EnAppSys
ENERGY INSIGHT

European Electricity Generation Summary

Q3-2021

July to September

Generation and Contribution by Fuel Type

Renewables: 262.7TWh (-10%) Fossil Fuels: 206.5TWh (0%) Nuclear: 183.7TWh (+5%)

Percentage changes are from the previous quarter

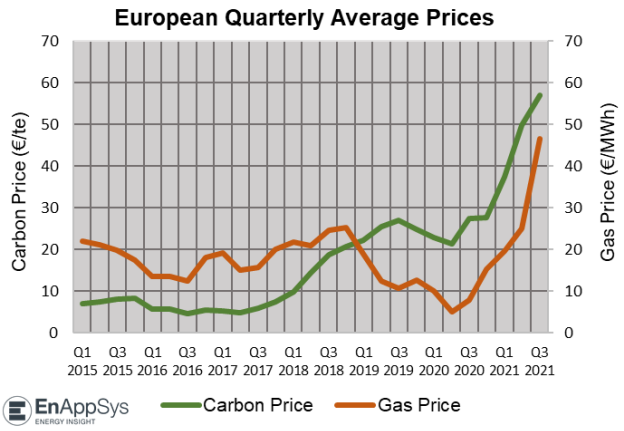
Contents

1 Executive Summary

The high price of gas, which consistently increased throughout the quarter to record levels, was a key factor in driving European generation trends in Q3 2021 which saw some notable departures from recent trends as a consequence of prevailing high fuel prices:

- Coal/lignite-fired generation contributed a greater share of generation than gas-fired generation, reversing the trend in recent years in which the share of coal/lignite had been declining.
- With a total of 92TWh output, European gas-fired generation output was 21TWh (18%) down on the previous quarter and 55TWh (37%) down on the same quarter last year
- With a total of 110TWh output, coal/lignite was materially greater than the contribution of gas-fired generation and was 21TWh (24%) greater than the previous quarter and 19TWh (21%) up on the same quarter last year

The sustained trend of increasing gas prices was driven by a number of factors: the need to replenish the low levels of storage resulting from a long cold winter last year, coupled with high reported levels of global LNG demand and limited flows of Russian gas into Europe as Russia reportedly sought to replenish its own storage stocks. The high price levels flipped the economics of coal/lignite versus gas-fired generation, despite the high price of EU ETS allowances resulting from the increased demand caused by such fuel switching.



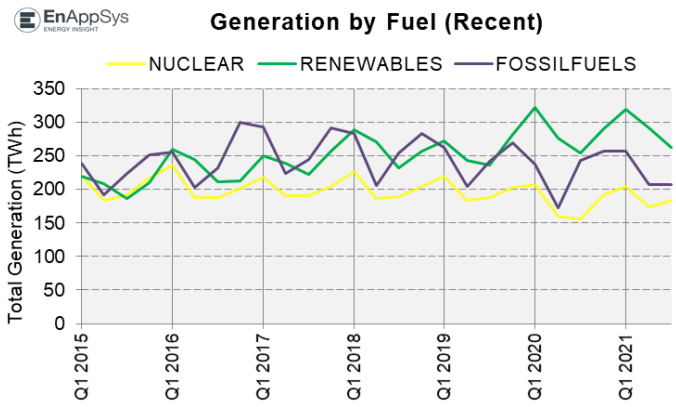
Although 2% higher than the Covid lockdown-affected same period last year, Q3 2021 demand of 653TWh remained slightly below demand levels in prior years.

Renewable technologies together contributed >40% of generation output in Q3, with the increasing levels of installed wind capacity offsetting the impact of reduced wind speeds through the period. Hydro output was the highest Q3 level since 2015 at 109TWh, slightly higher than Q3 last year (108TWh), but materially higher than the ~100TWh levels of outputs in Q3 periods of preceding years. After low levels of output in Q3 last year, nuclear output of 184TWh returned to levels more typically seen in in the same period for previous years.

2 Fuel Activity Overview

Europe Totals

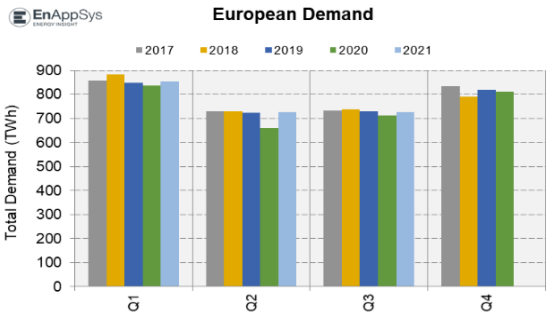
Total generation levels were slightly down across Europe, as summer decreased the demand across the continent with Q3 total of 653TWh, down 3% from the 673TWh in Q2 of 2021. **Aggregate renewable (including biomass and waste) dominance over conventional sources in the European fuel mix since the 4th quarter of 2019 has continued in this quarter and its share remained over 40%.** This can be seen in the Generation by Fuel chart, which presents total generation by the grouped categories of renewables, fossil fuels, and nuclear.

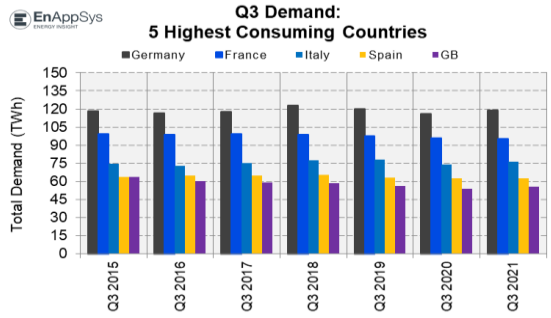


In total, 262.7TWh was generated by renewables, down 10% from the 291.3TWh in Q2 of 2021, but up 3% from the 254.1TWh in Q3 of 2020. The 262.7TWh of renewables contributed 40.2% of total generation, followed by 206.5TWh of fossil fuel-fired generation (31.6% contribution) and 183.7TWh of nuclear generation (28.1% contribution).

Demand trends

As can be seen from the European Demand chart, the recovery of demand from the Covid-19 impact is most visible between Q2 comparisons, nevertheless the demand levels are not the same as pre-covid periods. **There is about a 1.9% increase in the demand compared to 2020 Q3, yet a slight decrease in comparison with third quarters in earlier years.** The 4.8TWh decrease in the demand (compared to 2019 Q3) might be partially caused by the increasing deployment of embedded solar generators (negative demand) which have already shown a profound impact on the demand curves across Europe in the past months. Most of the European countries had





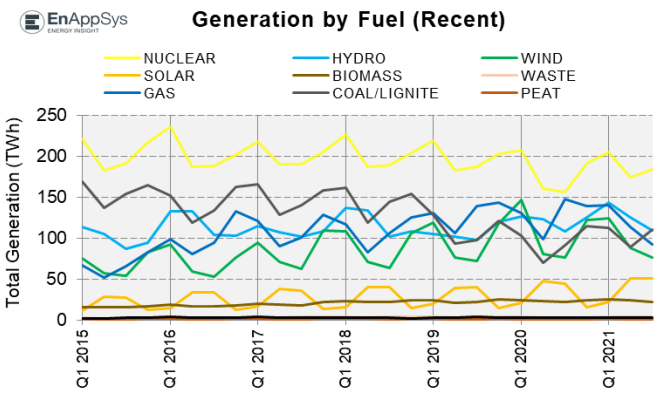
increased demand in comparison to Q3 2020, with Germany showing the largest increase by 2.6TWh. France was the only country which showed reduction (-0.5TWh) in demand among the five European with the greatest demand. **Western Europe had relatively colder summer, which has reflected on the demand for cooling as well. The decrease in demand of France is highly related with the 2℃ drop of the average temperatures across the Q3.** Nevertheless, the changes in the demand volumes were not enough to change the overall ranking of the countries.

Nuclear generation

Nuclear has consistently seen the highest generation of any single fuel type and this continues in this quarter. Nuclear generation showed an increase of 18% in comparison to the last Q3, which indicates a shift in the power mix. This shift is associated with the high gas and carbon allowance prices, which drives the nuclear fleets to run at higher loads for longer time periods. **The increase in the nuclear generation (27.7TWh) in comparison to Q3 of 2020 was mainly supplied by Belgium and France.** France returned back to the usual Q3 nuclear generation levels seen before 2020, whereas Belgium showed extraordinarily high levels of nuclear generation. This is partially due to the high gas prices and the fitness of the nuclear fleet which was under heavy maintenance last summer

Nuclear generation in Europe was 183.7TWh, 73.3TWh higher than the 110.4TWh of coal/lignite, closely followed by the hydro generation at 109.1TWh. Whereas nuclear is consistently the highest contributor because of its high installed capacity and consistent operation, the second highest is more variable over time. Nevertheless, the second place was taken by the coal/lignite generation since 2018. With the increase in the gas prices, despite the high price of emission allowances, gas generation dropped to 2016 Q3 levels and follows the top three fuels from far behind.

Fossil fuel generation



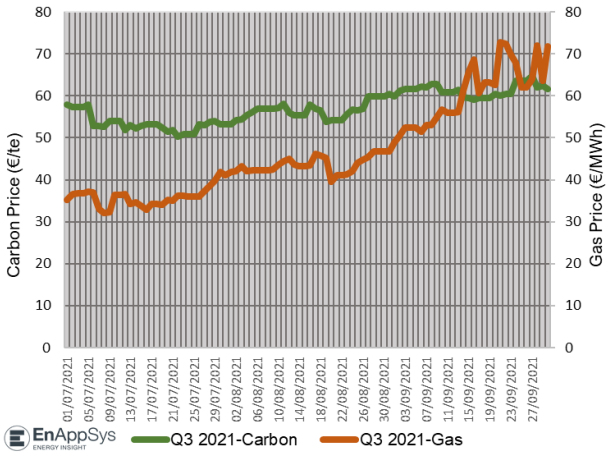
The previous historic trend for fossil fuel generation to increase significantly in the transition from second to third quarter was broken this year for the first time. The average increase of fossil fuel generation from second to third quarter is 33.7TWh since 2015 (excluding the 2020 transition with 70.7TWh increase due to the significant increase in the demand with the Covid recovery).

However, fossil fuel generation decreased slightly by 0.9TWh compared to Q2 of this year, whereas the decrease compared to the Q3 of 2020 is much more significant with a 15% drop.

Coal/Lignite generation is in second place this quarter and reached the levels that are usually seen in the first quarters when the demand is largest. Coal/lignite, solar and waste generation are the only fuel types that showed an increase compared to both Q3 of 2019 and Q3 of 2020.

Gas-fired generation had a significant drop of 38% in comparison to last year's Q3, whereas the new third place holder, hydro generation, saw an increase of 1%. The significance of the gas generation drop becomes more apparent when compared to 2019 Q3 values - a 46.7TWh decrease. Hydro is more dependent on weather and water reserves, hence the decrease in the gas generation lead to more coal generation. **Despite the coal phase-outs and record level Carbon allowance prices, coal generation increased by 12.5TWh in comparison to 2019 Q3 values.**

Most notably, coal/lignite output for the quarter exceeded that for gas-fired generation for the first time since Q4 2018, reversing the trend for declining coal/lignite. This was driven by a shortage of gas, driven by the overhang of high demand from last winter, resulting in the need to replenish gas storage stocks, and in turn driving high prices. **The high gas prices flipped the economics between gas and coal/lignite with coal/lignite becoming economically more attractive, despite the high carbon prices.**



Statistics

The following tables set out key statistics relating to generation in the quarter:

Table 1 Quarterly price summary Q3-2019 to Q3-2021

	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021
TOTAL GENERATION BY FUEL (TWh)									
Biomass	22.0	25.0	24.5	23.5	21.9	24.4	25.6	24.6	22.2
Coal/Lignite	97.9	120.7	102.9	70.0	91.2	114.9	113.0	89.4	110.4
Gas	139.0	143.7	130.5	98.2	147.8	138.9	139.9	113.8	92.3
Hydro	98.0	119.9	125.9	122.9	108.2	124.8	143.3	125.1	109.1
Nuclear	187.4	202.5	207.2	160.1	156.0	191.4	204.6	174.4	183.7
Oil	3.6	3.4	3.0	3.1	3.3	2.8	3.4	3.4	3.3
Peat	1.0	1.7	1.2	0.7	0.4	1.1	1.4	0.8	0.6
Solar	39.8	14.6	21.3	47.3	43.9	15.5	21.8	50.3	51.1
Waste	3.6	4.0	3.8	3.0	3.2	3.5	3.7	3.6	4.1
Wind	72.6	118.0	146.1	80.2	76.9	121.6	124.5	87.6	76.2
FOSSIL FUELS	241.5	269.5	237.7	172.0	242.7	257.7	257.7	207.4	206.5
NUCLEAR	187.4	202.5	207.2	160.1	156.0	191.4	204.6	174.4	183.7
RENEWABLE (INCLUDES WASTE)	236.1	281.4	321.5	276.9	254.1	289.8	318.9	291.3	262.7
TOTAL	**664.9**	**753.5**	**766.4**	**609.0**	**652.8**	**738.8**	**781.1**	**673.2**	**653.0**
Fossil Fuel Percentage	36%	36%	31%	28%	37%	35%	33%	31%	32%
Clean Percentage	64%	64%	69%	72%	63%	65%	67%	69%	68%
Renewable Share of Clean Power	56%	58%	61%	63%	62%	60%	61%	63%	59%
SHARE OF GENERATION (%)									
Biomass	3.3%	3.3%	3.2%	3.9%	3.3%	3.3%	3.3%	3.7%	3.4%
Coal/Lignite	14.7%	16.0%	13.4%	11.5%	14.0%	15.5%	14.5%	13.3%	16.9%
Gas	20.9%	19.1%	17.0%	16.1%	22.6%	18.8%	17.9%	16.9%	14.1%
Hydro	14.7%	15.9%	16.4%	20.2%	16.6%	16.9%	18.3%	18.6%	16.7%
Nuclear	28.2%	26.9%	27.0%	26.3%	23.9%	25.9%	26.2%	25.9%	28.1%
Oil	0.5%	0.5%	0.4%	0.5%	0.5%	0.4%	0.4%	0.5%	0.5%
Peat	0.1%	0.2%	0.2%	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%
Solar	6.0%	1.9%	2.8%	7.8%	6.7%	2.1%	2.8%	7.5%	7.8%
Waste	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.6%
Wind	10.9%	15.7%	19.1%	13.2%	11.8%	16.5%	15.9%	13.0%	11.7%
FOSSIL FUELS	36.2%	35.6%	30.9%	28.1%	37.1%	34.7%	32.8%	30.7%	31.5%
NUCLEAR	28.2%	26.9%	27.0%	26.3%	23.9%	25.9%	26.2%	25.9%	28.1%
RENEWABLE (INCLUDES WASTE)	35.5%	37.4%	42.0%	45.5%	38.9%	39.2%	40.8%	43.3%	40.2%

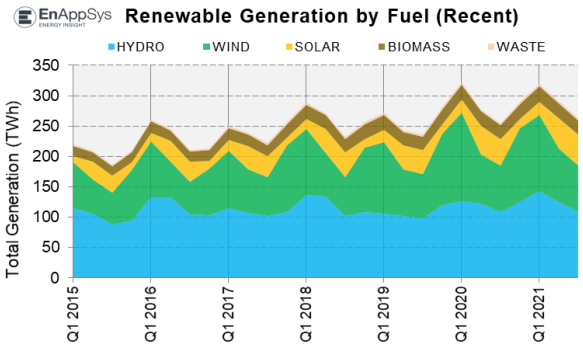
The following table sets out key statistics comparing the quarter with the same quarter in the previous six years:

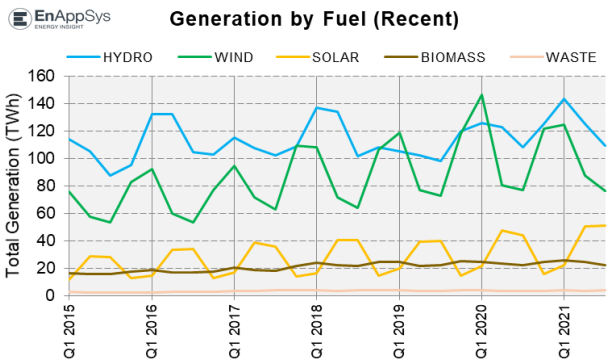
Table 2 Year-on-year comparison of Q3 generation (TWh and %)

	Q3 2016	Q3 2017	Q3 2018	Q3 2019	Q3 2020	Q3 2021
TOTAL GENERATION BY FUEL (TWh)						
Biomass	16.6	17.8	21.7	22.0	21.9	22.2
Coal/Lignite	133.5	140.3	144.4	97.9	91.2	110.4
Gas	94.9	100.7	106.0	139.0	147.8	92.3
Hydro	104.3	102.3	101.8	98.0	108.2	109.1
Nuclear	188.0	190.4	188.7	187.4	156.0	183.7
Oil	2.8	3.3	3.2	3.6	3.3	3.3
Peat	1.2	0.6	1.3	1.0	0.4	0.6
Solar	33.8	35.5	40.6	39.8	43.9	51.1
Waste	2.9	3.6	3.8	3.6	3.2	4.1
Wind	53.4	63.0	63.9	72.6	76.9	76.2
FOSSIL FUELS	232.3	245.0	254.9	241.5	242.7	206.5
NUCLEAR	188.0	190.4	188.7	187.4	156.0	183.7
RENEWABLE (INCLUDES WASTE)	211.0	222.3	231.7	236.1	254.1	262.7
TOTAL	**631.2**	**657.7**	**675.3**	**664.9**	**652.8**	**653.0**
Fossil Fuel Percentage	37%	37%	38%	36%	37%	32%
Clean Percentage	63%	63%	62%	64%	63%	68%
Renewable Share of Clean Power	53%	54%	55%	56%	62%	59%
CHANGE SINCE Q3 2016 (%)						
Biomass		7%	30%	32%	31%	34%
Coal/Lignite		5%	8%	-27%	-32%	-17%
Gas		6%	12%	47%	56%	-3%
Hydro		-2%	-2%	-6%	4%	5%
Nuclear		1%	0%	0%	-17%	-2%
Oil		20%	15%	30%	19%	19%
Peat		-49%	8%	-15%	-63%	-47%
Solar		5%	20%	18%	30%	51%
Waste		23%	28%	22%	9%	39%
Wind		18%	20%	36%	44%	43%
FOSSIL FUELS		**5%**	**10%**	**4%**	**5%**	**-11%**
NUCLEAR		**1%**	**0%**	**0%**	**-17%**	**-2%**
RENEWABLE (INCLUDES WASTE)		**5%**	**10%**	**12%**	**20%**	**25%**

3 Renewables

Across Europe as a whole, Q3 2021 saw 262.7TWh of power production from renewable sources, amounting to 40.2% of total European electricity generation. This is a decrease of 10% from the 291.3TWh in Q2 2021, despite the significant increase of 15% in solar generation and the moderate increase of 2% in waste generation. All the other fuel types except wind saw increases compared to Q3 of 2019.

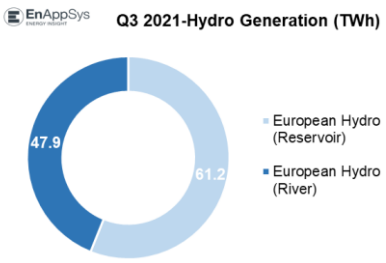




Wind generation was low, as North and Central Europe had low wind speeds across the quarter. After hydro, wind generation remains the second largest renewable generation type, yet dropping below a 30% share in the renewable mix for the first time in 2 years. Hydro (reservoir + river) generation remained as the largest individual component of renewable generation with a difference of 32.9TWh from wind generation at 76.2TWh. Biomass, hydro and wind were the renewable generation segments that saw reduction from the previous quarter, all being more than 10% below previous quarter levels.

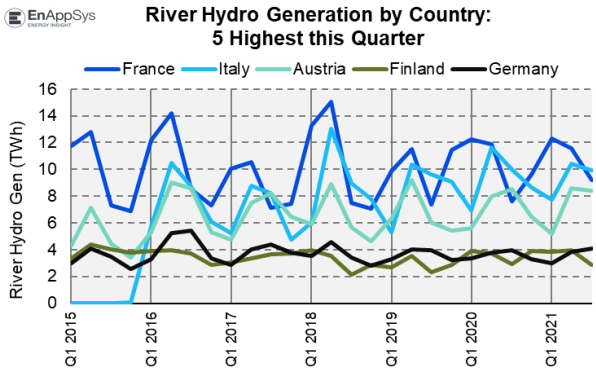
3.1 Hydro

This quarter, Hydro (reservoir + river) reached to 109.1Wh which is the largest recorded third quarter generation since 2015. In comparison to the second quarter, reservoir hydro generated 10% less, remaining at 61.2TWh, whereas decrease in the river hydro generation was more significant by 18% and dropped to 47.9TWh. In comparison with the previous Q3, European reservoir hydro generation remained almost the same, whereas the river hydro generation increased by 2%.



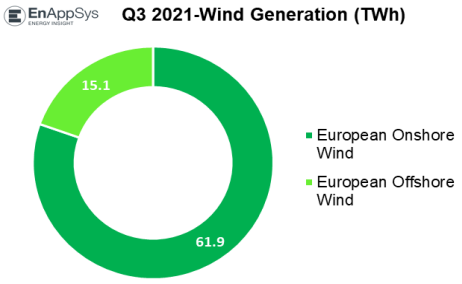
The ranking of the top 2 countries for run-of-river- and reservoir-based generation did not change from last quarter and last Q3 either: Norway (27.7TWh) and Sweden (16.1TWh), whereas France (12.2TWh) climbed to the third place and Italy moved to the fourth place in comparison to the Q3 of 2020. The main driver of the increase in the total French hydro generation was the exceptionally high run-of-river generation this quarter. River hydro generation was 1.6TWh higher in comparison to the Q3 of 2020. Italy river hydro generation remained relatively stable at 9.9TWh. Austria took the 5th place as usual in the total generation with 10.2TWh, following Italy with 1.5TWh difference behind.

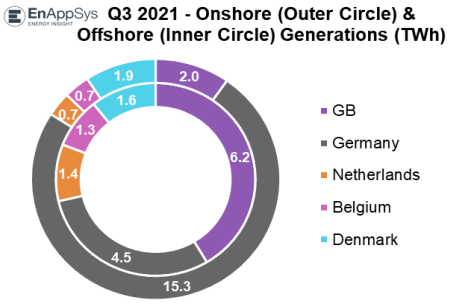
These top 5 producers have quite distinct differences in their hydro generation composition. Sweden usually contributes about 15% of total hydro generation with only reservoir hydro generation. Norway is similar to Sweden, nevertheless with much higher reservoir generation and a small amount of river hydro generation in addition. In Q3 2021, Norway reservoir hydro generation was 25.9TWh (although being 1TWh lower than average Q3 levels), and only this constituted 24% of European total hydro generation. France, Italy and Austria have relatively similar generation distribution between river and reservoir fleets with 75% to 85% river hydro generation.



Italy had the largest level of run-of-river hydro generation in the quarter, at 9.9TWh, taking the place of France as usual in the transition from the second to third quarter. Nevertheless, France followed very closely at 9.2TWh with the abundant season. Austria provided the 18% of the European river hydro generation with 8.4TWh contribution in Q3 and had very similar generation in 2020 as well.

3.2 Wind

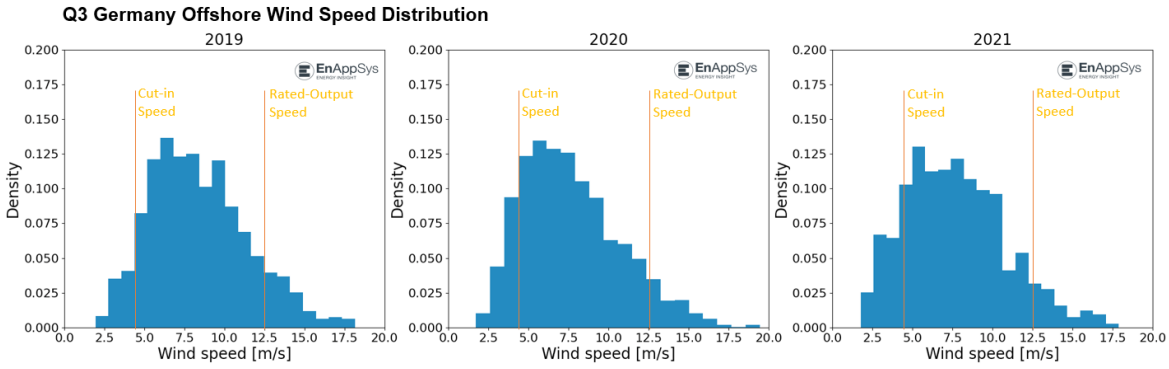




The usual seasonal trend of gradually decreasing wind generation from first to the third quarter held true this year as well and was further exaggerated this year by the low wind speeds prevailing during the period. Wind generation decreased significantly from the last quarter (-13% in total), yet in comparison to the previous Q3, wind generation remained relatively stable. On the other hand, in consideration of the increase in the installed capacity across Europe, generation levels would have been expected to be higher under normal wind conditions.

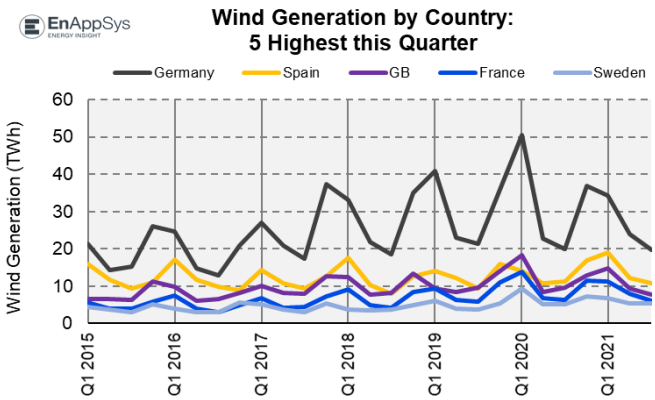
In comparison to the previous Q3, European onshore generation decreased by 3%, whereas the increase in the offshore generation by 18% could barely cover for the decrease in the onshore generation. Each of the countries with offshore fleets had an increase in generation from Q2 to Q3 and saw the largest offshore generation in a third quarter, except Germany, as the new installed capacities contributed to the generation in the other countries. Germany had a drop of 7% and 10% in comparison to the Q3 of 2020 and 2019, respectively. GB remained the largest generator of offshore: a trend since Q2 of 2020. The offshore fleet of GB generated more than the sum of Netherlands, Belgium and Denmark fleets.

Europe suffered from low wind speeds this quarter, which remained below 10m/s most of the time and had an unusually low occurrence of speeds below cut-in speed. Histogram density of German offshore speeds provides the comparison of wind speed distribution in Q3 of 2019, 2020 and 2021.



Despite the low wind availability, Germany, with total installed capacity of 70GW, has the largest wind fleet in Europe and took the first place in generation with 19.8TWh this quarter, yet its share in the total generation dropped 1.3%. GB and Ireland were the countries which suffered the most with 21% and 33% drops respectively in their wind generation in comparison to Q3 of 2020. Nevertheless, GB remained in the third place thanks to the new offshore installed capacity increasing the total generation levels, although the onshore generation dropped by more than half to 2TWh with respect to Q3 of 2020.

The most noticeable increase in the wind generation was observed in Sweden with only an onshore fleet. Sweden had an increase of 7% in comparison to previous Q3 and recorded the highest generation in a third quarter, as the country managed the impressive commissioning rate of 2.7GW from 2020 to 2021.



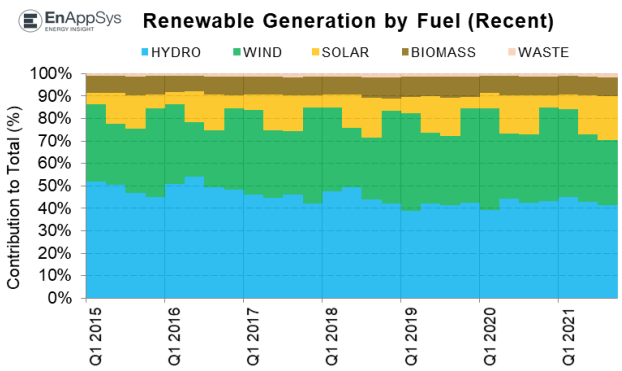
Similar to Germany, France and Spain suffered from low wind generation. Spain maintained its rank as the second most productive wind generator this quarter as well with 10.7TWh generation. On the other hand, Spain was the second country which had the greatest generation loss with 0.7TWh from the previous Q3, after GB. France generated 6TWh this quarter and took the fourth place. This level is clearly below usual third quarter levels, despite the 0.7GW new installed capacity. France started offshore developments as well, yet with the speed of Swedish capacity development, in the next quarter Sweden is likely to take the fourth place from France.

3.3 Solar

Solar generation reached a new record level of quarterly output in this Q3. This quarter, levels of solar generation (51.1TWh) were significantly greater than levels of biomass-fired generation (22.2TWh). Germany remained to be the largest solar generator with 16.3TWh total generation and the levels were similar to the previous third quarter.

With a large difference, Spain (8.8TWh) came at second. Spanish fleet saw a great development of 2.9GW in a year and this quarter's generation was 22% higher than the last year's. Italy remained on the third place with 6.6TWh generation and it was one of the very few countries whose solar generation levels lowered in comparison to last year. Portugal saw the largest relative improvement with 43% higher generation levels in comparison to the Q3 of 2020. Nevertheless, contribution of Portugal to the total solar generation is only 0.6TWh.

3.4 Biomass and Waste



Biomass output remained in between the usual 20-25TWh bandwidth and recorded a 2% increase from previous Q3. Waste generation significantly increased by 27% compared to Q3 last year and was the highest waste generation in a quarter ever recorded with 4.1TWh output. The increase in the waste generation has more of a regulative driver, as the waste generators are usually subsidised. Despite the high fuel costs, the soaring gas prices could open the space in the markets for waste generation.

Statistics

The following table sets out key statistics by quarter:

Table 1 Quarterly renewable generation statistics Q3 2019 to Q3 2021 (TWh and %)

	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021
TOTAL GENERATION BY FUEL (TWh)									
Biomass	22.0	25.0	24.5	23.5	21.9	24.4	25.6	24.6	22.2
Hydro	98.0	119.9	125.9	122.9	108.2	124.8	143.3	125.1	109.1
Solar	39.8	14.6	21.3	47.3	43.9	15.5	21.8	50.3	51.1
Waste	3.6	4.0	3.8	3.0	3.2	3.5	3.7	3.6	4.1
Wind	72.6	118.0	146.1	80.2	76.9	121.6	124.5	87.6	76.2
TOTAL	**236.1**	**281.4**	**321.5**	**276.9**	**254.1**	**289.8**	**318.9**	**291.3**	**262.7**
Primary Renewable Source	HYDRO	HYDRO	WIND	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO
SHARE OF RENEWABLES (%)									
Biomass	9.3%	8.9%	7.6%	8.5%	8.6%	8.4%	8.0%	8.5%	8.5%
Hydro	41.5%	42.6%	39.1%	44.4%	42.6%	43.1%	44.9%	43.0%	41.5%
Solar	16.9%	5.2%	6.6%	17.1%	17.3%	5.3%	6.9%	17.3%	19.5%
Waste	1.5%	1.4%	1.2%	1.1%	1.3%	1.2%	1.1%	1.2%	1.6%
Wind	30.8%	41.9%	45.4%	29.0%	30.3%	42.0%	39.1%	30.1%	29.0%

The following table contains the key statistics comparing the quarter with the same quarter in previous years:

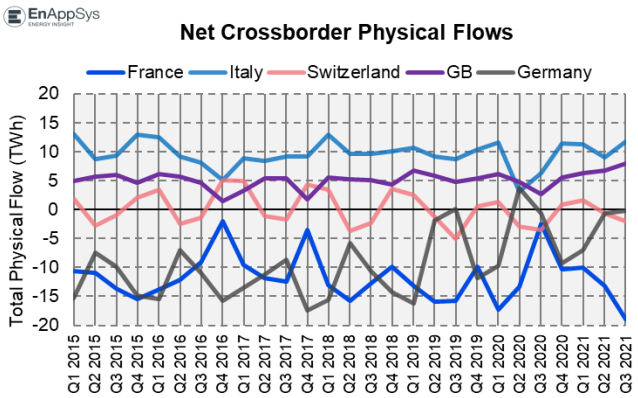
Table 2 Year-on-year comparison of Q3 renewable generation TWh

	Q3 2016	Q3 2017	Q3 2018	Q3 2019	Q3 2020	Q3 2021
TOTAL GENERATION BY FUEL (TWh)						
Biomass	16.6	17.8	21.7	22.0	21.9	22.2
Hydro	104.3	102.3	101.8	98.0	108.2	109.1
Solar	33.8	35.5	40.6	39.8	43.9	51.1
Waste	2.9	3.6	3.8	3.6	3.2	4.1
Wind	53.4	63.0	63.9	72.6	76.9	76.2
TOTAL	**211.0**	**222.3**	**231.7**	**236.1**	**254.1**	**262.7**
Primary Renewable Source	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO
CHANGE SINCE Q2 2016 (%)						
Biomass		7%	30%	32%	31%	34%
Hydro		-2%	-2%	-6%	4%	5%
Solar		5%	20%	18%	30%	51%
Waste		23%	28%	22%	9%	39%
Wind		18%	20%	36%	44%	43%

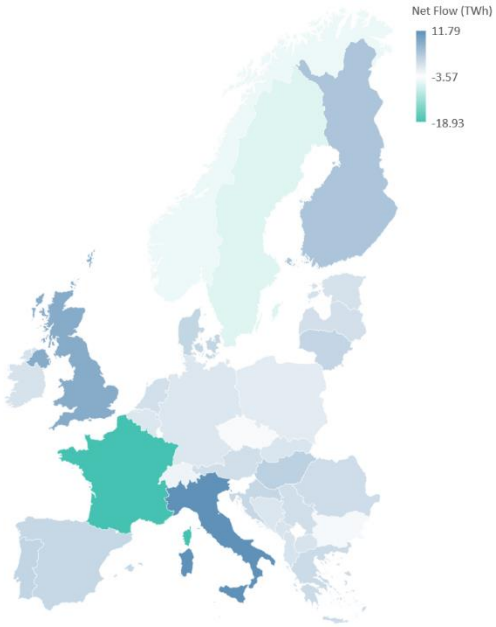
4 Interconnectors

Whilst aggregate European demand was largely met internally with only 7.5TWh of total European demand of 653TWh being imported in Q3 2021, net flows between countries within Europe were material. Nevertheless, in comparison to the previous Q3, European net import increased by 59%.

In line with the previous quarters, in Q3 of 2021 Italy is still the largest importer in Europe with 11.8TWh net import, whereas France is the largest export with 18.9TWh net export. **This quarter, France reached all time largest export volume in a quarter with 21.6TWh export, which lead to the largest net export as well, 18.9TWh. This is highly related with the current market conditions, as France has a fuel mix heavily powered with nuclear generation, hence saw relatively lower prices and France had particularly low demand this quarter, as the cooling need was lower.**



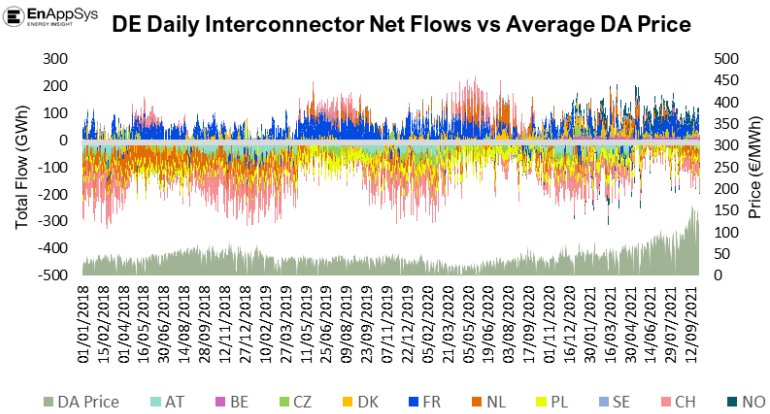
Q3 2021: Net Crossborder Flows



In the third quarters, when Germany net export levels drop, Sweden or Norway takes the second place as net exporter. This quarter, Sweden was the second largest net exporter with 6.21TWh, thanks to increase in the wind generation with the additional installed capacity. Norway remained at 5.02TWh, 32% less than the previous Q3.

Switzerland continues its role of the "energy storage unit" of the Europe, switching from net export to net import positions depending on the market trends. As usual, third quarter saw the largest net export volume in the year so far. However in comparison to the previous Q3 with 3.5TWh net export volume, this quarter saw a decrease of 1.5TWh in the net export volume. Interestingly, Switzerland exported 0.2TWh more in 2021 Q3 when compared with 2020 Q3 while the import volume, specifically from France and Germany, increased as well.

GB is currently the second largest net importer in Europe, after Italy. The import volume of GB is considerably small compared to the import volume of Italy; 8.47TWh and 12.04TWh respectively. However, due to the soaring prices in the island, net import volume reached the record levels of 8TWh. **All the interconnectors from the continent to GB were always in net import since June 2021 and availability of interconnectors were decisive in the price spikes during tight margin periods.** Considering the commission of NordLink, next quarter GB might become the largest net importer. Finland is the third largest net importer with 4.5TWh, despite having relatively small demand, 18.3TWh.



The change in the fuel mix of Germany started to reflect on the import and export volumes as well. Germany has always been a net exporter since 2015, with net export volumes decreasing in the second and third quarters. After 2018, this drop in the net export has been more drastic as Germany started the coal and nuclear phase-outs. Moreover, connection with Norway increased the import volumes as well, as Norway usually has lower prices due to large hydro generation. This quarter, Germany was the largest importer with 12.4TWh import, getting close to the all-time largest import record of 12.6TWh, which was set by Germany again in Q3 of 2019. This quarter, export volumes of Germany to Netherlands and Switzerland decreased significantly.

	TWh			% Demand
Countries	Imports	Exports	Net Flow	Net Value
AL	0.52	-0.23	0.29	192.00%
AT	5.72	-4.82	0.90	6.16%
BA	1.02	-1.15	-0.14	-5.27%
BE	3.33	-3.52	-0.19	-0.98%
BG	0.27	-3.02	-2.75	-31.09%
CH	4.98	-7.02	-2.04	-14.52%
CZ	3.61	-6.47	-2.85	-19.30%
DE	12.40	-12.61	-0.21	-0.18%
DK	4.93	-2.75	2.18	25.91%
EE	1.96	-1.51	0.44	24.02%
ES	4.67	-2.78	1.90	3.04%
FI	6.44	-1.95	4.49	24.60%
FR	2.63	-21.56	-18.93	-19.88%
GB	8.47	-0.50	7.97	14.30%
GR	2.19	-0.76	1.44	9.79%
HR	2.53	-0.57	1.97	42.11%
HU	4.85	-1.94	2.91	27.43%
ISEM	0.44	-0.06	0.37	4.22%
IT	12.04	-0.26	11.79	15.45%
LT	2.55	-0.42	2.12	72.24%
LV	0.56	-0.56	0.72	41.24%
ME	0.88	-0.74	0.14	16.04%
MK	0.89	-0.61	0.28	13.88%
NL	4.93	-4.12	0.81	3.19%
NO	1.17	-6.19	-5.02	-18.27%
PL	3.14	-4.05	-0.91	-2.15%
PT	2.58	-0.30	2.28	18.78%
RO	1.71	-0.58	1.12	8.02%
RS	1.61	-0.77	0.85	11.09%
SE	2.09	-8.30	-6.21	-22.24%
SK	3.63	-3.64	-0.02	-0.24%

There were significant flows as a proportion of net demand between Nordic and Baltic states and also in the Balkan region. Thanks to high interconnectivity, Albania imports more than its domestic generation. At the other end of the spectrum, Bulgaria takes place with exporting 31% of its demand. Bulgaria has 5 interconnectors and a fuel mix mainly composed of nuclear and coal. Turkey acts as an additional interconnector for Bulgaria and Greece. Bulgaria and Greece available interconnector capacity is limited by ~500MW and Greece usually sees higher prices due to its reliance on gas generation. Connection with Turkey provides additional import capacity, as Turkey mostly fully exports to Greece through ~650MW available interconnector capacity.

5 Notes on the Report

The figures used in the report refer to data provided through ENTSO-E which have been aggregated by EnAppSys into a European total. This data does sometimes suffer from outages or gaps in reporting, but it is considered to be generally complete. This report is based on the most recently available data as at quarter and year ends. National Grid data is used for GB demand.

Included Countries

Albania	Germany	Norway
Austria	Great Britain	Poland
Belgium	Greece	Portugal
Bosnia & Herzegovina	Hungary	Romania
Bulgaria	I-SEM	Serbia
Croatia	Italy	Slovakia
Czech Republic	Latvia	Slovenia
Denmark	Lithuania	Spain
Estonia	Montenegro	Sweden
Finland	Netherlands	Switzerland
France	North Macedonia	

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.

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