L-Gas Market Conversion Review

Winter briefing 2023

Task Force Monitoring L-Gas Market Conversion

Ministry of Economic Affairs and Climate Policy

Foreword

This is the seventh edition of the report monitoring the conversion of the low calorific gas (L-gas) markets in Belgium, France, Germany and the Netherlands in order to reduce demand for Groningen gas. Compared to previous versions, this report concentrates on the progress of the conversion programmes in the different countries. Special focus will be on the conversions planned in Gas Year (GY) 2022/23, since the conversion programmes are expected to reach their highest levels of conversion so far.

The report is compiled by the Task Force Monitoring L-gas Market Conversion, consisting of government representatives, representatives of transmission system operators (TSO's) and energy market regulators from Belgium, France, Germany and the Netherlands, and an observer from the European Commission. The activities of the Task Force are supported by the General Secretariat of the Benelux Union. The report is published twice a year: a Winter and a Summer briefing. The Netherlands will use this report to inform the Dutch Parliament on the progress of reducing the demand for Groningen gas.

Executive summary

The government of the Netherlands announced in March 2018 its decision to terminate natural gas production from the Groningen field as soon as possible, in order to guarantee safety in the area of Groningen against the risk of earthquakes resulting from natural gas extraction. In this process, security of supply is taken into account.

Household appliances in the Netherlands still depend on gas from the Groningen field (max. Wobbe 44.4 MJ/m^3), while households in Germany, France and Belgium depend on gas with a slightly higher quality (L-gas, max. Wobbe 46.5 MJ/m^3). Without Groningen gas, so called "pseudo L-gas" is needed to secure supply in the L-gas market region. Pseudo L-gas can be produced by either adding nitrogen to high calorific gas (H-gas) in order to bring down the Wobbe-value until it meets the upper Wobbe-limits of the L-gas specifications (46.5 MJ/m^3) or by adding H-gas to (pseudo) Groningen-gas[1] until the same upper Wobbe-limit of the L-gas specifications is reached. The Groningen field can only be closed if the total L-gas market can be supplied by sufficient pseudo L-gas produced from H-gas and nitrogen.

Pseudo L-gas is exported to neighbouring markets in Belgium, France and Germany, where it serves dedicated L-gas consumers. As a result of the Groningen phase out, the transmission system operators of Belgium, France and Germany have made arrangements to undertake extensive conversion programmes to reduce L-gas supply from the Netherlands. By GY 2029/30, imports of L-gas will be reduced to nearly zero.

The current report aims to monitor the progress in the L-gas conversion programmes in Belgium, France and Germany and the activities in the Netherlands to reduce the consumption of (pseudo) Groningen-gas. It provides the analysis needed by the Ministry of Economic Affairs and Climate Policy to decide on the allowed Groningen production and to meet the requirements of the resolution of the Dutch Parliament to be informed twice a year about the progress in reducing the demand for Groningen gas.

Overall, it can be concluded that the L-gas market conversion is progressing well. Total consumption of Dutch L-gas declined by 19% (89 TWh) from 463 TWh in GY 2020/21 to 374 TWh in GY 2021/22. The reduction in L-gas consumption was driven by climatological factors, the high gas prices and the continued implementation of the market conversion programmes in the respective L-gas markets. In GY 2021/22, 885,000 gas connections and appliances have been converted. The estimated volume effect on L-gas demand of the GY 2021/22 conversions totaled to 28.7 TWh, with 21.1 TWh taking place in Germany, 6.24 TWh in Belgium, 1.2 TWh in France and 0 in the Netherlands. In GY 2022/23, just over 1,000,000 gas connections and appliances are expected to be converted, the highest number of the market conversion programmes so far. The estimated volume effect of the GY 2022/23 conversions (43.7 TWh) is ~52% higher than the volume effect of the conversions in GY 2021/22.

In the upcoming years until GY 2029/30, combined L-gas exports from the Netherlands to Belgium, France and Germany are expected to be reduced at an average rate of approximately 10% per year due to the conversion programmes[2]. Consequently, L-gas demand met with imports from the Netherlands is expected to fall to 0 in Belgium by GY 2024/25, to 0 in France by GY 2029/30 and to 0.3 TWh in Germany[3] by GY 2029/30 both in an average and cold GY[4].

Under the current market conditions, the Task Force does not foresee any possibilities to further accelerate the conversion process. Currently, all efforts are aiming at achieving the agreed demand reduction for the coming years. To meet this declining L-gas demand against an even faster decreasing Groningen production, there is a crucial role for the production of pseudo G/L-gas. The Netherlands increased the production of pseudo G/L-gas by expanding the nitrogen blending capacity at the Wieringermeer conversion facility from 215,000 to 295,000 m^3/h starting from December 2019. This translated into an additional 48.9 TWh of pseudo G/L-gas production capability. Moreover, a new nitrogen plant at Zuidbroek with a capacity of 180,000 m^3/h N_2, which translates into an additional pseudo L-gas production with a maximum of 97 TWh, is currently under construction. It was planned to start operations in April 2022, but the construction has been impacted by the outbreak of COVID-19 and the subsequent lockdowns and more recently by disputes between the Engineering, Procurement and Construction

[1] Pseudo Groningen-gas (or pseudo G-gas) is obtained via enrichment: nitrogen is added to high calorific gas (H-gas) in order to bring down the Wobbe-value until it meets the upper Wobbe-limits of the G-gas specifications (44.4 MJ/m3). This gas quality is stored in the Dutch G/L-gas storages.

[2] GTS (2017), Netwerk Ontwikkelingsplan 2017.

[3] Please note that the remaining demand in the gas year 2029/30 (0.3 TWh / 100.000 kWh/h) is given by a regional grid in Germany, that can only be supplied via the Netherlands (Haanrade / Thyssengas).

[4] In the case of Belgium and France, the demand profile for a cold GY has been calculated based on 1995-96 temperature profile by GTS as stated in the Dutch Gas Act for the L-gas supply-demand balance of this briefing. In the case of Belgium, the preferred national approach is to consider the year 1962-63 as a cold year profile. The French regulation approach is requiring to work with a 2% risk cold GY (using Lille weather data); leading to a demand profile national reference shared with the French stakeholders, about 2% above the GTS's figures. The preferred national approach both in the case of Belgium and France are reflected in Figure 2.5 and in the tables 2.2 and 2.3 of the Annex.

(EPC) contractor and subcontractor. GTS informs the market of the planning via REMIT messages[5]. Due to the price driven demand reduction, the delay does not affect the Groningen production.

Consequently, the security of L-gas supply is becoming intimately linked to the deliverability of H-gas into the Netherlands. During the previous GY the supply of H-gas from Russia to Northwest-Europe diminished and eventually stopped. This means that around a third of the supply of H-gas now has to come from other sources. The main source for H-gas is now Liquified Natural Gas (LNG), supplied through existing terminals in the United Kingdom, Belgium and the Netherlands. Since these terminals do not have enough capacity to replace the former Russian supply, additional LNG-import facilities are developed in the Netherlands, Germany and France. An extension of the regas capacity at the LNG terminal of Zeebrugge (Belgium) is ongoing. These projects are in different stages of development and contribute mainly to a mid-term solution. On the short term, the demand supply balance is being kept by a decline in the European gas demand due to high prices. In spite of current positive market sentiments however, there is still a risk of H-gas shortages. This means that there is a possibility that there may not be enough H-gas supply for both the H-gas market demand and full usage of the conversion facilities for the production of the still needed amounts of pseudo G/L-gas.

Based on an optimal usage of the blending facilities the Dutch State Secretary, responsible for the phase out of the Groningen production, did set the cap for Groningen production in GY 2022/23 at 28 TWh for both an average and a cold year. This production volume is the result of the decision of the State Secretary to keep all remaining eleven Groningen production locations open during the winter of GY 2022/23 in line with the advice of Gasunie Transport Services (GTS, the Dutch transmission system operator). These production locations will produce at a minimum flow in order to ensure availability in case of extreme cold weather, unexpected (out of spec) qas qualities, transportation limitations, a shortage of H-gas or an outage in the L-gas system. After the winter, the State Secretary will decide on the potential closure of six of the production locations on the Groningen field as previous studies from GTS (still based on the assumption of sufficient supply of H-gas) have shown the earliest possible closing date of the Groningen field to be the start of GY 2023/24.

Yearly in January, GTS provides advice to the State Secretary on the needed Groningen capacity and volume for the security of supply for the upcoming gas year. The January 2023 analysis of GTS shows that also in GY 2023/24 all operational capacity from the Groningen field is needed to ensure security of supply. This would result in an additional production in the current gas year, since more than five production locations at the Groningen field have to remain operational in the summer and produce minimum flow. As a consequence, GTS advises the State Secretary to increase the allowed production volume of the Groningen field in GY 2022/23 to 31 TWh. For the GY 2023/24 GTS advises the State Secretary to set the cap to the Groningen production at the same level as the proposition for this GY, being 31 TWh. Based on the current assumptions, GTS still foresees the possibility of scarcity in the H-gas supply, but also an increase of LNG import capacity. At the moment it is unclear what the impact will be on the production from the Groningen field for the years after GY 2023/24[6]. As the situation on the gas market is completely new and many developments are still uncertain, all trends and projects will be followed closely and GTS will update its advice at least yearly to take into account new insights.

Security of L-gas supply is being ensured by increasing the H-gas conversion capacity via nitrogen blending in the Netherlands and the market conversion from L-gas to H-gas in Germany, Belgium and France. This, as well as the activities in the Netherlands to reduce the consumption of L-gas, will ensure the security of L-gas supply to consumers in all markets both in an average and in a cold year.

Throughout the market conversion period, the role of enrichment will decline in line with the decreasing Groningen production. Hence, nitrogen blending facilities will have an increasing role in meeting L-gas demand through the next GYs.

[5] More information at https://www.gasunietransportservices.nl/transparency/remit/urgent-market-messages/2-2406

[6] For more details see the advice from GTS dated the 31st of January 2023, entitled *Advies Benodigde Groningencapaciteiten en -volumes ten behoeve van leveringszekerheid voor gasjaar 2023/2024*

1. Introduction

The government of the Netherlands announced in March 2018 its decision to terminate natural gas production from the Groningen field as soon as possible, in order to guarantee safety in the area of Groningen against the risk of earthquakes resulting from natural gas extraction.

The initial schedule for production phase-out - which aimed for termination in 2030 at the latest - was revised in 2019 following the adjusted advice of the Dutch State Supervision of the Mines after an earthquake occurred on May 22, with the objective of accelerating the termination by GY 2022/23 for average weather conditions. From the start of the GY 2022/23, Groningen gas is expected to only be needed in case of extreme low temperatures (-9 degrees Celsius or colder), unexpected (out of spec) qas qualities, transportation limitations, a shortage of H-gas and in case of a severe disruption elsewhere in the L-gas system. To be able to guarantee production in those circumstances the field will operate on minimum flow during the entire gas year. Groningen gas has a notably lower calorific value compared to the average European gas, which means it cannot simply be replaced by other domestic or imported sources. These need to be converted, principally via nitrogen blending, to L-gas.

L-gas is consumed in the Netherlands and exported to neighbouring markets in Belgium, France and Germany, where it serves dedicated L-gas consumers. As a result of the Groningen phase out, these consumers will be converted to other sources of energy, mostly H-gas. In fact, whilst over 90% of L-gas in Northwest-Europe is produced in the Netherlands, almost half of it is currently consumed in the three importing markets.

Hence, the decision to terminate Groningen production has consequences in terms of adaptation for the Dutch domestic gas market, but also for import markets in Belgium, France and Germany. The four countries have been working together on the phasing-out of L-gas consumption since 2012, which was initially motivated by the natural decline of the Groningen field. Belgium, France and Germany have developed and are implementing concrete plans to have their consumers of L-gas converted to other sources of energy, most notably H-gas, by 2030.

The Dutch Parliament adopted a resolution which requires the Ministry of Economic Affairs and Climate Policy to report twice a year on concrete measures to reduce the demand for Groningen gas and their foreseen impact[7]. In this report, explicit attention has to be given to measures within and with regard to neighbouring countries. Moreover, the claimed reductions should be substantiated with actual data and options should be investigated to accelerate the reduction of the demand. In order to fulfil this requirement, the Netherlands proposed to establish a Task Force on Gas Market Conversion Monitoring within the framework of the Pentalateral Gas Platform. The authorities of Belgium, France and Germany concurred with this proposal.

The current report aims to monitor the progress in L-gas conversion in Belgium, France and Germany and the activities in the Netherlands to reduce the consumption of L-gas, as well as the overall security of supply developments within the low-calorific market region. It provides the analysis needed by the Ministry of Economic Affairs and Climate Policy to decide on the allowed Groningen production and to meet the requirements of the resolution of the Dutch Parliament. It also creates a dedicated platform through the Task Force to further improve transparency and mutual understanding among the involved countries, and enables to share options to accelerate the conversion, without prejudice to national operators and end users. During the previous years, it has served as a platform to monitor and discuss developments related to COVID-19 and its impact on the market conversion planning. The Netherlands has used the information received during these meetings to inform their Parliament on 21st February, 8 April, on 19 June, on 21st September 2020, on 11 February, 16 April, 25 June 2021, on 14 March and most recently on 26 September 2022.

The current report provides an update on the progress of the conversion programs, with a focus on the planned conversions through the GY 2022/23.

[7] The Parliament's resolution followed the decision made by the Dutch Council of State on July 3, 2019, which annulled the Ministry of Economic Affairs and Climate Policy's decision on the allowed Groningen production in the Gas Year 2018/19. The Council of State concluded that it was not sufficiently motivated why the demand for Groningen gas could not be reduced faster than foreseen. The Council of State not only referred to Dutch demand but also to exports. According to the Council of State it was not sufficiently clear what the Ministry meant with his statement that he is in dialogue with neighbouring countries to reduce their demand and what actions he undertakes to accelerate the reduction of exports of Groningen gas.

2. L-gas market conversion volume

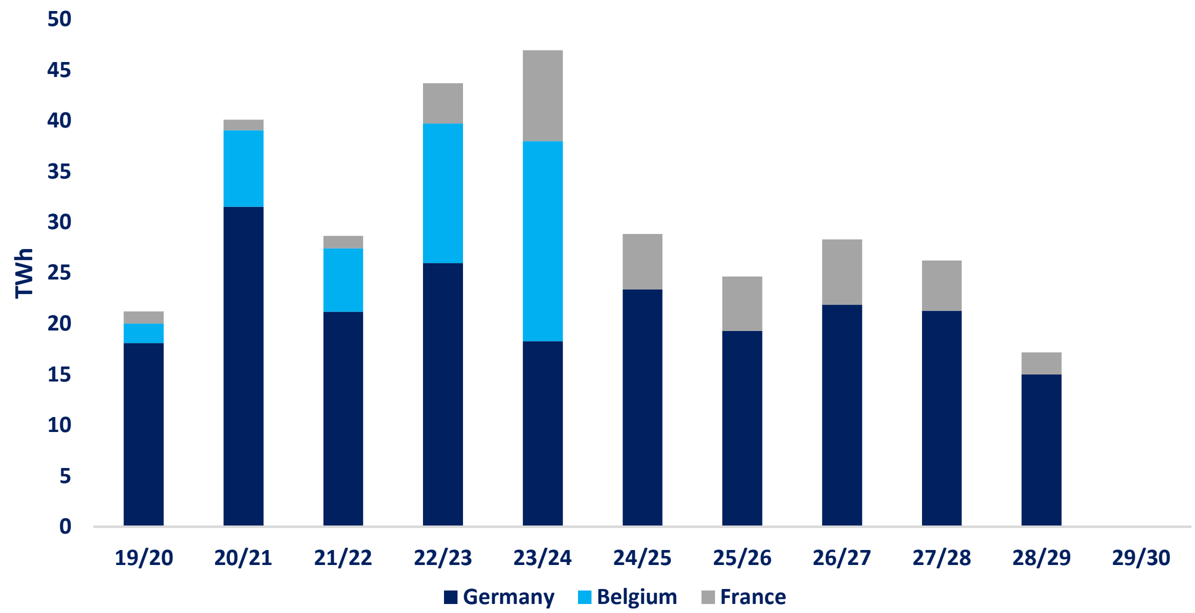
The gas infrastructure operators of Belgium, France and Germany have made arrangements to undertake extensive conversion programmes, mainly switching L-gas consumers to H-gas, to reduce the L-gas supply from the Netherlands: by GY 2029/30, their imports of L-gas will be reduced to close to zero.

Both the realised number of gas installations or consumers that are converted and the corresponding volumes are important to consider. In this report, countries supply data for each.

The current report provides an update on the progress of the conversion programmes, with a special focus on the conversions through GY 2022/23. Just over 1,000,000 gas connections and appliances are expected to be converted in GY 2022/23, the highest number through the market conversion programmes so far.

The estimated volume effect of the 2022/23 conversions (43.7 TWh) is ~52% higher than the volume effect of the conversions in GY 2021/22, when it was just over 28 TWh.

Figure 2.0.1 Volume effect of actual and planned conversions between GY 2019/20 and GY 2029/30 (TWh, based on average temperatures).



2.1 Germany

Legislative changes and conversion costs

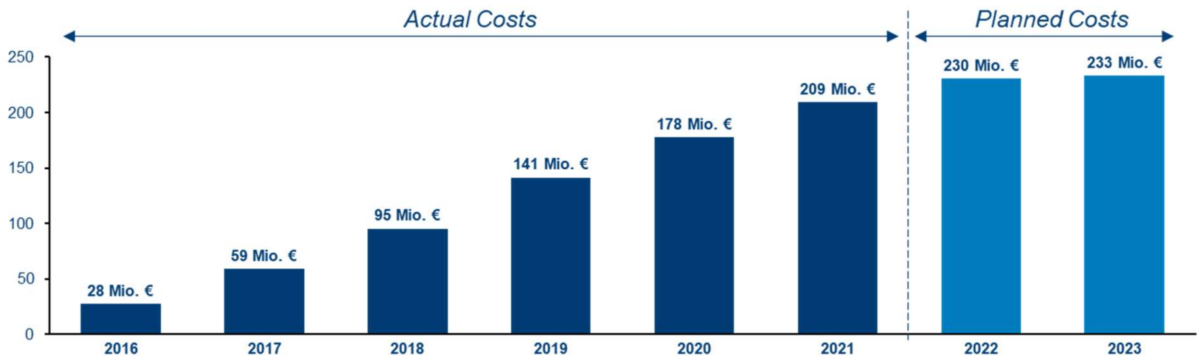
In order to implement the market conversion in Germany some 5.5 million gas appliances need a physical adaptation. A sophisticated timetable for the conversion process was put into place in 2014 and legal changes have been introduced. As of 2017, the Basic Energy Law (Energiewirtschaftsgesetz) had been revised substantially in order to serve as the basis for the market conversion from L- to H-gas. § 19a of the Basic Energy Law clarifies since that the legal responsibility for the process lies with the transmission system operators and that the necessary costs of adaptation of gas appliances are socialized (as an integral part of the gas grid fee). In addition, at a later stage the Basic Energy Law was amended concerning access to the German L-gas grid in order not to provide substantial amounts of L-gas to new customers.

The total costs for the conversion from L- to H-gas in Germany are estimated at approximately € 4.3 billion. The conversion costs can be split into two different cost categories: (1) costs for adapting the customers' appliances from L- to H-gas and (2) costs for grid expansion.

The costs for adapting the customers appliances from L- to H-gas are reimbursed. The reimbursement only refers to the adaption and not the replacement of appliances. Customers with installations that cannot be adapted from L- to H-gas and have to be replaced are entitled to receive a lump sum of up to € 600 under certain circumstances.

The actual costs for the adaption of appliances from the years 2016 – 2021 and the planned costs for the years 2022 – 2023 are displayed in the illustration below, altogether totaling to approximately € 1.2 billion.

Figure 2.1.1 Actual and planned costs for the adaption of appliances, 2016-23 (€ million)



The respective costs are financed by a "market conversion levy" that is paid on top of the TSO transport tariffs. Estimates for the cumulated market conversion levy until 2029 see costs of roughly € 2.3 billion.

Costs for grid expansion on TSO and DSO level are not included in the market conversion levy described above. TSO costs for grid expansion related to L- to H-gas conversion amount to another € 2 billion and are financed by the regular transport fees.

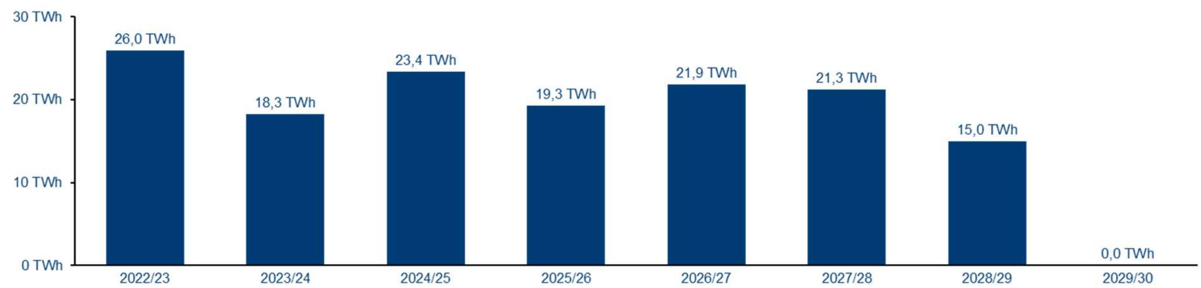
Conversions from 2015 to 2022[8]

Approximately 2,050,000 appliances have been converted from L- to H-gas in the years 2015 – 2022, which amounts to almost 40% of the overall conversions.

During the years 2015 – 2018, several early conversions have been implemented ahead of the scheduled dates for conversion. Furthermore, the German TSOs have accelerated the planning for the consecutive years repeatedly. The conversions realized between 2015 and 2018 account for a capacity of 4.6 GWh/h and a yearly volume of 28 TWh. More than half of this volume accounted to conversions ahead of schedule, which served to bring down demand for Groningen gas earlier. As the advanced changes had been made years before the due date, they continue to be a relief for the Groningen production in the years to come.

In 2022, 495,000 appliances were converted, with an estimated volume effect of 21.2 TWh (average year). While the number of appliances to be converted per gas year is rather stable for the upcoming years, the resulting volume effect differs significantly due to the regional distribution of industry and power plants with a high gas consumption.

Figure 2.1.2 Estimated volume effect of market conversion per Gas Year (TWh)



Grid expansion required for the L-/H-Gas conversion steps in 2022 were commissioned in time, including an 18 km connection pipeline in the area of Euskirchen and several pressure regulating and metering stations.

Conversions in 2023

In 2023, 552,000 installations are to be converted leading to an estimated volume effect of 26 TWh. As of December 2022, all preparations for the conversion activities in 2023 are on track, including the required grid expansion projects.

8 For further details please refer to the Winter Report 2021 of the Task Force Monitoring L-Gas Market Conversion and to the Winter Report 2022 of the Task Force Monitoring L-Gas Market Conversion.

Figure 2.1.3 Conversion areas in 2023

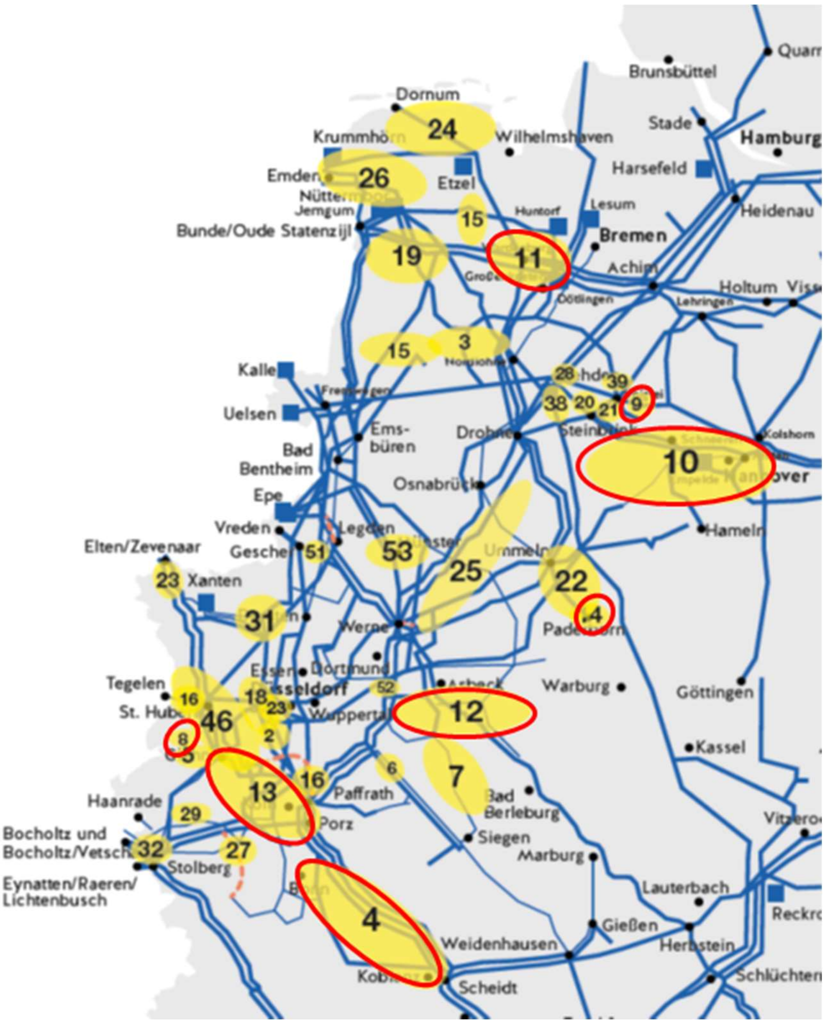


Table 2.1.1 Market conversion in Germany in 2023

Nr.	Conversion Area	TSO	# of installations	Month
4	Mittelrhein	OGE	67,000	April
4	Mittelrhein	OGE	30,000	May
4	Mittelrhein	OGE	19,000	July
4	Mittelrhein	OGE	30,000	August
4	Mittelrhein	OGE	20,000	August
4	Mittelrhein	OGE	17,000	September
8	Viersen-Meerbusch	TG	8,000	May
8	Viersen-Meerbusch	TG	6,000	June
8	Viersen-Meerbusch	TG	15,000	July
8	Viersen-Meerbusch	TG	16,000	August
8	Viersen-Meerbusch	OGE	3,000	April

8	Viersen-Meerbusch	OGE	5,000	September
11	EWE-Zone Teil IV	GTG	66,000	February - August
11	EWE-Zone Teil IV	GTG	23,000	October - November
9	Bereich Voigtei	Nowega	7,000	September
10	Drohne - Ahlten	OGE	17,000	September
12	Hagen - Iserlohn - Ergste	OGE	18,000	April
12	Hagen - Iserlohn - Ergste	OGE	44,000	Mai
12	Hagen - Iserlohn - Ergste	OGE	38,000	August
12	Hagen - Iserlohn - Ergste	OGE	14,000	October
13	Köln - Bergisch Gladbach	OGE	2,000	March
13	Köln - Bergisch Gladbach	OGE	11,000	May
13	Köln - Bergisch Gladbach	OGE	11,000	Juli
13	Köln - Bergisch Gladbach	OGE	11,000	September
13	Köln - Bergisch Gladbach	OGE	8,000	October
13	Köln - Bergisch Gladbach	TG	2,000	March
13	Köln - Bergisch Gladbach	TG	11,000	May
13	Köln - Bergisch Gladbach	TG	11,000	July
13	Köln - Bergisch Gladbach	TG	9,000	September
13	Köln - Bergisch Gladbach	TG	8,000	October
14	Paderborn	TG	8,000	May

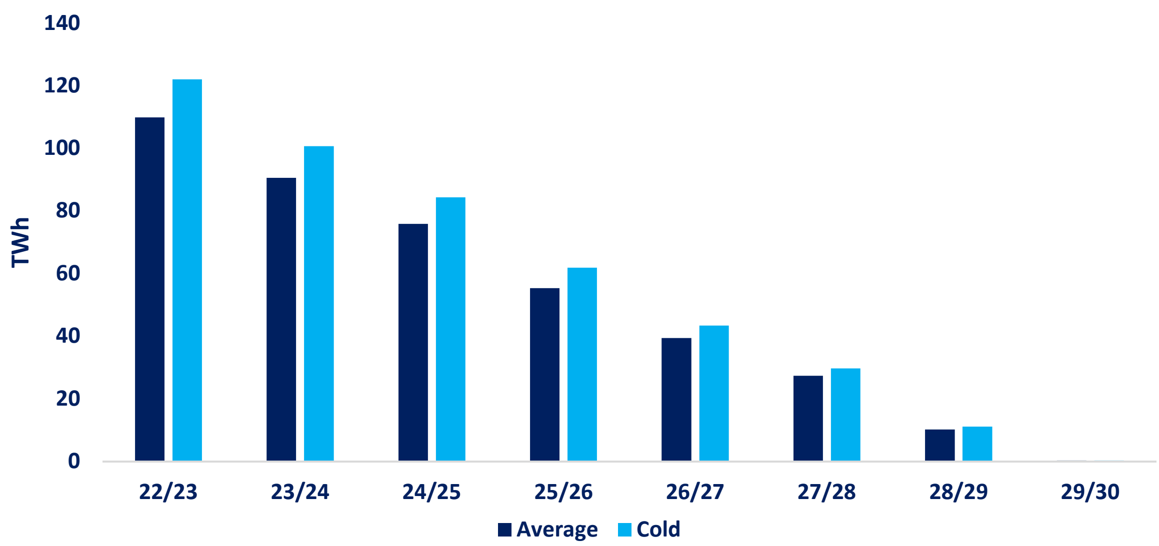
Conversions until GY 2029/30

In Germany, approximately 2.7 million gas appliances will still need to be converted between GY 2023/24 and GY 2028/29, translating into a total volume of 119 TWh.

Consequently, L-gas imports from the Netherlands to Germany are expected to fall to 0.3 TWh by GY 2029/30, both in an average and cold GY.

The conversion planning as presented the winter briefing 2023 contains no significant changes against the previous planning.

Figure 2.1.4 Germany's L-gas imports from the Netherlands (GY 2022/23 - GY 2029/30) for average and cold GYs



2.2 France

Legislative changes and conversion costs[9]

In France almost 1.3 million of gas consumers have to be converted between GY 2019/20 and GY 2029/30, translating into a total volume of 43.4 TWh/y.

Since 2015, the French legal and regulatory framework has been adapted to carry out the conversion of the L-gas network. Costs incurred by the TSO and the DSOs for the conversion of the L-gas networks are covered through transmission and distribution tariffs and are estimated to amount to approximately € 800 million.

Conversions from 2018 to 2022

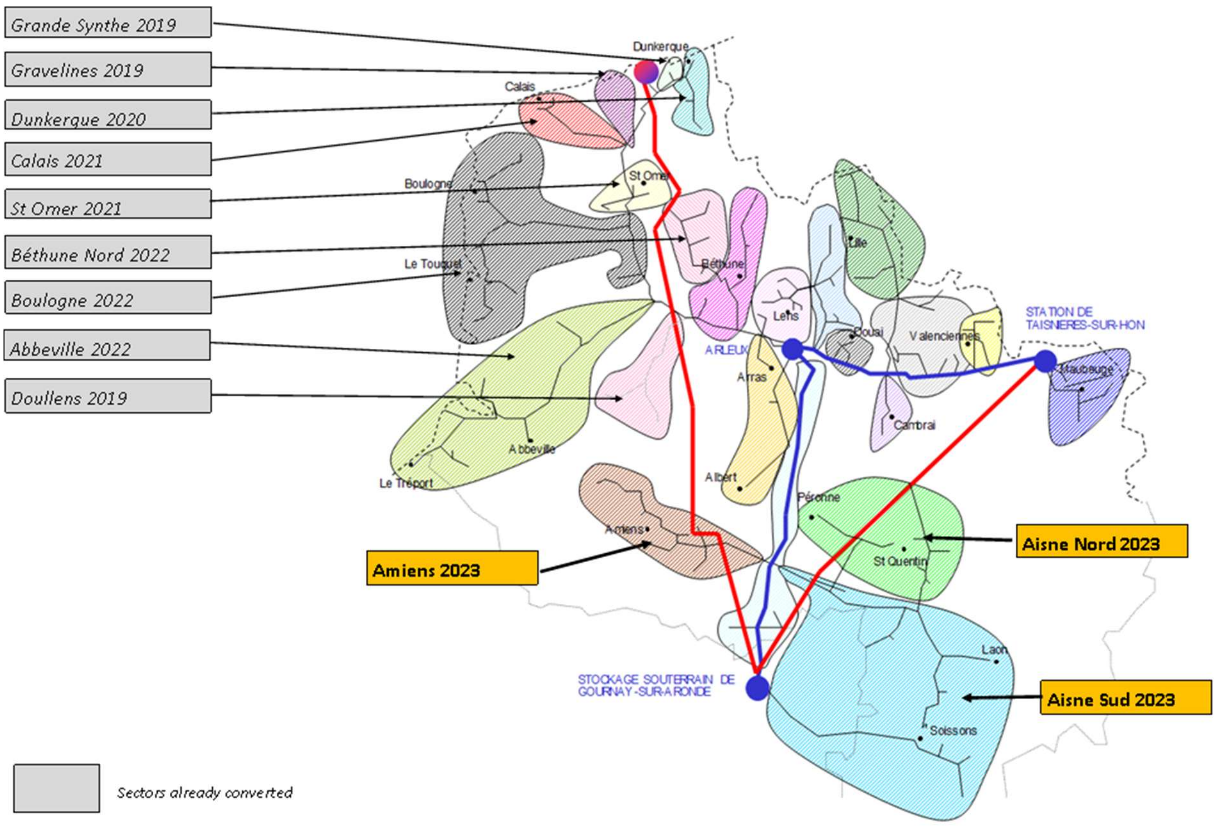
A pilot phase has been decided to test the conversion process between 2018 and 2020. Approximately 68,000 customers have been converted from L- to H-gas during this period accounting for an annual volume of 1 TWh.

In 2021, two sectors with 54,000 customers and, in 2022, three sectors with 122,000 customers have been converted accounting respectively for an annual volume of 1.2 TWh and 4 TWh under average weather conditions.

Conversions in 2023

In 2023, three sectors with 177,000 customers are to be converted leading to an estimated volume effect of 9 TWh. As of December 2022, all conversion activities are on track.

Map 2.2.1 Market conversions in France in 2019-2023

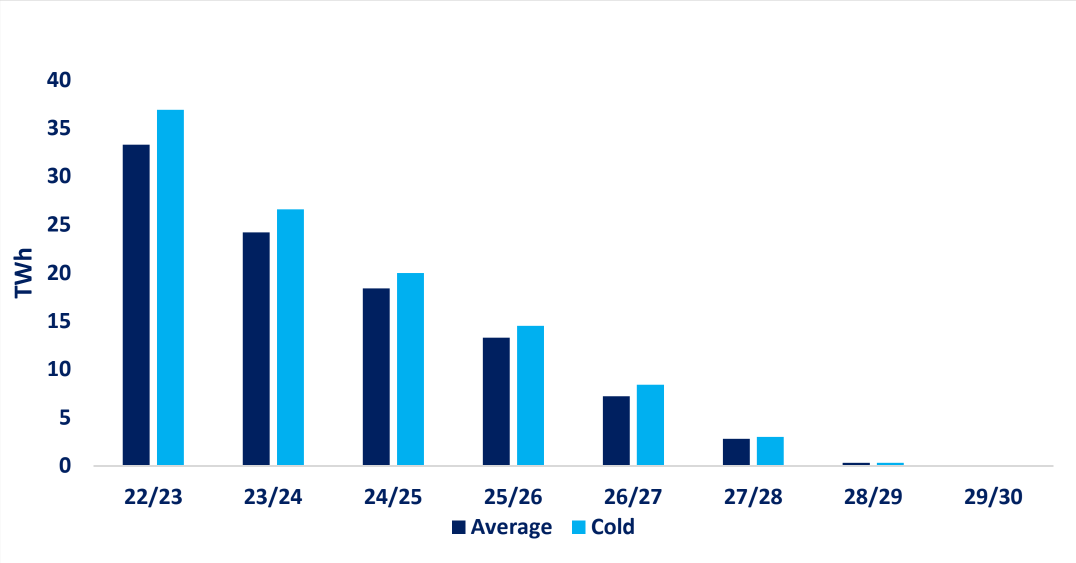


9 For further details: 'Winter Report 2021' and 'Winter Report 2022' of the Task Force Monitoring L-Gas Market Conversion.

Conversions until GY 2029/30

In France, over 0.9 million of gas consumers will need to be converted between GY 2023/24 and GY 2029/30, translating into a total volume of 11 TWh/y. Consequently, L-gas imports from the Netherlands to France are expected to fall to 0 by GY 2029/30, both in an average and cold GY.

Figure 2.2.1 France's consumers demand for L-gas from the Netherlands (GY 2022/23 - GY 2029/30) for average and cold GYs



2.3 Belgium

Conversions up to 2022[10]

In GY 2018/19, around 35,000 connections were converted in Wallonia and Flanders. These conversions took place at junction points between the H- and the L-grids.

In GY 2019/20, almost 130,000 connections were converted, translating into an annual consumption of 1.92 TWh under average weather conditions. Due to the outbreak of the COVID-19 pandemic, delays in the works carried out at TSO level and in the activities at DSO level led to a postponement of the conversion from 1st June 2020 to 1st September 2020.

In 2021, more than 300,000 connections were converted, translating into a total volume of 7.53 TWh under average weather conditions. As such, the volume effect of the 2021 conversion was the highest to date. The conversion took place as planned, without any delay to be reported.

Conversions in 2022

In 2022, around 254,000 connections were converted translating into a volume of 3.73 TWh under average weather conditions. The conversion has been divided in two phases: Flanders & Wallonia (1st of June) and Brussels (1st of September). The conversion of Brussels is now completed.

Remainder of the conversion – optimization of the conversion planning

The successful completion of the L/H conversion phases to date led the Belgian gas network operators (TSO and DSOs) to identify ways of converting larger L-gas market areas to H-gas each year, thereby reducing the total duration of the conversion program. The new indicative planning foresees that the Belgian L/H-conversion should be completed on September 1st, 2024 (instead of June 1st, 2029, as previously planned). The areas to be converted year by year are shown in Map 2.3.1.

This optimisation of the conversion planning is the result of a joint analysis by the Belgian TSO and DSOs, whereby individual conversion areas have been grouped, resulting in efficiency gains. This was made possible by the

[10] For further details please refer to the Winter Report 2021 of the Task Force Monitoring L-Gas Market Conversion and to the Winter Report 2022 of the Task Force Monitoring L-Gas Market Conversion.

previous conversion phases, whereby the network operators acquired positive experience and confidence in the feasibility in such a scheme. Essentially two changes have been brought to the conversion planning:

- The L-gas areas of Antwerp, which were due to be converted in 2028 and 2029, are now planned for conversion in 2023.
- The L-gas areas previously planned for conversion in 2025, 2026 and 2027 are now scheduled in 2024.

The conversion phases of 2023 (1st of June) and 2024 (1st of June and 1st of September) are formally validated.

Map 2.3.1 Indicative market conversion planning in Belgium

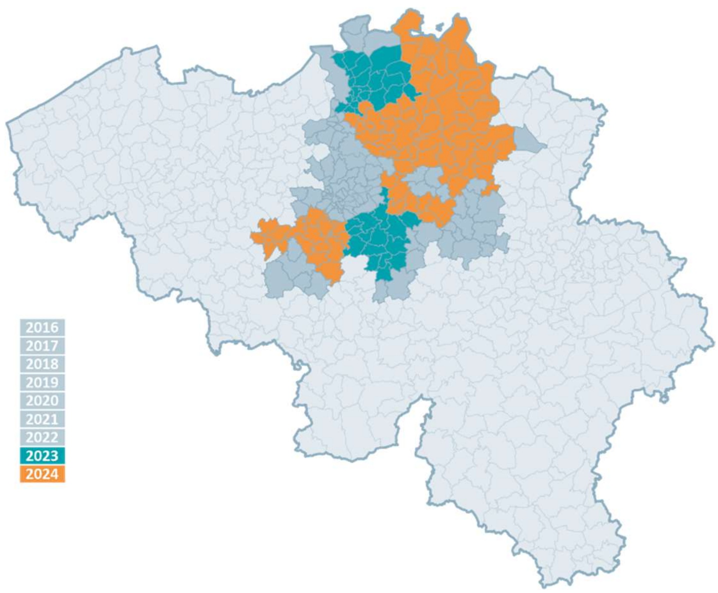
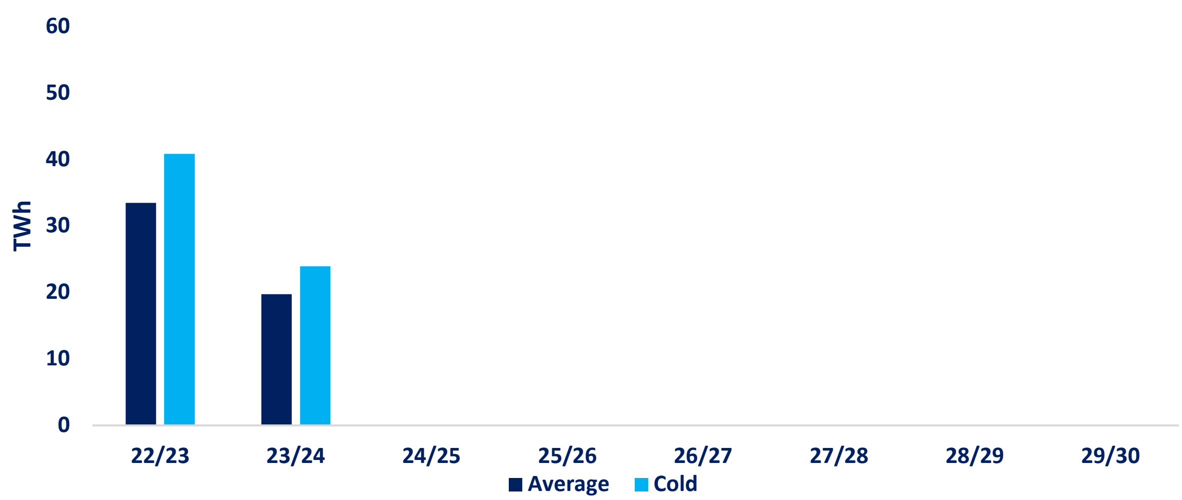


Figure 2.3.1 Belgium's L-gas imports from the Netherlands (GY 2022/23 - GY 2029/30) for average and cold GYs



2.4 The Netherlands

Contrary to other L-gas consuming countries, the Netherlands have decided not to enter into a large scale conversion operation. Instead, a new nitrogen facility is being built which, together with the already existing nitrogen facilities and some underground storage facilities, will be able to provide enough L-gas (volume and capacity) to meet Dutch and foreign L-gas demand in the years to come. For more details, please refer to Chapter 3 of the Report.

The legislative framework has however been adapted in order to limit future L-gas consumption. The Dutch Gas Act has already been adapted to prevent future L-gas consumption growth by prohibiting the connection of newly built houses and buildings to the gas grid. The new legislation concerning the conversion of industrial customers (adopted on June 20, 2020) specifies that industrial customers consuming more than 100 million cubic meters of L-gas annually are not allowed to use L-gas anymore after October 2022. Therefore, Dutch demand for L-gas is expected to decrease by approximately ~30 TWh, equating to the consumption of the nine largest users. Five of these nine users have already stopped their offtake of L-gas and converted to other sources of energy. The remaining four industrial users have been and will be granted a temporary exemption from the ban by the Ministry of Economic Affairs and Climate Policy. This exemption holds until their planned conversion in the upcoming years.

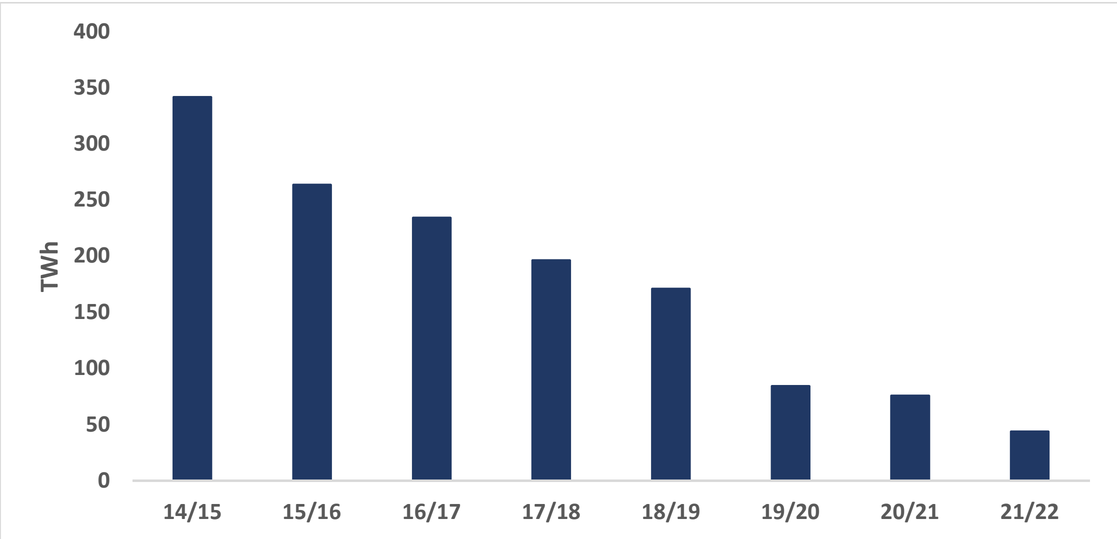
In addition, steps are being taken to phase-out natural gas from the Dutch energy system between now and 2050. This follows the Paris Agreement on Climate Change and the Dutch Climate Agreement.

3. L-gas production

3.1 L-gas production in the Netherlands for the period GY 2014/15 – GY 2029/30

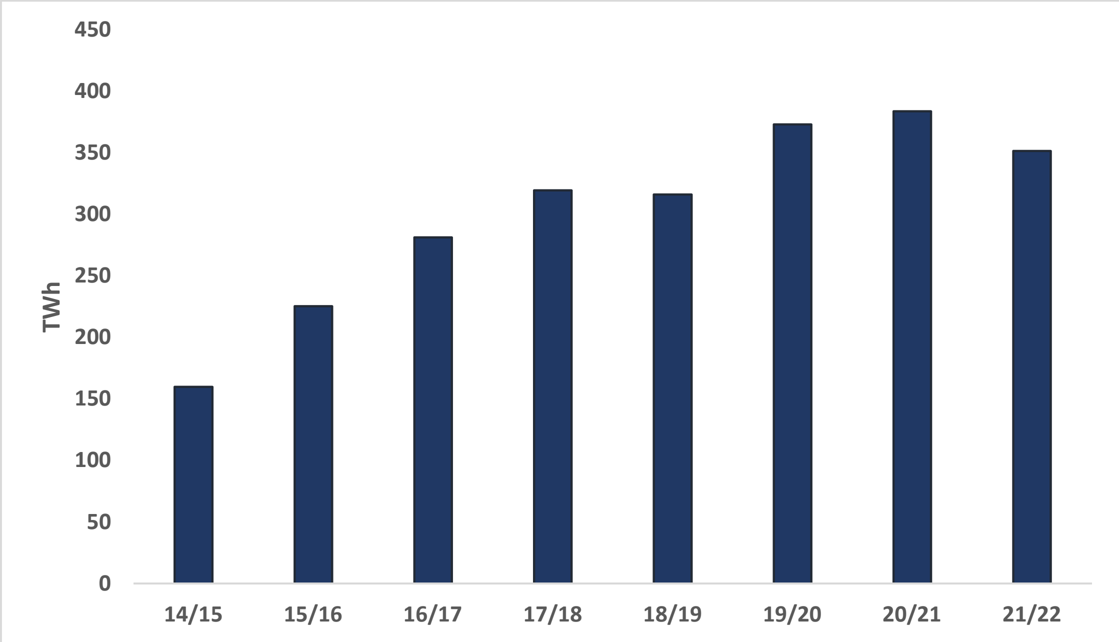
Following an increasing number of earthquakes in the province of Groningen, linked to the natural gas extraction in the area, the Dutch authorities have imposed successive caps on Groningen's gas production starting from GY 2014/15. This trend continued through to GY 2021/22, as Groningen gas production was at its lowest point at 44 TWh.

Figure 3.1.1. Production from the Groningen field (GY 2014/15 – GY 2021/22)



In line with the declining natural L-gas production from the Netherlands, the production of pseudo L-gas rose from ~160 TWh in GY 2014/15 to ~352 TWh in GY 2021/22. As Groningen production fell more steeply than demand reduction, the share of pseudo L-gas in total Dutch L-gas production grew to ~89% of the total demand in GY 2021/22. The Groningen field can only be closed if the total L-gas market can be supplied by pseudo L-gas, for which sufficient H-gas and nitrogen is needed.

Figure 3.1.2 Production of pseudo L-gas in the Netherlands (GY 2014/15 – GY 2021/22)



However, the production of the pseudo G/L-gas, the replacement of the Groningen gas, depends on the supply of H-gas. As a consequence of the omitting Russian gas supplies ~30% of the demand of H-gas now has to come from other sources. The main source for H-gas is now LNG, supplied through existing terminals in the United Kingdom, Belgium and the Netherlands. Since these terminals do not have enough capacity to replace the former Russian supply, additional LNG-import facilities are being developed in the Netherlands, Germany and France. An extension of the regas capacity at the LNG terminal of Zeebrugge (Belgium) is ongoing. These projects are in different stages of development and contribute mainly to the mid-term solution. On the short term, the demand supply balance is being kept by a decline in the European gas demand due to high prices. However, in spite of current positive market sentiments, there is still a risk of H-gas shortages. This means that there is a possibility that there may not be enough H-gas supply for both the H-gas market demand and full usage of the conversion facilities for the production of the still needed amounts of pseudo L-gas.

Based on an optimal usage of the blending facilities the Dutch State Secretary set the cap for Groningen production in GY 2022/23 at 28 TWh for both an average and a cold year. This production volume is the result of the decision of the State Secretary to keep all remaining eleven Groningen production locations open during the winter of GY 2022/23 in line with the advice of GTS. These production locations will produce at a minimum flow in order to ensure availability in case of extreme cold weather, unexpected (out of spec) qas qualities, transportation limitations, a shortage of H-gas or an outage in the L-gas system. After the winter, the State Secretary will decide on the potential closure of six of the production locations on the Groningen field as previous studies from GTS (still based on the assumption of sufficient supply of H-gas) have shown the earliest possible closing date of the Groningen field to be the start of GY 2023/24.

The mission of the Government of the Netherlands is to close the Groningen field as quickly as possible, taking into account security of supply. An important measure that is taken is the conversion of the gas storage Grijpskerk from an H-gas storage to an L-gas storage. This conversion of the storage was planned so that it could, when volume and capacity were sufficient, take over the back-up functionality of the Groningen field and speed up the closure of the field. Another measure is the construction of a new nitrogen plant at Zuidbroek. This blending facility has a capacity of 180,000 m^3/h N_2 and is able to produce a maximum of 97 TWh additional pseudo L-gas. With the construction being heavily impacted by the outbreak of COVID-19, consequent lockdowns and a dispute between the EPC contractor and subcontractor, the planned commissioning date of the nitrogen plant is delayed. GTS informs the market of the planning via REMIT messages[11]. Due to the price driven demand reduction, the delay does not affect the Groningen production.

[11] More information at https://www.gasunietransportservices.nl/transparency/remit/urgent-market-messages/2-2406

Yearly in January, GTS provides advice to the State Secretary on the needed Groningen capacity and volume for the security of supply for the upcoming gas year. The January 2023 analysis shows that also in GY 2023/24 there is capacity needed from the Groningen field to ensure security of supply. This results in an additional production in the current gas year, since more than five production locations at the Groningen field have to remain operational during the summer and produce minimum flow. As a consequence, GTS advises the State Secretary to increase the allowed production volume of the Groningen field in GY 2022/23 to 31 TWh. For the GY 2023/24 GTS advises the State Secretary to set the cap to the Groningen production at the same level as the proposition for this GY, being 31 TWh. Based on the current assumptions, GTS still foresees the possibility of scarcity in the H-gas supply, but also an increase of LNG import capacity. At the moment it is unclear what the impact will be on the production from the Groningen field for the years after GY 2023/24[12]. As the situation on the gas market is completely new and many developments are still uncertain, all trends and projects will be followed closely and GTS will update its advice at least yearly to take into account new insights.

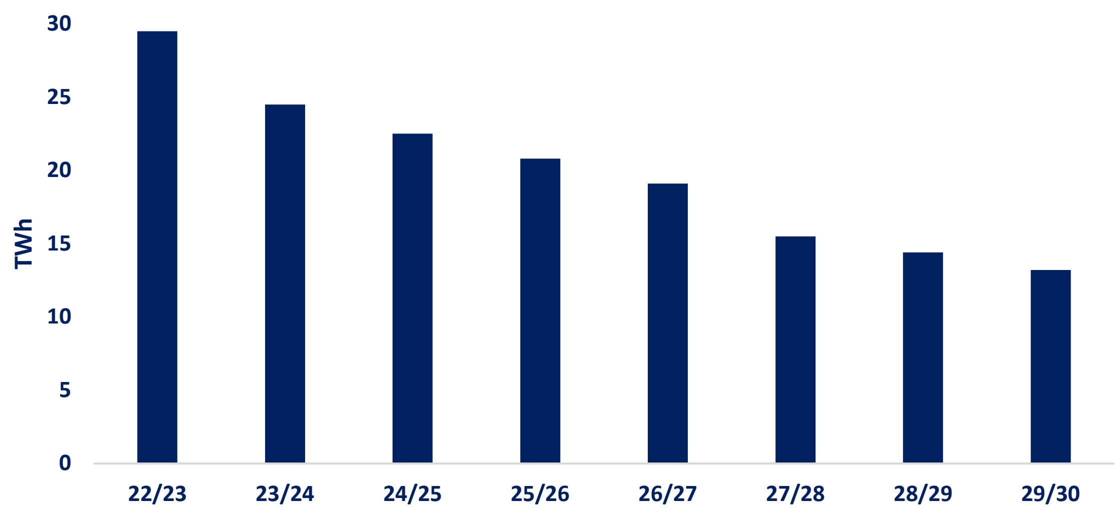
3.2 Expected L-gas production outside Netherlands for the period GY 2021/22 – GY 2029/30

In Germany, L-gas production is expected to decrease at an annual average rate of ~15% from 29.5 TWh in GY 2022/23 to 13.2 TWh by GY 2029/30. There is one peak nitrogen/H-gas blending facility in Germany, in Rehden, supplying only limited volumes of converted L-gas. In 2021, the blending facility in Rehden was extended with a local nitrogen plant for backing of the local supply demand balance.

In addition, the German TSO GTG Nord built a blending facility at the Dutch border. This facility allows for blending Dutch Groningen gas with H-gas. This blending facility is in operation since April 2021 and allows for an annual decrease of L-gas deliveries from the Netherlands of up to 30% (5-6 TWh/y approx.) of the demand of GTG's cross border point Oude Statenzijl, depending on, inter alia, the actual amount of gas imports. In GY 2021/22 1 TWh was blended. Thus, the facility is a further relief to the Groningen production. The building costs of the facility and its operational costs are borne by network users.

There is no L-gas production in Belgium and France. The French nitrogen/H-gas blending facility located at Loon Plage (near Dunkerque) designed for peak-load needs only was abandoned in 2021 as this area of GRTgaz network was converted. There is one peak nitrogen/H-gas blending facility in Lillo, Belgium, supplying only limited volumes of converted L-gas.

Figure 3.2.1 Indication of the L-gas production in Germany (GY 2022/23 – GY 2029/30) in TWh



[12] For more details see the advice from GTS dated the 31st of January 2023, entitled *Advies Benodigde Groningencapaciteiten en -volumes ten behoeve van leveringszekerheid voor gasjaar 2023/2024*

Annex

Annex I: Consumers demand for L-gas from the Netherlands in the GY 2021/22 in TWh

1.1 Consumers demand for L-gas from the Netherlands[13] in the GY 2021/22 in TWh

GY 2021/22	Germany	France	Belgium	Netherlands
October 2021	11.1	2.9	2.8	15.2
November 2021	14.0	4.5	4.2	22.6
December 2021	14.1	5.0	4.8	28.4
January 2022	14.5	5.3	5.1	29.2
February 2022	11.7	4.0	4.0	24.3
March 2022	12.0	3.5	3.4	19.9
April 2022	11.0	2.5	2.7	15.8
May 2022	7.3	1.5	1.5	9.4
June 2022	6.0	1.2	1.2	7.8
July 2022	4.6	1.1	1.0	6.7
August 2022	3.0	1.0	1.0	6.0
September 2022	4.7	1.5	1.2	7.7
Total	113.9	34.0	32.9	193

Annex II: Indication of the demand for L-gas from the Netherlands until GY 2029/30

2.1 Indication of the demand for L-gas from the Netherlands in Germany until GY 2029/30 (TWh)

	Cold		Average
	TWh	GWh/d	TWh
2022/23	122.0	802	109.8
2023/24	100.6	686	90.6
2024/25	84.3	574	75.8
2025/26	61.8	458	55.3
2026/27	43.4	343	39.4
2027/28	29.7	228	27.3
2028/29	11.1	115	10.2
2029/30	0.3[14]	2	0.3

2.2 Indication of the demand for L-gas from the Netherlands in Belgium until GY 2029/30 (TWh)

	Cold		Average
	TWh	GWh/d	TWh
2022/23	39.4	256	32.0
2023/24	24.1	158	19.6
2024/25	0	0	0
2025/26	0	0	0
2026/27	0	0	0
2027/28	0	0	0
2028/29	0	0	0
2029/30	0	0	0

[13] For Germany and Belgium, this accounts for imports of L-gas from the Netherlands and not total domestic demand. For France, this accounts for final consumers demand per month, not taking into account L-gas injections/withdrawals in/from Gournay storage, and L/H blending. For the Netherlands, it accounts for domestic demand.
[14] Please note that the remaining demand in the gas year 2029/30 (0.3 TWh / 100.000 kWh/h) is given by a regional grid in Germany, that can only supplied via the Netherlands (Haanrade / Thyssengas).

2.3 Indication of the demand for L-gas from the Netherlands in France until GY 2029/30 (TWh)

	Cold		Average
	TWh	GWh/d	TWh
2022/23	36.9	302	33.3
2023/24	26.6	230	24.2
2024/25	20.0	176	18.4
2025/26	14.5	122	13.3
2026/27	8.4	59	7.2
2027/28	3.0	12	2.8
2028/29	0.3	0	0.3
2029/30	0	0	0

2.4 Indication of the demand for L-gas in the Netherlands until GY 2029/30 (TWh)

	Cold		Average
	TWh	GWh/d	TWh
2022/23	251	3077	216
2023/24	248	2917	213
2024/25	230	2732	198
2025/26	221	2677	190
2026/27	217	2637	186
2027/28	212	2601	182
2028/29	208	2565	178
2029/30	203	2529	174

Annex III: Expected market conversion volume until GY 2029/30

3.1 Expected market conversion volume in Germany until GY 2029/30 (TWh)

Gas year	Volume converted [TWh]	Number of installations [thousands]
2022/23	26.0	552
2023/24	18.3	503
2024/25	23.4	516
2025/26	19.3	508
2026/27	21.9	561
2027/28	21.3	311
2028/29	15.0	308
2029/30	0	0

3.2 Expected market conversion volume in Belgium until GY 2029/30 (TWh)

Gas year	Volume converted [TWh]	Number of installations [thousands]
2022/23	12.4	373
2023/24	19.6	490
2024/25	0	0
2025/26	0	0
2026/27	0	0
2027/28	0	0
2028/29	0	0
2029/30	0	0

3.3 Expected market conversion volume in France until GY 2029/30 (TWh)

Gas year	Volume converted [TWh]	Number of installations [thousands]
2022/23	4.0	122
2023/24	9.0	177
2024/25	5.5	212
2025/26	5.3	279
2026/27	6.4	197
2027/28	4.9	183
2028/29	2.2	37
2029/30	0	0

Annex IV: Expected L-gas production

4.1 Indication of the L-gas production in the Netherlands from Groningen until GY 2023/24 (TWh)

Gas year	Cold	Average
2022/23	31.3	31.3
2023/24	31.3	31.3

4.2 Indication of the L-gas production in Germany until GY 2029/30 (TWh)

Gas year	Cold	Average
2022/23	29.5	29.5
2023/24	24.3	24.3
2024/25	22.5	22.5
2025/26	20.8	20.8
2026/27	19.1	19.1
2027/28	15.5	15.5
2028/29	14.4	14.4
2029/30	13.2	13.2

Annex V: L-gas storage in northwest Europe

5.1 Working gas volume and daily withdrawal capacity of L-gas storage sites in Germany, France and the Netherlands

	Working gas (TWh)	Withdrawal rate (GWh/d)
Germany		
Nüttermoor L-Gas	0.4	24
Speicherzone L-Gas (EWE)	8.4	282
Empelde	2.3	73
Epe L-Gas (RWE)	1.7	98
Epe L-Gas (UES)	4.3	288
France		
Gournay	13.4	215
the Netherlands		
EnergyStock	3.0	252
Norg (Langelo)	49.0	742
Alkmaar	5.0	357
Epe Nuon	3.0	117
Epe Eneco	1.0	95
Epe Innogy	3.0	119
Peakshaver	1.0	312
Grijpskerk	12.0	620

5.2 Net withdrawals (in TWh) of L-gas per country in GY 2019/20, GY 2020/21 and GY 2021/22

	2019/20	2020/21	2021/22
The Netherlands	5.1	0.8	-6.7
France	0.4	0.5	1.2
Germany	0.4	6.2	-3.4

Annex VI: Climatological context

L-gas is predominantly used in the residential sector for space heating, therefore L-gas gas demand is strongly correlated with the temperature and wind. This is also the reason why the allowed Groningen production is determined by the number of degree days in a year. The definition of the degree days is given in the Dutch Gas Act. As stated in the Dutch Gas Act, both the temperature and wind are measured at weather station the Bilt.

The number of degree days can be calculated by

$D = \Sigma \max[(14 - Teff),0]$

Where:

D = the number of degree days

14 = heating limit (the so-called “stookgrens”)

Teff = daily average effective temperature

$Teff = T - (V/1,5)$

Where:

T = daily average temperature

V = daily average wind speed

Contributors

This report is compiled by the Netherlands Ministry of Economic Affairs and Climate Policy and Gasunie Transport Services (GTS) in close collaboration with:

Germany

Federal Ministry for Economic Affairs and Energy	Stefan Rolle, Andreas Kaiser
Federal Network Agency	Elena Albrecht, Andreas Müller, Jörn Mehlitz
TSO: Open Grid Europe	Frank Harlacher
TSO: Gasunie Deutschland	Thorsten Brümmer
TSO: Thyssengas	Dr. Thomas Hügging
TSO: GTG Nord	Christian Barth, Tammo Dunkhase
TSO: Nowega	Sebastian Koch

France

Ministry for Ecological Transition	Etienne Denieul, Samir El Kanbi, Carole Mercier
Energy Regulatory Commission	Edith Hector
TSO: GRTgaz	Emmanuel Freitag

Belgium

Federal Public Service Economy	Bernard Picron, Benjamin Heylen, Alexis Bossuyt
Commission for Electricity and Gas Regulation	Christian Cuijpers
TSO: Fluxys Belgium	Denis Bawin, Juan Vazquez

The Netherlands

Ministry of Economic Affairs and Climate Policy	Wim van 't Hof (chairman), Stijn Uitdewilligen, Luc van der Stegen
Gasunie Transport Services	Anne Spijkstra, Wendy Docters, Jan de Boer
Authority for Consumers & Markets	Nina Fleuren, Jasper Nooren

General Secretariat of the Benelux Union	Geert Wegman
European Commission	Carmen-Magdalena Oprea