



ENTSOG WINTER SUPPLY REVIEW

2018/2019

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Winter Review 2018/2019

Executive Summary

ENTSOG has completed the review of the European gas supply and demand for Winter 2018/2019 (October to March). The Seasonal Reviews aim to provide a deeper understanding 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. They also help to build experience and a solid background for the assumptions considered in the Winter Outlook. Such knowledge is also factored in the recurrent TYNDP process to ensure consistency and continuous improvement in every ENTSOG report. The main findings of this Winter Review are:

- > **Seasonal gas demand was considerably high in Europe comparing 5 years period.**
- > **For 2018/2019 Winter, daily peak demand still was third highest value measured last 8 years, decreased 6,9% comparing to the previous period (value was comparable with the level in 2012/2013 and 2016/2017). Average daily demand value for highest 14-day coldest period remained high and it was very close to the previous winter level (similar to three previous consecutive periods).**
- > **UGS utilisation was significantly lower than the one from previous winters. The level at the end of season was highest comparing last 7 winters (441.4 TWh).**
- > **LNG terminals' send-out and LNG tanks capacities performed significant role concerning demand modulation in some countries, especially to those located in the south of Europe.**
- > **Significant increase in LNG import in supply mix share: +9% growth comparing last year reaching 17% in mix share (to 508.4 TWh in winter 2018/19)**

Detailed data for the cross-border flows are available on the Transparency Platform¹.

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 infrastructures.

1. Introduction

This review, as part of the ENTSOG Annual Work Program 2019 is published on a voluntary basis and aims at providing an overview of the demand and supply balance during Winter 2018/2019. The report brings transparency to the internal analysis carried out by ENTSOG for the purpose of

¹ Transparency Platform: <https://transparency.entsog.eu/>

developing the seasonal Supply Outlooks and the Union-wide TYNDP, as well as for the ongoing R&D plan.

More generally, the report aims to provide an overview of European trends that could not be captured at national 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.

Overview

The following section highlights specific events, which occurred during the period between October 2018 and March 2019, that caused fluctuations in the supply and demand balance. The major gas related topics were²:

OCTOBER

- In October, strong LNG arrivals and soaring regasification rates across Europe, coupled with above-average temperatures saw European gas prices ease on month
- October LNG regasification in Continental Europe broke above 5 Bcm, the first time for a calendar month since May 2011
-

NOVEMBER

- LNG regasification in Continental Europe in November was at its highest level for a calendar month since at least January 2010 as the recent LNG glut showed no sign of slowing
- The boost in LNG regas levels has released pressure on storage withdrawals to balance the system, with capacity holders able to hold onto stocks for later due to the firm supply from terminals weighing on spot pricing during November

DECEMBER

- In December Norway's Equinor has begun gas production at the Aasta Hansteen field in the Norwegian Sea.

JANUARY

- The Dutch wholesale natural gas spot price rose 15% on year as falling domestic production increased the Netherlands' dependence on alternative sources

FEBRUARY

² Source: Platts

- February gas demand across Europe was down sharply on the previous month due to warm weather, with temperatures as much as 10 degrees above seasonal normal.
- Russian gas supplies to Europe dropped 4% on the month to 0.45 Bcm/d in February on a significant weather-driven fall in demand

MARCH

- Norwegian pipeline gas supplies to Germany surged again in March, outpacing exports to the UK for the first time in six months
- Supplies to Germany hit a 2.5-year high in March at 2.47 Bcm as European counterparts through March, giving an incentive for Norwegian exporters to target Germany.

The level of storages at the end of Winter 2018/2019 was the highest (441.4 TWh) of the 7 last years with a relatively low use of storages at the end of the season.

2. Gas Prices and Quantities at European hubs

The following graphs show the evolution of gas prices in Europe during the Winter 2018/2019:

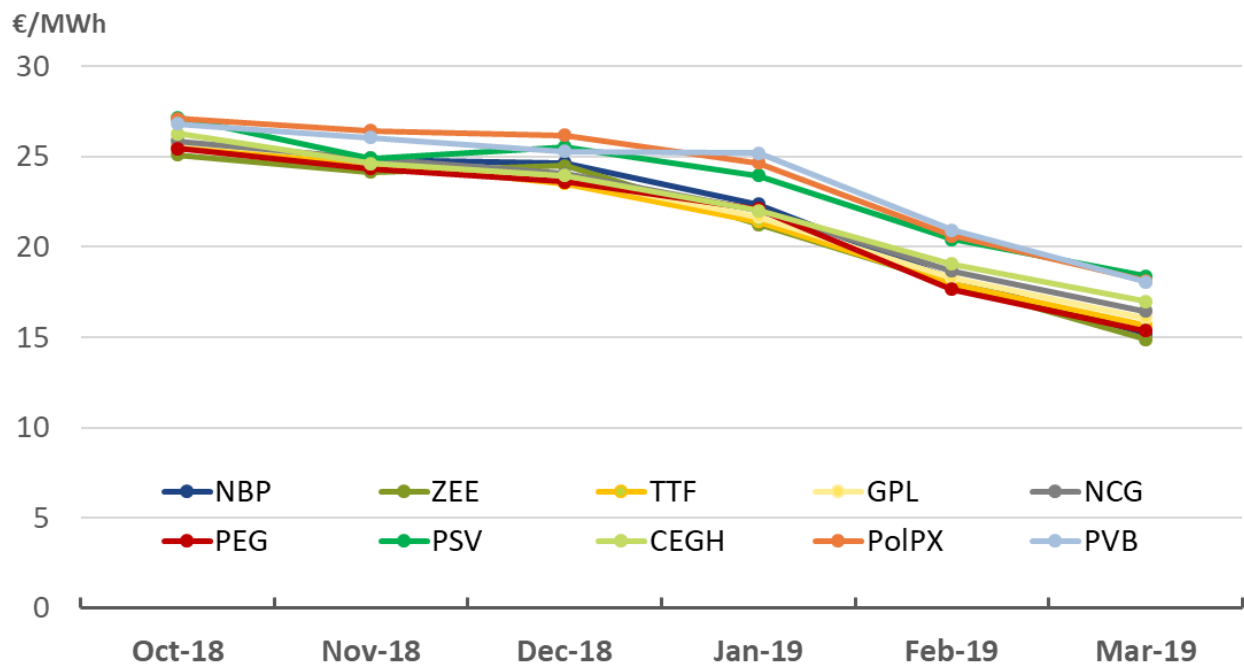


Figure 1 - Day-ahead average prices at European hubs in €/MWh (Source: Bloomberg)

Figure 1 shows the evolution of the day-ahead winter average prices at different European gas hubs. As in the previous winter review, price convergence between the different European hubs continued, responding the same price signals. During entire period hubs showed generally a similar trend. Italian, Polish and Spanish gas prices remained slightly higher. Price drop observed across the Europe during Winter 2018/2019 continued in summer.

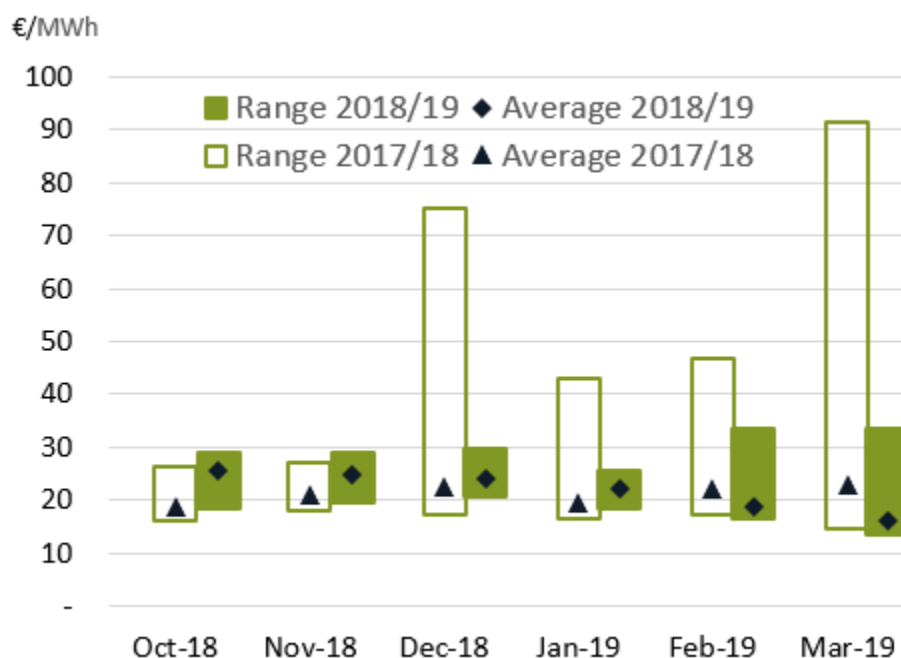


Figure 2 - Ranges and averages of the day-ahead hub prices at European hubs in €/MWh (Source: Bloomberg)

Figure 2 displays the maximum range and average of the day-ahead winter price for the last two years over all the European hubs. The average price in the first four months was higher than previous winter starting from 21.6 €/MWh in October. For 6 months period trend was reversed – each month average price was closer to the last year average and in final months lower, reaching 16,5 €/MWh. In 2018/2019 there were no price peaks like during previous period (in 2017/2018: NCG to 71 €/MWh in October, PSV to 75 €/MWh in December, TTF to 76 €/MWh and NBP close to 90 €/MWh in March). This situation caused relatively narrow price ranges in winter 2018/2019.

3. Demand

3.1. European seasonal gas demand

The gas demand in Winter 2018/2019 was lower (3,221 TWh) compared to the previous winter (3,384 TWh³). All months except January, the daily monthly average demand was lower especially in February and March. Ranges of maximum and minimum values were comparable during first half of season, then in 2018/2019 range there was much higher in January and significantly lower

³ Discrepancy between Winter Review 2017/2018 value of total demand is caused by changes in the official statistics data for Germany (shift of monthly volumes between summer and winter).

in February and March. **Figure 3** shows the range and the daily monthly average for total demand in EU and a comparison with the previous winter.

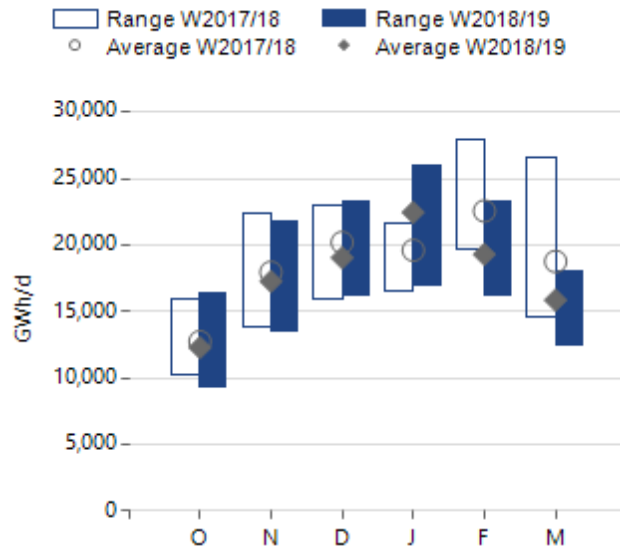


Figure 3 - Total gas demand. Winter 2017/2018 vs Winter 2018/2019

Figures 4 and 5 show the demand range and monthly average when split into Final Demand (Residential, Commercial and Industrial) or Power Generation sectors, for the countries where the demand breakdown is available. Residential, Commercial and Industrial sector represents more than 80% of the total demand.

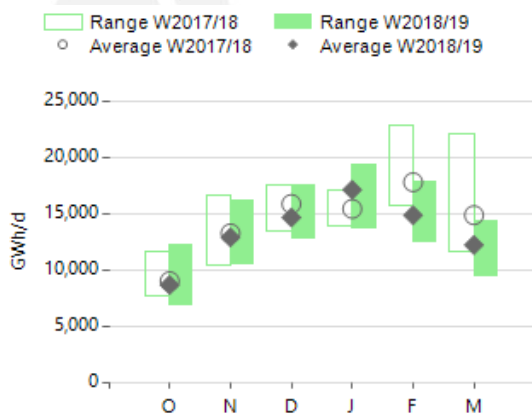


Figure 4 - Final gas demand *

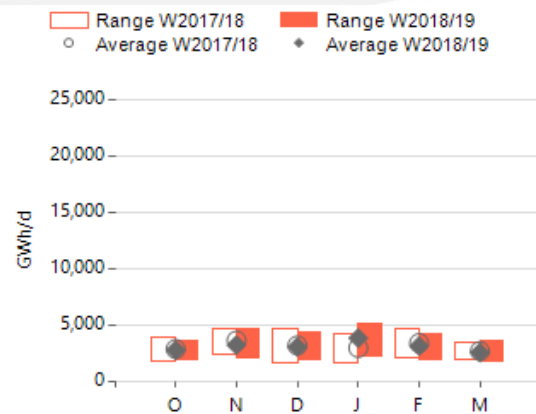


Figure 5 - Power generation gas demand *

* These graphs refer to the countries for which demand breakdown is available (with exception of Austria and Poland).

3.2. Winter demand evolution 2014-2019

The demand for the winter 2018/2019 was lower than in Winter 2017/2018 (-4,8%). Demand decreased first time since 2014/2015, but it still stays well above 3000 TWh to a much higher level than 2014/15 and 2015/16 figures.

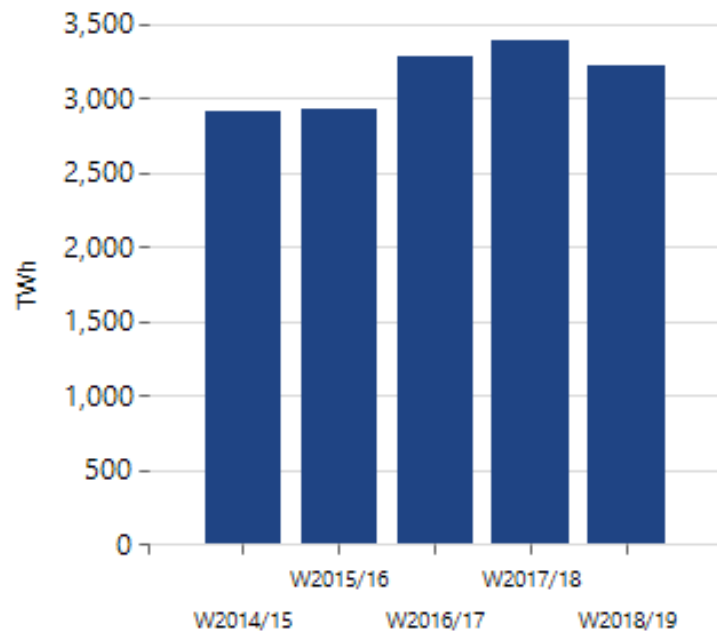


Figure 6 - Total consumption of natural gas. Winters 2014/2015 – 2018/2019

Figure 11 shows the daily average demand for each month in every winter since 2014. The largest daily average demand occurred in January 2017 (23,077 GWh/d), and this winter achieved a similar value (22,471 GWh/d). Daily average of monthly gas demand profile was similar to Winter 2016/17

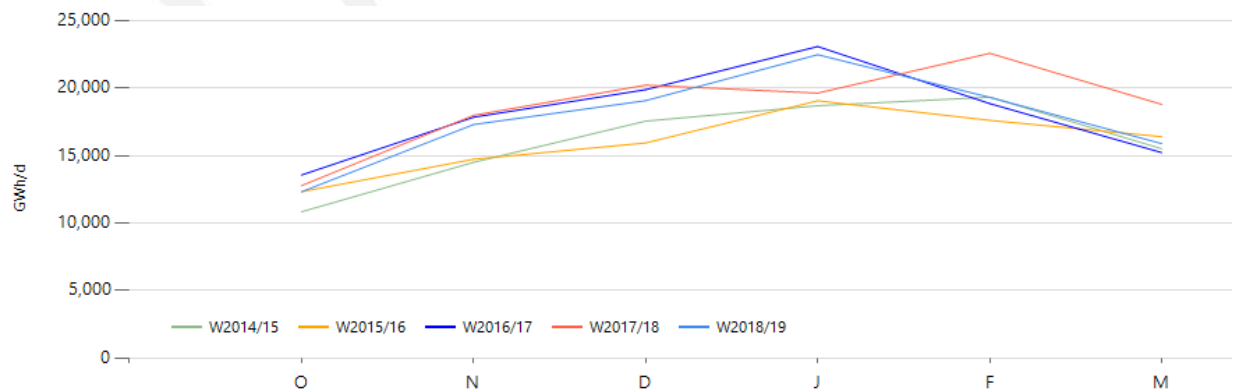


Figure 7 - Daily average of monthly gas demand. Winter 2014/2015 – 2018/2019

As shown in the graphs below, for the countries where the demand breakdown is available, demand for power generation remained similar as previous year but for final gas consumption, reduction is visible reaching lower value comparing to the 2016/2017

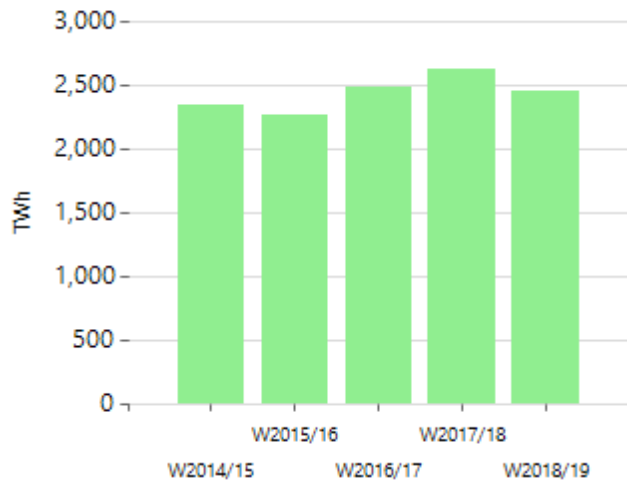


Figure 8 - Final gas consumption (residential, commercial and industrial). Winters 2014/2015 – 2018/2019 *

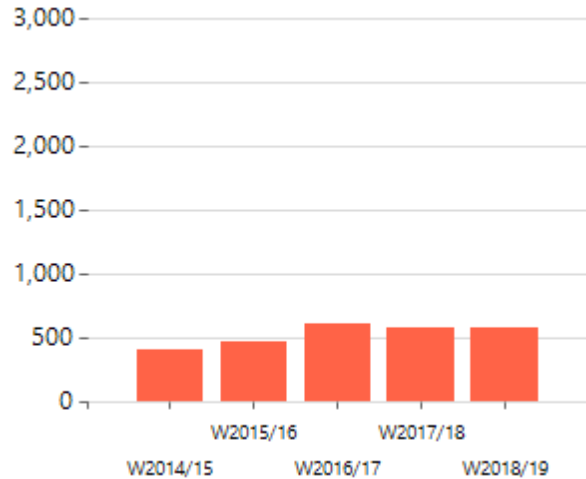


Figure 9 - Gas consumption for power generation. Winters 2014/2015 - 2018/2019 *

* These graphs refer to the countries for which demand breakdown is available (with exception of Austria and Poland). In years and countries where the data breakdown has not been provided, then demand forms part of Residential, Commercial and Industrial.

> Country detail

During Winter 2018/2019, almost in all countries in the Europe decrease in total winter demand was observed. Only in Bosnia, Belgium, Greece and Ireland increase was noted. In countries with lower gas consumption, small increase might cause relatively high increase in percentage change (vide Bosnia).

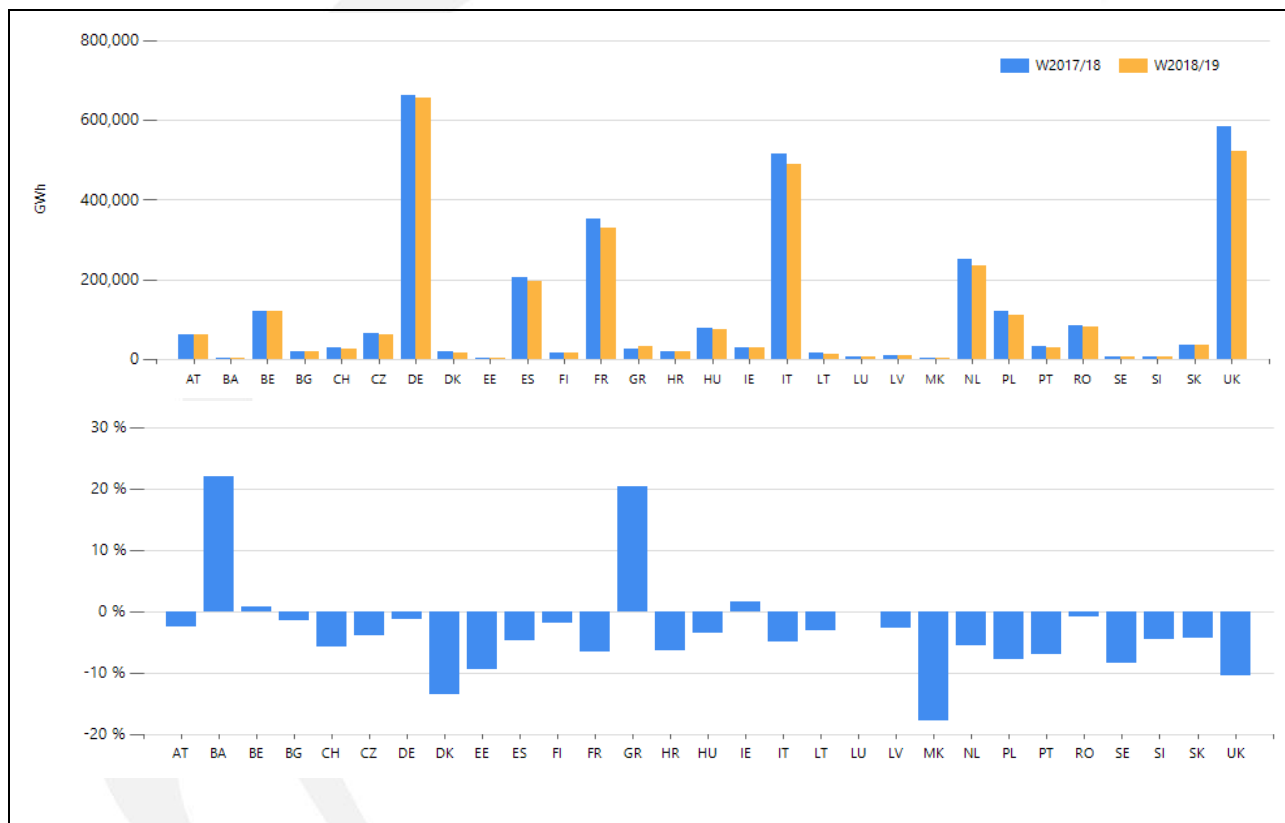


Figure 14 – Total winter demand and variation. Country detail. Winter 2017/2018 vs. Winter 2018/2019

3.3. Peak demand 2018/2019

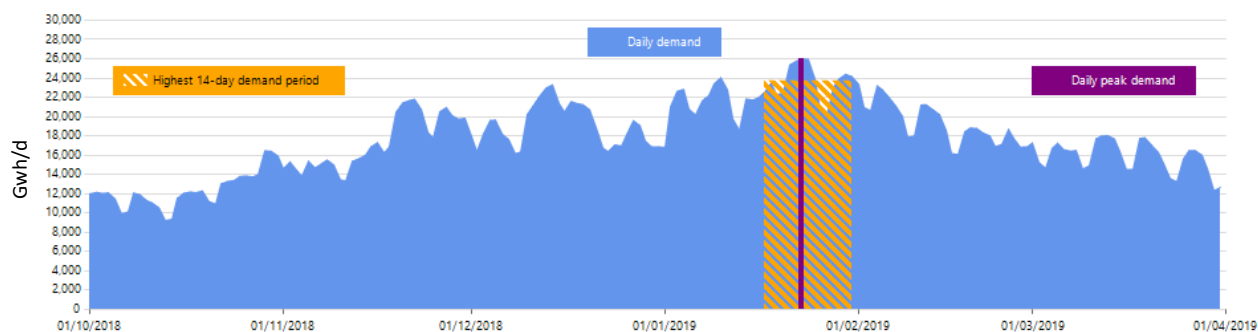


Figure 10 - Total demand daily profile. Winter 2018/2019

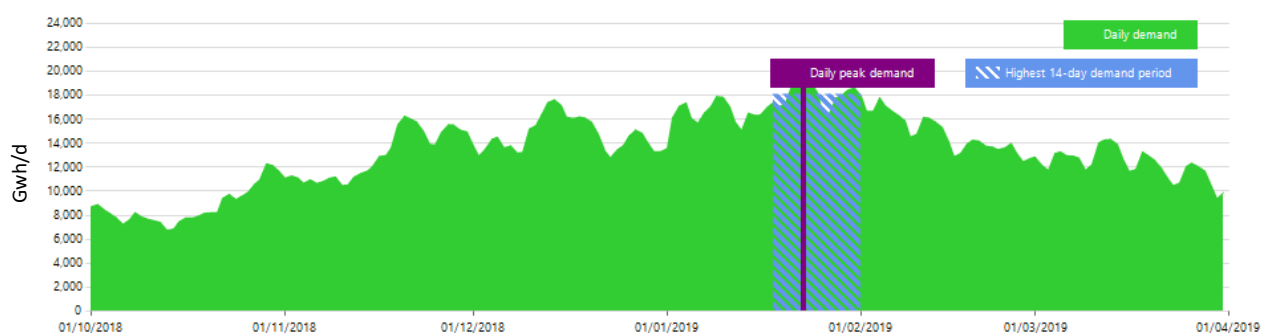


Figure 11 – Final demand (residential, commercial and industrial) daily profile. Winter 2018/2019 *

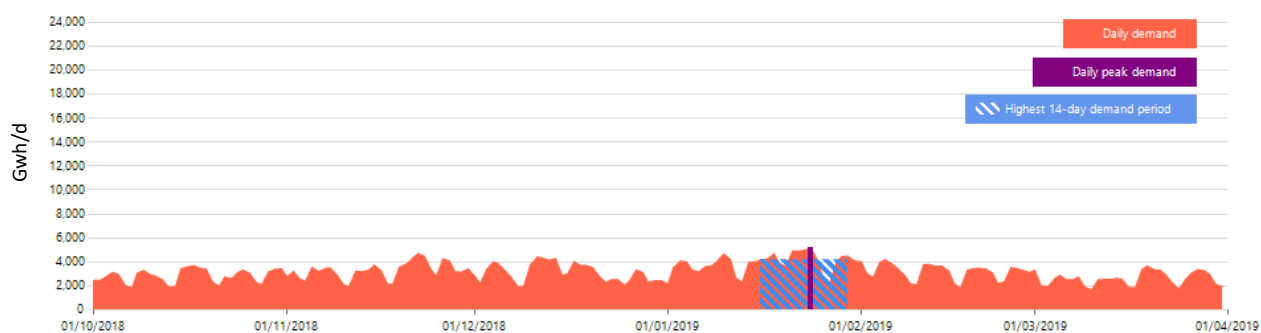


Figure 12 - Power generation demand daily profile. Winter 2018/2019 *

* These graphs refer to the countries for which demand breakdown is available (with exception of Austria and Poland).

The peak demand was reached at the second part of January 2019 during the cold spell, in the middle of the 14-day peak period. Likewise, the peak and 14-day period for final demand and for the power generation was reached during the cold spell in January 2019.

14- day peak period	Jan 18 th to Jan 31 st 2019	Peak day	23/01/2019
Average 14-day demand	23,693 GWh/d	Peak demand	25,990 GWh/d

Table 1 - Values and dates of high demand situations

3.4. Peak demand evolution 2011-2019

For 2018/2019 Winter, daily peak demand still was third highest value measured last 8 years, decreased 6,9 % comparing to the previous period (value was comparable with the level in 2012/2013 and 2016/2017). Average daily demand value for highest 14-day coldest period remained high and it was very close to the previous winter level (similar to three previous consecutive periods).

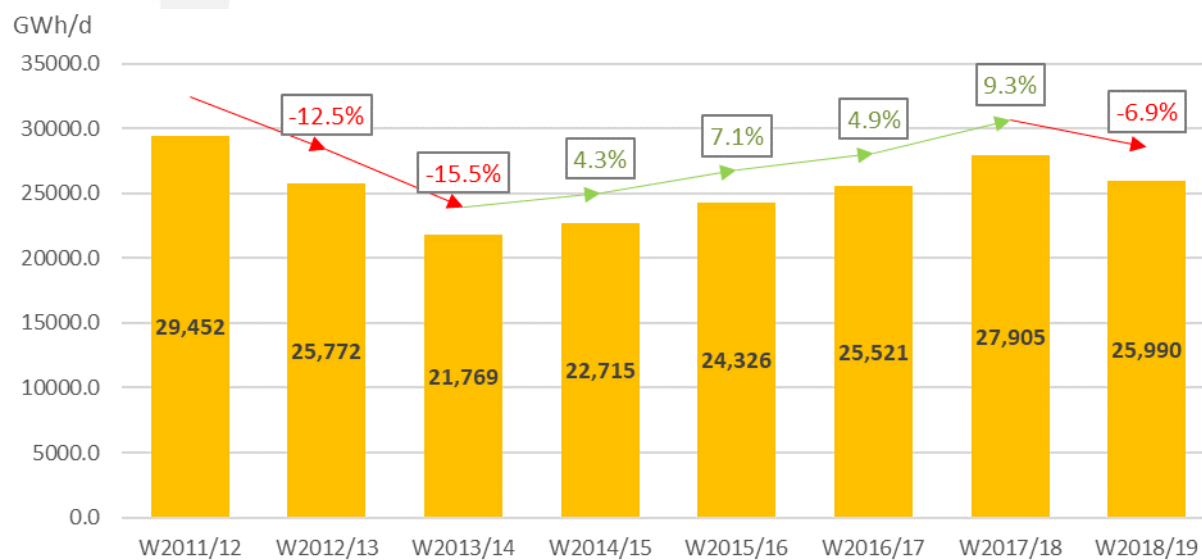


Figure 13 - Daily peak demand. Winters 2011/2012 – 2018/2019

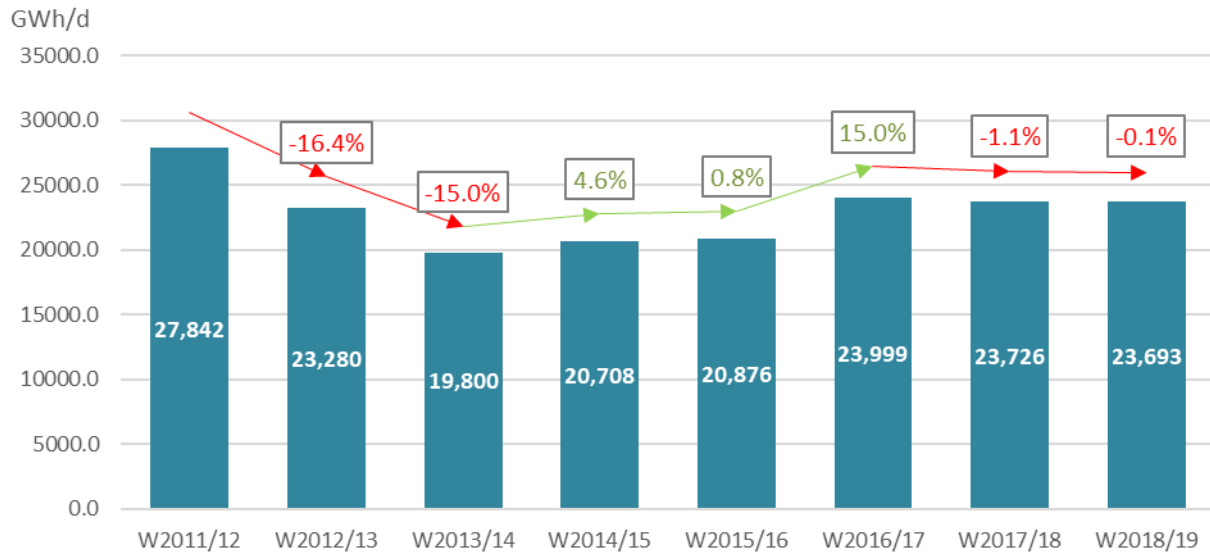


Figure 14 - Average daily demand for highest 14-day demand period. Winters 2011/2012 – 2018/2019

The charts below show a comparison between the high demand periods for the last two winters where a greater level of detail is available on the split between gas demand for power generation and for residential, commercial and industrial. It is important to mention that the total value of these graphs is lower than the previous figures because the information of the split is not available for all the countries.

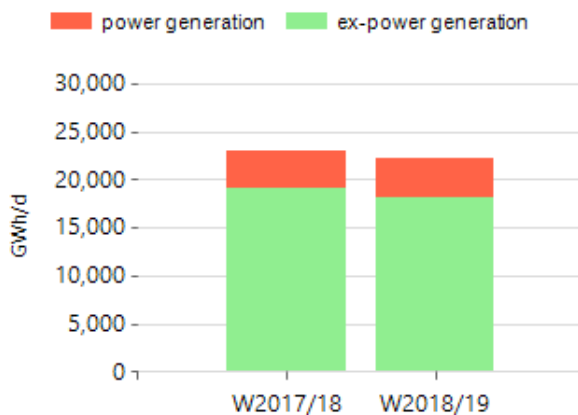


Figure 15 - Average daily demand for highest 14-day demand period split *

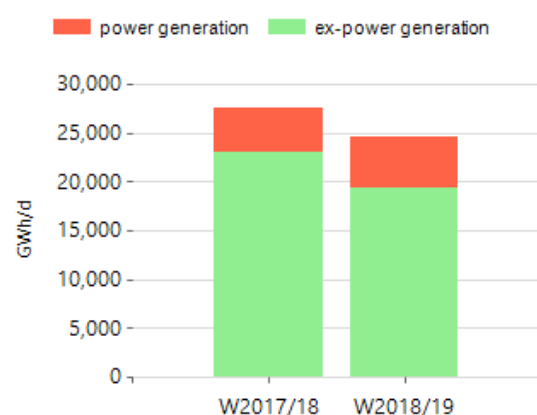


Figure 16 - Daily peak demand split *

* These graphs refer to the countries for which demand breakdown is available (with exception of Austria and Poland).

> Seasonal modulation

The pattern followed by winter demand is strongly linked to the climatic conditions, like the presence of cold snaps or particularly mild conditions in one or several months during the winter.

The graph below shows the deviation of the monthly average demand from the winter average for each of the last five winters. In this graph, January 2019 shows a high figure in comparison to all the winter average, almost reaching the level from January 2017.

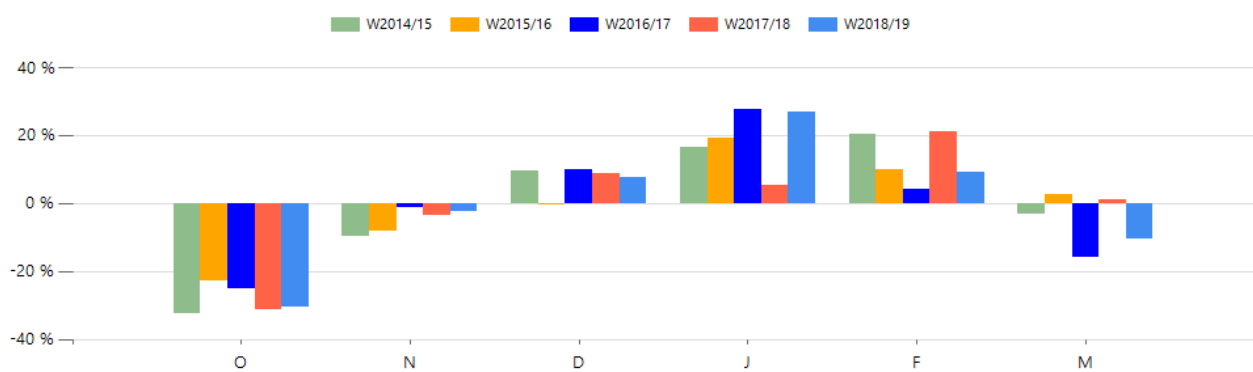


Figure 17 - Winter modulation 2014/2015 – 2018/2019

Figure 22 shows the monthly variation between the maximum and minimum daily demand and also the average daily demand for each month of the winters. When comparing Winter 2018/2019 with the previous winters, the range and average shown in January are higher than usual.

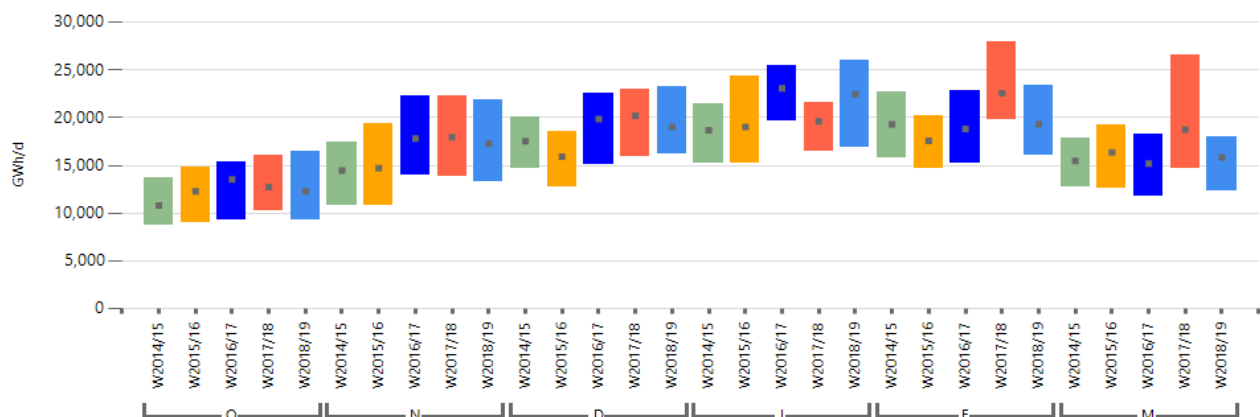


Figure 18 - Monthly demand ranges and average daily demand for each month. Winters 2014/2015 – 2018/2019

> Country detail

Peak demand, in the same way as the seasonal demand, decreased across Europe in Winter 2018/2019. Only Bosnia, Belgium, Greece and Ireland experienced increase in the peak consumption.

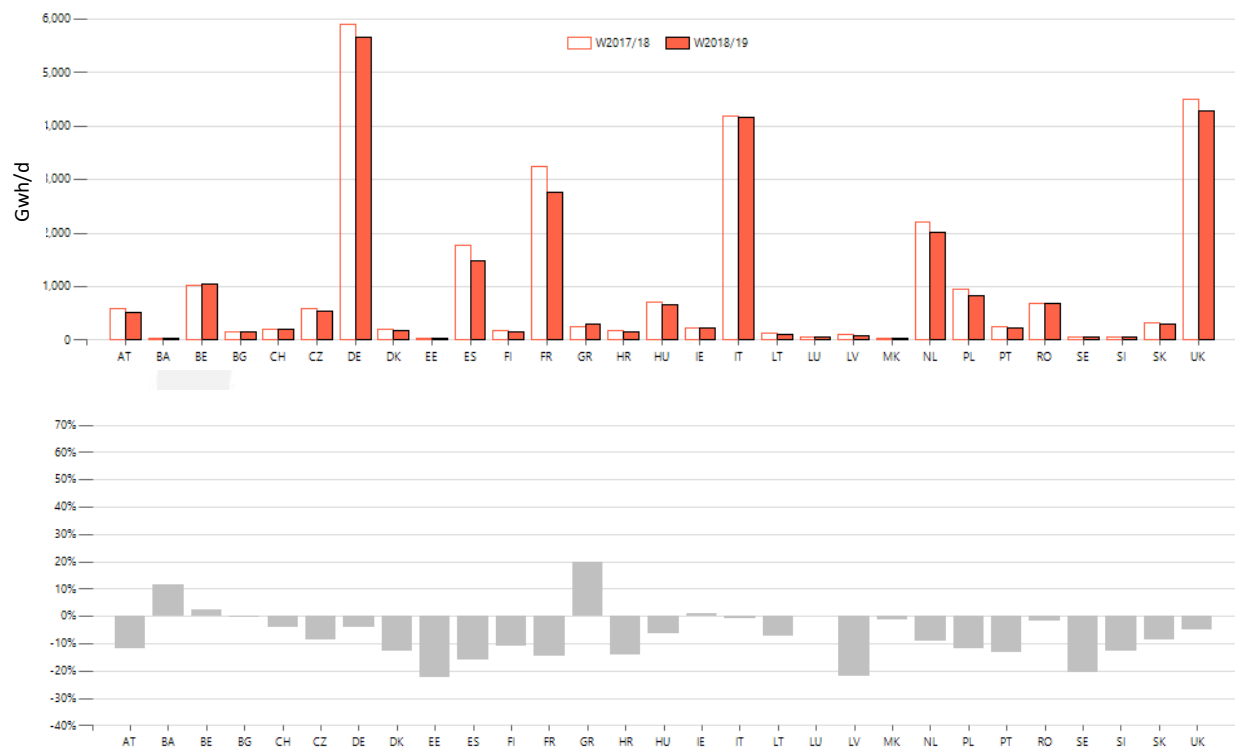


Figure 19 - Daily peak demand and variation. Winter 2017/2018 vs. 2018/2019

Peak consumption this winter was rounding a 20% lower than in the previous one in Estonia, Latvia and Sweden.

As presented in **Figure 24**, many countries show a decrease of the 14-day high demand compared to last winter. As shown in these graphs, beside of the countries that increased their peak consumption (shown in the previous graphs), few other countries increased it slightly as well (Belgium, Bulgaria, Ireland, Italy, North Macedonia, Romania and United Kingdom).

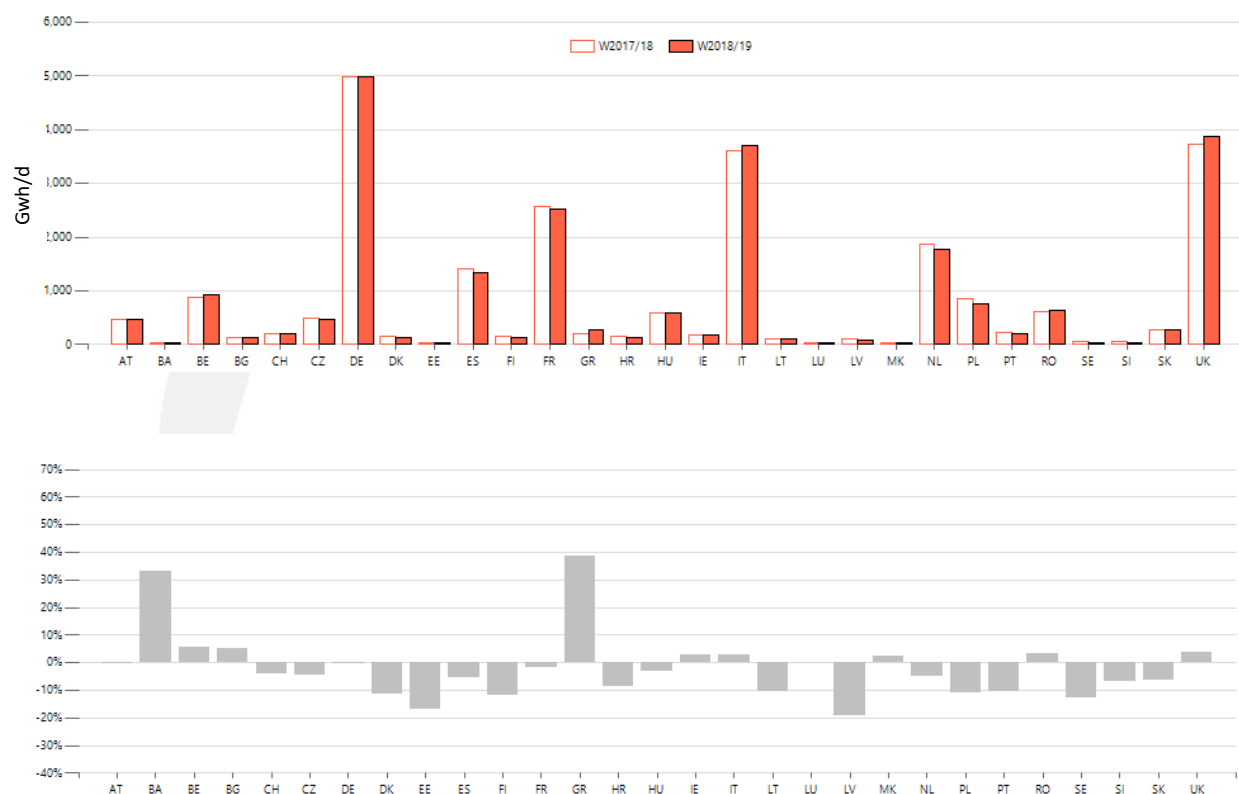


Figure 20 - Average 14-d demand and variation. Winter 2017/2018 vs. 2018/2019

Germany, Austria and Luxembourg 14-day high demand remained almost the same as previous season.

The following graphs show the minimum, maximum and average daily demand during Winter 2018/2019, as well as the daily maximum and minimum demand of the last five winters per country:

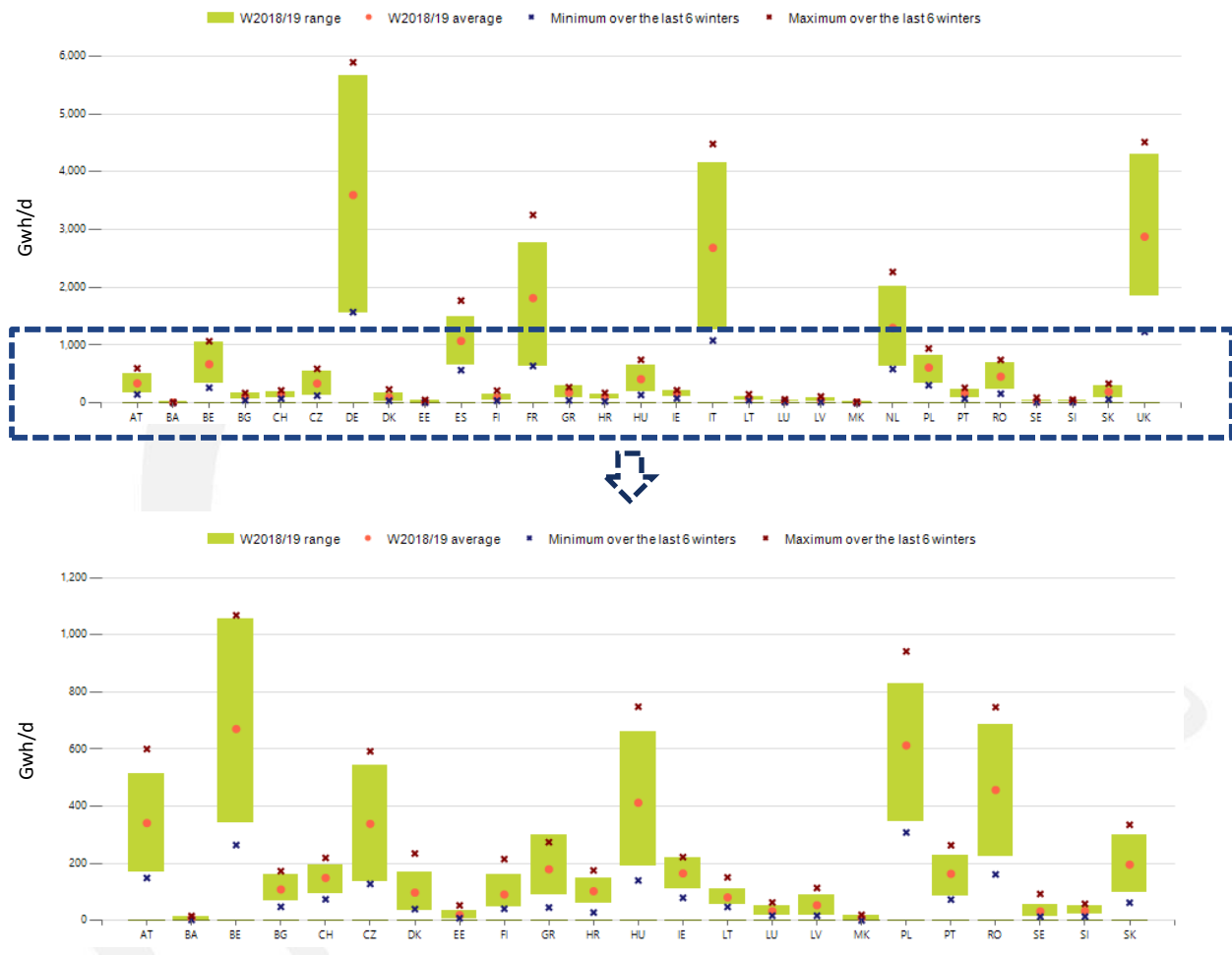


Figure 21 - Winter maximum, minimum and average demand

> Simultaneity

In order 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, defining:

- The European Peak Simultaneity (EPS)
 - $EPS = \text{European Peak Demand} / \text{Un-simultaneous Peak} (\%)$
- The simultaneity of an individual country in the European peak day (CPS)
 - $CPS = \text{Country demand on the European peak day} / \text{Country peak demand} (\%)$

So defined, the European peak simultaneity during the peak day on 23rd January 2019, was 96%, same as average considering this last 5 winters.

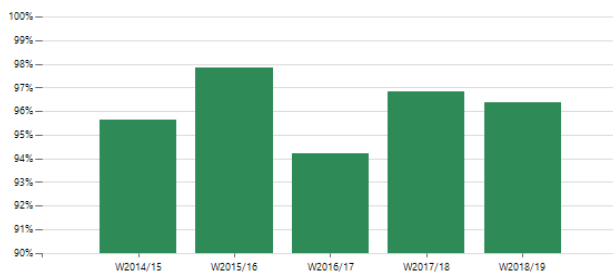


Figure 22 - European peak simultaneity

Winter	Day	Peak Demand (GWh/d)	EU Peak Simultaneity (%)
W2014/15	05/02/2015	22,715	96%
W2015/16	19/01/2016	24,326	98%
W2016/17	18/01/2017	25,521	94%
W2017/18	28/02/2018	27,905	97%
W2018/19	23/01/2019	25,990	96%

Table 2 - Peak demand and European peak simultaneity. Winters 2014/ 2015 - 2018/2019

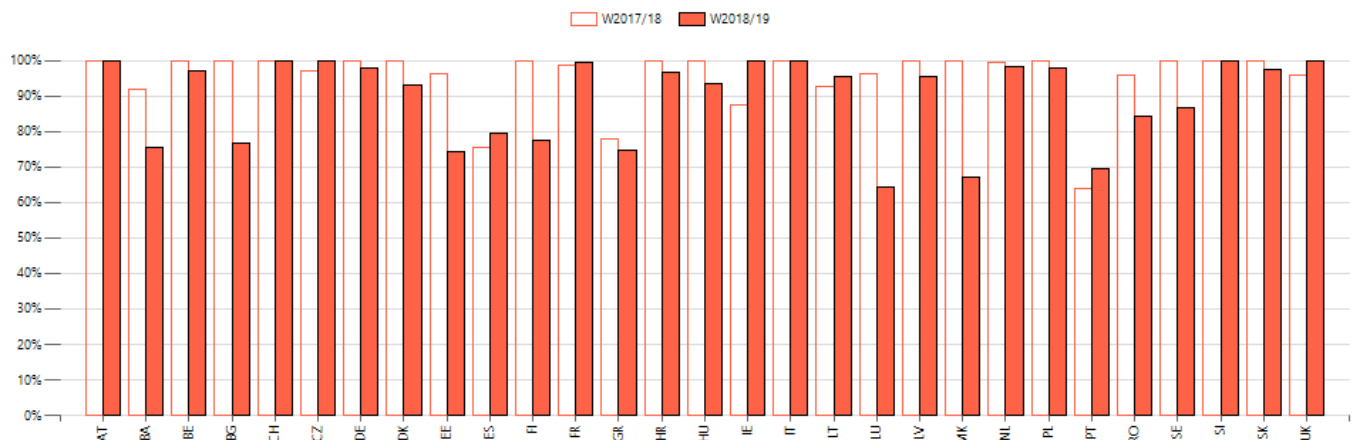


Figure 23- Simultaneity of the highest single day between last 2 winters

4. Supply

4.1. European seasonal gas supply

The graph below shows the evolution of the aggregated gas supply in Europe during the last winter season 2018/2019.

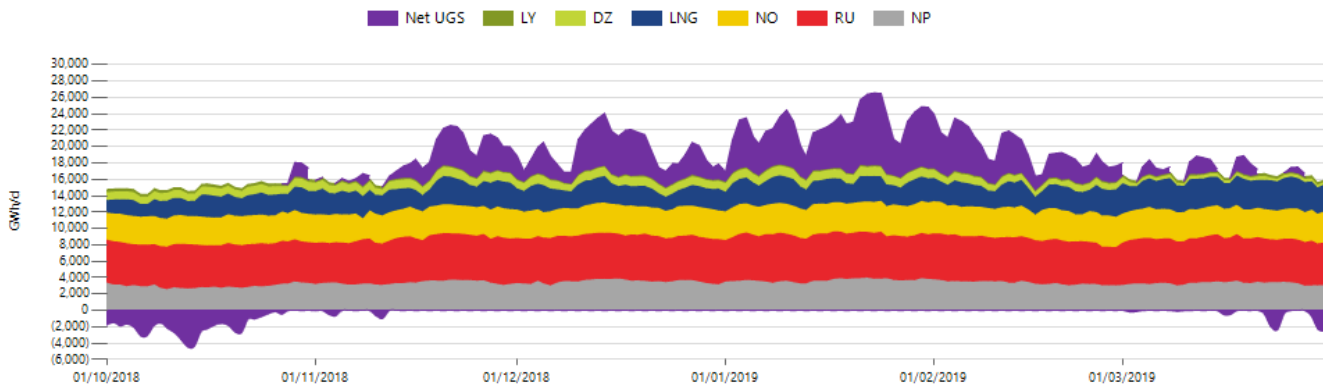


Figure 24 - Supply profile. Winter 2018/2019

The next graphs give an overview of Imports and National production supply shares during Winters 2017/2018 and 2018/2019 in both absolute and relative terms.

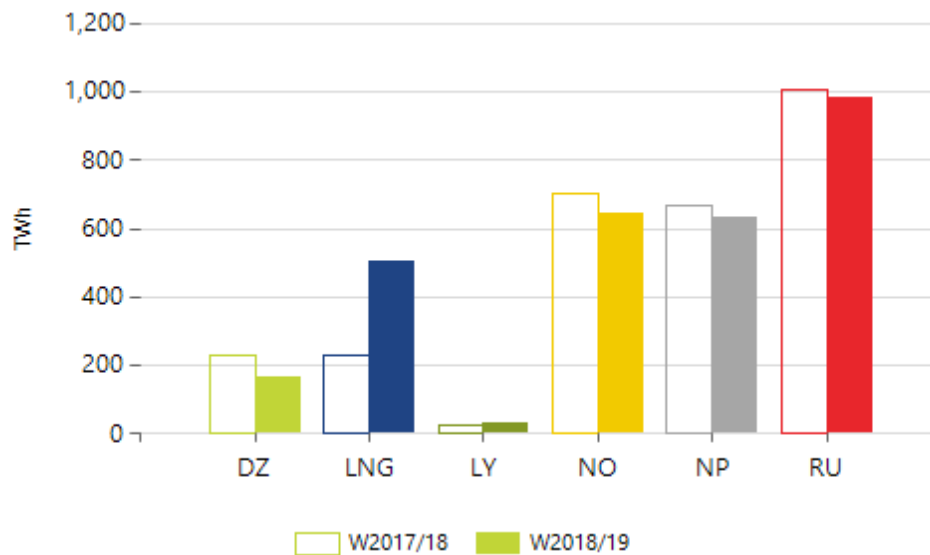


Figure 25 - Total supply by source

Figure 29 shows the seasonal supplies by source for the last two winters in absolute figures. The total gas showed significant difference this winter compared to the previous one in favour of LNG.

Share in supplies mix for Europe decreased in case of Russia (-2%), Algeria (-3%) and Norway (-3%). Decrease in those shares and lower National Production (-2%), stable share of Libya was compensated by significant increase in LNG import: +9% growth in supply mix share (in nominal values from 228.6 TWh in 2017/2018 to 508.4 TWh in 2018/2019).

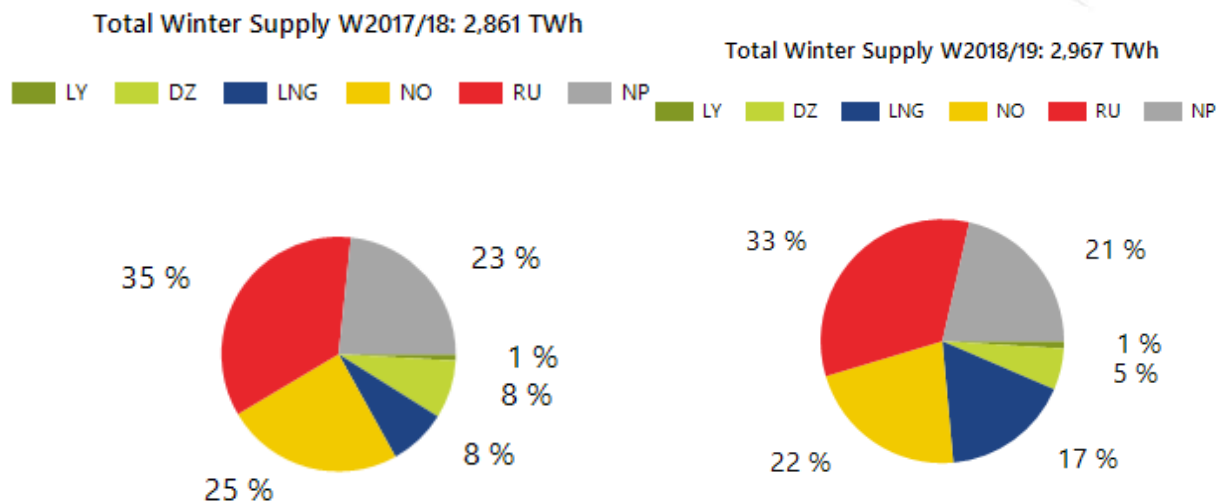


Figure 26 – Shares in supply mix. Winter 2017/2018

Figure 27 – Shares in supply mix. Winter 2018/2019

The total supply (without UGS) has been higher in Winter 2018/2019 - 2,967 TWh comparing with 2,861 TWh in previous winter.

4.2. Supply Modulation

The following graphs illustrate for national production and each import supply source, the average flow and the monthly range (between the lowest and highest daily flow of each month during the whole winter).

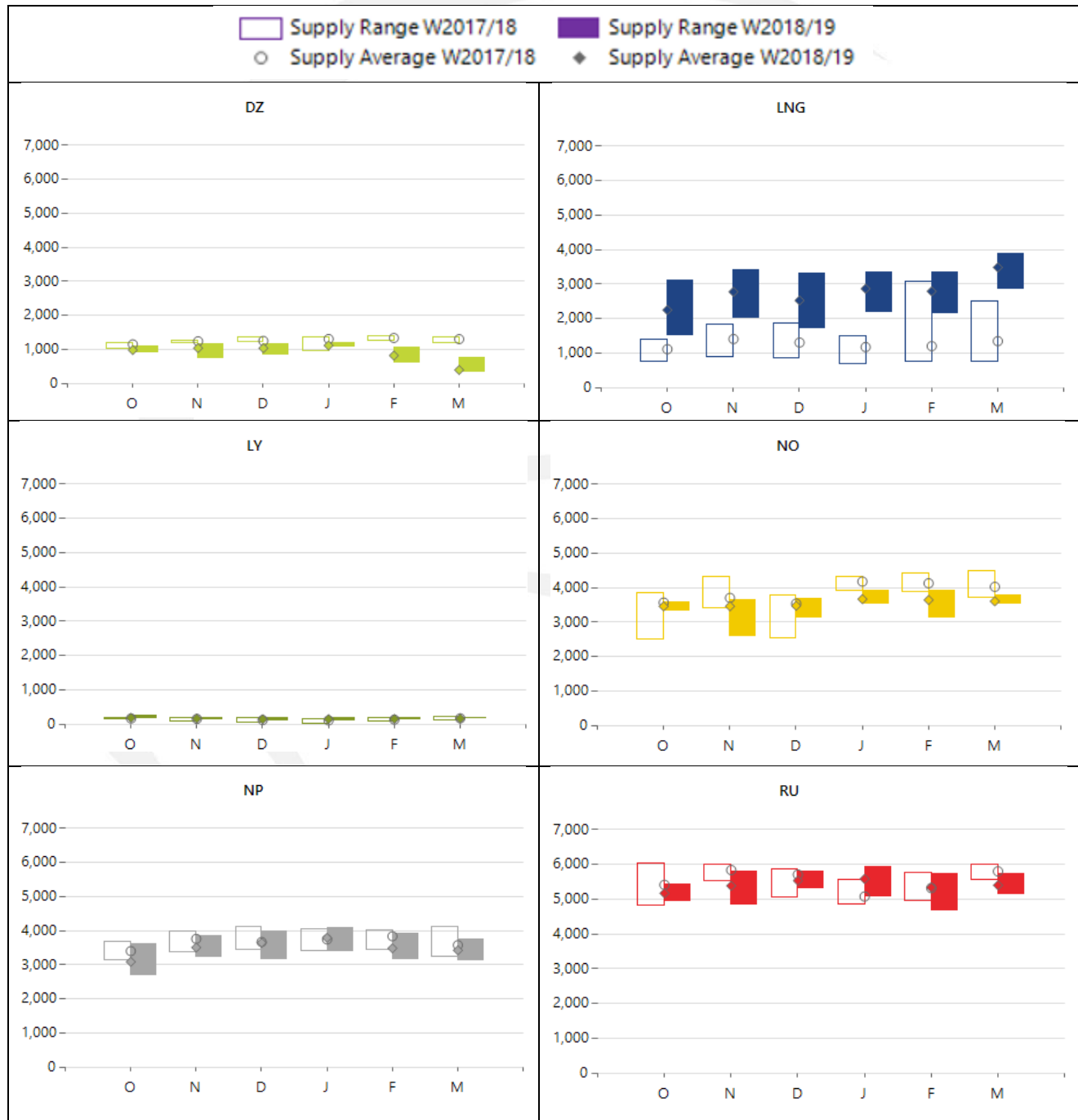


Figure 28 - Supply daily range (GWh/d)

4.3. Underground Storages

The utilisation of the underground storages depends on many factors, linked to price signals such as summer-winter spread or climatic and economic considerations having impact on gas demand.

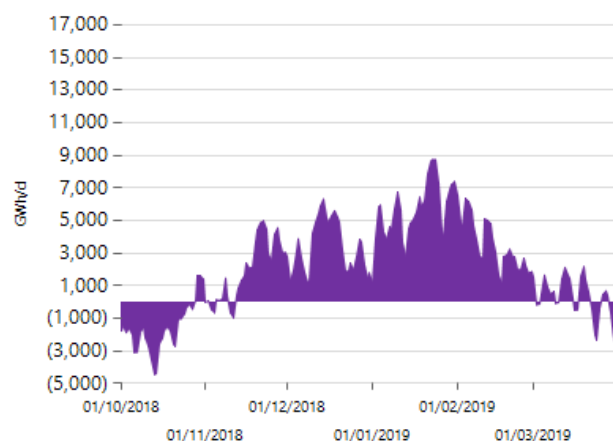


Figure 29 - UGS injection/withdraw profile. Winter 2018/2019

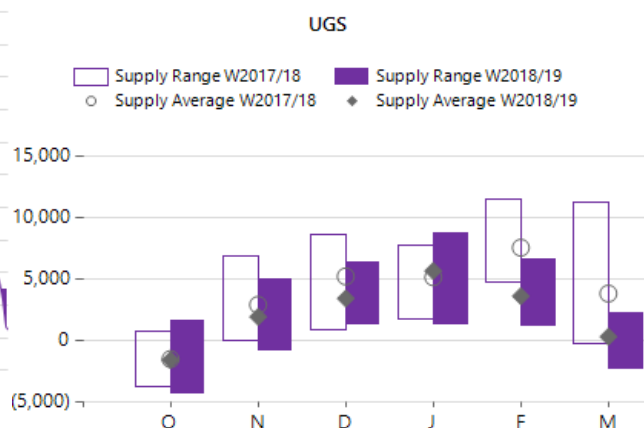


Figure 30 - UGS daily range of withdrawal and injection. Winter 2018/2019 vs. Winter 2017/2018

The peak deliverability of UGS was 8,731 GWh/d, meaning a 29% decrease from the previous year (12,215 GWh/d). **Figure 34** shows the high utilisation from February both in range and average.

Figure 35 compares the stock level evolution curve of the last 7 winters. The stock level for the Winter 2018/2019 started from a level of 898.8 TWh, comparable level than in the previous winter. The injection period was short, the maximum stock level was reached on 28th October. At the end of this winter the level reached 441.4 TWh, highest seen in last seven winters.

This is corresponding also to the fact, that UGS Utilisation was relatively low (457.4 TWh) comparing total working gas volume, gas in the storages was used moderately, without increase in withdraw observed in winter 2017/2018.

	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

Table 3 - UGS Utilisation (TWh) Winter 2011/2012 – 2018/2019. (Source: AGSI)

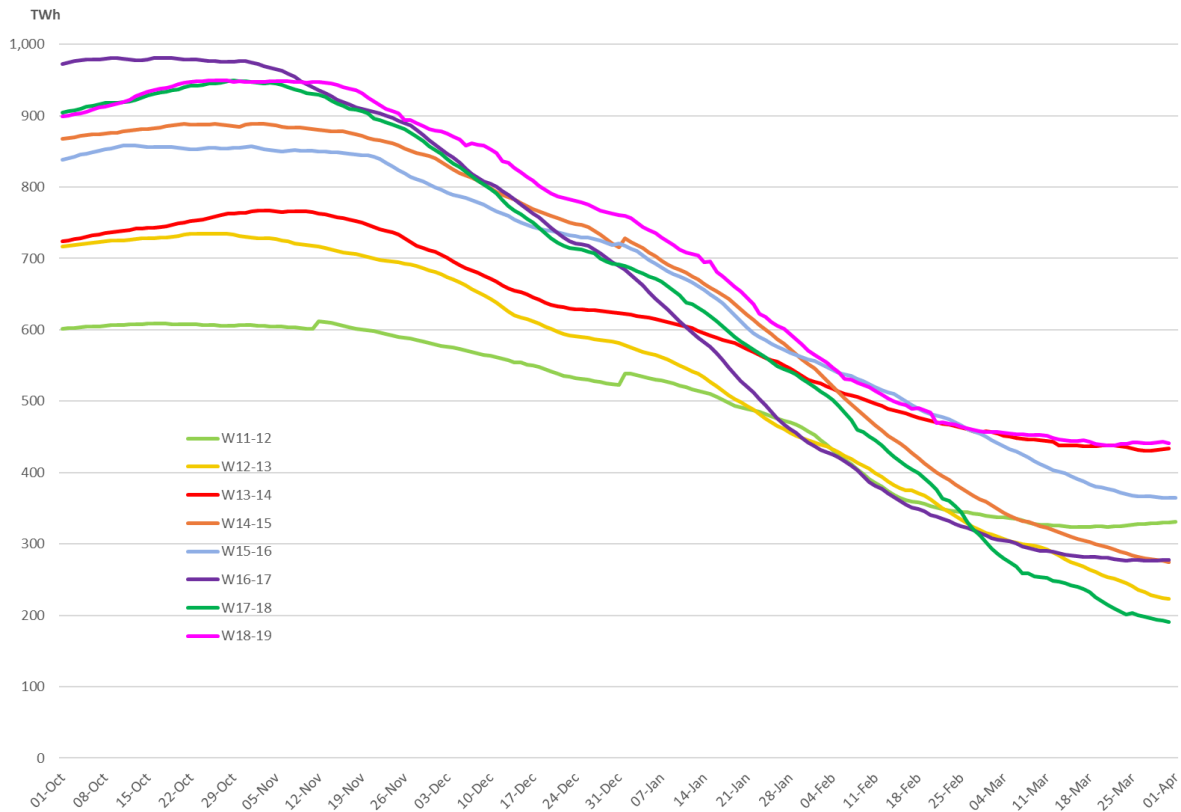


Figure 31 - Evolution of UGS stock level. Winters 2011/2012 – 2018/2019 (Source: AGSI)

4.4. Supply coverage of high daily demands

Due to the different ability of the different supply sources to increase or decrease the supply levels in response to demand, the supply mix varies significantly depending on the demand level. The following graphs compare the supply level of the different sources under different demand conditions. It shows that LNG, and especially underground storages are the main source of flexibility in high demand situations.

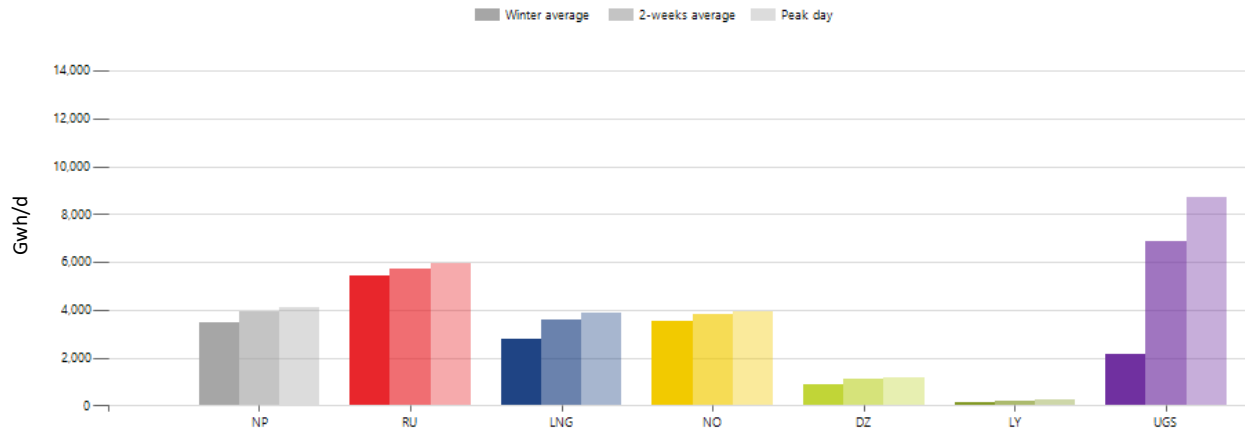


Figure 32 - Daily average supply / Average daily supply for highest 14-day demand period / Supply for peak day demand.
Winter 2018/2019

4.5. Winter supply evolution 2014/2015 -2018/2019

The following graph show the evolution of the different supply sources during the last five winters. When comparing the last five winters, National Production is decreasing year by year and for the last season, the LNG bar shows a very high use, close to Norway imports and National Production which are slightly lower than in the previous winter.

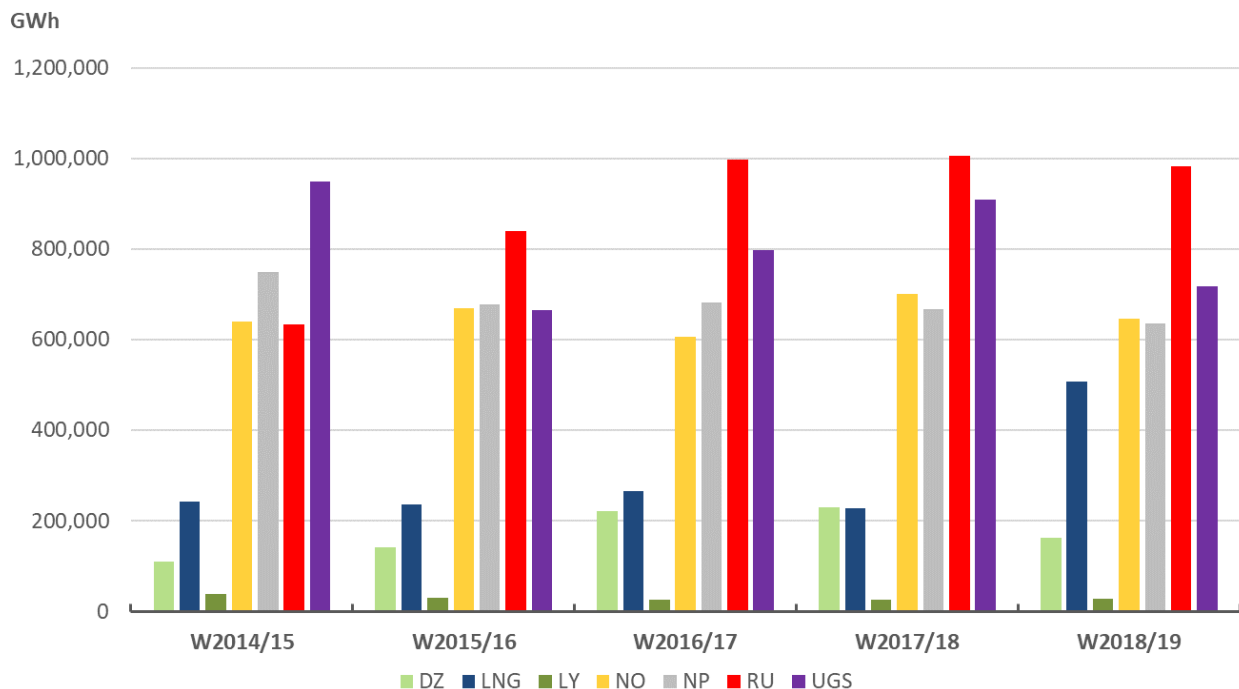


Figure 33 - Evolution of winter gas supplies 2014/2015 – 2018/2019

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