

EnAppSys
ENERGY INSIGHT

GB Electricity Market Summary

First Quarter 2019

January to March

Gas: 32.2TWh (+11.2%)
Imports: 6.2TWh (+62.3%)

Renewables: 27.2TWh (-1.1%)
Coal: 2.9TWh (-37.2%)

Nuclear: 16.1TWh (-1.7%)

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Executive Summary

The first quarter of 2019, running from the start of January through to the end of March, generally saw a continuation of the trends that had already been progressing in the market, with coal effectively ceasing to be a major fuel source in the GB power market.

This activity has come about as coal now ranks below gas, nuclear, wind, imports, biomass as a fuel source of significance in the GB market, with only solar and hydro producing less power than coal in the quarter.

Having dropped below 50% of generation in Q1 2018, the first quarter of 2019 saw the share of generation from fossil fuels continue to fall to hit 43% of total generation.

This means that fossil fuels have on a quarterly basis provided 39-43% in each of the past four quarters with this now being a very tight range as a result of the high levels of wind that occur across the winter period.

At the same time, the component of clean energy that came from renewable sources climbed to hit a record high of 68%. This clean energy includes nuclear and renewable sources.

The impact of all this activity was that the market continues to progress onwards to an increasingly green future, with the news that National Grid is seeking to be able to manage the system without any carbon emissions for a number of hours by 2025 set to continue to support this evolution.

Driving this progression was significant growth in levels of renewable generation in the first quarter of the year, with these levels hitting a new record high of 27.2TWh. This is up 8.8% from Q1 in the previous year.

These levels compare favorably with the 32.2TWh generated by gas-fired plants in the market (a difference that could be breached by a 2.5TWh increase in renewable generation and a subsequent 2.5TWh decrease in fossil fuel generation due to displacement).

This activity came as renewable sources in general continued to see increased generation, but as wind in particular provided a very large share of generation and for

the second quarter in a row renewables provided more than a third of total generation (a level only first achieved in Q4 2018).

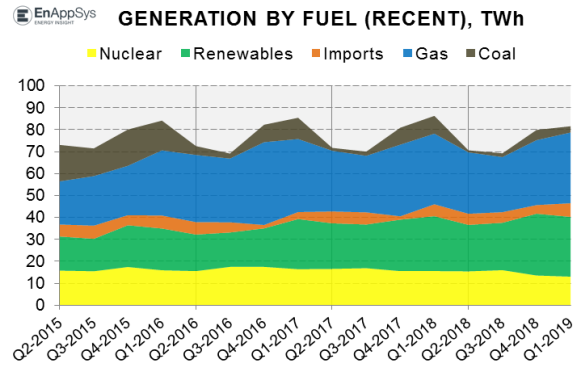
The 16.6TWh of power generated by wind farms in the quarter comfortably exceeds to 13.1TWh provided by nuclear plants, with wind farms having only marginally provided more power than nuclear plants in Q1 2018.

In the quarter wind farms produced a new record high for levels of generation at over 15GW, achieving this on the 9th February 2019.

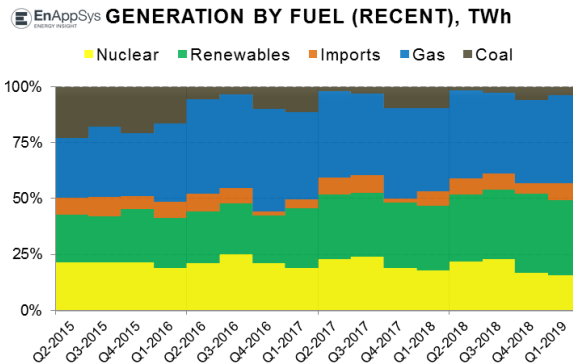
Fuel Activity Overview

The first quarter of 2019, from the start of January through to the end of March saw almost three-quarters of the generation in the market either come from gas or renewable power sources.

The levels of generation at each fuel type were relatively similar, but the largest volumes of power came from gas-fired plants, which generated 32.2TWh. These levels were up 11.2% from the previous quarter and also up 0.2% from



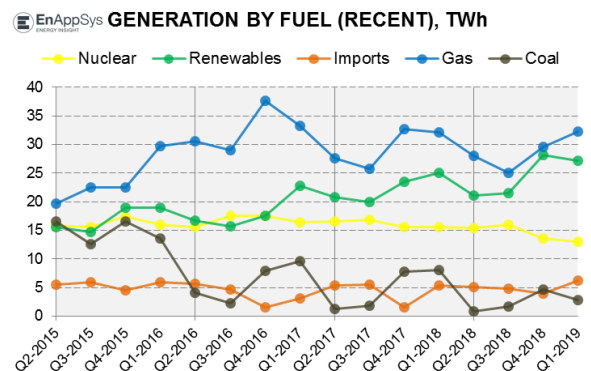
the same quarter in the previous year.

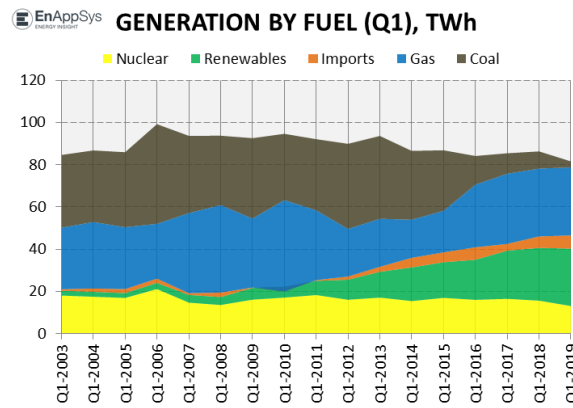


These levels are close to recent highs for gas-fired generation, but as a share of total fossil fuel generation these levels are particularly high.

Levels of fossil fuel generation at 35.1TWh were at their highest levels over the last four months, but were lower than they had been in any previous Q1, having been 66.8TWh in Q1 2011 and 40.3TWh in Q1 2018.

The next highest generation levels came from renewable projects in the market at 27.2TWh, with these being the second highest ever levels of renewable generation on record and the highest for the first quarter of the year.

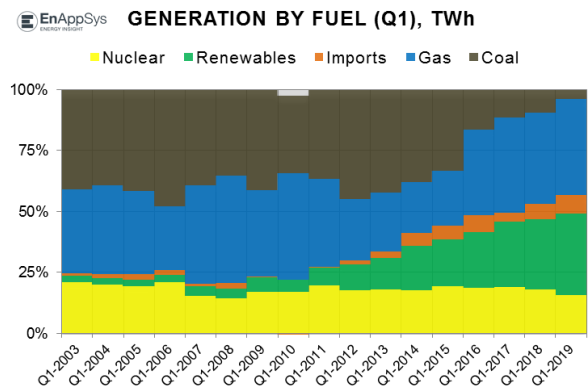




The majority of this renewable generation came from wind farms which saw a new record high for levels of generation in a half hour, with a power output of 15,159MW; achieving this on the 9th February 2019.

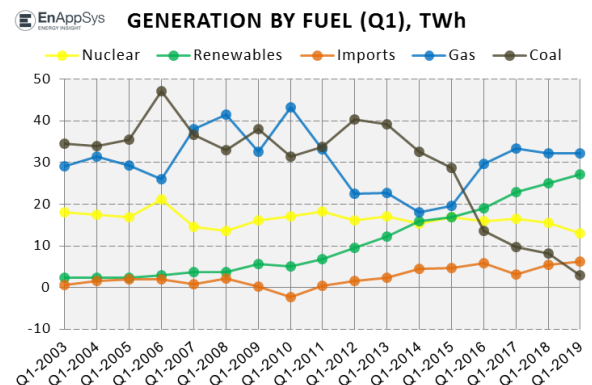
These levels of renewable generation were up 8.8% from Q1 2018, but were down -1.1% from the previous quarter which saw the highest ever levels of renewable generation.

Although nuclear plants saw the next highest levels of generation, at 13.1TWh these levels were significantly lower than that achieved at gas or renewable plants in the market. These levels were particularly low for the nuclear fleet and were down 1.7% from the previous quarter and 16.2% down from Q1 2018.



The next highest share of power consumed was a result of electricity imports which equated to 6.2TWh of net imports, which effectively displaced local generation.

These levels continue to be high as a result of the large nuclear presence in France, with that country generally spilling power, the high levels of exports from Germany and as a result of the higher UK carbon taxes. These import levels were up 62.3% from the previous quarter and up 15.2% from Q1 2018.



The smallest share of electricity generation of these five major groups came from coal plants which continue to sit on the periphery of the market and which only generated 2.9TWh in the quarter. These levels were down 37.2% from the previous quarter and down 65% from Q1 2018.

In the quarter 39.5% of power came from gas-fired power plants, 33.4% from renewables, 16.0% from nuclear, 7.6% from imports and 3.5% from coal-fired plants.

Statistics

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

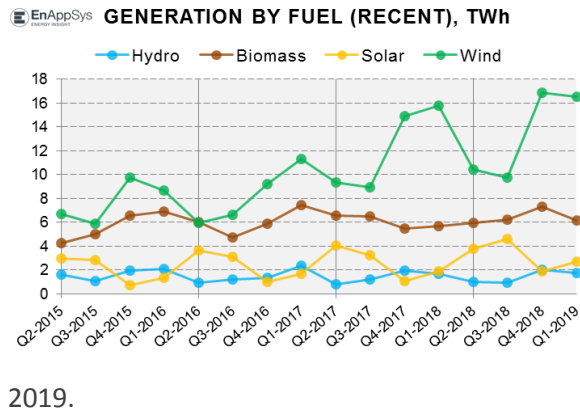
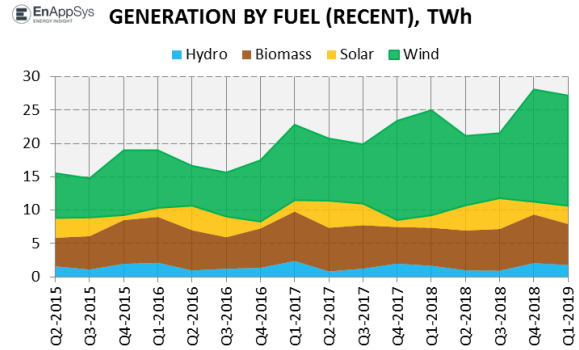
*GB Only (Excludes Northern Ireland)	Q1-2017	Q2-2017	Q3-2017	Q4-2017	Q1-2018	Q2-2018	Q3-2018	Q4-2018	Q1-2019
TOTAL GENERATION BY FUEL (TWh)									
Coal	9.67	1.30	1.91	7.73	8.13	0.92	1.71	4.63	2.85
Gas	33.27	27.65	25.73	32.63	32.15	27.99	25.08	29.60	32.21
Imports	3.18	5.41	5.56	1.53	5.42	5.06	4.86	3.93	6.24
Nuclear	16.46	16.59	16.91	15.59	15.60	15.48	16.02	13.59	13.06
Renewables	22.84	20.77	19.89	23.42	25.01	21.16	21.56	28.13	27.21
FOSSIL FUELS	42.95	28.95	27.64	40.36	40.28	28.91	26.79	34.24	35.05
TOTAL	85.42	71.72	69.99	80.91	86.30	70.60	69.23	79.88	81.57
Fossil Fuel Percentage	50%	40%	39%	50%	47%	41%	39%	43%	43%
Clean Percentage	46%	52%	53%	48%	47%	52%	54%	52%	49%
Renewable Share of Clean Power	58%	56%	54%	60%	62%	58%	57%	67%	68%
SHARE OF GENERATION (%)									
Coal	11.3%	1.8%	2.7%	9.6%	9.4%	1.3%	2.5%	5.8%	3.5%
Gas	39.0%	38.6%	36.8%	40.3%	37.3%	39.6%	36.2%	37.1%	39.5%
Imports	3.7%	7.5%	7.9%	1.9%	6.3%	7.2%	7.0%	4.9%	7.6%
Nuclear	19.3%	23.1%	24.2%	19.3%	18.1%	21.9%	23.1%	17.0%	16.0%
Renewables	26.7%	29.0%	28.4%	29.0%	29.0%	30.0%	31.1%	35.2%	33.4%

*GB Only (Excludes Northern Ireland)	Q1-2011	Q1-2012	Q1-2013	Q1-2014	Q1-2015	Q1-2016	Q1-2017	Q1-2018	Q1-2019
TOTAL GENERATION BY FUEL (TWh)									
Coal	33.69	40.33	39.26	32.61	28.71	13.56	9.67	8.13	2.85
Gas	33.08	22.57	22.75	18.06	19.66	29.68	33.27	32.15	32.21
Imports	0.37	1.49	2.37	4.56	4.69	5.92	3.18	5.42	6.24
Nuclear	18.24	16.03	17.04	15.40	16.92	15.98	16.46	15.60	13.06
Renewables	6.73	9.49	12.22	15.94	16.87	19.00	22.84	25.01	27.21
FOSSIL FUELS	66.77	62.90	62.02	50.67	48.37	43.24	42.95	40.28	35.05
TOTAL	92.10	89.91	93.65	86.56	86.85	84.14	85.42	86.30	81.57
Fossil Fuel Percentage	72%	70%	66%	59%	56%	51%	50%	47%	43%
Clean Percentage	27%	28%	31%	36%	39%	42%	46%	47%	49%
Renewable Share of Clean Power	27%	37%	42%	51%	50%	54%	58%	62%	68%
SHARE OF GENERATION (%)									
Coal	36.6%	44.9%	41.9%	37.7%	33.1%	16.1%	11.3%	9.4%	3.5%
Gas	35.9%	25.1%	24.3%	20.9%	22.6%	35.3%	39.0%	37.3%	39.5%
Imports	0.4%	1.7%	2.5%	5.3%	5.4%	7.0%	3.7%	6.3%	7.6%
Nuclear	19.8%	17.8%	18.2%	17.8%	19.5%	19.0%	19.3%	18.1%	16.0%
Renewables	7.3%	10.6%	13.1%	18.4%	19.4%	22.6%	26.7%	29.0%	33.4%

Renewables

In the quarter renewable projects generated a total of 27.2TWh, with these levels being only second to generation from gas-fired power stations in the market.

The highest share of renewable generation continues to come from wind farms which are now the GB market’s dominant source of renewable generation.



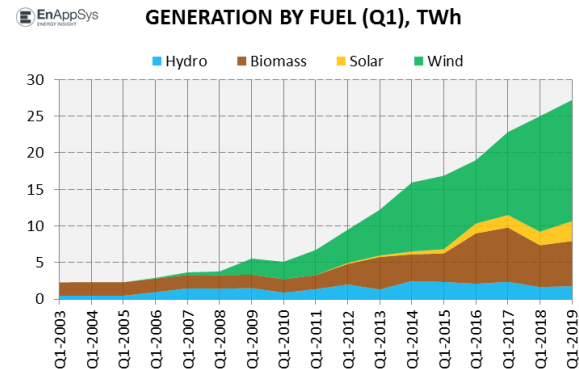
Wind farms generated 16.6TWh in the quarter, with these levels being down 2% from the previous quarter, but up 5% from the levels achieved in Q1 2018. The generation in the quarter included a new record for power output at 15,159MW; achieving this on the 9th February

2019.

The next highest level of renewable generation in the quarter came from biomass plants, which generated 6.2TWh, with this being down 16% from the previous quarter and up 8% from Q1 2018.

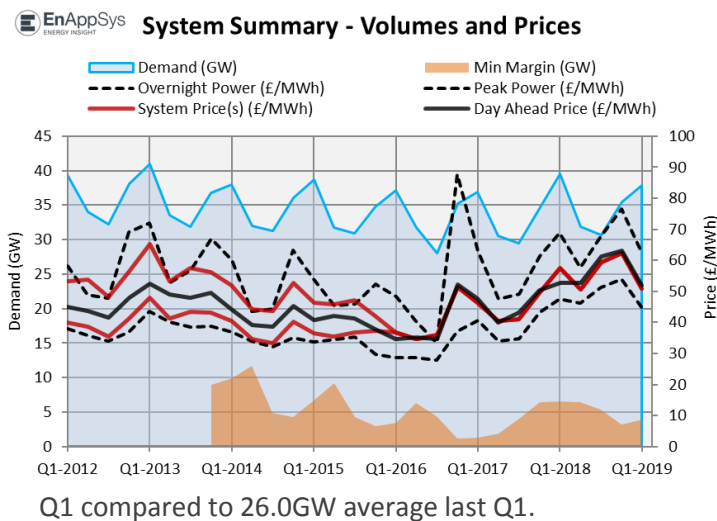
Then relatively low levels of renewable generation were achieved at both hydro and solar projects.

Solar projects generated, despite it being a winter month, 2.7TWh with this being up 43% from the previous quarter and up 46% from Q1 2018.



Demand and Prices

Q1 2019 saw total demand at 81.9TWh, down 4% from the 85.4TWh in Q1 2018, but still higher than the average of 36.8GW in Q1 2017.



Average availability across the quarter was similar to that in Q1 2018, at 60.0GW versus 59.8GW last Q1. The lower demand this Q1 has seen less thermal plant online though, leading to less available margin, at 21.7GW on average this

This is still a fairly comfortable level of margin, with the lowest in the quarter at 3.9GW, lower than the 6.5GW minimum in Q1 2018, but higher than the 1.3GW minimum seen in Q1 2017 when units were out of the market in SBR and the system often became tight.

Given this fairly comfortable system for much of the quarter, system prices have not seen any notable highs or lows; the average system price was £50.81/MWh; the minimum £-70.24/MWh and the maximum just £195/MWh.

This peak system price of £195/MWh occurred at 11:00 on Thursday 24th January. The system was tight, with only ~0.9GW wind generation (versus ~1.5GW forecast) and ~0.3GW spinning reserve. 106 offers were in the pricing stack (51 of which were STOR), but just two bids. The highest priced offers were from hydro and pumped storage units (fast acting), including Fasnakyle, Clachan, Glendoe, Dinorwig and Ffestiniog, with the price being set by a £195/MWh offer for Ffestiniog 4.

Statistics

The following table contains some of the key statistics relating to the quarter:

*GB Only (Excludes Northern Ireland)	Q1-2017	Q2-2017	Q3-2017	Q4-2017	Q1-2018	Q2-2018	Q3-2018	Q4-2018	Q1-2019
WHOLESALE PRICES (£/MWh)									
Day Ahead Price	47.75	40.04	43.05	50.24	52.72	52.66	61.25	62.98	51.82
Within Day Price (MIDP)	47.23	40.03	42.01	49.62	54.62	51.65	59.73	61.67	50.83
WITHIN DAY PRICE BREAKDOWN (£/MWh)									
Off-Peak Hours	40.53	33.87	34.79	43.34	47.64	46.26	51.32	54.03	44.70
Peak Hours (excl Superpeak)	47.15	41.81	44.67	50.30	55.00	53.39	62.89	62.39	51.22
Superpeak Hours	62.85	47.66	49.03	61.47	68.81	57.77	67.71	76.64	62.29
SYSTEM BUY PRICE (£/MWh)									
Maximum	292.55	1509.80	176.69	178.00	990.00	158.00	189.26	191.37	195.00
Average	46.42	40.48	41.10	49.46	57.50	50.64	59.38	62.42	50.81
Minimum	-14.00	-73.15	-25.00	-69.17	-150.00	-92.38	-71.45	-68.40	-70.24
SYSTEM SELL PRICE (£/MWh)									
Maximum	292.55	1509.80	176.69	178.00	990.00	158.00	189.26	191.37	195.00
Average	46.42	40.48	41.10	49.46	57.50	50.64	59.38	62.42	50.81
Minimum	-14.00	-73.15	-25.00	-69.17	-150.00	-92.38	-71.45	-68.40	-70.24
Demand (MW)	36,835	30,600	29,459	34,448	39,527	31,840	30,719	35,472	37,905
Availability (MW)	56,342	48,009	45,186	55,505	59,823	49,443	49,530	56,442	59,955
Margin (MW)	22,573	21,386	18,937	23,888	25,965	22,206	21,455	19,989	21,735
Minimum Margin (MW)	1,287	1,867	4,090	6,480	6,499	6,478	5,349	3,227	3,877
Demand (TWh)	79.6	66.8	65.0	76.1	85.4	69.5	67.8	78.3	81.9
Availability (TWh)	121.7	104.9	99.8	122.6	129.2	108.0	109.4	124.6	129.5
Margin (TWh)	48.8	46.7	41.8	52.7	56.1	48.5	47.4	44.1	46.9
Minimum Margin (TWh)	2.8	4.1	9.0	14.3	14.0	14.1	11.8	7.1	8.4

Notes on the Report

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

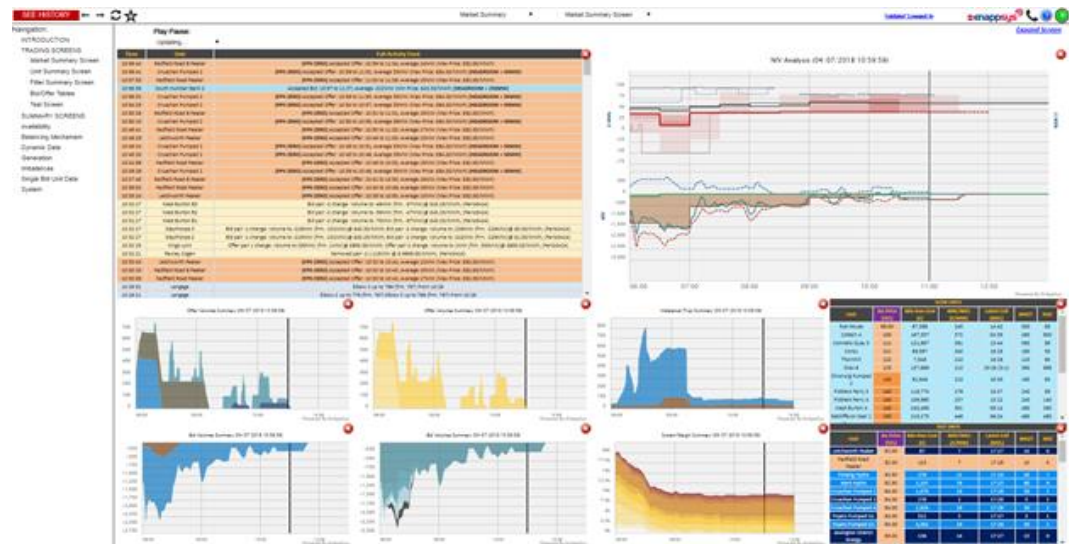
Availability levels are calculated by totaling levels of recorded availability at all plants in the market.

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 about@enapps.com or visit the company's website at www.enapps.com.