWN (£/MWh)									
Off-Peak Hours	46.26	51.32	54.03	44.70	36.52	31.22	32.01	24.47	19.65
Peak Hours (excl Superpeak)	53.39	62.89	62.39	51.22	42.32	39.27	39.93	32.18	24.71
Superpeak Hours	57.77	67.71	76.64	62.29	45.97	43.69	50.38	41.93	28.22
SYSTEM PRICE (£/MWh)									
Maximum	158.00	189.26	191.37	195.00	375.00	120.00	160.00	2242.31	100.00
Average	50.64	59.38	62.42	50.81	41.27	36.56	40.00	29.00	24.98
Minimum	-92.38	-71.45	-68.40	-70.24	-71.26	-65.93	-88.00	-66.25	-70.49
Demand (MW)	31,840	30,719	35,472	37,905	30,142	28,574	26,377	31,615	24,364
Availability (MW)	49,443	49,530	56,442	59,955	59,956	59,957	59,958	59,959	59,960
Demand (TWh)	69.5	67.8	78.3	81.9	65.8	63.1	58.2	68.3	53.2
Availability (TWh)	108.0	109.4	124.6	129.5	130.9	132.4	132.4	129.5	131.0

5 Notes on the Report

The figures used in the report refer to GB only, against BEIS figures 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 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.

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 and not distributed. 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.

6 About EnAppSys

EnAppSys provides services to companies in the energy and power markets, specifically by providing data, information and consultancy services.

EnAppSys is focused on providing information and analytical services covering the energy sector and is actively growing the business to provide products with enhanced analysis and forecasting capabilities.

The company has a European platform which covers underlying activity across all European markets with more detailed information available across Ireland, Belgium and the Netherlands with additional content in other regions being continuously built out.



To find out more about EnAppSys contact the company at info@enappsys.com or visit the company's website at www.enappsys.com.

Next to providing a pan-European energy data platform, flexible configurable screens and automated data feeds, EnAppSys offers consultancy services and incredibly detailed market insights for companies in the energy industry.

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.

M2GO City, Stadhuisplein 3, 4531 GZ, Terneuzen, The Netherlands

Company Registration No.: 67992358

