



EnAppSys
ENERGY INSIGHT

GB Electricity Market Summary

Full Year 2019

Gas: 115.1TWh (0%)

Imports: 21.4TWh (+10%)

Renewables: 104.8TWh (+9%)

Coal: 6.0TWh (-61%)

Nuclear: 53.2TWh (-13%)

Table of Contents

Contents

Contents	i
Executive Summary	1
Fuel Activity Overview	3
Statistics	5
Renewables	6
Statistics	7
Demand, Margin and Prices	8
Statistics	8
Notes on the Report	10
About EnAppSys	11

Executive Summary

The GB power markets in 2019 saw a 9% increase in levels of generation year-to-year, with this coming from growth due to new offshore wind farms and due to a new biomass unit conversion at Drax.

Gas-fired power stations continue to provide the dominant share of electricity generation – at 39% of the total – with this level being essentially unchanged from that achieved in 2018, and totaling 115.1TWh.

Despite this lead being held by gas-fired plants, renewable projects generated very similar levels of output in the year at 104.8TWh, with renewables coming ever closer to the point where renewable generation levels outstrip fossil fuel generation over a single year.

These renewable levels should continue to grow in future years as more offshore wind farms come online, but there has been a general slowdown in the development of new renewable generators aside from these large offshore projects. Growth in solar generation has in particular seen a slowdown in recent years.

With outages at Dungeness B and Hunterston (one of the two reactors) running since 2018, the levels of nuclear generation in the year were down, with this having dropped by 20% since 2016 to total 53.0TWh.

The year-on-year drop in levels of nuclear generation amounted to 8.0TWh and this more than offset the 1.9TWh growth in levels of renewable generation over the same period.

Growth was noted in levels of electricity imports into the country, aided by the new NEMO Interconnector to Belgium, with growth in imports to 10% and climbing to a record high net import level of 21.4TWh.

These levels of imports should continue to rise in future years as more connections go live due to the higher carbon prices that apply within Great Britain, which mean that a British power station will have a higher cost of generation than an identical one in France or the Netherlands.

The market in 2019 has seen the wholesale cost of electricity fall by 25% year-on-year from 2018, dropping from £57.44/MWh on average to £42.86/MWh. This has come about as although carbon prices have increased, gas prices fell significantly in 2018.

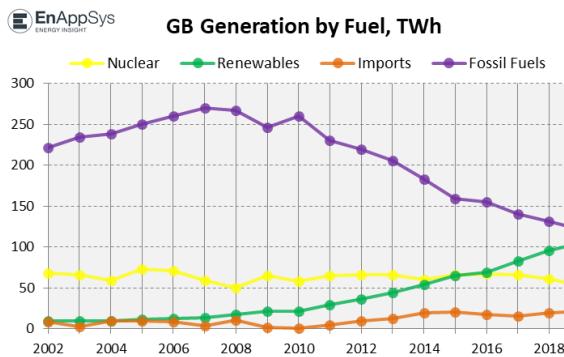
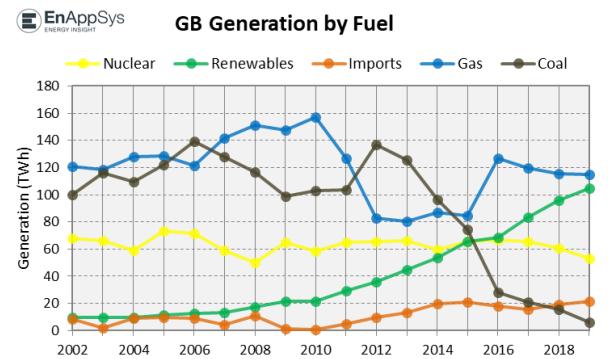
Levels of generation from coal-fired plants were very low at 6.0TWh, with this only amounting to 2% of generation within Great Britain.

In the year 38% of power generation came from gas-fired power stations, 35% from renewable projects, 18% from nuclear plants, 7% from power imports and 2% from coal plants.

Fuel Activity Overview

The British power market in 2019 saw levels of gas-fired generation remain essentially unchanged from the levels achieved in 2018, with 38.3% of power coming from gas-fired power plants. This amounted to 115.1TWh, only very slightly down from 115.5TWh in the previous year.

At the same time – and after significant levels of growth in renewable output over the past two years – levels of renewable generation continue to climb reaching 104.8TWh, breaking 100TWh for the first time. These levels were up 9% from the previous year.

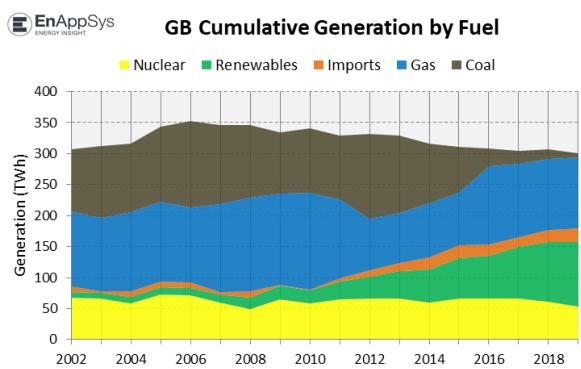


Levels of renewable generation should be set to climb significantly in future years as more offshore wind farms come online, but for now the levels of growth have slowed, allowing gas-fired plants to continue to be the dominate source of power generation within Great Britain.

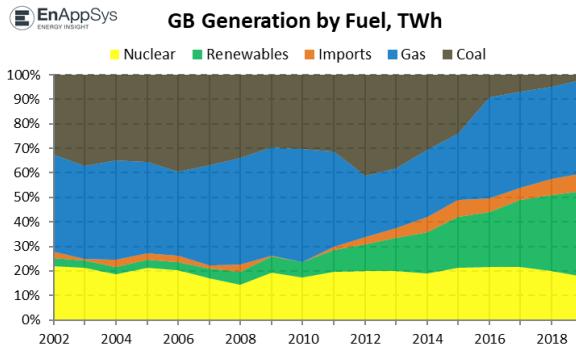
One of the fuel types that have seen notable changes from 2018 to 2019 has been nuclear, which has been affected by outages at Dungeness B (no running since September 2018) and Hunterston (no running on one of the two reactors since March 2018).

These plants are approaching the end of their working life and have been undergoing maintenance and inspections in order to ensure safe operation when they come back online.

The 8.0TWh decline in levels of nuclear generation from the previous year exceeded the 1.9TWh growth in levels of renewable generation, with this contributing to higher than otherwise



expected levels of fossil fuel generation. Overall, levels of nuclear generation have declined by 20% since a recent high in 2016, with generation levels dropping from 66.6TWh to 53.0TWh over this four year period.



further interconnections to France and other markets such as Norway and Denmark are built and this will allow for the potential for greatly increased levels of interconnector imports.

A factor in whether these levels continue to increase as capacity installed is the difference in carbon pricing between Great Britain and the continent.

At the moment Great Britain has higher carbon taxes than the rest of Europe due to an additional levy called the Carbon Price Support that adds roughly £18 per tonne of CO₂. This is a significant increase above the rest of Europe and means that a power station within Britain will have a higher cost of generation than an identical power station on the continent. This disparity will continue to drive imports as capacity grows, disadvantaging domestic sources of power production.

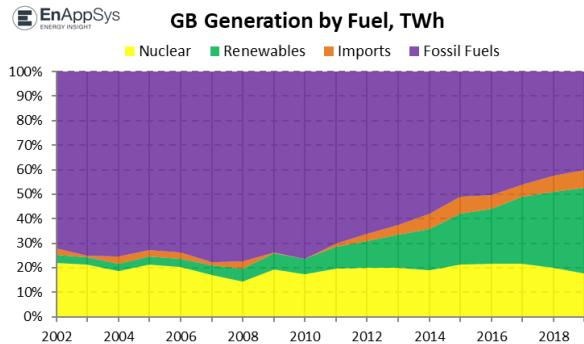
Alignment of the carbon prices in Great Britain and the continent would result in a more even exchange of power between these regions.

Coal-fired power stations only generated 2% of power within Britain in 2019, with this amounting to 6.0TWh. This was a drop of 61% from the previous year as coal continues to exit the market and a massive drop of 95.6% from 2012 when coal power stations provided over 40% of power generated within Britain.

In the year gas-fired power stations generated 38% of all power, renewables 35%, nuclear 18%, imports 7% and coal-fired power stations 2%.

Levels of imports into Great Britain hit their highest ever levels in 2019 - up at 21.4TWh – following the go live of the NEMO Interconnector between Belgium and Great Britain. This is a growth of 10% from the previous year.

Levels of interconnector capacity are set to grow significantly in future years as



Statistics

The following tables contain some of the key statistics relating to 2019 and some previous years:

*GB Only (Excludes Northern Ireland)	2011	2012	2013	2014	2015	2016	2017	2018	2019
TOTAL GENERATION BY FUEL (TWh)									
Coal	103.48	136.84	125.74	96.65	74.46	27.92	20.67	15.47	5.96
Gas	127.01	82.86	80.23	86.72	84.35	126.98	119.59	115.45	115.07
Imports	4.77	9.88	13.02	19.48	20.75	17.81	15.71	19.38	21.38
Nuclear	64.75	65.81	65.93	59.74	65.68	66.58	65.72	61.01	53.02
Renewables	29.24	36.09	44.51	53.75	65.35	68.64	83.20	95.88	104.75
TOTAL	329.24	331.48	329.43	316.34	310.58	307.93	304.90	307.19	300.17
SHARE OF GENERATION (%)									
Coal	31.4%	41.3%	38.2%	30.6%	24.0%	9.1%	6.8%	5.0%	2.0%
Gas	38.6%	25.0%	24.4%	27.4%	27.2%	41.2%	39.2%	37.6%	38.3%
Imports	1.4%	3.0%	4.0%	6.2%	6.7%	5.8%	5.2%	6.3%	7.1%
Nuclear	19.7%	19.9%	20.0%	18.9%	21.1%	21.6%	21.6%	19.9%	17.7%
Renewables	8.9%	10.9%	13.5%	17.0%	21.0%	22.3%	27.3%	31.2%	34.9%
CHANGE FROM YEAR TO 2019 (%)									
Coal	-94.2%	-95.6%	-95.3%	-93.8%	-92.0%	-78.6%	-71.1%	-61.4%	
Gas	-9.4%	38.9%	43.4%	32.7%	36.4%	-9.4%	-3.8%	-0.3%	
Imports	348.6%	116.4%	64.2%	9.7%	3.0%	20.0%	36.0%	10.3%	
Nuclear	-18.1%	-19.4%	-19.6%	-11.3%	-19.3%	-20.4%	-19.3%	-13.1%	
Renewables	258.2%	190.3%	135.3%	94.9%	60.3%	52.6%	25.9%	9.2%	
Fossil Fuels	230.49	219.70	205.97	183.37	158.81	154.89	140.26	130.91	121.03
Fossil Fuel Share	70.0%	66.3%	62.5%	58.0%	51.1%	50.3%	46.0%	42.6%	40.3%
Renewable Share	8.9%	10.9%	13.5%	17.0%	21.0%	22.3%	27.3%	31.2%	34.9%

Renewables

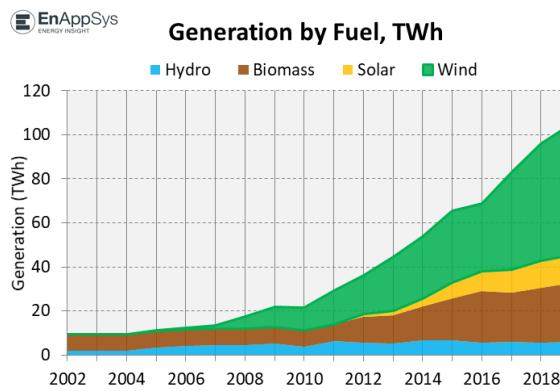
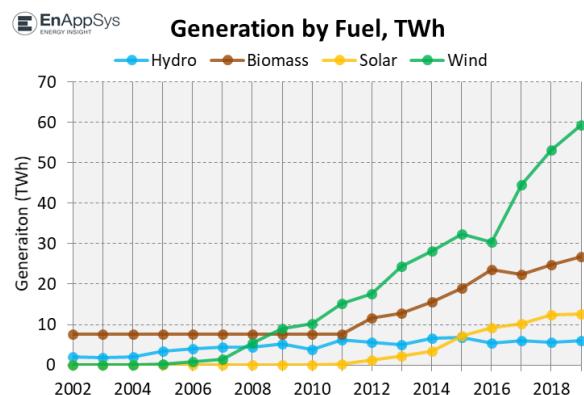
Renewables generated 104.8TWh of power in 2019, with this being up 9.2% from the previous year.

Levels of renewable generation should be set to climb significantly in future years as more offshore wind farms come online, but for now the levels of growth have slowed except at offshore wind farms.

Wind farms continued to see the trend

of significant growth in levels of wind

generation continue, with levels reaching 59.3TWh in the year, up 11.5% from the previous year.

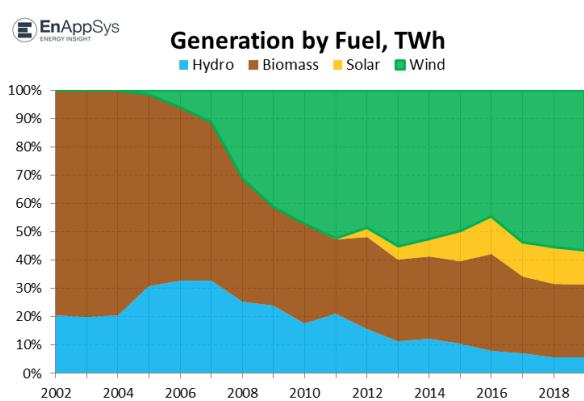


source increasing by 8% from 2018, with total generation at 59.3TWh. This came following the conversion of an additional biomass unit at Drax in late 2018 that offered additional renewable credits, but at a slightly reduced level against other unit conversions.

After biomass the next largest share of renewable generation came from solar projects which produced 12.7TWh, which amounted to 13% of renewable generation in the year. These levels were up 2.6% from the previous year as solar production growth has also slowed

Wind farms remain the largest source of renewable power generation within Great Britain, providing over 50% of renewable generation, with these levels set to climb as more wind farms come online.

The next largest share of renewable generation came from biomass plants, with levels of generation from this



recently.

Hydro plants produced 6.0TWh – in line with historical norms – with 6% of renewable generation coming from hydro projects. These levels were up 9% from the previous year in line with normal fluctuations in levels of hydro flow.

Of the renewable generation, 57% came from wind farms, 26% from biomass plants, 12% from solar projects and 6% from hydro plants.

Statistics

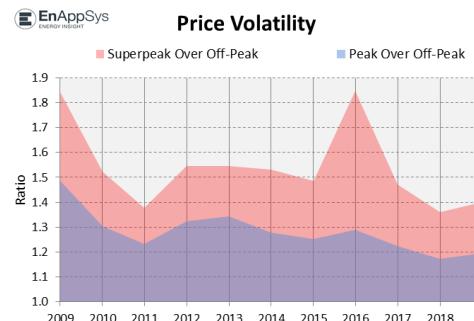
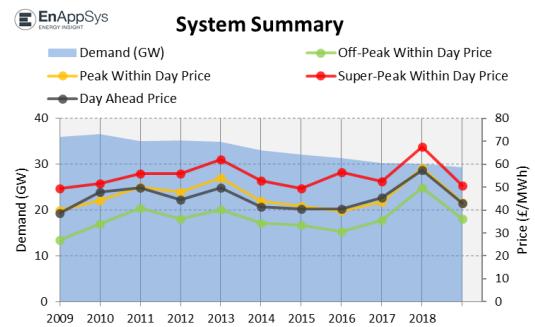
The following tables contain some of the key statistics relating to 2019 and some previous years:

*GB Only (Excludes Northern Ireland)	2011	2012	2013	2014	2015	2016	2017	2018	2019
TOTAL GENERATION BY FUEL (TWh)									
Biomass	7.62	11.69	12.84	15.67	19.03	23.61	22.43	24.86	26.77
Hydro	6.21	5.68	5.06	6.56	6.84	5.40	6.00	5.51	6.00
Solar	0.16	1.21	2.12	3.39	7.13	9.15	10.15	12.37	12.69
Wind	15.26	17.51	24.49	28.13	32.35	30.48	44.62	53.15	59.28
TOTAL RENEWABLES	29.24	36.09	44.51	53.75	65.35	68.64	83.20	95.88	104.75
SHARE OF RENEWABLE GENERATION (%)									
Biomass	26.1%	32.4%	28.9%	29.2%	29.1%	34.4%	27.0%	25.9%	25.6%
Hydro	21.2%	15.7%	11.4%	12.2%	10.5%	7.9%	7.2%	5.8%	5.7%
Solar	0.5%	3.4%	4.8%	6.3%	10.9%	13.3%	12.2%	12.9%	12.1%
Wind	52.2%	48.5%	55.0%	52.3%	49.5%	44.4%	53.6%	55.4%	56.6%
LARGEST RENEWABLE SOURCE	WIND	WIND	WIND	WIND	WIND	WIND	WIND	WIND	WIND
INCREASE FROM YEAR TO 2019 (%)									
Biomass	251.4%	129.0%	108.5%	70.9%	40.7%	13.4%	19.4%	7.7%	
Hydro	-3.3%	5.7%	18.6%	-8.5%	-12.3%	11.0%	0.0%	8.8%	
Solar	8018.6%	946.2%	499.0%	274.9%	78.1%	38.7%	25.0%	2.6%	
Wind	288.5%	238.6%	142.0%	110.7%	83.2%	94.5%	32.8%	11.5%	
Total	258.2%	190.3%	135.3%	94.9%	60.3%	52.6%	25.9%	9.2%	

Demand, Margin and Prices

The market in 2019 saw levels of demand fall to 280.4TWh from 301.1TWh, as the requirements for electricity generation fell year on year. This does not include generation from small projects connected into lower power networks and so this is not a complete view of electricity savings in the country.

Against this, whilst carbon prices have risen in 2019, a large drop in gas prices has meant that day ahead prices were down 25% from £57.44/MWh in 2018 to £42.86/MWh. This indicates a much lower cost of generating electricity and hence a much lower cost of electricity from source (this does not include the additional charges levied on household bills).



One of the key measures for price volatility within the British power market is the ratio between the price during the superpeak periods (4-7pm) against the overnight price (the superpeak price divided by the offpeak price).

During the period of high evening peak prices in 2016 this ratio grew to 1.86, but this year a ratio of 1.40 shows an increased level of volatility from 2018, but remaining low against the historical norm of 1.52. This implies lower prices around peak periods and reduced opportunities for electricity generators focused around generating on these peak periods, with conditions being below the norm of historical years.

Statistics

The following tables contain some of the key statistics relating to 2019 and some previous years:

*GB Only (Excludes Northern Ireland)	2011	2012	2013	2014	2015	2016	2017	2018	2019
WHOLESALE PRICES (£/MWh)									
Day Ahead Price	47.92	44.54	49.69	41.55	40.51	40.47	45.27	57.44	42.86
Within Day Price (MIDP)	41.75	45.21	50.58	42.10	39.94	39.01	44.73	56.84	41.94
WITHIN DAY PRICE BREAKDOWN (£/MWh)									
Off-Peak Hours	33.88	36.23	40.21	34.46	33.24	30.62	35.67	49.81	36.11
Peak Hours (excl Superpeak)	44.12	47.95	53.96	44.03	41.58	39.43	43.64	58.42	43.18
Superpeak Hours	51.60	55.96	62.18	52.74	49.40	56.58	52.44	67.73	50.58
Peak Over Off-Peak	1.30	1.32	1.34	1.28	1.25	1.29	1.22	1.17	1.20
Superpeak Over Off-Peak	1.52	1.54	1.55	1.53	1.49	1.85	1.47	1.36	1.40
DEMAND (MW)	38,321	37,327	37,078	35,536	35,479	34,746	32,820	34,369	32,012
AVAILABILITY (MW)						49,895	50,465	53,527	51,496
MARGIN (MW)						15,149	17,645	19,158	19,484
DEMAND (TWh)	335.7	327.9	324.8	311.3	310.8 	305.2	287.5	301.1	280.4
AVAILABILITY (TWh)						438.3	442.1	468.9	451.1
MARGIN (TWh)						133.1	154.6	167.8	170.7
WHOLESALE PRICE INCREASE FROM YEAR TO 2019									
Day Ahead Price	-11%	-4%	-14%	3%	6%	6%	-5%	-25%	
Within Day Price (MIDP)	0%	-7%	-17%	0%	5%	8%	-6%	-26%	
WITHIN DAY PRICE INCREASE FROM YEAR TO 2019									
Off-Peak Hours	7%	0%	-10%	5%	9%	18%	1%	-28%	
Peak Hours (excl Superpeak)	-2%	-10%	-20%	-2%	4%	10%	-1%	-26%	
Superpeak Hours	-2%	-10%	-19%	-4%	2%	-11%	-4%	-25%	
DEMAND INCREASE FROM YEAR TO 2019	-16%	-14%	-14%	-10%	-10%	-8%	-2%	-7%	

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 separated 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 gives 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 split apart 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 publically available data stream and figures cannot be distributed. FPNs at wind farms do not correlate well with metered volumes and so cannot be used reliably.

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

About EnAppSys

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

The company has a GB power market database stretching back to 2002 and an online platform that provides readily available information ranging from forwards market prices to historic generator operations.

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 and extending the geographic and sector coverage beyond the UK and the electricity market.

The company serves customers across Europe and has market monitoring platforms used by a significant number of market parties in both Britain and the Netherlands and is increasing coverage continuously.



The company's business objective is to make available timely, optimal and insightful information, analysis and systems to the energy sector to ensure all sizes of company have the best available tools and information to make informed decisions and to optimise their business strategy.

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