GB Electricity Market Summary

Fourth Quarter 2019

October to December

Gas: 29.3TWh (+19%)
Imports: 5.0TWh (+16%)
Renewables: 28.7TWh (+17%)
Coal: 2.3TWh (+464%)
Nuclear: 14.6TWh (+14%)

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Executive Summary

The fourth quarter of 2019 – running from the start of October through to the end of December – saw levels of renewable generation continue to closely match the levels of gas-fired generation achieved in the quarter.

Whilst gas-fired plants generated 29.3TWh, renewable projects generated 28.7TWh, with this figure for renewable output being close to the 31.6TWh produced by all fossil fuel plants in the market.

After these two fuel types, nuclear plants generated the third highest levels of generation (totaling 14.6TWh), with on-going outages at Dungeness B and one of the reactors at Hunterston affecting the overall output levels.

Interconnector imports in the quarter also remained high, aided by the reasonably new NEMO Interconnector to Belgium, with levels of imports amounting to 5.0TWh in the quarter.

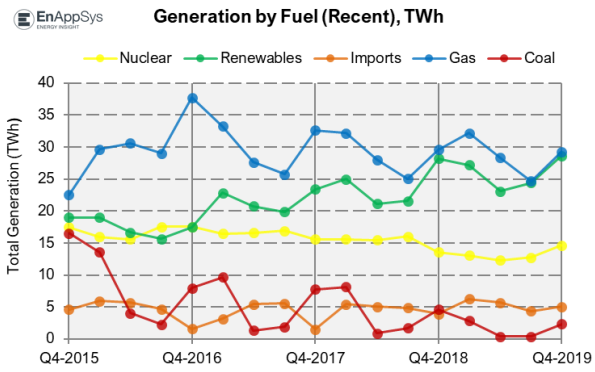
Levels of coal-fired generation remain low with only 2.3TWh of electricity generated from these plants. This is down from 4.6TWh in Q4 2018 as coal continues to exit the market.

Power prices remain low due despite high levels of carbon pricing, as gas prices remain low and peak prices have also remained low as the market has not seen any major periods of scarcity pricing.

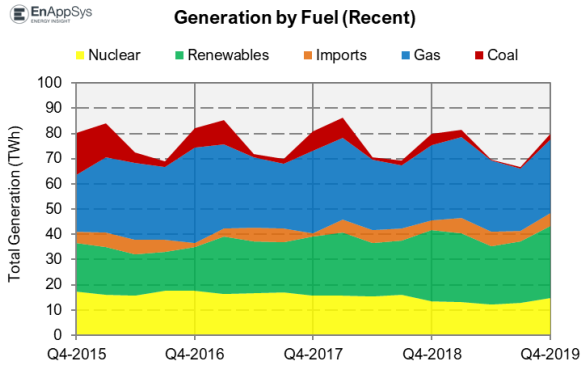
Gas-fired power stations generated 36.6% of power in the quarter, followed by 35.9% from renewables, 18.3% from nuclear, 6.3% from imports and 2.9% from coal.

Fuel Activity Overview

The fourth quarter of 2019 saw - for the second consecutive quarter – very similar levels of both renewable and gas-fired electricity generation. This came due to significant levels of wind generation in the quarter.

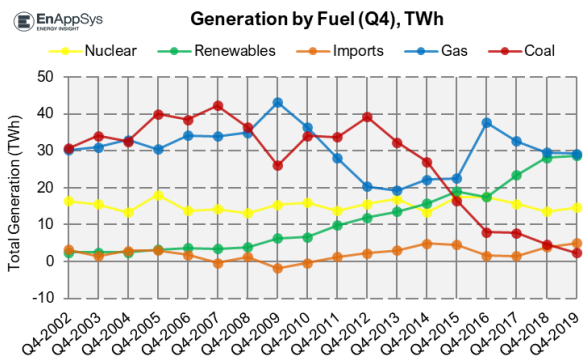


Despite this, gas-fired power stations continued to provide the majority of the power produced in the quarter, with this totaling 29.3TWh. These levels were up 19% from the previous quarter, but more significantly down 1% from the levels achieved in Q4 2018.

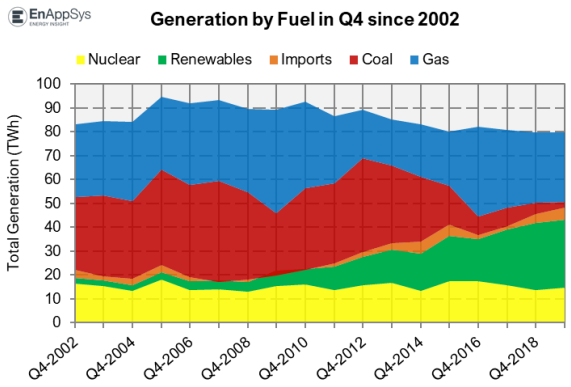


With only slightly lower levels of generation at 28.7TWh, renewable projects provided the second largest levels of power generation, with this amounting to record high levels, as the growth in levels of renewable power generation continues.

With overall levels of fossil fuel generation totaling 31.6TWh in the quarter, the point at which renewables overtake fossil fuels is now close, with a 1.5TWh increase in renewable generation at the expense of fossil fuel stations having been sufficient to reach this milestone.



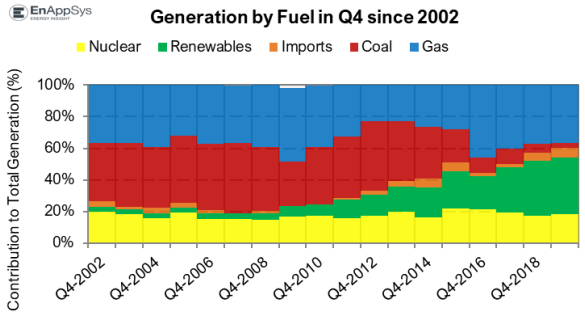
Fuel Activity Overview



Although Dungeness B and one of the Hunterston nuclear reactors remained inactive throughout the quarter as part of long on-going outages, nuclear generation levels have started to rise as the other units were generally active across the quarter.

This saw a 14% rise in levels of nuclear powered generation from Q3 2019 which combines with an 8% increase from Q4 2018, to total 14.6TWh.

Levels of imports into Great Britain from neighbouring countries increased by 16% from the previous quarter, but also climbed by 28% from Q4 2018. This was in part due to the go live of the NEMO interconnector, but also reflects reduced levels of imports from the continent towards the end of 2018.



In the quarter levels of coal-fired generation rose significantly ahead of closures as coal plants start to burn their built up coal stocks and this led to a 5-fold increase in generation to 2.3TWh (up from 0.4TWh in Q3 2019, but down from 4.6TWh in Q4 2018).

In the quarter gas-fired power stations generated 36.6% of electricity, 35.9% from renewables, 18.3% from nuclear, 6.3% from power imports and 2.9% from coal-fired power stations.

Fuel Activity Overview

Statistics

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

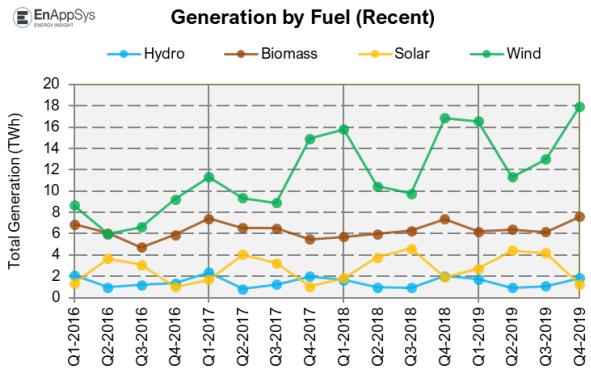
*GB Only (Excludes Northern Ireland)	Q4-2017	Q1-2018	Q2-2018	Q3-2018	Q4-2018	Q1-2019	Q2-2019	Q3-2019	Q4-2019
TOTAL GENERATION BY FUEL (TWh)									
Coal	7.73	8.13	0.92	1.71	4.63	2.85	0.36	0.41	2.32
Gas	32.63	32.15	27.99	25.08	29.60	32.21	28.31	24.67	29.26
Imports	1.53	5.42	5.06	4.86	3.93	6.24	5.67	4.33	5.02
Nuclear	15.59	15.60	15.48	16.02	13.59	13.06	12.28	12.78	14.61
Renewables (Biomass, Wind, Solar & Hydro)	23.42	25.01	21.16	21.56	28.19	27.22	23.06	24.41	28.65
FOSSIL FUELS	40.36	40.28	28.91	26.79	34.24	35.05	28.67	25.08	31.58
TOTAL	**80.91**	**86.30**	**70.60**	**69.23**	**79.94**	**81.58**	**69.67**	**66.60**	**79.86**
Fossil Fuel Percentage	50%	47%	41%	39%	43%	43%	41%	38%	40%
Clean Percentage (Renewable & Nuclear)	48%	47%	52%	54%	52%	49%	51%	56%	54%
Renewable Share of Clean Power	60%	62%	58%	57%	67%	68%	65%	66%	66%
SHARE OF GENERATION (%)									
Coal	9.6%	9.4%	1.3%	2.5%	5.8%	3.5%	0.5%	0.6%	2.9%
Gas	40.3%	37.3%	39.6%	36.2%	37.0%	39.5%	40.6%	37.0%	36.6%
Imports	1.9%	6.3%	7.2%	7.0%	4.9%	7.6%	8.1%	6.5%	6.3%
Nuclear	19.3%	18.1%	21.9%	23.1%	17.0%	16.0%	17.6%	19.2%	18.3%
Renewables (Biomass, Wind, Solar & Hydro)	29.0%	29.0%	30.0%	31.1%	35.3%	33.4%	33.1%	36.7%	35.9%

*GB Only (Excludes Northern Ireland)	Q4-2017	Q1-2018	Q2-2018	Q3-2018	Q4-2018	Q1-2019	Q2-2019	Q3-2019	Q4-2019
AVERAGE GENERATION BY FUEL (GW)									
Coal	7.73	8.13	0.92	1.71	4.63	2.85	0.36	0.41	2.32
Gas	32.63	32.15	27.99	25.08	29.60	32.21	28.31	24.67	29.26
Imports	1.53	5.42	5.06	4.86	3.93	6.24	5.67	4.33	5.02
Nuclear	15.59	15.60	15.48	16.02	13.59	13.06	12.28	12.78	14.61
Renewables (Biomass, Wind, Solar & Hydro)	23.42	25.01	21.16	21.56	28.19	27.22	23.06	24.41	28.65
FOSSIL FUELS	40.36	40.28	28.91	26.79	34.24	35.05	28.67	25.08	31.58
TOTAL	**80.91**	**86.30**	**70.60**	**69.23**	**79.94**	**81.58**	**69.67**	**66.60**	**79.86**

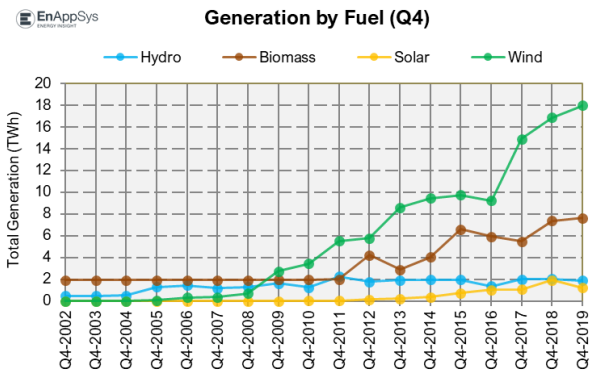
*GB Only (Excludes Northern Ireland)	Q4-2011	Q4-2012	Q4-2013	Q4-2014	Q4-2015	Q4-2016	Q4-2017	Q4-2018	Q4-2019
TOTAL GENERATION BY FUEL (TWh)									
Coal	33.68	39.18	32.31	27.06	16.53	7.97	7.73	4.63	2.32
Gas	28.06	20.38	19.23	22.17	22.50	37.70	32.63	29.60	29.26
Imports	1.22	2.22	3.01	4.86	4.60	1.57	1.53	3.93	5.02
Nuclear	13.76	15.60	16.93	13.34	17.45	17.52	15.59	13.59	14.61
Renewables (Biomass, Wind, Solar & Hydro)	9.78	11.89	13.60	15.76	19.00	17.50	23.42	28.19	28.65
FOSSIL FUELS	61.75	59.55	51.54	49.23	39.03	45.67	40.36	34.24	31.58
TOTAL	**86.51**	**89.27**	**85.08**	**83.19**	**80.08**	**82.26**	**80.91**	**79.94**	**79.86**
Fossil Fuel Percentage	71%	67%	61%	59%	49%	56%	50%	43%	40%
Clean Percentage	27%	31%	36%	35%	46%	43%	48%	52%	54%
Renewable Share of Clean Power	11%	13%	16%	19%	24%	21%	29%	35%	36%
SHARE OF GENERATION (%)									
Coal	38.9%	43.9%	38.0%	32.5%	20.6%	9.7%	9.6%	5.8%	2.9%
Gas	32.4%	22.8%	22.6%	26.7%	28.1%	45.8%	40.3%	37.0%	36.6%
Imports	1.4%	2.5%	3.5%	5.8%	5.7%	1.9%	1.9%	4.9%	6.3%
Nuclear	15.9%	17.5%	19.9%	16.0%	21.8%	21.3%	19.3%	17.0%	18.3%
Renewables (Biomass, Wind, Solar & Hydro)	11.3%	13.3%	16.0%	18.9%	23.7%	21.3%	29.0%	35.3%	35.9%

Renewables

Overall levels of renewable generation in Q4 2019 amounted to 28.7TWh, up 17% from the previous quarter and up 2% from Q4 2018.



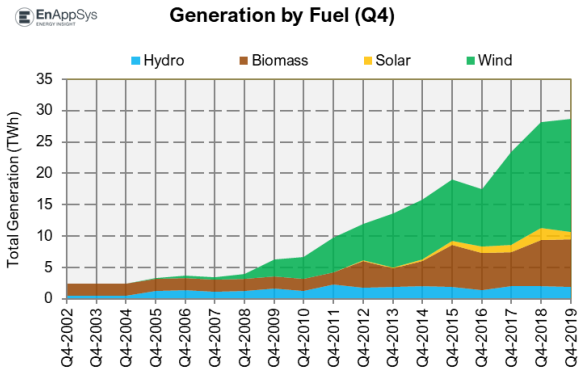
The largest source of renewable generation continues to be wind farms, which generated 18.0TWh of power in the quarter. This was the highest ever levels of wind generation, with these levels rising 38% from the previous quarter as the weather got windier and 6% from Q4 2018.



Levels of wind generation have been climbing due to the on-going growth in levels of offshore wind capacity, with significant new projects set to be installed in the coming years.

With wind farms generating 63% of renewable generation in Q4 2019 this now sees much of the progression into a renewable electricity system stem from activity at these wind farms.

The next largest share of renewable generation in the quarter came from biomass plants, which generated 7.6TWh, with this being up 3% from the levels in Q4 2018. This growth is aided by increased levels of biomass burning at Drax, a former coal power station.



The final major sources of renewable generation gave a much

more modest contribution within the quarter, with hydro plants producing 1.9TWh and solar plants 1.2TWh.

Hydro plants typically see their highest levels of generation within the fourth quarter of the year, with levels of generation dropping 9% from Q4 2018 in line with seasonal fluctuations.

Solar projects by contrast typically see their highest levels of generation in summer months, with output levels dropping 71% from the previous quarter. Despite this levels of solar generation were also down 36% from activity in Q4 2018 indicating a less favourable winter period.

In the quarter wind farms generated 63% of renewable generation, biomass 27%, hydro 7% and solar 4%. As a share of total generation these values were 22.5%, 9.5% 2.3% and 1.5%.

Statistics

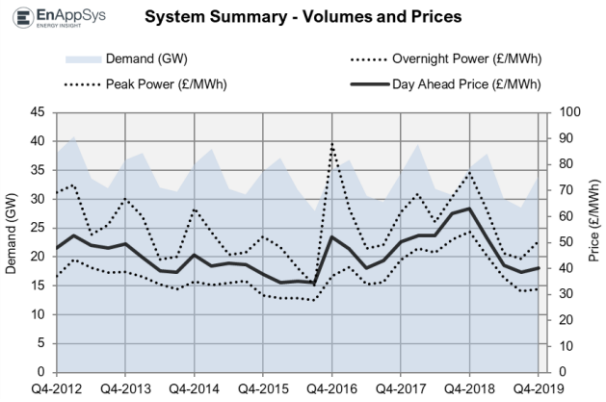
The following table contains some of the key statistics relating to the quarter:

*GB Only (Excludes Northern Ireland)	Q4-2017	Q1-2018	Q2-2018	Q3-2018	Q4-2018	Q1-2019	Q2-2019	Q3-2019	Q4-2019
TOTAL GENERATION BY FUEL (TWh)									
Biomass	5.49	5.71	5.98	6.26	7.38	6.20	6.38	6.15	7.61
Hydro	1.98	1.66	0.98	0.92	2.04	1.74	0.95	1.09	1.86
Solar	1.05	1.86	3.76	4.62	1.91	2.72	4.42	4.20	1.22
Wind	14.90	15.78	10.44	9.77	16.87	16.56	11.32	12.97	17.96
TOTAL RENEWABLES	**23.42**	**25.01**	**21.16**	**21.56**	**28.19**	**27.22**	**23.06**	**24.41**	**28.65**
SHARE OF RENEWABLE GENERATION (%)									
Biomass	23.4%	22.8%	28.3%	29.0%	26.2%	22.8%	27.7%	25.2%	26.6%
Hydro	8.5%	6.6%	4.6%	4.2%	7.2%	6.4%	4.1%	4.5%	6.5%
Solar	4.5%	7.4%	17.8%	21.4%	6.8%	10.0%	19.1%	17.2%	4.3%
Wind	63.6%	63.1%	49.4%	45.3%	59.8%	60.8%	49.1%	53.1%	62.7%
SHARE OF TOTAL GENERATION (%)									
Biomass	6.8%	6.6%	8.5%	9.0%	9.2%	7.6%	9.2%	9.2%	9.5%
Hydro	2.5%	1.9%	1.4%	1.3%	2.5%	2.1%	1.4%	1.6%	2.3%
Solar	1.3%	2.2%	5.3%	6.7%	2.4%	3.3%	6.3%	6.3%	1.5%
Wind	18.4%	18.3%	14.8%	14.1%	21.1%	20.3%	16.2%	19.5%	22.5%
LARGEST RENEWABLE SOURCE	WIND	WIND	WIND	WIND	WIND	WIND	WIND	WIND	WIND

*GB Only (Excludes Northern Ireland)	Q4-2011	Q4-2012	Q4-2013	Q4-2014	Q4-2015	Q4-2016	Q4-2017	Q4-2018	Q4-2019
TOTAL GENERATION BY FUEL (TWh)									
Biomass	1.98	4.23	2.88	4.01	6.57	5.91	5.49	7.38	7.61
Hydro	2.23	1.75	1.91	1.95	1.95	1.36	1.98	2.04	1.86
Solar	0.04	0.15	0.21	0.35	0.74	1.02	1.05	1.91	1.22
Wind	5.53	5.76	8.59	9.43	9.74	9.22	14.90	16.87	17.96
TOTAL RENEWABLES	**9.78**	**11.89**	**13.60**	**15.76**	**19.00**	**17.50**	**23.42**	**28.19**	**28.65**
SHARE OF RENEWABLE GENERATION (%)									
Biomass	20.3%	35.6%	21.2%	25.5%	34.6%	33.7%	23.4%	26.2%	26.6%
Hydro	22.8%	14.7%	14.0%	12.4%	10.2%	7.8%	8.5%	7.2%	6.5%
Solar	0.4%	1.2%	1.6%	2.2%	3.9%	5.8%	4.5%	6.8%	4.3%
Wind	56.5%	48.5%	63.2%	59.9%	51.3%	52.7%	63.6%	59.8%	62.7%
SHARE OF TOTAL GENERATION (%)									
Biomass	2.3%	4.7%	3.4%	4.8%	8.2%	7.2%	6.8%	9.2%	9.5%
Hydro	2.6%	2.0%	2.2%	2.3%	2.4%	1.7%	2.5%	2.5%	2.3%
Solar	0.0%	0.2%	0.3%	0.4%	0.9%	1.2%	1.3%	2.4%	1.5%
Wind	6.4%	6.5%	10.1%	11.3%	12.2%	11.2%	18.4%	21.1%	22.5%
LARGEST RENEWABLE SOURCE	WIND	WIND	WIND	WIND	WIND	WIND	WIND	WIND	WIND

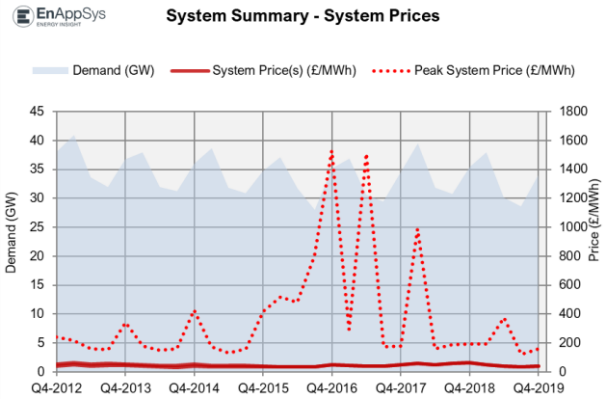
Demand and Prices

The fourth quarter of 2019 saw calm market conditions, although on a number of occasions the market did get very high with some elated prices in the Balancing Mechanism as a result.



This Balancing Mechanism is the means through which National Grid can request additional power in real time when needed based upon prices submitted by all the generators in the market.

Otherwise prices in the market remain low as gas prices remain well below recent highs and despite increases in carbon prices in recent years.



Overall the quarter has seen limited pricing activity of note, although a number of plant closures are expected at coal units that should act to tighten levels of market supply.

Statistics

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

*GB Only (Excludes Northern Ireland)	Q4-2017	Q1-2018	Q2-2018	Q3-2018	Q4-2018	Q1-2019	Q2-2019	Q3-2019	Q4-2019
WHOLESALE PRICES (£/MWh)									
Day Ahead Price	50.24	52.72	52.66	61.25	62.98	51.82	41.18	38.50	40.10
Within Day Price (MIDP)	49.62	54.62	51.65	59.73	61.67	50.83	40.99	37.25	38.88
WITHIN DAY PRICE BREAKDOWN (£/MWh)									
Off-Peak Hours	43.34	47.64	46.26	51.32	54.03	44.70	36.52	31.22	32.01
Peak Hours (excl Superpeak)	50.30	55.00	53.39	62.89	62.39	51.22	42.32	39.27	39.93
Superpeak Hours	61.47	68.81	57.77	67.71	76.64	62.29	45.97	43.69	50.38
SYSTEM PRICE (£/MWh)									
Maximum	178.00	990.00	158.00	189.26	191.37	195.00	375.00	120.00	160.00
Average	49.46	57.50	50.64	59.38	62.42	50.81	41.27	36.56	40.09
Minimum	-69.17	-150.00	-92.38	-71.45	-68.40	-70.24	-71.26	-65.93	-88.00
Demand (MW)	34,448	39,527	31,840	30,719	35,472	37,905	30,142	28,574	33,991
Demand (TWh)	76.1	85.4	69.5	67.8	78.3	81.9	65.8	63.1	75.1

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.

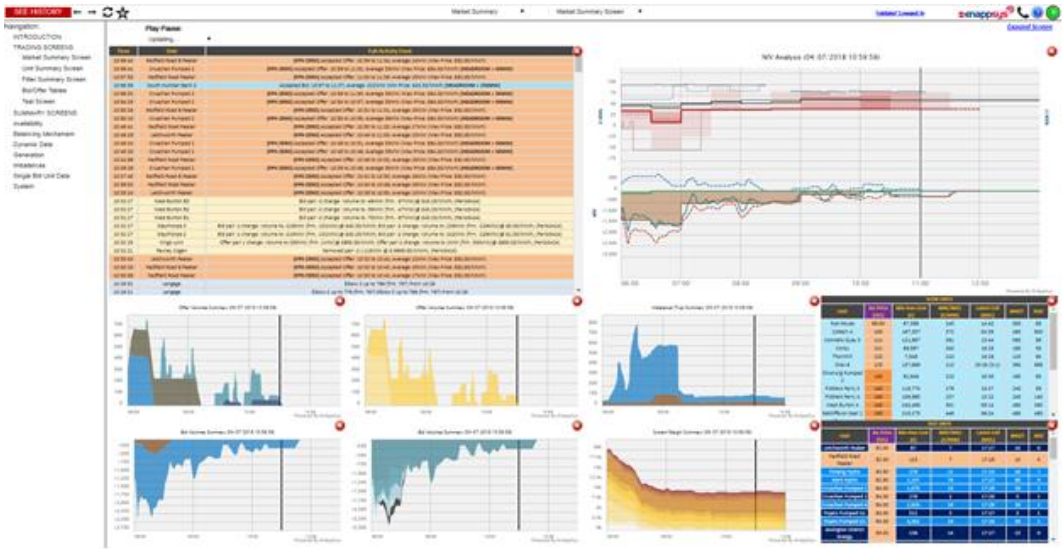
Availability levels are calculated by totaling levels of recorded availability at all plants in the market.

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 info@enappsys.com or visit the company's website at www.enappsys.com.