entsog
european network
of transmission system operators
for gas

ENTSOG
WINTER SUPPLY REVIEW

2023/2024

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Executive Summary

ENTSOG has completed the review of the European gas picture for the winter of 2023/24, September to April. ENTSOG's Seasonal Reviews aim at a deeper comprehension of the development of the demand and supply in the previous seasons and the identification of trends that cannot be captured at national or regional level.

The key findings of this review are:

- At the beginning of October 2023 UGS in Europe were almost completely full and were moderately used closing the withdrawal season in a very high level of 58%.
- Gas consumption remained at the same level as in the previous winter (2,170 TWh in the EU and 2,606 TWh including United Kingdom, Switzerland, Bosnia and Herzegovina and North Macedonia), largely due to mild weather and increased electricity production from renewable sources. However, some countries experienced a decrease in consumption.
- The sum of all the import flows to Europe together with the National Production dropped by around 5%.
- Pipeline gas from Norway increased by 3% in winter 2023/24 compared to the previous winter, contributing approximately 689 TWh representing 31% in total supply mix.
- LNG share in deliveries to Europe decreased from a 37% previous winter to a 34% share corresponding to 764 TWh.
- Pipeline gas supplied by Russia increased slightly in comparison with the Winter 2022/23 but remained in a low level compared to their historical maximum figures.
- National Production decreased by around 16% (or 70 TWh), reaching 362 TWh during the winter 2023/24 in Europe.
- The price in the European hubs followed a similar trend by reacting in the same way to price signals and finished the winter season at the level of 26-28 €/MWh in March 2024. Record storage stock levels, driven by lower demand due to a warmer winter, strong LNG availability, and improved pipeline gas deliveries, have resulted in lower prices.

Detailed data for the cross-border flows is available on the ENTSOG Transparency Platform[1].

Stakeholders' comments on this seasonal analysis are welcome and would enable ENTSOG to improve its knowledge of seasonal and market dynamics influencing the use of infrastructure. Comments would serve as a basis for the R&D plan and be beneficial to the quality of future reports.

[1] Transparency Platform: https://transparency.entsog.eu/

Seasonal and Market Overview

Different events on the European gas market caused fluctuations in the supply and demand balance from October 2023 till end of March 2024. The major ones were:

- Gas storage levels reached record highs at the start of the 2023/24 withdrawal season, with a filling rate of 96%. This increased to 100% in November and remained high, averaging 89% in December. In November 2023 the European Commission announced intermediate gas storage filling targets that EU Member States are required to meet in 2024 to reach 90% of gas storage filled by 1 November 2024.
- Norwegian gas exports to continental Europe and the UK started winter season very strong, after heavy planned and unplanned maintenance works, and reached a supply level close to capacity by the end of 2023.
- Russian pipeline exports continued to Europe during this season via the remaining supply routes, TurkStream and the Ukrainian transit, in higher levels than in the previous winter. An underground gas storage site in Ukraine was attacked by Russia at the end of March, with further attacks continuing afterwards.
- The Dutch TTF, used as a European benchmark, began winter in 43 €/MWh average but strong supplies helped it to decrease down to 26 €/MWh minimum in February 2024.

During winter 2023/24 there was new infrastructure commissioned helping to import and export different supply needs:

Table 1 - Newly commissioned infrastructure W2023/24

Newly commissioned infrastructure during Winter 2023/24			
Country	**Project Name**	**Start date**	**Capacity**
France	FSRU La Havre	October 2023	5 bcm/y
Bulgaria-Serbia	IP Kalotina / Dimitrovgrad	November 2023	1.8 bcm/y

Important Note

This review, as part of the ENTSOG Annual Work Program 2024, is published on a voluntary basis and aims at providing an overview of the demand and supply balance during the Winter 2023/24. The report also aims to provide an overview of European trends that cannot be captured at national or regional level and to build experience for future reports.

Regarding European dynamics, the report highlights the wide heterogeneity of national demand profiles and supply sources. These differences are linked among others to physical rationales such as climate, demand breakdown or producing field flexibility for example.

This report should not be seen as a direct review of previous Seasonal Outlooks, as outlooks do not aim to provide a forecast, but to better explore infrastructure resilience in view of actual past trends.

Winter Supply Reviews bring transparency on the internal analysis carried out by ENTSOG in order to build experience and a solid background for the assumptions considered in the Winter Supply Outlook. Such knowledge is also factored in the recurrent TYNDP process in order to ensure a consistent improvement over ENTSOG reports.

Annexes Power BI Graphs

***Disclaimer**: the source of data if not indicated otherwise is ENTSOG members.*

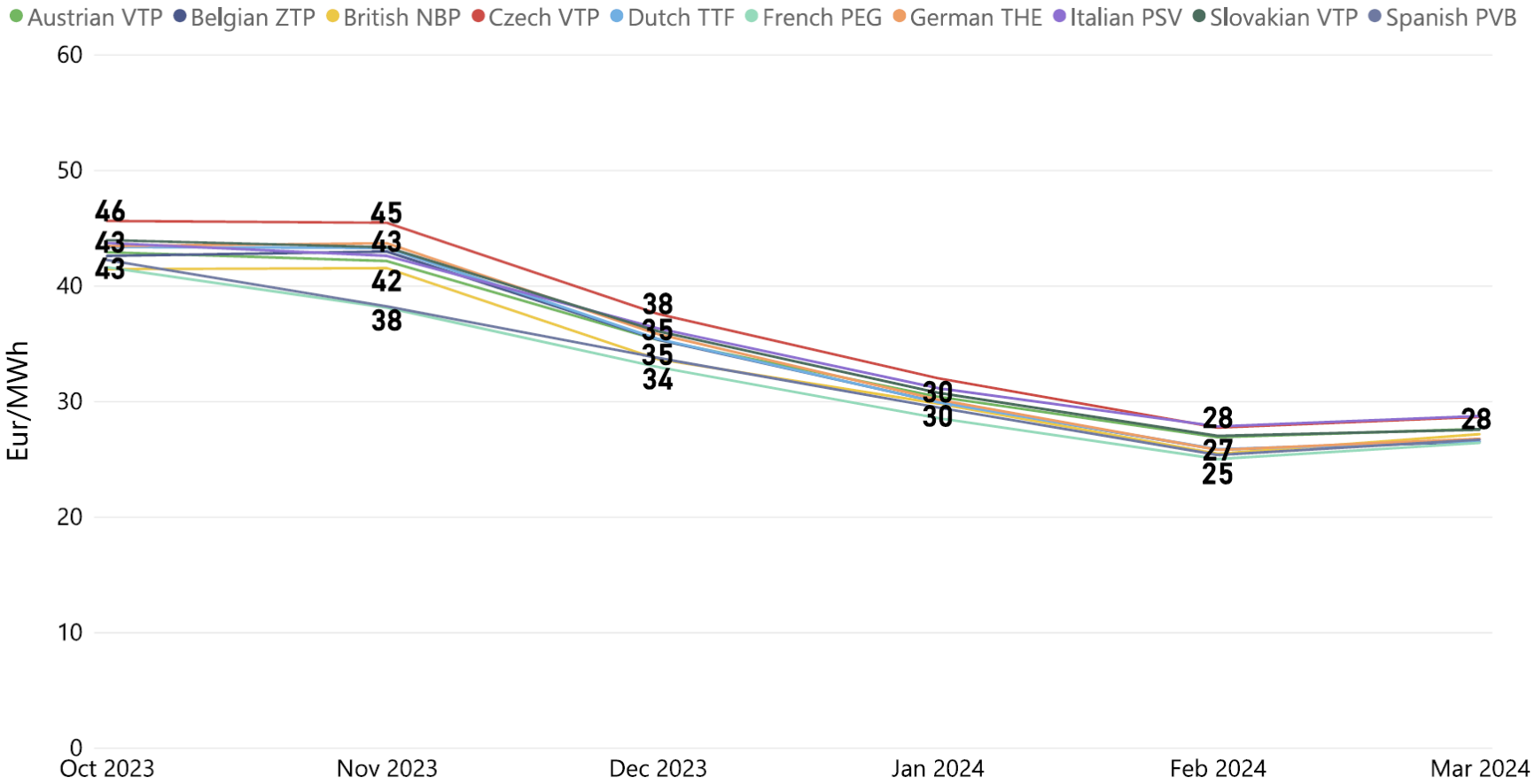


Figure 1 - Day-ahead average gas price at EU gas Hubs[2]

[2] Source: Global S&P (Platts)

Country	Demand W2022/23, TWh	Demand W2023/24, TWh	Difference, %
EU	2,157.71	2,170.11	0.57%
Europe	2,642.54	2,605.58	-1.40%
Austria	52.43	48.59	-7.31%
Belgium	81.65	93.42	14.41%
Bosnia and Herzegovina	1.40	1.32	-5.25%
Bulgaria	14.94	15.90	6.44%
Croatia	14.45	15.81	9.38%
Czech Republic	51.50	48.76	-5.32%
Denmark	12.94	14.62	13.00%
Estonia	2.18	2.83	30.08%
Finland	5.92	9.25	56.07%
France	276.60	253.85	-8.23%
Germany	531.20	548.90	3.33%
Greece	27.98	29.06	3.85%
Hungary	60.95	59.79	-1.89%
Ireland	29.57	27.74	-6.19%
Italy	394.78	391.43	-0.85%
Latvia	6.32	7.07	11.84%
Lithuania	6.94	11.11	60.09%
Luxemburg	4.18	4.31	3.05%
North Macedonia	1.95	2.25	15.31%
Poland	106.05	117.42	10.72%
Portugal	26.52	21.58	-18.63%
Romania	64.67	69.13	6.90%
Slovakia	30.79	31.04	0.81%
Slovenia	5.31	5.61	5.66%
Spain	175.91	163.59	-7.01%
Sweden	3.61	4.15	15.00%
Switzerland	20.68	20.75	0.32%
The Netherlands	170.32	175.15	2.83%
United Kingdom	460.80	411.15	-10.78%

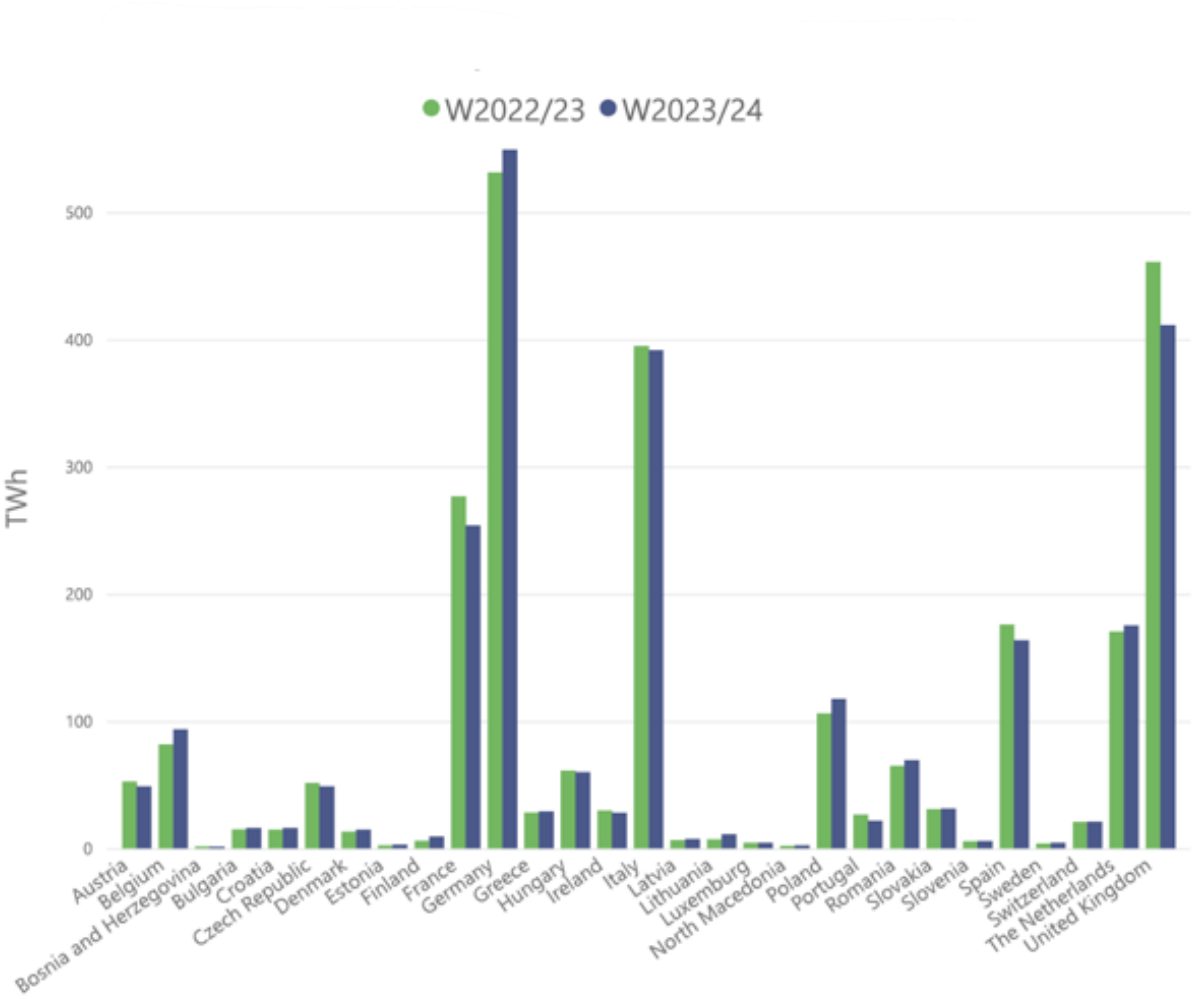


Figure 2 - Total gas demand by country. Winter 2022/23 vs 2023/24

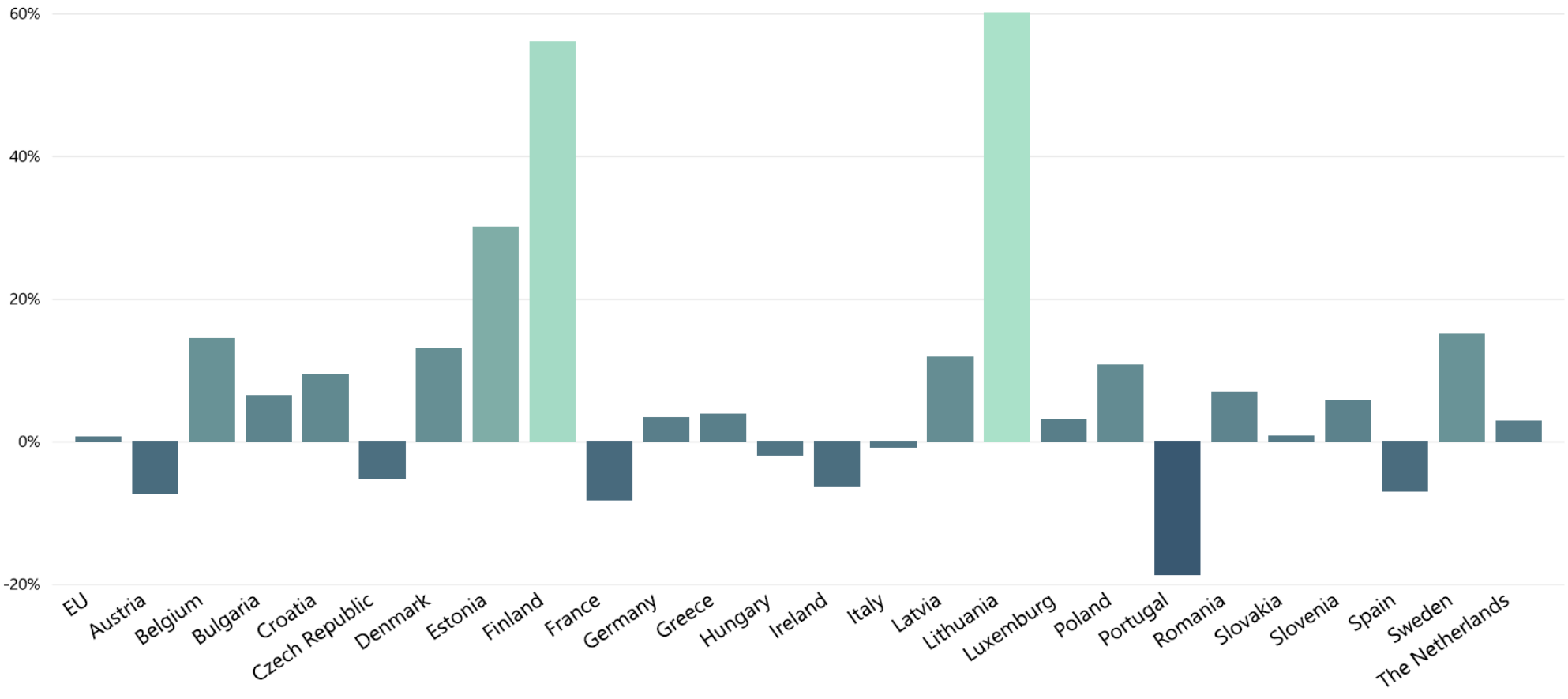


Figure 3 – Demand variation by country in EU %. Winter 2022/23 vs 2023/24

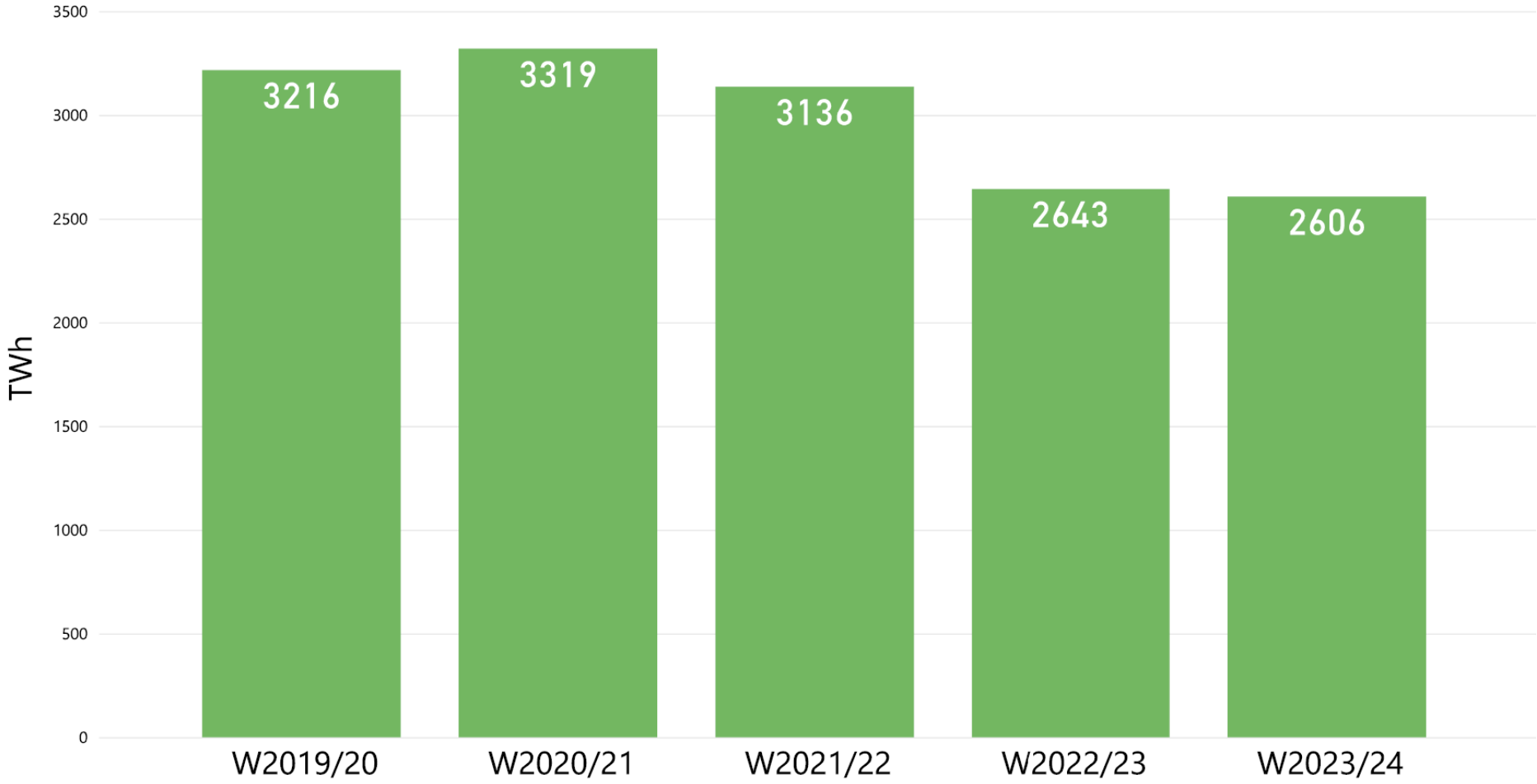


Figure 4 - Historical gas demand. Winters 2019/20 – 2023/24

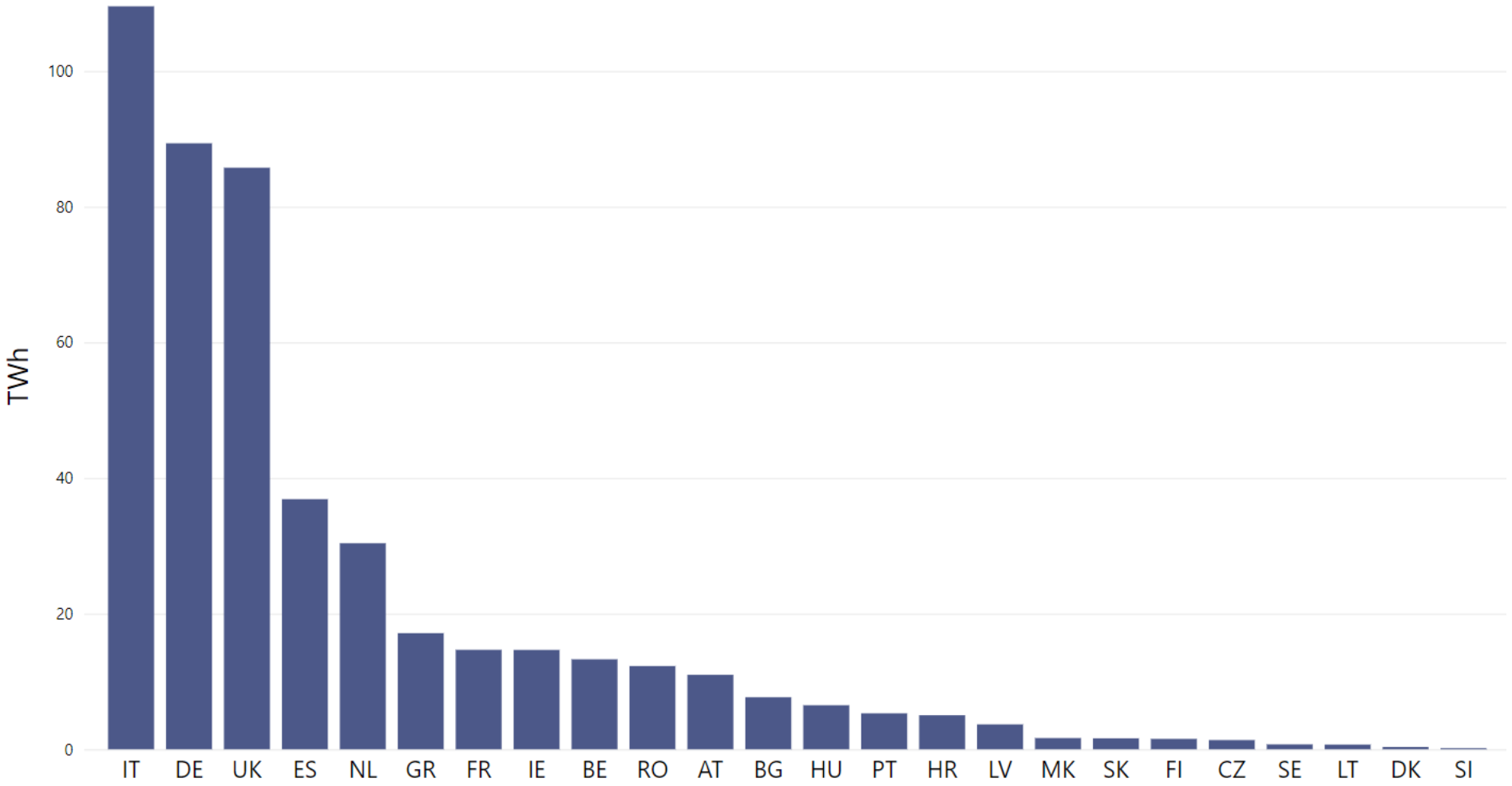


Figure 5 - Gas consumption for power generation. Winter 2023/24

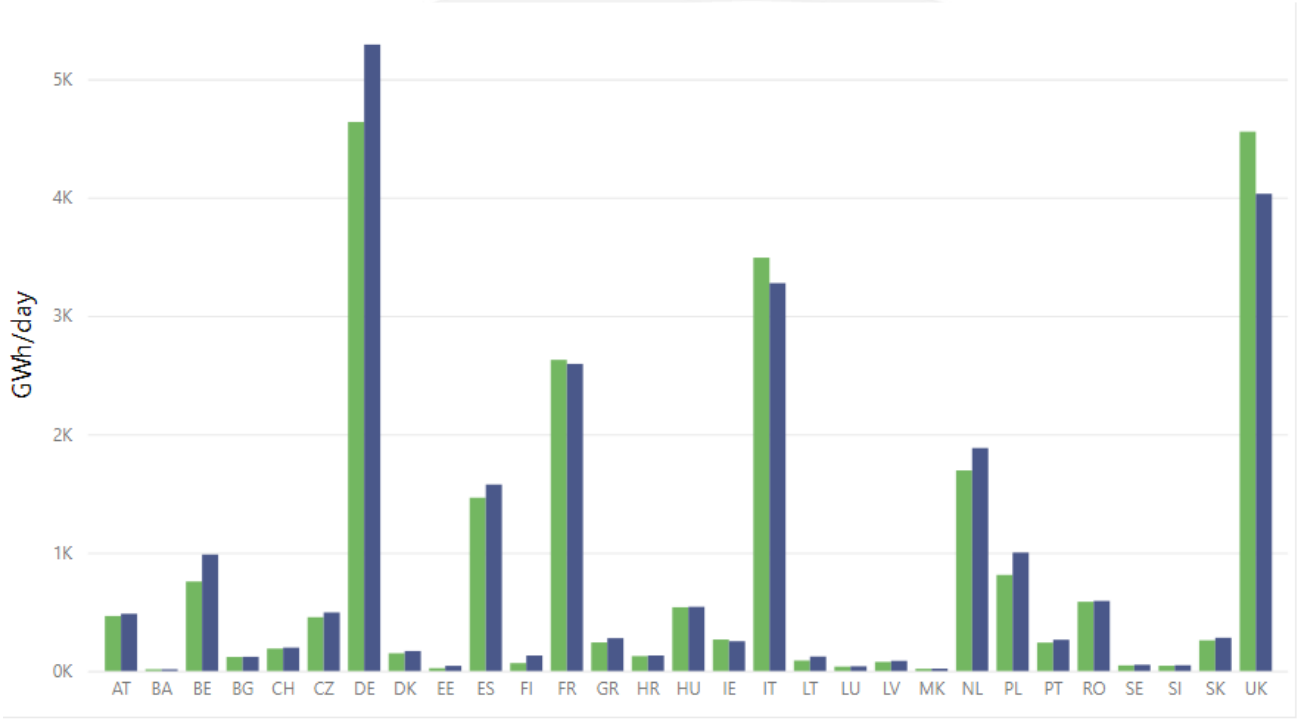
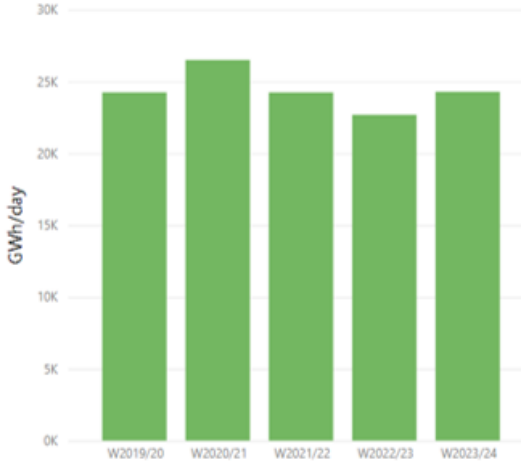


Figure 6 – Max peak demand by country. Winter 2022/23 vs 2023/24



Winter	Day	Peak Demand, GWh/day
W2019/20	22/01/2020	24,245
W2020/21	12/02/2021	26,503
W2021/22	25/01/2022	24,242
W2022/23	13/12/2022	22,689
W2023/24	10/01/2024	24,287

Figure 7 - Historical total max peak demand. Winters 2019/20 – 2023/24

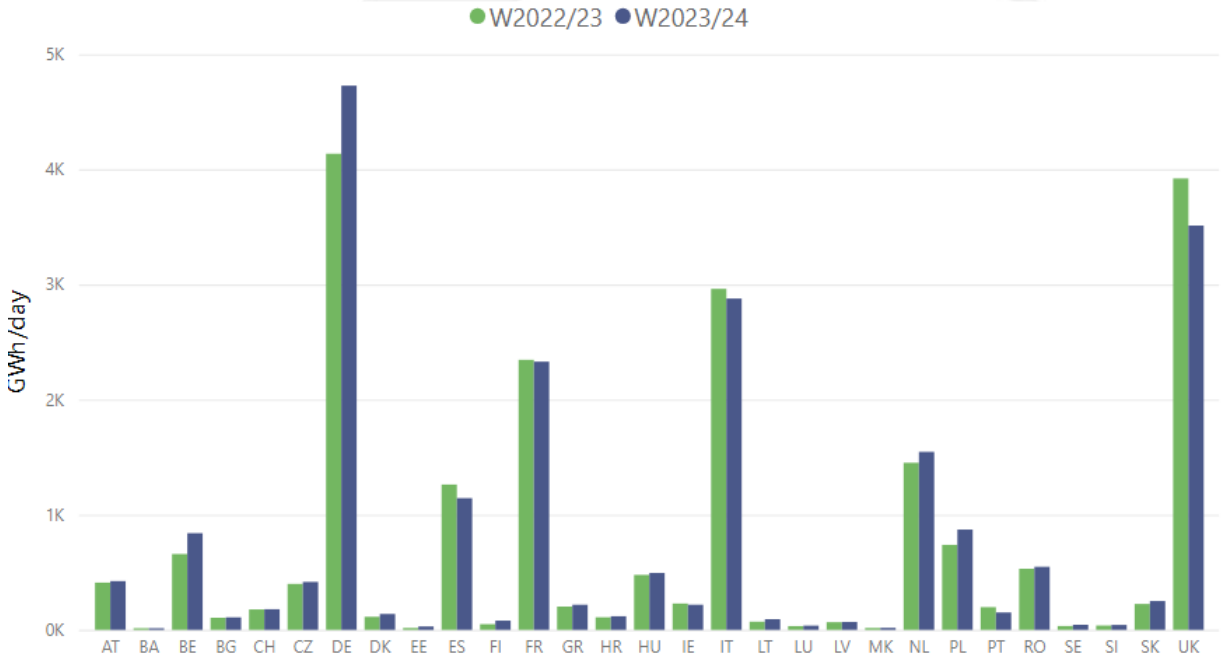


Figure 9 – 2-week peak demand by country. Winter 2022/23 vs 2023/24

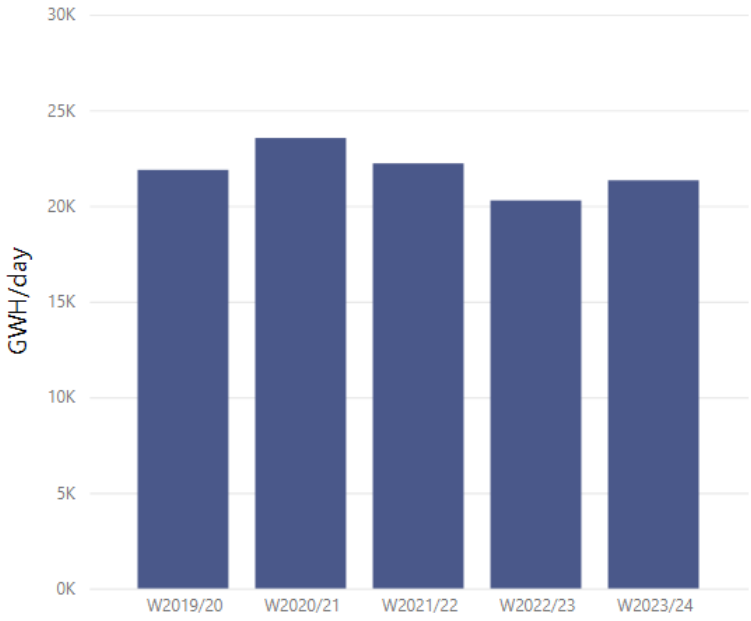


Figure 10 - Historical total 2-week peak demand. Winters 2019/20 – 2023/24

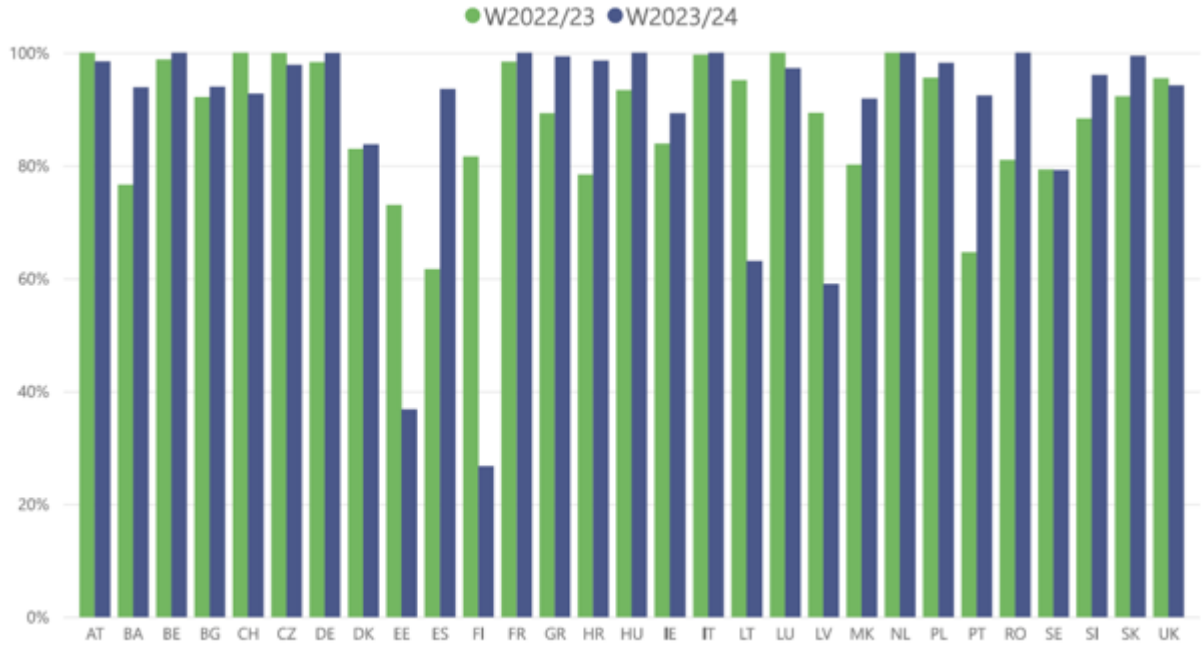


Figure 11 – Peak simultaneity by country. Winter 2022/23 vs 2023/24[3]

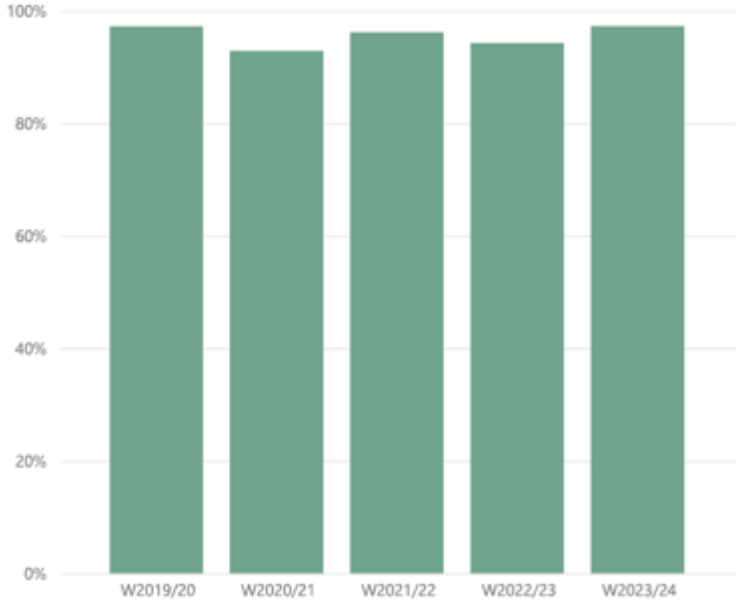


Figure 12 - Historical total peak simultaneity. Winters 2019/20 – 2023/24

[3] To measure the simultaneity between the peak days in different countries, the "Un-simultaneous Peak" is described as the sum of the peak day demands of the individual countries having occurred un-simultaneously the European Peak Simultaneity (EPS) is EPS = European Peak Demand / Un-simultaneous Peak (%).
The simultaneity of an individual country in the European peak day (CPS) is CPS = Country demand on the European peak day/Country peak demand (%).

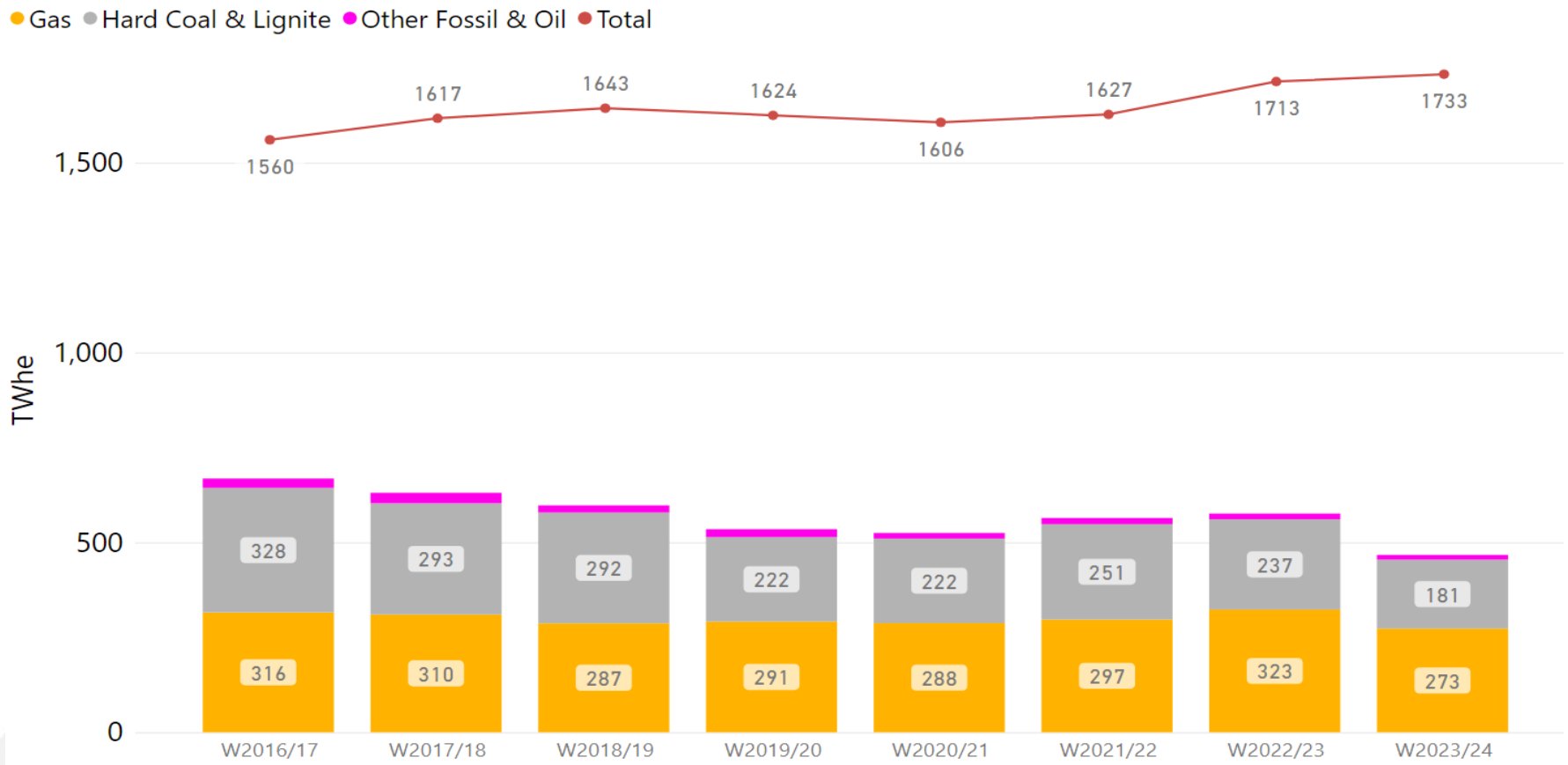


Figure 13 – Fossil fuel sources in the electricity mix. Winters 2016/17 – 2023/24[4]

[4] Based on data from ENTSOE Transparency Platform (EU data) and National Grid ESO data (UK data)

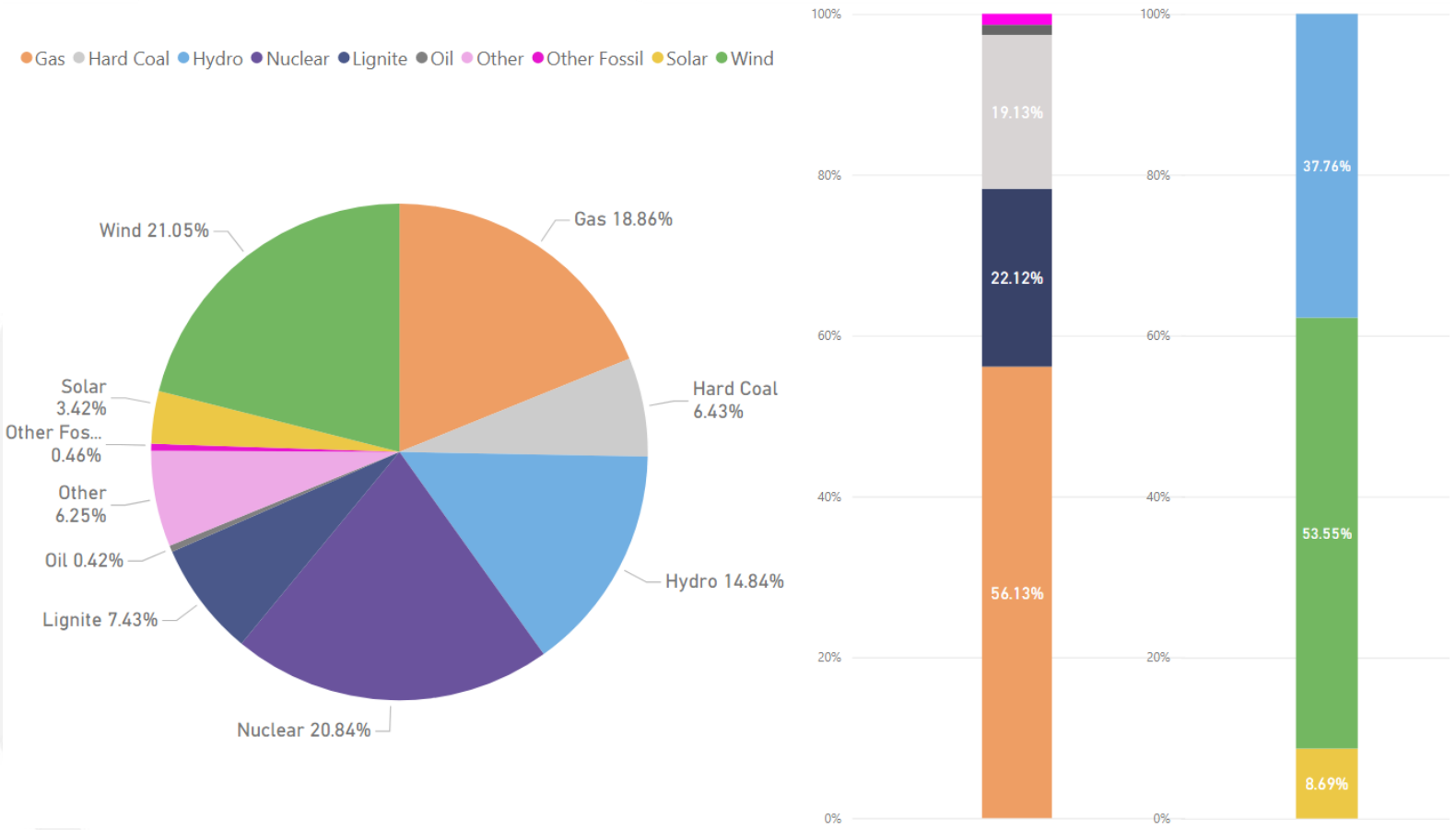


Figure 14 - Electricity power generation mix. Winter 2022/23[5]

[5] Based on data from ENTSOE Transparency Platform (EU data) and National Grid ESO data (UK data)

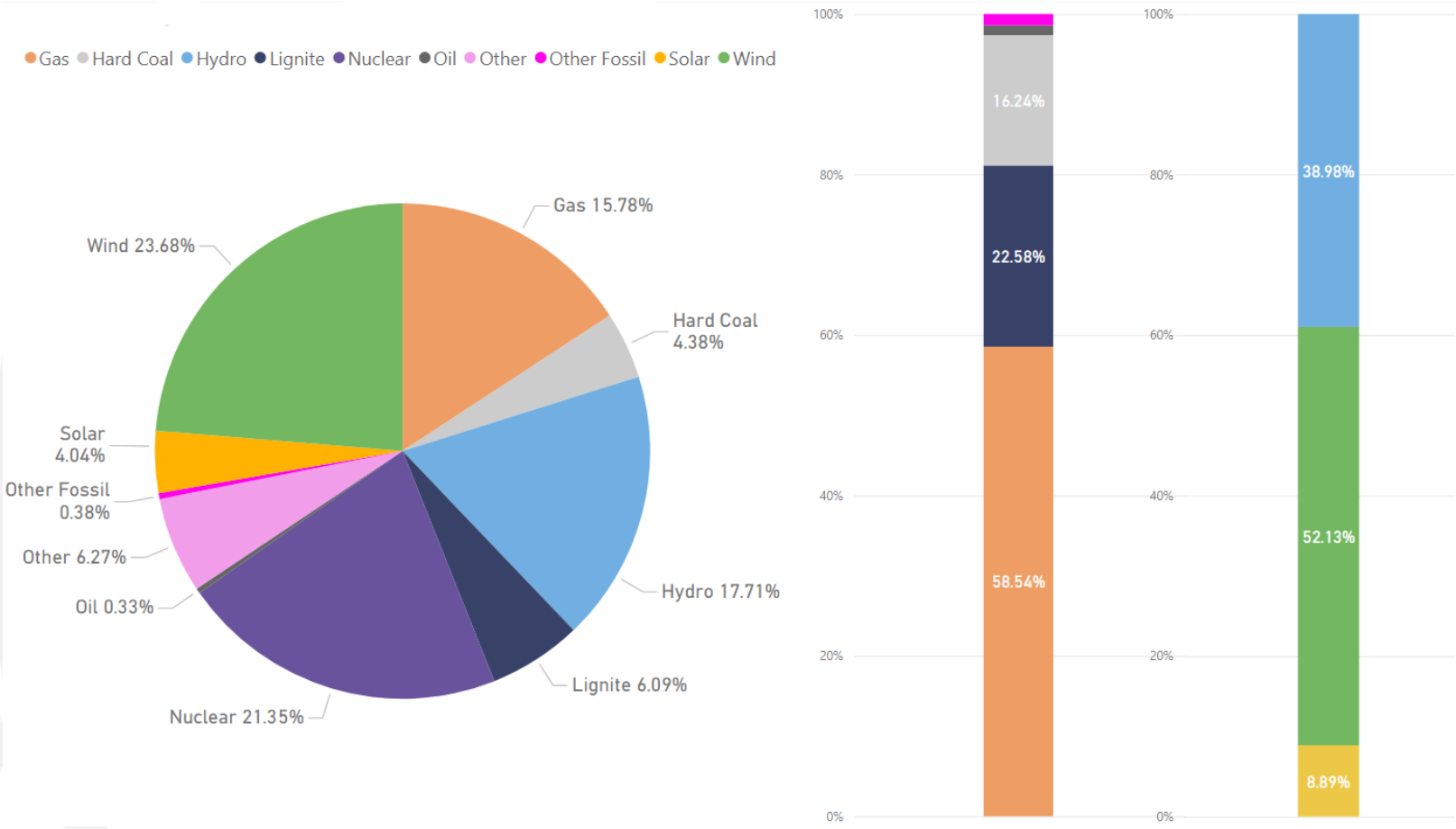


Figure 15 - Electricity power generation mix. Winter 2023/24[6]

[6] Based on data from ENTSOE Transparency Platform (EU data) and National Grid ESO data (UK data)

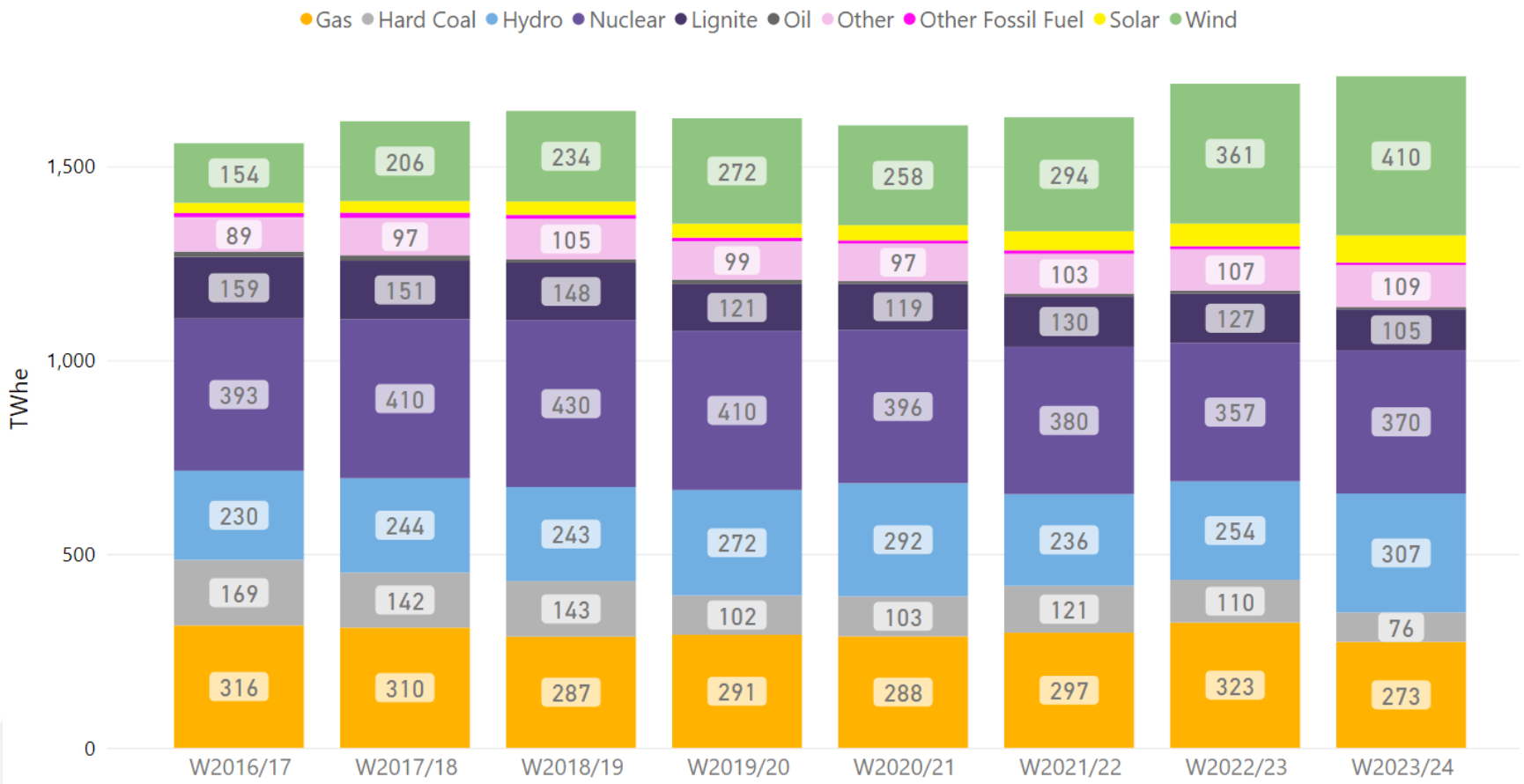


Figure 16 - Historical electricity generation mix. Winters 2016/17 – 2023/24[7]

[7] Based on data from ENTSOE Transparency Platform (EU data) and National Grid ESO data (UK data)

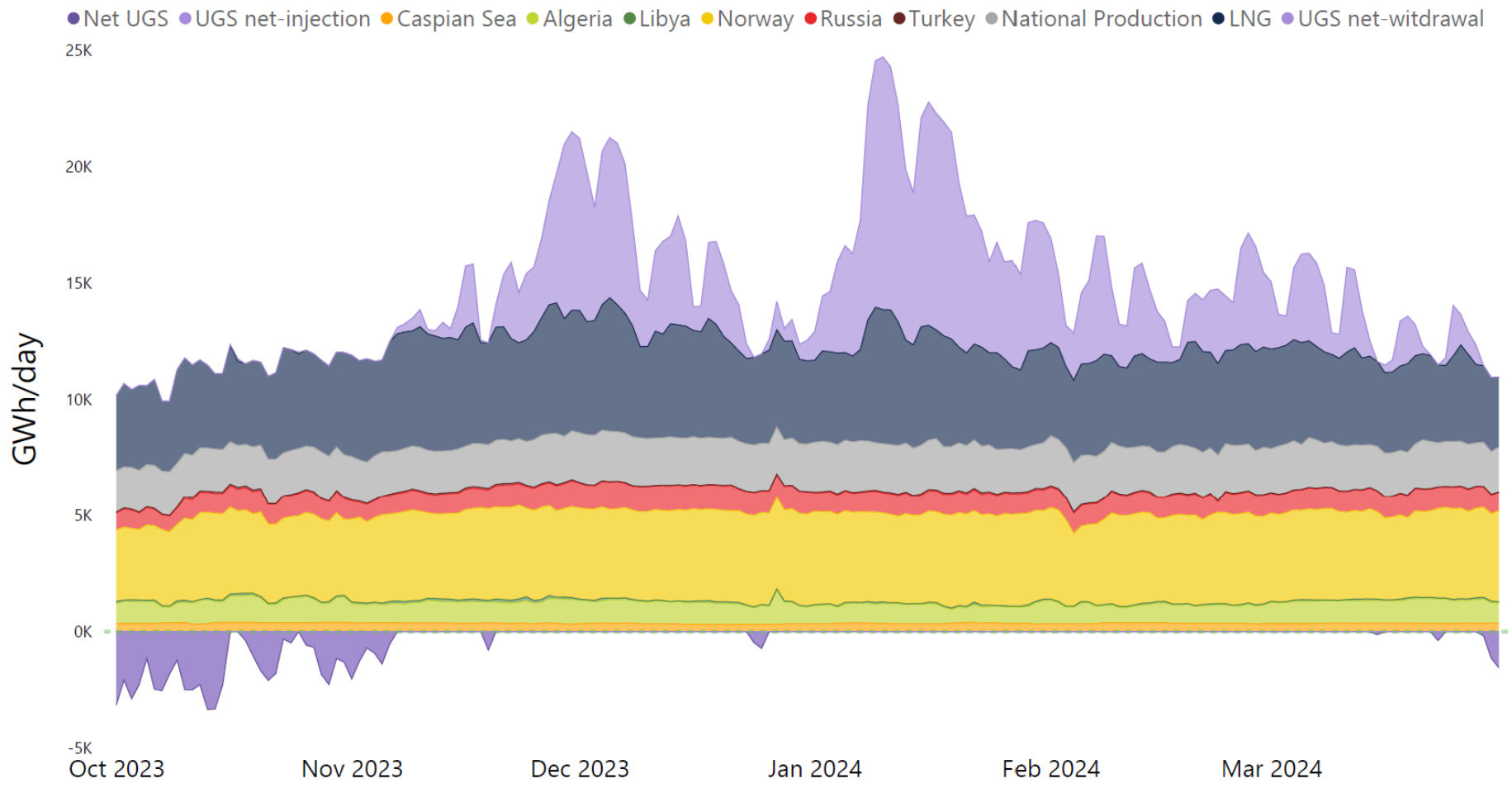


Figure 17 - Winter 2023/24 supply profile

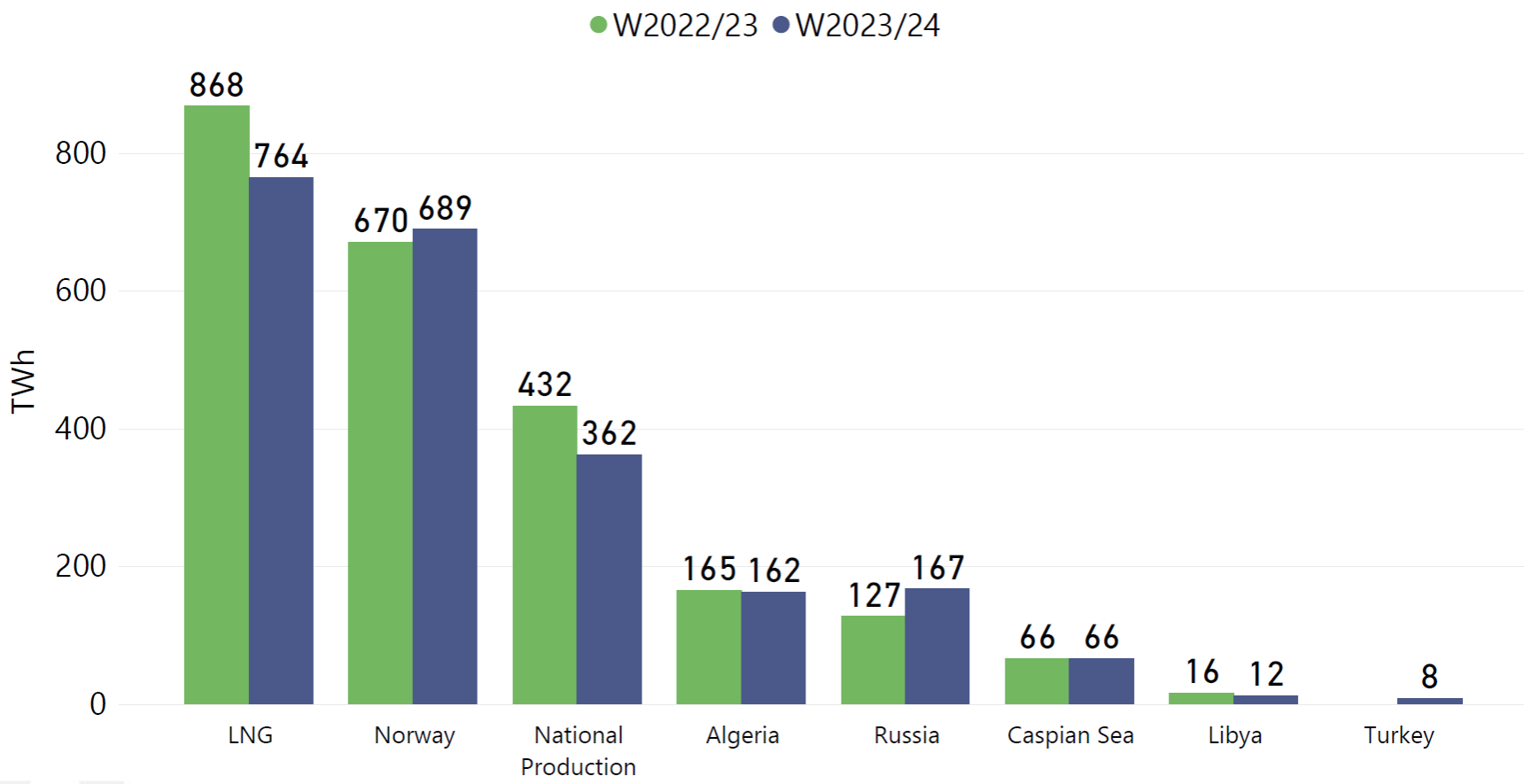


Figure 18 - Total supply by source. Winter 2022/23 vs 2023/24[8]

[8] Since April 2023, flows from Turkey have been delivered through the IP Strandzha (BG) /Malkoclar (TR) route, which was previously used in the reverse direction for exports from the EU to Turkey. Since 2023, network users have been receiving gas via the Turkish gas grid from LNG terminals, which are entirely or partially operated by Turkish operator BOTAS.

Country	LNG W2022/23, TWh	LNG W2023/24, TWh	Difference, %
Belgium	70	60	-15%
Croatia	14	14	-3%
Finland	1	10	1014%
France	174	172	-1%
Germany	14	37	161%
Greece	20	11	-48%
Italy	86	88	3%
Lithuania	18	12	-32%
Poland	36	31	-13%
Portugal	23	22	-5%
Spain	131	111	-16%
The Netherlands	104	107	2%
United Kingdom	176	91	-48%

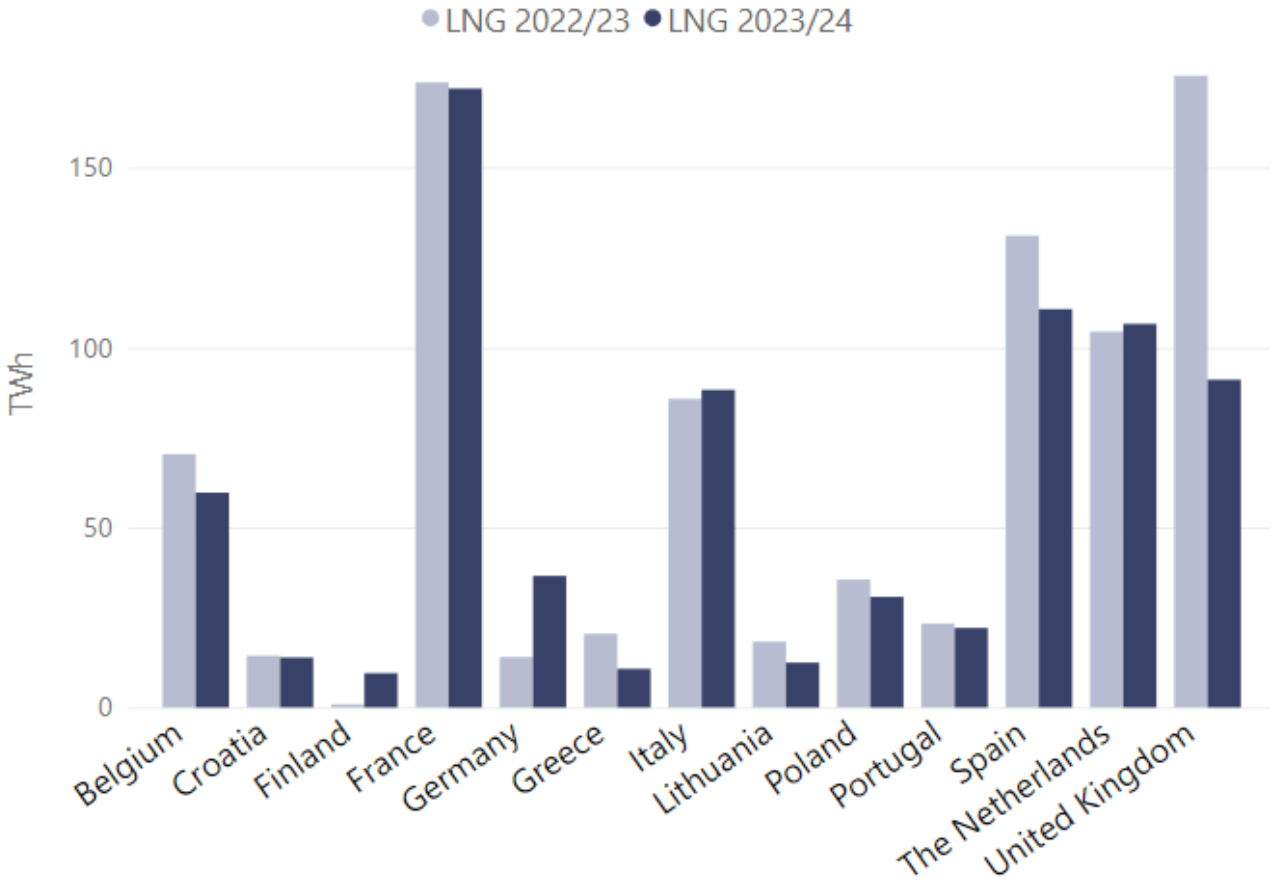


Figure 19 - LNG supply per country. Winter 2022/23 vs 2023/24

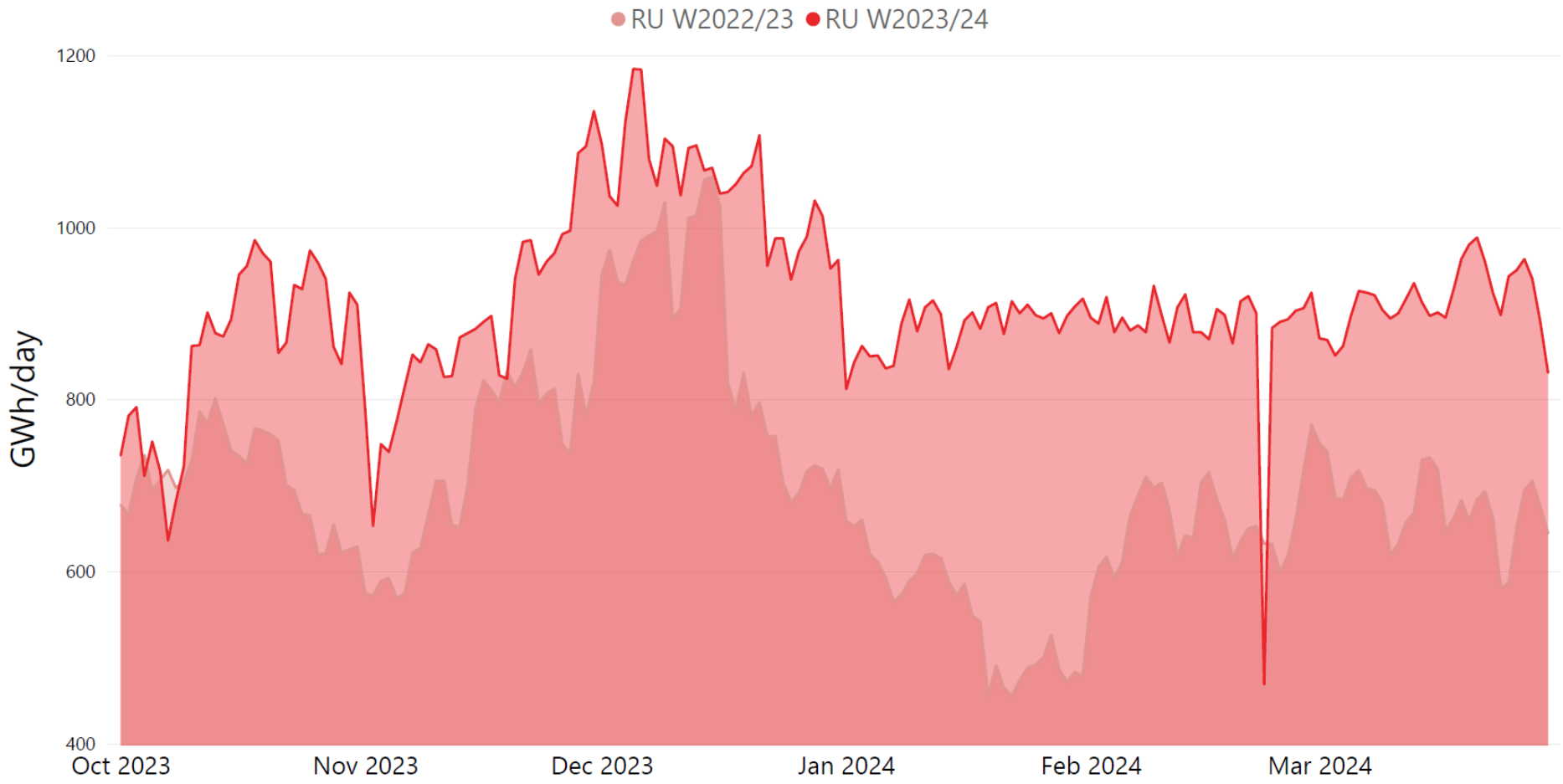


Figure 20 - Russian pipeline gas flows. Winter 2022/23 vs 2023/24

Supply source	Total, TWh
Algeria	165
Caspian Sea	66
Libya	16
LNG	868
National Production	432
Norway	670
Russia	127

2344
Sum of Total, TWh

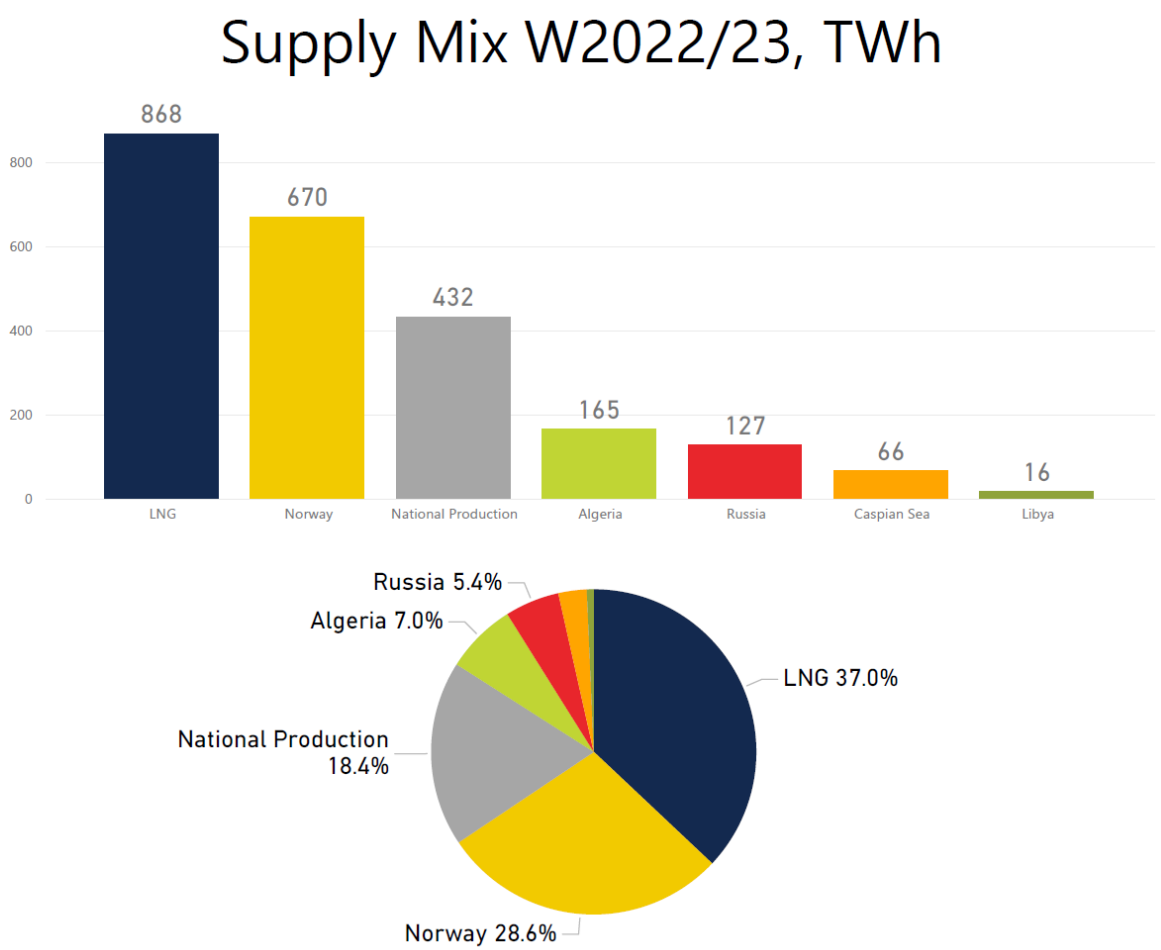


Figure 21 – Supply mix. Winter 2022/23

Supply source	Total, TWh
Algeria	162
Caspian Sea	66
Libya	12
LNG	764
National Production	362
Norway	689
Russia	167
Turkey	8

2230

Sum of Total, TWh

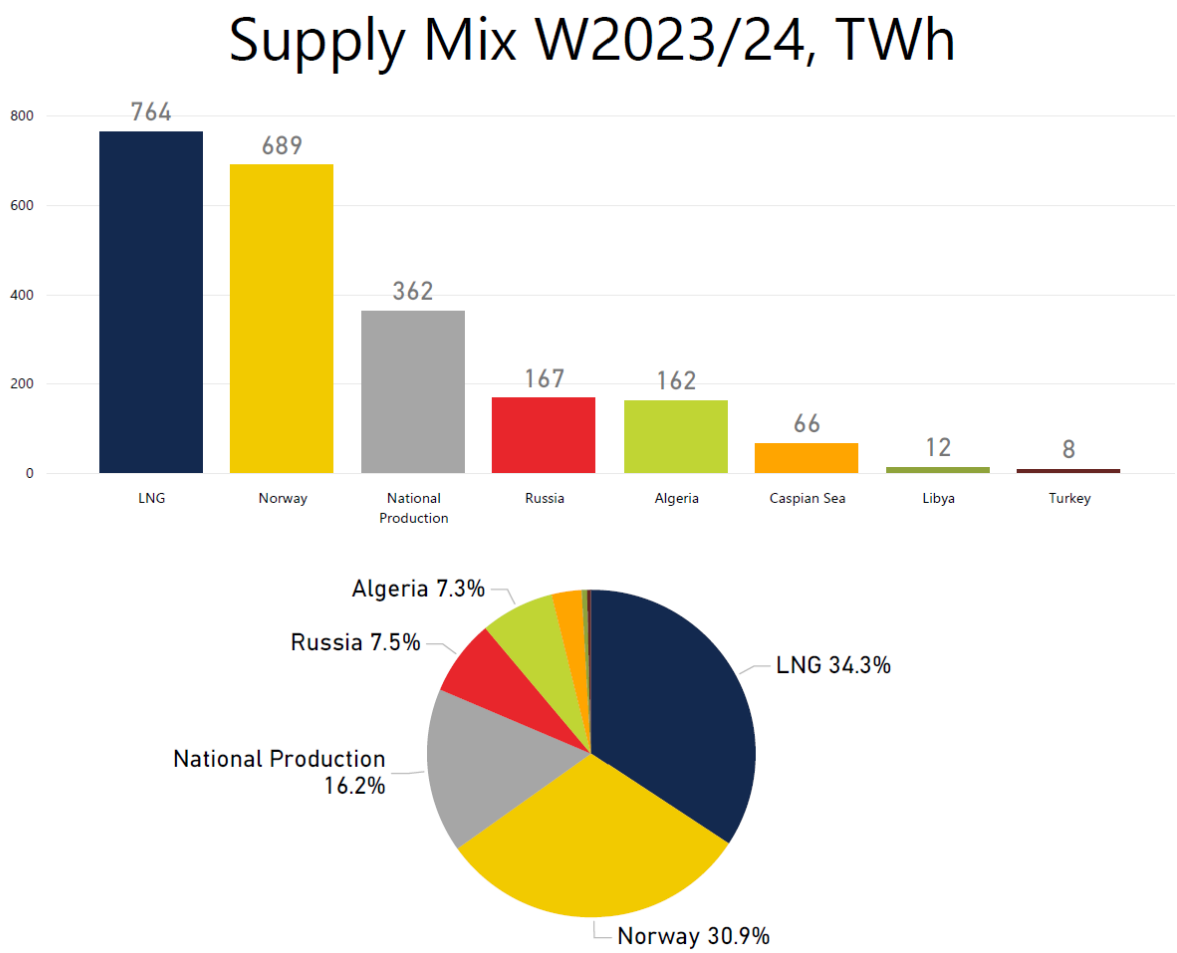


Figure 22 – Supply mix. Winter 2023/24

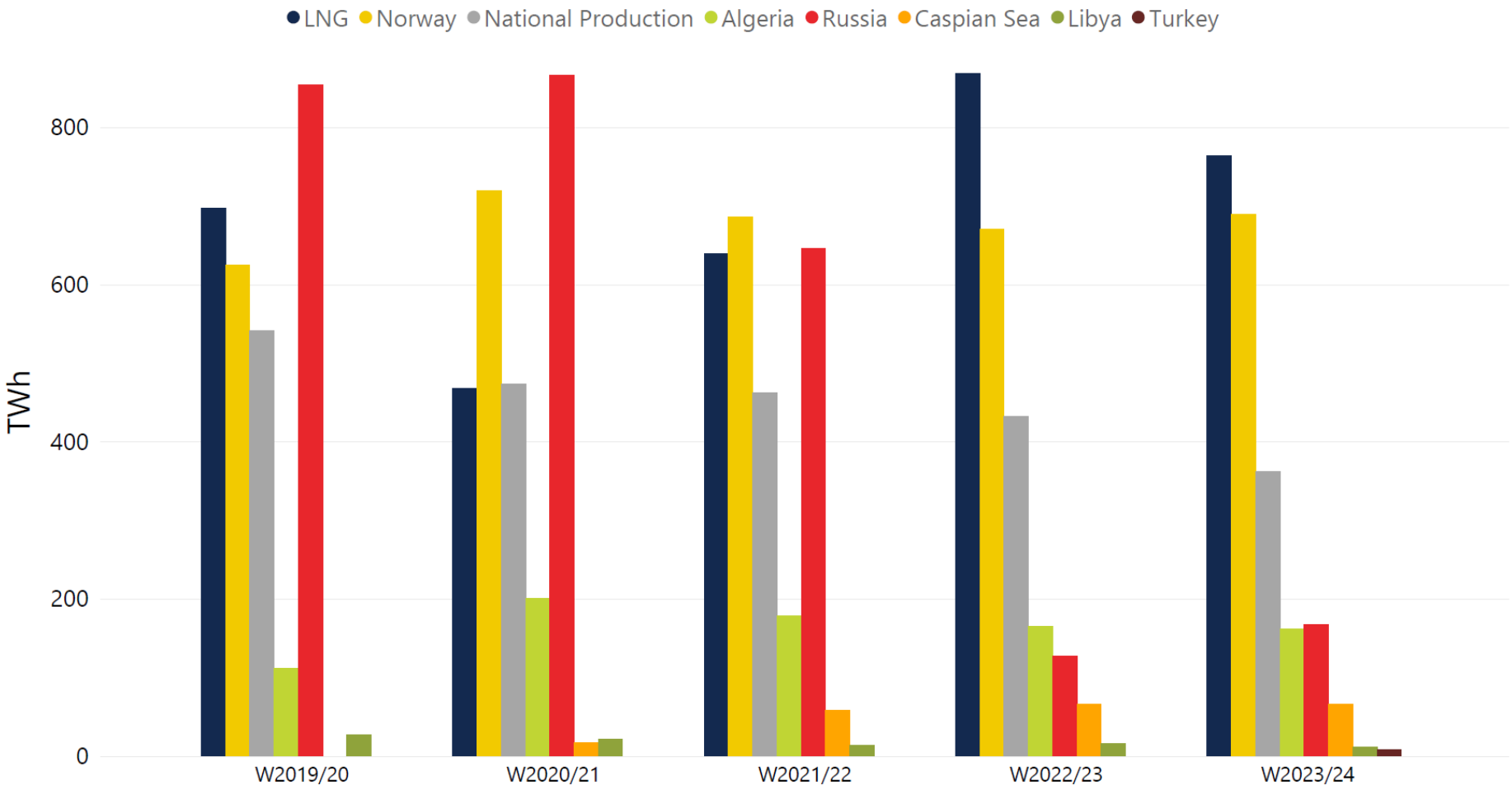


Figure 23 - Evolution of gas supplies. Winters 2019/20 – 2023/24

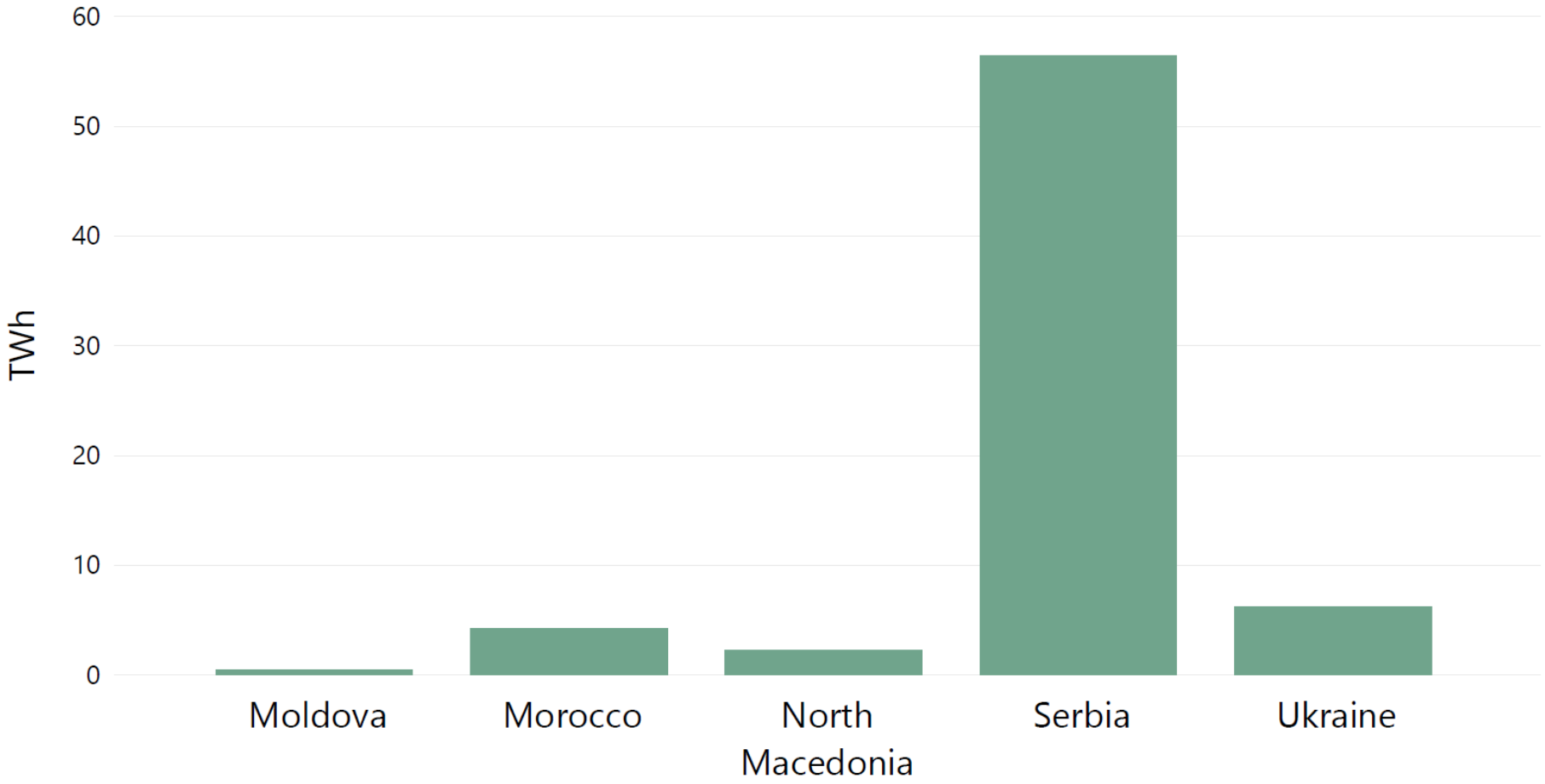
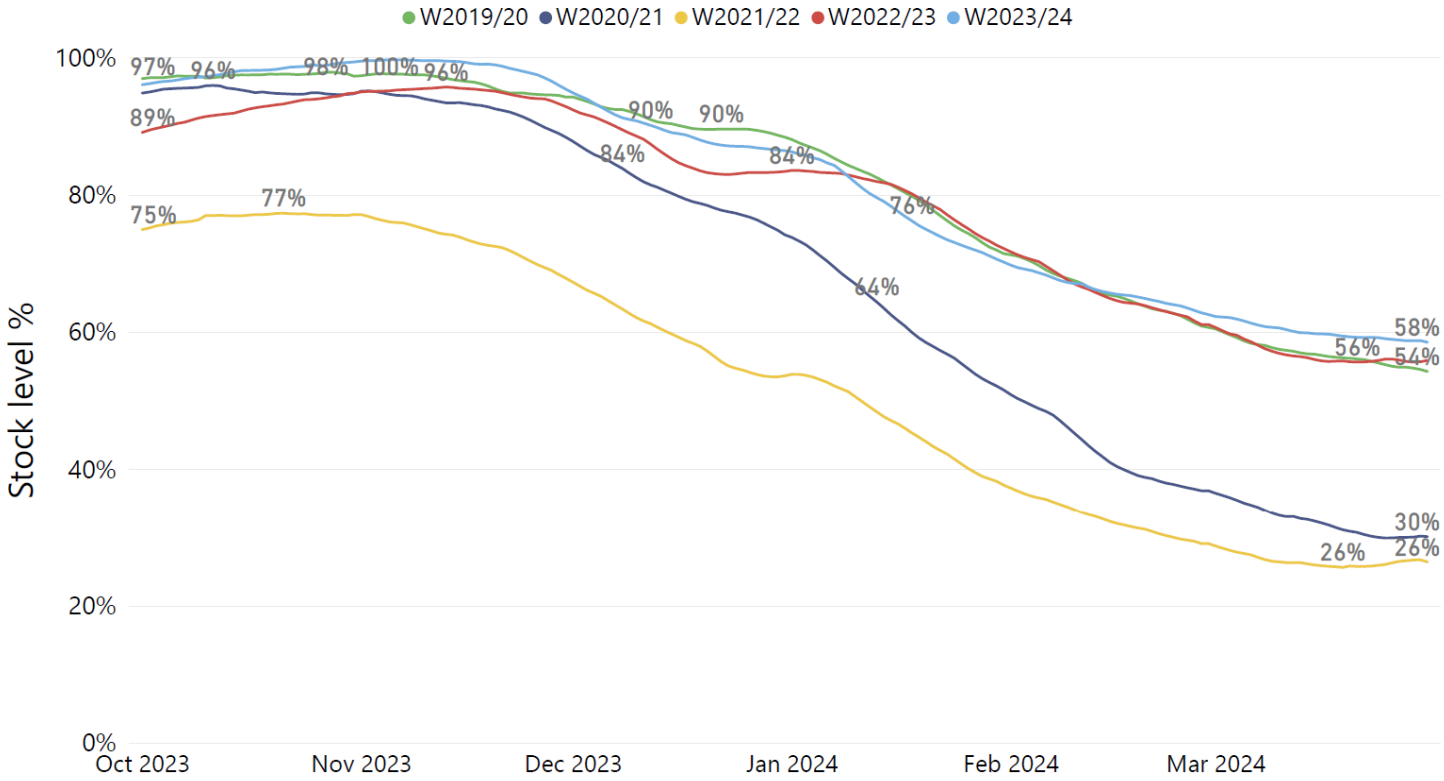


Figure 24 - Exports from the EU countries. Winter 2023/24



	1-Oct (TWh)	31- Mar (TWh)	UGS Utilisation (TWh)
W11-12	601.7	331.3	270.5
W12-13	716.2	222.8	493.5
W13-14	724.1	433.4	290.7
W14-15	867.4	274.6	592.9
W15-16	838.6	364.1	474.5
W16-17	972.9	278.1	694.8
W17-18	903.8	191.1	712.7
W18-19	898.8	441.4	457.4
W19-20	1063.2	598.4	464.8
W20-21	1053.3	336.1	717.2
W21-22	832.2	291.3	540.9
W22-23	991.0	627.8	363.2
W23-23	1,091	666.0	425.0

Figure 25 - Evolution of UGS stock level and UGS utilisation. Winters 2019/20 – 2023/24[9]

[9] Source: AGSI+

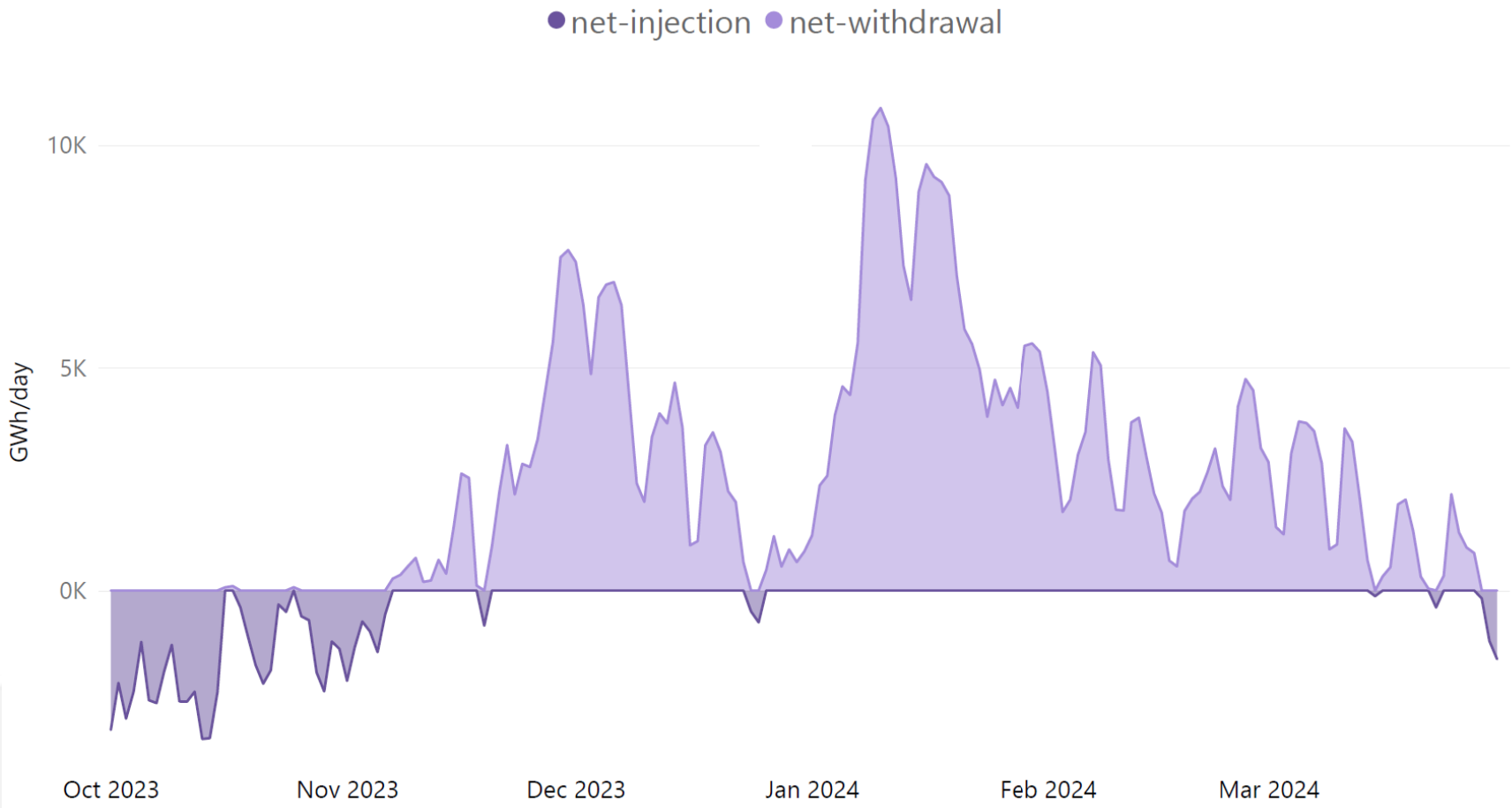


Figure 26 - UGS net-injection/net-withdrawal profile of European storage. Winter 2023/24

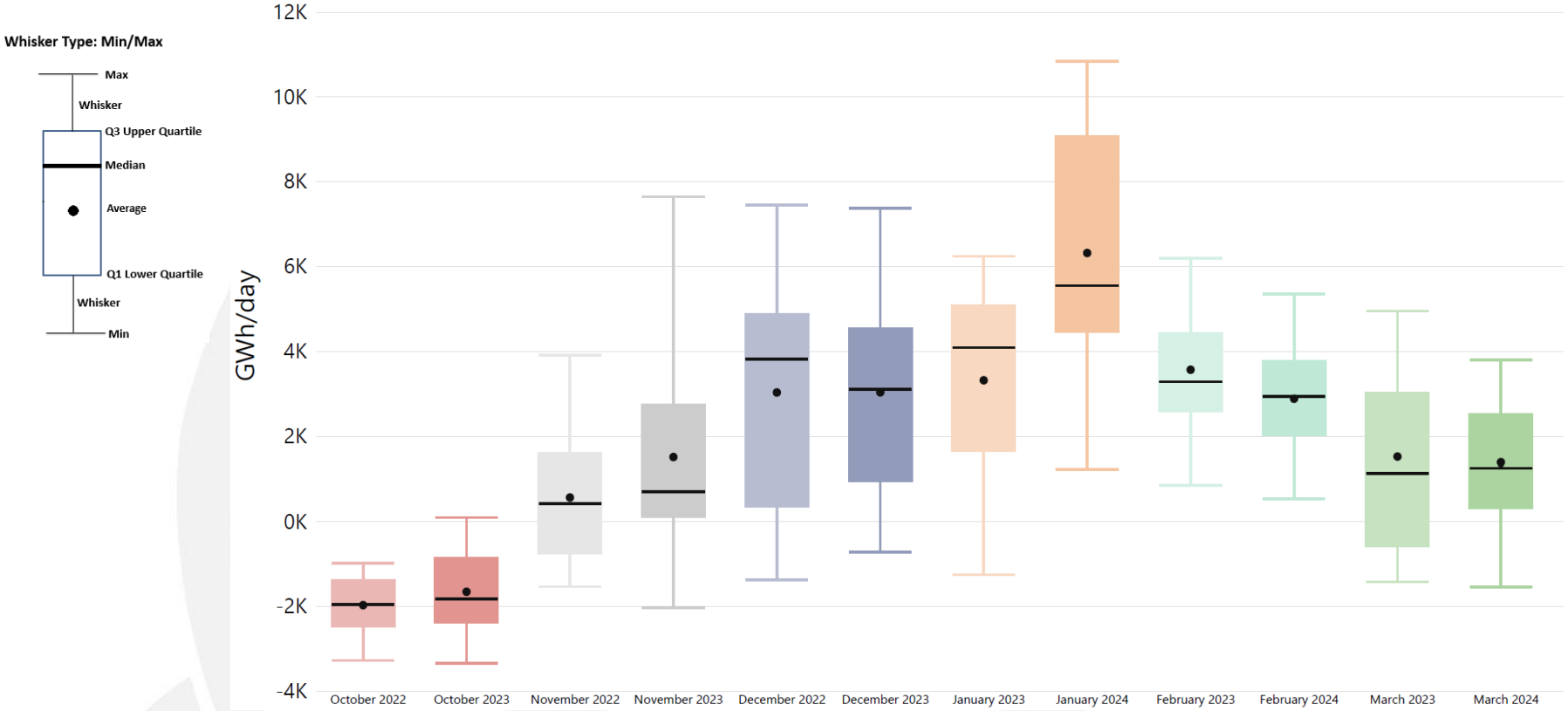


Figure 27 - UGS daily range of net-injection and net-withdrawal per month. Winter 2022/23 vs 2023/24[10]

[10] The evolution of the injection season depends on many factors, in particular the willingness of shippers (or other entities designated by Member States) to inject gas, and the actual amount of gas available for injection. The factors are linked to price signals such as summer/winter spread, EU and national laws stipulating mandatory injections, climatic effects on temperature-driven consumption, and economic considerations of end users. This figure provides the average net injection / withdrawal and the daily distribution ranges between the lowest and highest injection in GWh/d for Europe for each month of the winter periods of 2022/23 and 2023/24.

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