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Date
31 January 2024

Direct dial number
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Our ref.
EA 24.0052

Your ref.

Re
Required capacity and volume to guarantee security of supply for the 2024/2025 gas year

Your Excellency,

In accordance with the current Dutch Gas Act, GTS has the statutory duty of advising you annually on matters relating to ensuring security of supply while making minimal use of the Groningen field. With this letter, we are fulfilling this statutory duty[1] for the 2024/2025 gas year. We are providing this advice with the knowledge that legislation regarding the permanent closure of the Groningen field is still passing through the parliamentary process and is yet to be finalised.

We have carried out our analysis of the capacity and volume required to ensure security of supply in a manner similar to previous years, i.e. by drawing up a supply/demand balance for both. For the next two gas years, we estimate that there will be a shortage in the capacity balance in the event of peak demand arising simultaneously with a failure of a capacity resource equivalent to the single largest gas infrastructure. Moreover, we also see a potential shortage in the volume balance for several years when the gas storage facilities are virtually empty after the winter. In previous years, these imbalances (i.e. more demand than supply) were absorbed by restoring the balance with minimal use of the Groningen field. Now that you intend to permanently close the Groningen field[2], this imbalance will need to be resolved in some other way. Our analysis and findings are explained in more detail below.

Security of supply
In the Netherlands, security of supply is defined as the situation where 'end users of gas are supplied with gas of the right quality (low or high calorific) at the right time and in the required amount, even when demand is high[3].' This means that all end users in the Netherlands should be able to assume that security of gas supply is guaranteed, even in the event of extremely cold weather. When determining whether there is sufficient gas to meet the needs of end users, the (expected) gas flows coming into and going out of the country are also taken into account. Under EU regulations, an EU Member State may not, in principle, restrict gas flows to another EU Member State.

[1] In accordance with the Dutch Gas Act, Article 10(a)(1)(q)
[2] https://www.tweedekamer.nl/kamerstukken/wetsvoorstellen/deail?cfg=wetsvoorsteldetails&qry=wetsvoorstel%3A36441
[3] Explanatory Memorandum on the bill seeking to amend the Dutch Gas Act and the Dutch Mining Act to minimise gas extraction from the Groningen field, section 2.1; https://zoek.officielebekendmakingen.nl/kst-34957-3.html

Findings of the analysis

Our analysis shows that the EU infrastructure standard will not be met in the next two gas years[4], i.e. in the event of failure of a capacity resource equivalent to the single largest gas infrastructure (Norg gas storage facility), there will be insufficient capacity available to satisfy the total gas demand of the calculated area during a period of exceptionally high gas demand, occurring with a statistical probability of once every 20 years. We estimate that the possible capacity shortage in the 2024/2025 gas year will be approximately 10 GW[5]. This capacity shortage is less than previously reported[6] due to an update of the planning principles[7] and market developments. For example, a recent study by the Royal Netherlands Meteorological Institute (KNMI) shows that the effective average daily temperature associated with 'a day of exceptionally high gas demand, occurring with a statistical probability of once every 20 years' is now -14°C instead of -15.5°C due to climate change. In addition, due to the change in the direction of the gas flow since the loss of Russian gas, we were not expecting to receive any gas from the German H-gas caverns last year to help meet Dutch gas demand. As it turned out, however, last winter the Netherlands did receive gas from these caverns during cold spells. Finally, each gas year the projected demand for L-gas decreases compared to the previous year. The completion of the conversion programme in Belgium will result in an additional decrease in the 2024/2025 gas year. A possible capacity shortage in the 2024/2025 gas year will therefore occur from an effective average daily temperature of -11°C or colder.

Covering the capacity shortfall over the next two years by creating additional supply/capacity, for example through additional LNG imports or exporting less to a neighbouring country, is not a realistic option. If a capacity shortfall arises, mitigating measures – like disconnecting industrial users, for example – must be available within a few hours. If these mitigating measures prove insufficient, the network will become so imbalanced that entire areas, possibly including protected customers, will need to be disconnected. The consequences of this would be – to borrow a phrase from the Gas Protection and Recovery Plan – 'disruptive'. It is therefore important for there to be sufficient volume in the gas storage facilities for a cold winter. This is currently guaranteed through the EU obligation regarding the required minimum filling level of these facilities.

In addition to the capacity shortage, we also see a potential volume shortage in the 2024/2025 gas year. If the winter is colder than average, the gas storage facilities will be relatively empty after the winter, and without additional measures, there will be insufficient supply to fill the gas storage facilities to at least 90% again during the summer of 2025. Given the degree of the potential volume shortage (approx. 60 TWh cannot be ruled out), a reduction in demand by households in the summer will not suffice: after all, households use little gas in the summer. Reducing demand in industry would mean turning off the gas tap for months for the entire industrial sector. Even after 2025, it is expected that supply will not be sufficient to fill the gas storage facilities after a cold winter. The severity of the potential gas shortage depends on how cold it gets during the coming winters and developments concerning supply.

[4] In accordance with Article 5 of Regulation (EU) 2017/1938

[5] All volumes in this estimate are shown in terawatt hours (TWh), based on the gross calorific value (high heat value). This unit of energy can be converted to billion scm [35.17] by multiplying the number of TWh by 3.6/35.17. The capacities in this estimate are shown in gigawatt, (GW), also based on the gross calorific value (high heat value), and can be converted to million scm [35.17] per hour by multiplying by the same factor.

[6] Recommendations regarding required Groningen capacities and volumes for security of supply for the 2023/2024 gas year, dated 31 January 2023, our reference L 23.0046

[7] See Appendix 1 for a detailed explanation of the various principles.

To create sufficient supply in the long term, in our view additional import capacity for LNG through the existing terminals (Gate and EET) or another new terminal will need to be arranged. Without additional LNG import capacity, the summer filling problem may arise in the coming gas years too.

Ensuring security of supply after the closure of the Groningen field

With the intended closure of the Groningen field and declining domestic production, dependence on gas imports will become even greater. Currently, about 75% of the gas the Netherlands consumes within its borders is imported. This is because we depend on high-calorific gas to supply both the high and low-calorific gas markets. With the loss of the Russian gas supply, security of supply is increasingly dependent on the availability of H-gas on the global LNG market, which is still scarce, and we expect this scarcity to continue until 2025[8].

All these developments have prompted GTS to develop a vision on ensuring security of supply, both now and in the future. In this vision, we propose a system with the preconditions required for ensuring that security of supply can be sufficiently assured. We are currently working on developing our vision further and we will be publishing it soon.

We will work to ensure security of supply in the Netherlands without gas from the Groningen field. We continue to monitor developments in the energy markets closely and we will keep you informed of relevant developments.

Yours faithfully,

Bart Jan Hoevers
Managing Director

Appendix 1: Developments in the gas market, planning principles and scenarios
Appendix 2: Results

[8] https://globallnghub.com/getting-ready-for-the-next-lng-wave.html; Timera

Gasunie Transport Services B.V.

Date: 31 January 2024 Our ref.: EA 24.0052

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APPENDIX

Appendix 1: Developments in the gas market, planning principles and scenarios

This appendix provides a general picture of relevant market developments, based on which we determined the planning principles for the analysis. The model used for calculating capacities and volumes includes a supply side and a demand side. Every hour these should be in balance, with sufficient expected supply to meet the expected demand in that hour. Like last year, this year we again included the supply/demand for both G/L-gas and H-gas in our analysis. We have done this while determining the capacity required in a situation with high gas demand (peak day) and while determining the volume required for security of supply. Based on the 2022/2023 gas year evaluation[9], we concluded that the model works well. Under the Dutch Gas Act and its Implementing Regulation, we are required to consult market parties and representative organisations regarding the planning assumptions we intend to use in the forecast[10]. Consultation on the planning assumptions for the 2024/2025 gas year was held partway through October 2023[11]. During this meeting, the parties were invited to provide their views based on the planning assumptions presented. Two parties made use of this opportunity. These comments and GTS's response to these comments are presented together with this advice[12]. Based on the comments received, along with GTS' latest insights, the planning assumptions were modified and scenarios were added to the analysis.

The planning assumptions have a major influence on the results of the analysis. The basic scenario has, in GTS' opinion, realistic planning assumptions. We also present two sensitivity analyses. In the first, the 'optimistic scenario', the planning assumptions have been adjusted to a situation in which a higher supply and/or lower demand than the realistic scenario is envisioned. In the second, the 'pessimistic scenario', the planning assumptions have been adjusted to a situation where we assume a higher demand and/or less supply compared to the realistic estimate.

Market developments and planning assumptions

Current market developments are dominated by the loss of the Russian supply of high-calorific gas (H-gas) to north-western Europe. Russia previously supplied a third of the European H-gas demand. The loss of such a major source of gas resulted in scarcity and caused considerable turbulence on the gas market. This in turn resulted in unprecedentedly high gas prices in mid-2022, with major economic and social consequences. In businesses and in industry, demand destruction occurred due to these parties lowering or even ending their operations, in homes people turned down the thermostat[13], and in some cases the high energy prices even resulted in social and financial problems. All in all, the high gas prices caused a sharp drop in gas demand.

[9] *Rapportage inzet middelen en methoden in gasjaar 2022/2023* [Report on the resources and methodologies used in the 2022/2023 gas year]; our reference EA 23.052, dated 31 October 2023
[10] In accordance with the Dutch Gas Act, Article 10(a)(1)(q)
[11] For the slides for the market consultation, please see https://www.gasunietransportservices.nl/en/gasmarket/market-development/advice-production-groningen-field
[12] For further details, please refer to the various responses and the consultation matrix, which can be found at https://www.gasunietransportservices.nl/en/gasmarket/market-development/advice-production-groningen-field
[13] https://zetookdeknopom.nl/

The gap in gas supplies resulting from the loss of Russian gas imports was bridged in part by importing additional volumes of LNG through terminals in Belgium, the Netherlands and the UK. Additionally, new initiatives on the supply side emerged, such as the EemsEnergyTerminal in the Netherlands and the LNG terminals in Willemshaven, Brünsbuttel and Lubmin in Germany. In Germany, work is still underway on three FSRUs, which are expected to be ready to accept LNG starting from the 2024/2025 gas year. Still, the global LNG supply is not expected to be sufficient to fully supply all new LNG terminals. A wave of new LNG export projects will significantly increase LNG supply from 2025, however. Projects where construction has started or for which a final investment decision has been made will provide around 2500 TWh of extra LNG capacity by 2030, i.e. nearly half of the current global LNG trade[14]. The timelines suggest a particularly large increase between 2025 and 2027; see Figure 1. This conclusion is shared by the IEA, as can be seen in its World Energy Outlook[15]. The extent to which the additional LNG volume from 2025 onward will contribute to ensuring a sufficient supply with a stable price depends, among other things, on economic developments in Asia. Approximately two-thirds of all LNG currently goes to the Asian market, compared to which Europe (importing approx. 25%) is a modest player.

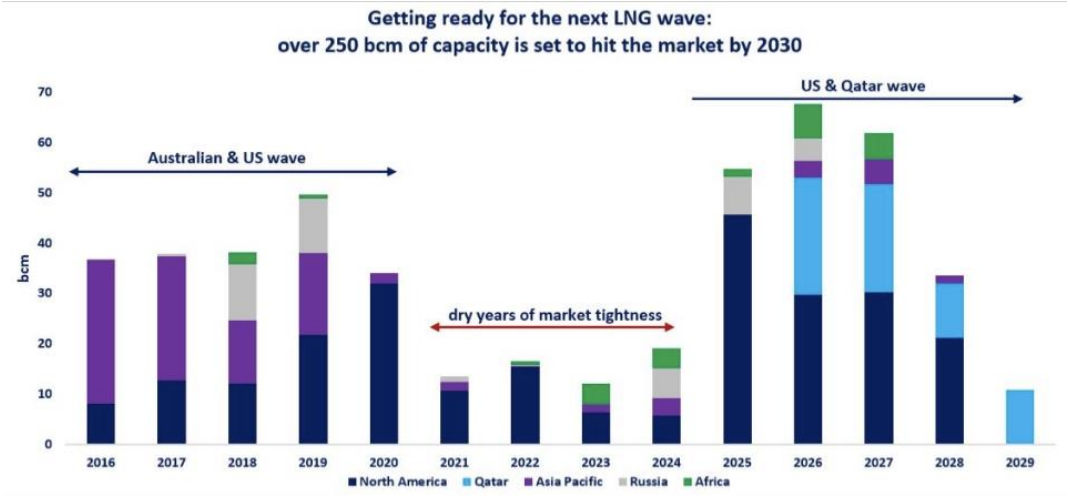

Figure 1: Increase in global LNG capacity per country per year[14]

The loss of the Russian gas supply, the redistribution of Norwegian gas, the reduction of production from the Groningen field and the increase in LNG capacity have all contributed to the direction of gas flows in the Dutch gas network changing, from east-to-west to west-to-east. However, parts of the current gas infrastructure are not designed for this. In 2022, at the Zelzate entry point, where gas from Belgium enters the Netherlands, the demand for entry capacity was greater than the supply, a situation that resulted in the spare capacity being sold with an auction premium (surcharge). At the time, both Germany and the Netherlands needed a lot of gas from Belgium to fill their respective storage facilities. The infrastructure was a problem in facilitating this flow, and it is expected that in the coming years, too, a lot of gas from the west will still be needed. For this reason, GTS has carried

[14] https://globallnghub.com/getting-ready-for-the-next-lng-wave.html
[15] World Energy Outlook 2023, published in October 2023; https://www.iea.org/reports/world-energy-outlook-2023; see in particular pages 20 and 24

out a 'bottleneck analysis' and the areas of congestion identified will be resolved in the coming in the coming years[16].

The increase in the supply of LNG is currently not enough to replace the entire supply of Russian gas. The result is that we are seeing shortages on the market, with relatively high prices and low demand, a situation that will continue unless additional supply can be secured. In addition to LNG, the Dutch supply consists of gas from the small fields and imports from Norway, Belgium and the UK. Taking the current utilisation rate of these resources into account, only imports from the UK and Belgium can increase (slightly). After all, the small fields are already at their maximum production capacity. This applies to gas imported from Norway as well. The Norwegians have the option of transporting their gas to the UK, Belgium, France, Denmark, Poland, Germany and the Netherlands. Three pipelines supply both the Netherlands and Germany, with the Netherlands receiving around 20% of this Norwegian gas based on the agreed split between the Netherlands and Germany. It is possible that when the distribution key changes, the Netherlands may get a larger share of the Norwegian gas. However, it is expected that this distribution key will remain unchanged for the time being. Only when Germany can start making optimal use of its LNG terminals and once exports to its neighbouring countries have been restored is it possible that the distribution key will become more favourable for the Netherlands.
Given that the maximum capacity of most supply routes is being used, the Netherlands needs all the gas available to meet its demand. This also means that when maintenance is required and/or installation outages or pipeline failures occur, the result is an immediate drop in supply: there are virtually no alternative supply routes. The market is also alert to this vulnerability and responds immediately with higher gas prices. In GTS' view, this shows that the current supply/demand balance is precarious.

Developments in gas demand

(V1) Domestic L-gas and H-gas demand

Developments

With the loss of Russian gas approximately 80 TWh of supply has vanished from the Netherlands. National consumption in a year that follows an average temperature profile has dropped from around 380 TWh to in the range of 290 to 310 TWh. We assume that this new baseline will remain, given the relatively high gas price, the limited supply of LNG over the next two years, and possible demand destruction (i.e. permanent change in behaviour) among households. Accordingly, a return to previous higher level of gas demand does not seem to be likely for the time being. From conversations with peer German TSOs, it is clear that Germany is also assuming a new, lower baseline.

Scenarios

The 2022 Climate and Energy Outlook (2022 C&EO) published by PBL Netherlands Environmental Assessment Agency and Statistics Netherlands is used to estimate domestic demand, both for high and low calorific gas[17]. A new C&EO report[18] was published on 26 October 2023; in this new report no changes were made to the projected natural gas

[16] https://www.gasunietransportservices.nl/en/gasmarket/investment-plan/investment-plan-2024
[17] *Klimaat- en Energieverkenning 2022* [2022 Climate & Energy Outlook], as published in 1 November 2022 by PBL Netherlands Environmental Assessment Agency
[18] *Klimaat- en Energieverkenning 2023* [2022 Climate & Energy Outlook], as published in 26 October 2023 by PBL Netherlands Environmental Assessment Agency

consumption. The projections published in the 2022 C&EO are the most recent and have been used as a basis for this estimate, taking into account the high gas prices. The price of gas has an effect on the gas consumption of households and small-scale industry. The 2022 C&EO assumes that demand will partially recover and that the sustained decline in demand in the built environment, through energy savings and insulation, will only amount to a few percent. In the analysis, for the projected decrease in the gas demand in households, in line with what has been achieved to date, a reduction of 10% was applied. Although gas prices are still relatively high, demand does not appear to be bouncing back in unison with the price drop. It would then appear that a part of the drop in demand for households is permanent. The peak capacity of the regional TSOs has remained in line with the 2022 C&EO. In our calculations, we assume that all existing and proposed measures for the domestic market will be implemented as described in the 2022 C&EO. Accordingly, the effects of energy-efficiency measures are (implicitly) included in the reduced market demand[19]. The 2022 C&EO assumes that production in this business sector will return to the level before mid-2022 in the coming years. The price-driven behaviour of industrial players can clearly be seen in Figure 2, where the increase in gas prices due to the loss of a part of the Russian gas supply had an immediate effect on industry's gas demand. Meanwhile, the lower prices (though still relatively high) do not appear to be causing a further decline in industrial gas demand. We have therefore assumed in our calculations that gas demand for industry is still in line with the 2022 C&EO projections.

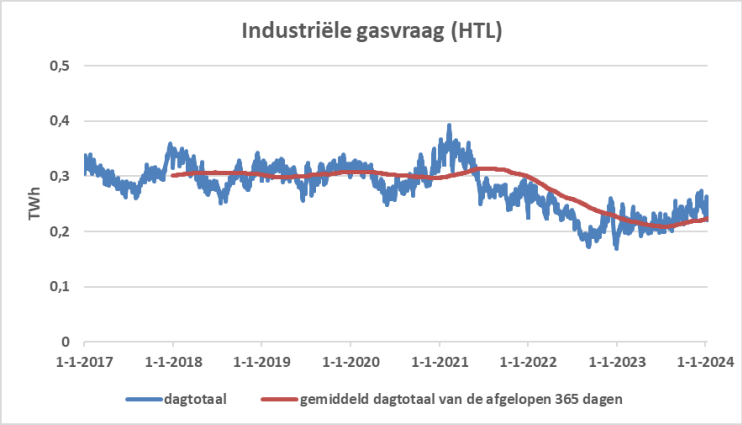

Figure 2: Gas consumption of industries connected to the high-pressure gas grid as a function of time [TWh] (source: GTS)

For the coming years, both volume and capacity will decrease in line with the projections in the 2022 C&EO, i.e. by around 3% per year.

(V2) L-gas export to Belgium, France and Germany

Developments

To estimate the L-gas export capacities and volumes to Germany and France, we use the report drawn up twice a year by the Monitoring L-Gas Market Conversion Task Force. The energy ministries of the Netherlands, Germany, Belgium and France, the regulators, the European Commission, ENTSOG and the relevant network operators are all represented on

[19]In accordance with the Dutch Gas Act, Article 10(a)(9)(b)(4).

this task force, the aim of which is to provide better insight into the conversion of the market and the associated decline in L-gas demand outside the Netherlands. For the estimate for the 2024/2025 gas year, we have used the information from the task force report that will be published in February 2024[20]. It is expected that Belgium will have switched completely to H-gas before the start of the 2024/2025 gas year, meaning that the Belgian demand for L-gas from the Netherlands is forecast to be zero. Conversion is on schedule in both France and Germany, with conversion expected to be finalised in 2029/30 in both countries.

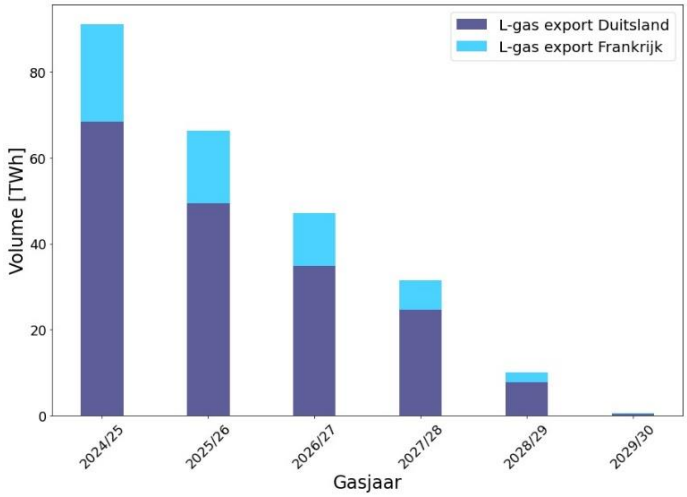

Figure 3: Projected L-gas export for Germany and France for the upcoming gas years, assuming an average temperature profile [TWh][21]

Scenarios
The most realistic scenario is based on the figures provided to the task force by the various ministries responsible for energy affairs/policy. The German TSOs have stated that they have observed that the high prices in 2022 have caused a certain level of demand destruction, which they have reflected in their estimates for the required L-gas volume from the Netherlands. A further reduction in demand, to include in an optimistic scenario for example, would appear to be unrealistic.

(V3) H-gas export to Germany

Developments
Changing the direction of the primary gas flow (now from west to east) due to the loss of Russian gas has also had an influence on transmission in our network. Prior to mid-2022, the Netherlands' gas imports from Germany exceeded its exports, but since then the situation has turned around and now it is exporting more gas to Germany than it is importing.
In Germany, as in the Netherlands, a new domestic balance has emerged since the loss of Russian gas, with additional imports from Norway, the Netherlands and Belgium, a halving of

[20] Winter briefing, Monitoring L-Gas Market Conversion Task Force, publication expected in February 2024
[21] Winter briefing, Monitoring L-Gas Market Conversion Task Force, publication expected in February 2024

exports to neighbouring countries, and around a 20% drop in domestic demand as a result of the relatively high gas prices (see Figure 4).

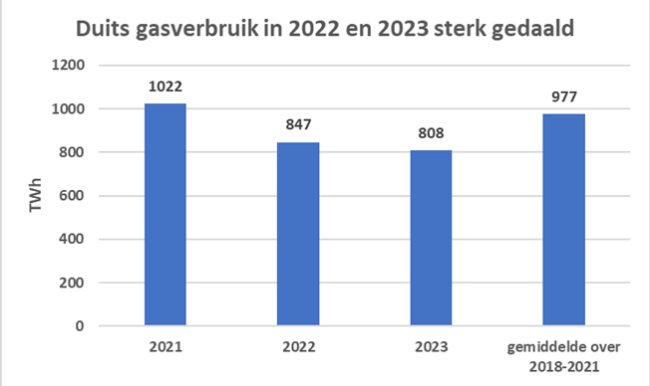

Figure 4: German domestic demand for H-gas per calendar year [TWh][22].

Another measure Germany is taking to replace Russian gas is investing in additional supply and diversification of sources via six FSRUs. Three of these are already operational, with limited capacity, and it is expected that the other three will be available in the winter of 2024/2025. As a result, the current share of German LNG imports in the supply mix is still relatively low (approx. 8%), though this is set to increase in the coming years, given that the offtake capacity from these FSRUs will increase as the German pipeline network is expanded. These expansions will take place over the coming years, with the LNG terminals being linked to a cluster of gas storage facilities in north-western Germany (see green arrows in Figure 5) and to the North European Gas Pipeline (NEL), where the gas can be distributed further in Germany with additional compression (see the red arrows in Figure 5).
We therefore assume that, once the transmission grid congestion eases and there are no longer any restrictions on the feed-in of LNG, the annual German LNG import volume can be increased from currently around 60-70 TWh to around 200-300 TWh[23]. It is expected that the effects on exports to Germany from neighbouring countries, exports from Germany to its neighbours, and German domestic gas demand will only be seen after all six FSRUs have been commissioned and can, with the availability of the extra transmission capacity, import as much as possible. It is unclear at this time what this possible new distribution key will be.

The German TSOs do not foresee any expansion at the Dutch border points, though they do anticipate a limited expansion at border points with Belgium (Eynatten) and Norway (Dornum)[24].

[22] Data obtained from https://www.bundesnetzagentur.de/EN/Home/home_node.html
[23] https://www.bmwk.de/Redaktion/DE/Publikationen/Studien/20230303-lng-studie.html, pages 46 and 47
[24] *Netzentwicklungsplan* (NEP) 2022 (German grid development plan for 2022)

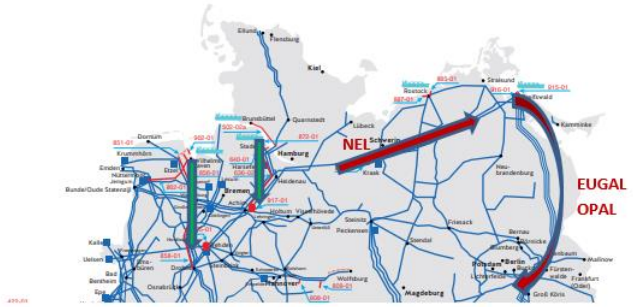

Figure 5: Projected gas flows following the expected expansion of the German network[25].

Scenarios

An analysis by the Institute of Energy Economics at the University of Cologne (EWI)[26] shows that there are both scenarios where the transit of gas from the Netherlands to Germany will remain high in the coming years and scenarios in which this will decline from the present level (i.e. approx. 234 TWh in a gas year with an average temperature trend; in the case of a cold year, it is expected that an additional +/-50 TWh will go to Germany). Our most realistic scenario assumes that German demand will remain high given that, as described above, the effect that increasing the supply and offtake of LNG via the new FSRUs will have on the export flow from the Netherlands to Germany is uncertain. In the optimistic scenario, we assume a decrease in gas transit starting from 2026/27, due to the increasing supply of LNG via the then fully operational FSRUs and the possibility of a decrease in the level of gas imported from the Netherlands. The underlying assumption is that the supply of LNG in the Netherlands will remain mostly unchanged, meaning that more H-gas will be available for the Dutch market. Accordingly, the projected transit for 2027 to 2030 is set at two-thirds of the most realistic expectation, both for volume and capacity at the time of peak demand.

(V4) H-gas export to Belgium

Developments

Export of H-gas to Belgium via Zelzate and 's-Gravenvoeren has ceased altogether and it is not expected that this situation will be reversed, given that Belgium is expected to be an important transit country for Germany for years to come. There are two small areas in Belgium (Zandvliet and Obbicht) that can only be supplied via the Netherlands. This is a constant offtake throughout the year, both in terms of volume and capacity.

Scenarios

In the scenario with the most realistic assumptions, we assume the situation as described above; we see no reason to deviate from this in the coming years, not even for an optimistic or pessimistic scenario.

[25] *Netzentwicklungsplan* (NEP) 2022 (German grid development plan for 2022)
[26] https://www.bmwk.de/Redaktion/DE/Publikationen/Studien/20230303-lng-studie.html, pages 46 and 47.

(V5) H-gas export to the UK

Developments

A distinction has been made between capacity and volume. Prior to mid-2022, the net annual volume hovered around zero, partly driven by demand from the two countries. Since the loss of Russian gas, the UK has become a net exporter of gas to the Continent. The UK supplies this gas in the summer and in the relatively warm months before and after, at times when the supply of LNG is more than sufficient to meet UK domestic demand. There are only a limited number of gas storage facilities in the UK that can be called on when the weather turns particularly cold. Accordingly, it is expected that gas will be supplied from the Netherlands to the UK at times of peak demand.

Scenarios

At times of peak demand, it is expected that gas will flow towards the UK. The results of the ENTSOG simulations were used to calculate capacity[27].

Developments in gas supply

(A1) domestic gas production

Developments

Domestic gas production consists of the production from the 'small fields'. This gas is produced both onshore and offshore. As in previous years, the gas from these fields was produced as quickly as possible and with the deployment of maximum resources. The small-field producers state the expected maximum capacities for the future, and these are used in an analysis, based on previous expectations and production, to determine the anticipated volume. Based on the historical data, we can see that production is decreasing by an average of 15 to 20 TWh per year; see the light green bars in Figure 6. The expectation is that the volume will continue to decline at a similar rate over the coming years too; see Figure 6.

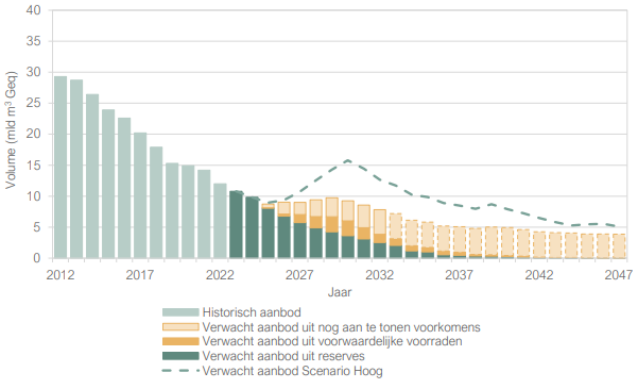

Figure 6: Historical and expected production from the Dutch small fields[28].

[27] ENTSOG Winter Supply Outlook 2023/2024, Including Summer 2024 Overview, published on 16 October 2023

[28] https://www.nlog.nl/sites/default/files/2023-09/annual_review_2022_-_natural_resources_and_geothermal_energy_in_the_netherlands.pdf
Natural resources and geothermal energy in the Netherlands, annual review 2022; page 20

Scenarios
In all three scenarios, an estimate has been made by taking the capacities and volumes stated by the producers and correcting these figures for the difference between the estimates and production in the previous ye. Capacity will decrease in line with volume, levelling off in the coming years. 'Stranded fields', i.e. fields with proven reserves but from which no gas is currently being extracted, are also included in the forecast[29].

(A2) The LNG Peakshaver

Developments
The LNG peak shaving facility ('LNG Peakshaver') comprises two H-gas tanks and a nitrogen tank (which together can produce G-gas) and a recently completed blending station. The current modelling, which takes into account both the H-gas and the G/L-gas balance, takes into account the capacity of the tanks (8.3 GW); however, the tank volume is limited to a maximum of 0.7 TWh (then the tanks are empty).

Scenarios
The LNG Peakshaver is included, using the specifications stated above, in the balance for all three scenarios for the entire period.

(A3) LNG terminals[30]

Developments
The Netherlands has two operational LNG terminals: Gate terminal in the Maasvlakte industrial area (Rotterdam) and EemsEnergyTerminal (EET) at the port of Eemshaven. LNG has been imported via Gate terminal at maximum capacity since mid-2022, as can be seen in Figure 7.

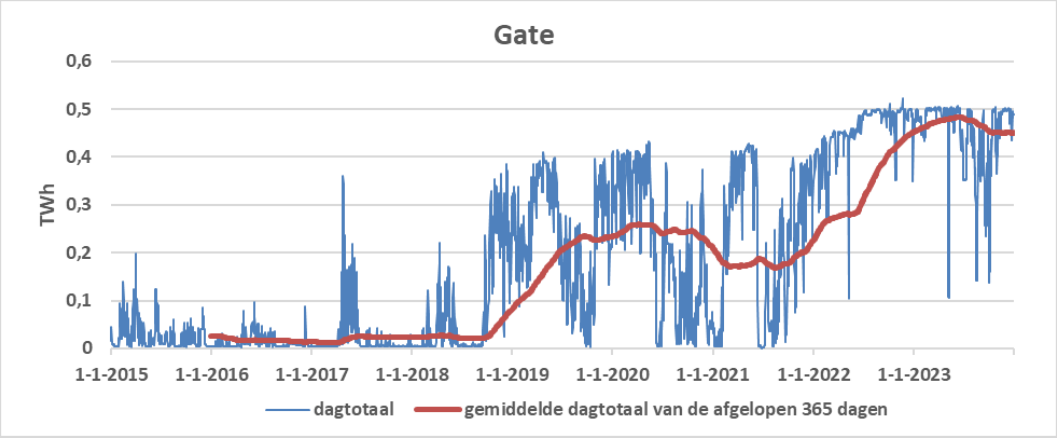

Figure 7: Import via Gate LNG terminal as a function of time [TWh] (source: GTS).

[29] This includes fields for which the licensing process has not yet been completed.
[30] In accordance with the Dutch Gas Act, Article 10(a)(9)(b)(3)

Gate terminal recently decided to install a fourth tank[31]. This new tank will be operational from 1 October 2026 and will add 5.5 GW of additional entry capacity. From then on, the total import volume will increase from the current approx. 160 TWh to around 210 TWh, based on the assumption that the terminal will operate a maximum of +/- 8,000 hours per year (the remaining hours are for maintenance and possible outages).

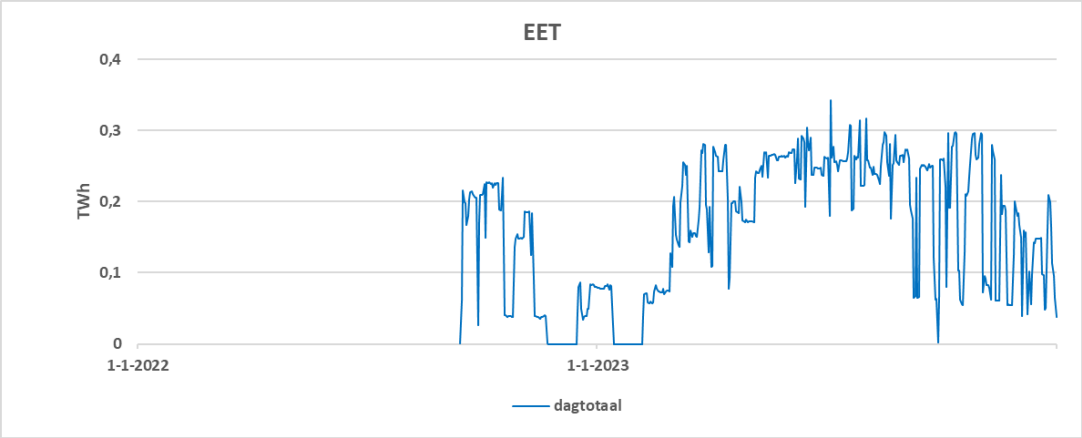

Figure 8: Import via EemsEnergyTerminal (LNG terminal) as a function of time [TWh] (source: GTS)

For the EET, which became operational in September 2022, we observe that the commissioning of this new terminal has been accompanied by some issues. EET depends on the heat of the seawater and that of the adjacent power station to regasify the LNG. A faltering supply of hot water from the power station and the lack of its own source of heat means that EET's transmission capacity was lower in winter than in summer previous year, i.e. there is a correlation between the temperature and EET's supply capacity. These issues have been addressed by installing dedicated heating for the terminal, which became operational in the current gas year. For the estimate, we have therefore assumed that this LNG terminal operates independently from temperature and to its full potential in terms of both capacity and volume. EET is included in the base scenario until 1 October 2027: this is when the current permits expire.

Other LNG initiatives are also being developed, like the Zeeland Energy Terminal (ZET), for example, a joint venture between VTTI and Höegh LNG. The planned terminal, to be located in the Vlissingen port area[32] in the province of Zeeland, would comprise an FSRU and the related infrastructure. The envisioned date of commissioning is 1 October 2027. Another initiative in the pipeline is from Global Energy Storage and Stena. These parties are conducting a feasibility study into the possible realisation of LNG import capacity in Rotterdam and/or offshore[33]. It is not yet clear when the facility/infrastructure will be commissioned; however, it will not be before 1 October 2026.

[31] https://www.gasunie.nl/en/news/gate-terminal-starts-construction-of-4th-lng-tank-at-the-port-of-rotterdam
[32] https://www.vtti.com/decarbonization-infrastructure/zeeland-energy-terminal-zet-netherlands/
[33] https://open.overheid.nl/documenten/oep-4c109100803a5b0330115239f1cee13008a6d293/pdf; page 6

Scenarios

The base scenario with the most realistic assumptions assumes continuation of Gate, including the expansion of the terminal with the fourth tank as of 1 October 2026, and availability of EET up to 1 October 2027. It is expected that the full potential of both terminals will be used, both in terms of volume and capacity. An optimistic scenario is also included, with various possible future LNG initiatives, including one with specifications comparable to those of EET to being commissioned after 1 October 2027. In the pessimistic scenario, we assume a decrease in LNG supply to 70% of the current maximum availability, both in terms of capacity and volume.

(A4) H-gas imports from Norway

Developments

Since mid-2022, Norway has been exporting as much gas as it can to the Netherlands and Germany, i.e. around 600 TWh on an annual basis. Of this, about 80% currently goes to Germany and the rest to the Netherlands. The Norwegians also have the option of transporting their gas to the UK, Belgium, France, Denmark and Poland, with the amounts possibly varying slightly between countries. Since mid-2022, the Netherlands has been receiving less gas from Norway than previously; see Figure 9.

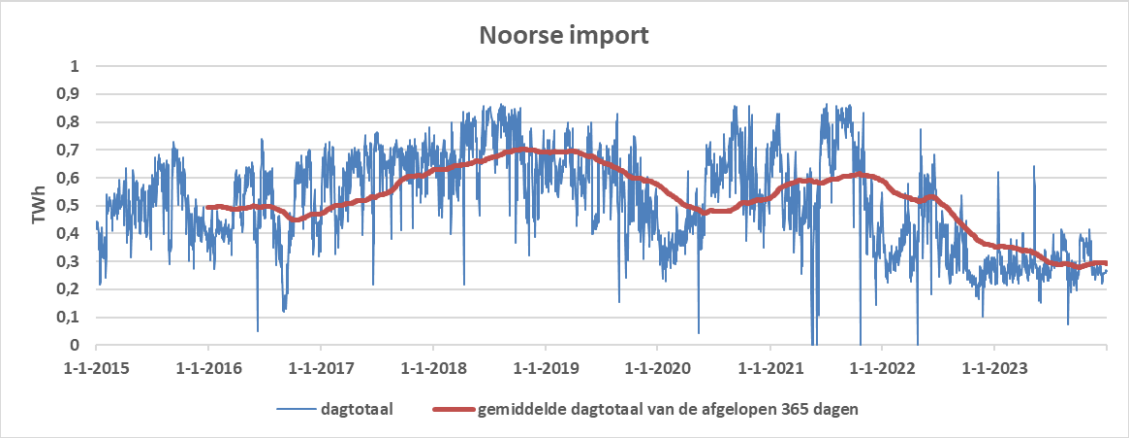

Figure 9: Import from Norway as a function of time [TWh] (source: GTS).

Scenarios

The projection for the supply of H-gas from Norway is in line with the actual flows after the loss of the Russian gas supply to Germany. We assume that production in Norway will continue to be high. We do not expect any change in the current situation in the coming years: our assessment is that a reduction in German demand for H-gas (due to transport costs) will more likely be reflected in lower imports from the Netherlands than lower supply from Norway.

(A5) H-gas imports from the UK

Developments

Import of British gas via the Balgzand Bacton Line (BBL) from the UK to the Netherlands mainly depends on the gas demand in each of these countries. In recent years, we have

seen that the imports to the Netherlands through the BBL can be high, especially in the summer months when gas supply in the UK far outstrips demand and given that there are few British gas storage facilities to store the surplus. If the Continent then needs gas to fill its gas storage facilities, for example, gas will then flow from the UK to the Netherlands. Given the demand-driven nature of supply, lower demand in the Netherlands – if the gas storage facilities are full, for example – can reduce or stop gas imports from the UK. This happened last summer, for example, in contrast to the summer of gas year 2021/22, when the gas storage facilities were not sufficiently filled. This erratic pattern can be seen in Figure 10.

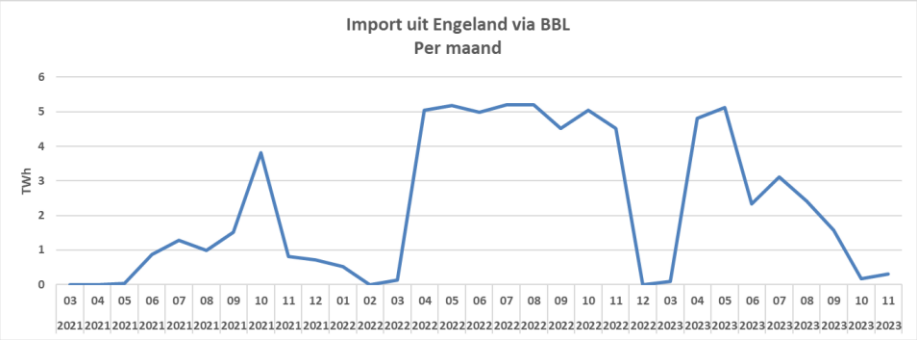

Figure 10: Import from the UK to the Netherlands per month [TWh] (source: GTS).

BBL Company, the operator of the BBL, agreed an 'enhanced pressure service' with National Grid (the TSO of the British gas grid) in the spring of 2022 for a period of one year. The objective is to increase capacity from the UK to the Netherlands from 7 GW to 10 GW, with the result that more volume can be transported to the Netherlands in the summer months. National Gas provides this service on a best-effort basis. The intention is that this service will be provided again in the summer of the current gas year and in subsequent years, but this is not yet certain.

Scenarios
The expectation regarding capacity at times of peak demand is that the UK will have an insufficient supply of LNG to meet its own peak demand and that there will therefore be no capacity available for peak demand in the Netherlands, meaning that gas will flow to the UK. The results of the ENTSOG simulations were used to calculate capacity[34]. To estimate the volumes, we assume maximum imports during the summer months, assuming that the UK has a surplus and north-western Europe needs gas to fill its storage facilities. The same applies to the months immediately before and after the summer, assuming the weather is mild. No change is expected in the coming years.

(A6) H-gas imports from Belgium

Developments
In Belgium, gas arrives over a number of routes: LNG via Zeebrugge in Belgium and Dunkirk in France, Norwegian gas via the Zeepipe pipeline, and gas from the UK via the Interconnector pipeline. Because gas consumption is low in the summer and there are no H-gas storage facilities in Belgium, a large part of this gas supply is sent to Germany or the

[34] ENTSOG Winter Supply Outlook 2023/2024, Including Summer 2024 Overview, published on 16 October 2023

Netherlands. Imports from Belgium have increased since the loss of the Russian gas supply in mid-2022. The amount of gas imported depends on the filling level of the gas storage facilities at the end of the winter: relatively low use of the gas storage facilities over the winter means that less gas needs to be imported from Belgium in the summer.

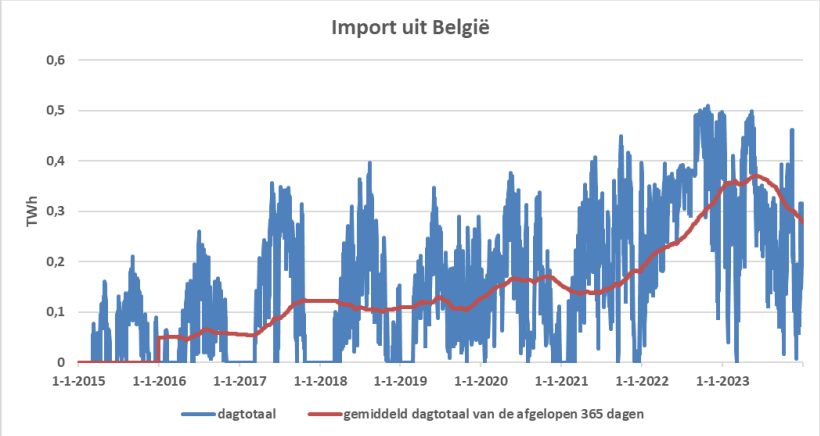

Figure 11: Import from Belgium as a function of time (source: GTS).

Scenarios

The expectation for the 2024/25 gas year is that there will still be a lot of import volume from Belgium, mainly in the summer months but also in the months immediately before and after, assuming the weather is mild. At a time of peak demand, it is expected that there will be sufficient gas in Belgium to meet the Belgian demand and the German demand that can be supplied via Belgium, and that a small portion of the gas imported to Belgium will be available for the Netherlands. For this analysis, for the most realistic scenario the minimum peak demand from the ENTSOG simulations is assumed[35].

(A7) H-gas imports from Germany

Developments

Even though the Netherlands has been a net exporter of gas to Germany on an annual basis since the beginning of 2022, we still receive gas by way of Oude Statenzijl, which returns to Germany via Bocholtz; see Figure 12.

[35] ENTSOG Winter Supply Outlook 2023/2024, Including Summer 2024 Overview, published on 16 October 2023

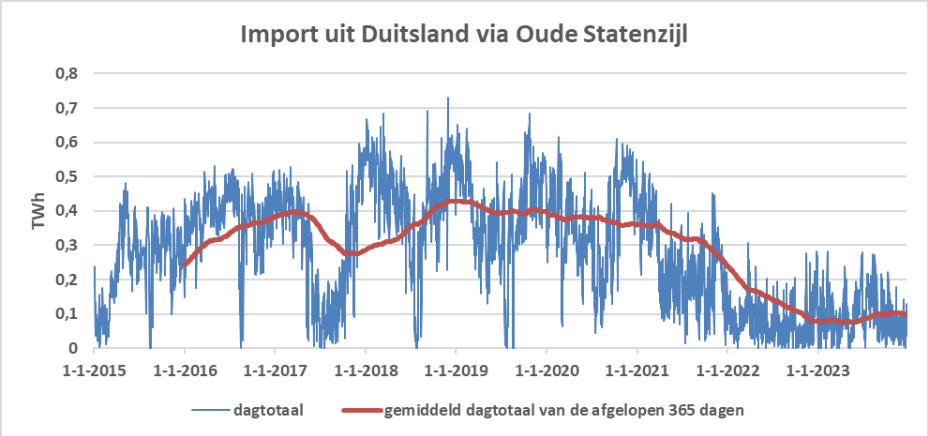

Figure 12: Import from Germany as a function of time (source: GTS).

Scenarios

We take into account an imported volume of 39 TWh per year. However, the expected capacity of this volume, at the time of peak demand, is zero.

(G) Gas storage facilities[36]

In our analyses we assume that all gas storage facilities will be fully filled on 1 October 2024, the start of the gas year. This assumption applies to the start of each gas year in the analysis, i.e. each gas year starts with storage facilities filled to full capacity. During the winter period, the gas stores are used as a last resort to ensure supply and demand are in balance on an hourly basis. With this methodology, more gas is never withdrawn from the gas storage facilities than is needed to ensure security of supply. During the summer, the available supply is initially used to meet the gas demand of end consumers and border points and then, only if there is any left, it can be stored. In principle, the intention is to use the gas storage facilities in a volume-neutral manner every gas year, i.e. to fill them year after year. However, the possibility of doing so depends on the gas demand in the winter (in a cold winter a lot of volume is withdrawn from the gas stores to facilitate security of supply) and how much supply there is in the summer to refill the gas storage facilities. Table 1 below shows gas storage facilities with a connection to our network.

Network Point Description	Situated in	Connected with NL or NL & DE	Type of gas
Alkmaar (Taqa - PGI)	NL	NL	L-gas
Bergermeer (Taqa-UGS)	NL	NL	H-gas
Enschede (Eneco-UGS Epe)	DE	NL	L-gas
Enschede (Nuon-UGS Epe)	DE	NL&DE[37]	L-gas
Enschede (RWE-UGS Epe)	DE	NL	L-gas
Grijpskerk (NAM - UGS)	NL	NL	L-gas
Norg (NAM - UGS)	NL	NL	L-gas

[36] In accordance with the Dutch Gas Act, Article 10(a)(9)(b)(3)

[37] The gas in this L-gas cavern is also available (to a limited extent) to the German market; see https://group.vattenfall.com/what-we-do/market-transparency/gas-storage

Oude Statenzijl (ASTORA JEMGUM)	DE	NL&DE	H-gas
Oude Statenzijl (ETZEL-CRYSTAL-H)	DE	NL&DE	H-gas
Oude Statenzijl (Gascade-H)	DE	NL&DE	H-gas
Oude Statenzijl (ETZEL-FREYA-H)	DE	NL&DE	H-gas
Oude Statenzijl (EWE JEMGUM)	DE	NL&DE	H-gas
Oude Statenzijl (EWE-H)	DE	NL&DE	H-gas
Oude Statenzijl RENATO (EWE SSO)	DE	NL	H-gas
Zuidwending (UGS)	NL	NL	L-gas

Table 1: L-gas and H-gas storage facilities and caverns connected to the Dutch network (among other things) (source: GTS). The Enschede cavern (Epe RWE-L) is not mentioned in the table because this cavern is only filled with Dutch gas and, additionally, the gas supplied to the cavern is seen as a diversion of the regular L-gas export to Germany.

In the capacity analysis, for facilities that are exclusively connected to our network the full capacity of gas storage has been included. For the other facilities, a choice has been made concerning the expected use based on analysis or sources. This may mean that the capacity analysis does not include all the available production capacity of these gas storage facilities, given that it is expected that not all production capacity will be available to meet the Dutch peak demand. Now that the Groningen field is no longer being used to produce gas, all L-gas storage facilities are filled with pseudo G-gas (H-gas mixed with nitrogen).

(GO1) Dutch seasonal gas storage facilities[36]

Table 2 shows the specifications of the seasonal gas storage facilities that are exclusively connected to the Dutch network. The seasonal gas storage facilities have a relatively large working volume and follow a seasonal pattern: gas is injected in the summer and withdrawn in the winter. In the Netherlands, we have three G-gas seasonal gas storage facilities (Norg, Alkmaar and Grijpskerk) and one H-gas storage (Bergermeer).

Gas storage facility	**Maximum production capacity [GW]**	**Working gas volume on 1 October 2024 [TWh]**	**Maximum injection capacity [GW]**
Norg	33.4	59.3	18.7
Alkmaar	15.0	5.0	1.7
Grijpskerk	25.8	12[38]	6.4
Bergermeer	21.7	48.2	17.9

Table 2: Specifications of the seasonal gas storage facilities exclusively connected to the Dutch network[39].

For the analysis, it has been assumed that the seasonal gas storage facilities shown above will remain available with the specified capacities and that they will continue to operate according to a seasonal pattern in the coming years.

(GO2) L-gas caverns

Table 3 shows the specifications of the L-gas caverns that are connected exclusively to the Dutch network. These caverns show a different behaviour compared to the seasonal gas storage facilities: on the one hand, they can switch between injection and withdrawal

[38] The working volume shown here is the L-gas working volume; this deviates from the data in the dataset on https://agsi.gie.eu/, as stated in the *Stand van zaken conversie Grijpskerk* (State of affairs concerning the Grijpskerk conversion) document dated 23 November 2022, attachment to the document with your reference PDGGODSGG / 22567440

[39] https://agsi.gie.eu/

throughout the year, making them more flexible; on the other hand, the storage volume of these facilities is much more limited.

Cavern	Maximum production capacity [GW] [GW]	Working gas in storage on 1 October 2024 [TWh]	Maximum injection capacity [GW]
Epe RWE Gasspeicher	4.1	2.6	2.7
Epe Eneco Gasspeicher	3.9	1.4	2.0
Epe Nuon Gasspeicher	5.9	2.8	3.5
UGS EnergyStock	18.0	3.6	12.9

Table 3: specifications of the L-gas caverns exclusively connected to the Dutch network[40].

Scenarios

The most realistic scenario assumes the availability of all L-gas caverns shown in Table 3.

(GO3) German H-gas caverns

There are six H-gas caverns along the German border that can serve both the Netherlands and Germany and one cavern that is exclusively connected to the GTS network. These gas storage facilities have a high production capacity, but due to technical/physical limitations of the transmission network, only a small portion of this is available for the German market. The rest is, in principle, available for the Dutch market[41], and this has also in practice been the case historically: there was always capacity available for the Dutch market. The capacity available to meet the Dutch peak demand is based on the peak-demand simulations in the ENTSOG Winter Supply Outlook[42].

Summary of the different scenarios

The market developments and the choice of what we believe are the most realistic assumptions are explained above. Two variants compared to the most realistic scenario have been defined: an 'optimistic scenario' and a 'pessimistic scenario'. Both scenarios have been composed by varying a large number of input parameters between a realistic high and low value. The parameters that gave the largest deviation in the result were used to determine the optimistic and pessimistic scenario. The optimistic scenario is defined by a drop in German exports to two-thirds of the current amount, for both volume and capacity, from 2026/27. The pessimistic scenario is defined by a decline in LNG imports to 70% of the current forecast for the Dutch supply, for both volume and capacity, which would mean that Gate and EET would be operating at 70% of their maximum potential, also taking into account Gate's expansion in 2026/27 and the loss of EET in 2027/28.

[40] https://agsi.gie.eu/

[41] In the previous forecast, we were not aware of the technical/physical limitations of the transmission network, so the analysis assumed the unavailability of these German H-gas caverns. This new knowledge has, however, been taken into account in our updated advice provided in the document 'Analysis of the current gas market situation and security of supply for the next gas year', dated 26 May 2023, our reference L 23.0289

[42] ENTSOG Winter Supply Outlook 2023/2024, Including Summer 2024 Overview, published on 16 October 2023

Appendix 2: Results

In this appendix, we present the results of our analyses.

Capacity analysis

In previous advisory documents, GTS used the infrastructure standard[43] to determine the required capacity for security of supply. This standard prescribes how what is referred to as the 'N–1 formula' is calculated. This formula is used to determine the technical capacity of the gas infrastructure required to meet the total gas demand in the calculated area in the event of a disruption of the single largest gas infrastructure on a day with an exceptionally high gas demand, occurring with a statistical probability of once every 20 years. This takes into account, among other factors, the expected degree of utilisation of the existing infrastructure[44].

In the previous estimate, for the 'exceptionally high gas demand, occurring with a statistical probability of once every 20 years', the gas demand at a mean effective 24-hour temperature[45] of -15.5°C[46] was applied. That temperature was based on a study by the Royal Netherlands Meteorological Institute (KNMI) from 2011. GTS carried out an analysis in 2018[47] and came to the conclusion that an adjustment to this temperature was not required at that time. However, at the end of last year GTS asked KNMI to repeat the 2011 study in light of climate change[48]. By looking at the trend of rising minimum temperatures in winter, KNMI concluded that, looking back over the past thirty years, the mean effective 24-hour temperature of the coldest day occurring with a statistical probability of once every 20 years is -14°C. Accordingly, this was the temperature we used in our analysis.

Taking into account all planning assumptions described above, we arrive at the following result:

[43] In accordance with Article 5 of Regulation (EU) 2017/1938
[44] In accordance with Article 5(1) of Regulation (EU) 2017/1938
[45] For the definition of 'mean effective 24-hour temperature', see section 1(c) of the Implementation Regulation to the Dutch Gas Act.
[46] Internal study, Royal Netherlands Meteorological Institute (KNMI); 2011
[47] This study was carried out at the time when GTS had the statutory duty to report on the minimum required Groningen capacities and volumes for security of supply
[48] Internal study, Royal Netherlands Meteorological Institute (KNMI); 2023

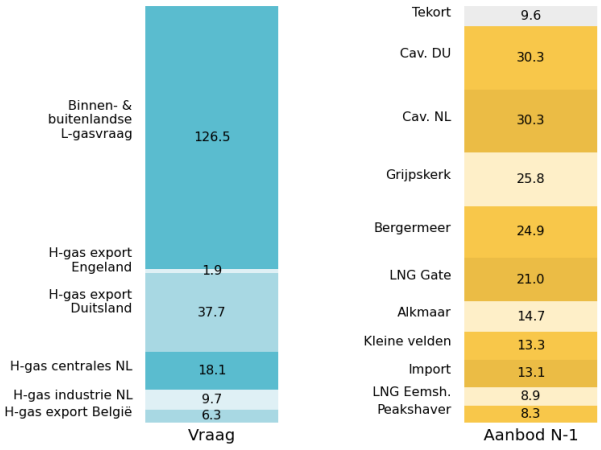

Figure 13: Expected balance of high and low-calorific resources at a mean effective 24-hour temperature of -14°C (in GW, by segment). The left bar shows the demand segments, the bar on the right shows the supply segments (numbers in both figures in GW). In line with the infrastructure standard, the Norg gas storage facility (the single largest gas infrastructure) is not included.

Figure 13 shows (to scale) the various demand-side and supply-side capacities. The left bar shows the total of all H-gas and L-gas demand, while the right bar shows the expected available production capacity for both H-gas and G-gas resources at the time of peak demand. In line with the infrastructure standard, this takes into account the failure of the single largest gas infrastructure, i.e. the Norg gas storage facility.
This figure shows that a capacity shortage would arise in a situation with exceptionally high demand, even if all other resources were to be available. It can be seen in Figure 14 that, in the scenario in which realistic assumptions are applied, we expect that there will still be a (small) capacity shortage of approximately 1 GW in the gas year 2025/26.

The capacity shortage has decreased compared to the previous estimate[49]. This has to do with the lower gas demand (partly due to more energy-saving measures being taken in response to high gas prices), as well as with the conversion programmes in surrounding countries. Furthermore, there is the expected contribution of the German H-gas caverns at the time of peak demand and the new KNMI determination of the temperature related to a day of exceptionally high gas demand, occurring with a statistical probability of once every 20 years, which they adjusted from -15.5˚C to -14˚C.

[49] Recommendations regarding required Groningen capacities and volumes for security of supply for the 2023/2024 gas year, dated 31 January 2023, our ref. L 23.0046

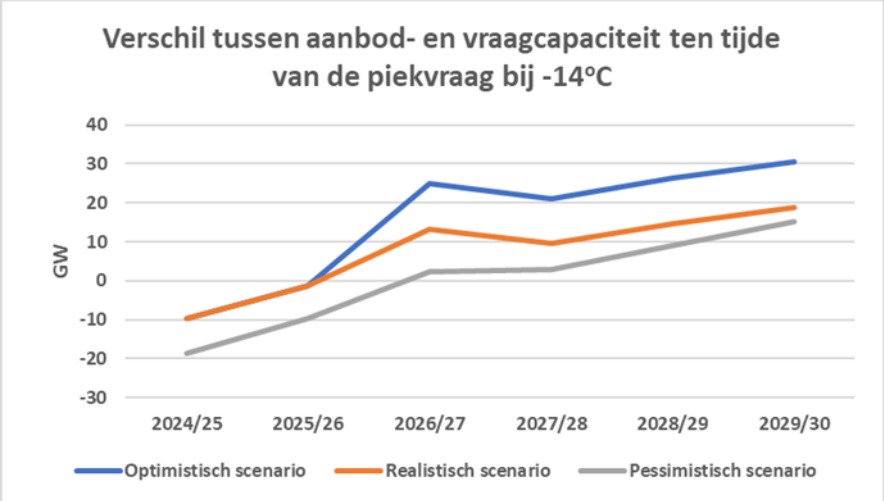

Figure 14: Expected difference between supply and demand capacity for the coming years, assuming -14°C and unavailability of Norg (N-1). The negative numbers indicate a shortfall, the positive numbers a surplus. The orange line represents GTS' realistic scenario. The grey line indicates the pessimistic scenario, which assumes 70% of the current Dutch LNG capacity being available, taking into account the expansion of Gate in 2026/27 and the loss of EET in 2027/28. The blue line represents the optimistic scenario, which assumes a decline in German exports to 2/3 of the current volume and the same capacity as in the most realistic scenario.

The analysis thus shows an expected capacity shortage for all three scenarios in the 2024/25 and 2025/26 gas years. This can be resolved in various ways, i.e. by creating more capacity supply, or by reducing peak demand, or by a combination of the two.

The capacity shortfall can be bridged with part of the currently operational Groningen field production sites. If the Groningen field were to be closed permanently on 1 October 2024, as set out in the draft law on ending Groningen field gas production[50], the Groningen field production sites could no longer serve as a bridging resource for the capacity balance.

It is expected that no projects with a positive impact on the capacity supply, such as LNG projects or developments of small fields, will be completed in the Netherlands for gas years 2024/25 and 2025/26. Furthermore, increasing the import of pipeline gas based on the currently available pipeline capacity under cold conditions is not plausible. Demand can be reduced based on market forces or further agreements with neighbouring countries. If this does not lead to the desired reduction in demand, the only remedy left would be to bring the Gas Protection and Recovery Plan into action. This plan sets out the measures available to the Ministry of Economic Affairs and Climate Policy during a gas emergency or crisis. The highest-level measure on the 'ladder of measures' set out in this plan is to cut off supply to (certain) protected customers, and though this measure could help tremendously given that households represent a large share in the gas demand, this would clearly be undesirable.

50 https://www.tweedekamer.nl/kamerstukken/wetsvoorstellen/detail?cfg=wetsvoorsteldetails&qry=wetsvoorstel%3A36441

Volume analysis

Unlike with peak demand, the supply and demand balance with regard to volume is not drawn up for a specific moment, but for an entire gas year. Given that at least part of the demand depends on the temperature, we have calculated the temperature profiles of the past thirty years. The temperatures of the 1995/96 gas year are used for a cold temperature profile, 2004/05 for an average temperature profile and 2006/07 for a warm temperature profile[51].

These temperature-related demand profiles are then filled with both L and H-gas resources. The assumption here is that the total demand, i.e. the L-gas and H-gas demand combined, is always supplied. The effect of this is that the H-gas supply is first used to meet the H-gas market demand. This is in line with the definition of security of supply set out in the explanatory memorandum on the act aiming to minimise gas extraction from the Groningen field[52], which states that this is the situation where end users of gas are supplied with gas of the right quality (low or high calorific) at the right time and in the required amount, even when demand is high[53]. The remaining supply of H-gas is then made available to make pseudo G-gas.
When determining the required volume, we have assumed maximum use of (where possible) enrichment, i.e. blending gas with a higher calorific value (energy content/heat value) with gas with a lower calorific value[54], and we have assumed a maximum annual average nitrogen use of 100%[55], the latter in line with the Decrees of the Dutch government over the past five years [56][57][58][59][60]. At the moment we do not see any prospects for permanently increasing the use of the nitrogen plants on an annual basis to more than 100%.

Total projected L-gas market demand for the 2024/2025 gas year
The total L-gas market demand that needs to be supplied from the Netherlands is the domestic market demand and exports combined. As stated in the summary of the planning assumptions, we base the estimate of the domestic market on the 2022 C&EO. The projected gas demand for the regional TSOs has been reduced by 10%. The estimate for the foreign market is based on the data provided by the task force referred to in Appendix 1. Using our models, the total projected L-gas market demand that will need to be supplied from the Netherlands in the 2024/25 gas year has been calculated for the temperature profiles of the past thirty gas years[61]. For this we used a 'degree-day comparison', i.e. the forecast L-gas market demand as a function of the number of degree days in the temperature profile.

[51] In accordance with the description in the Implementation Regulations of the Gas Act, Article 3a(4)
[52] Act of 17 October 2018 amending the Gas Act and the Mining Act to minimise gas extraction from the Groningen field
[53] Explanatory memorandum on the bill seeking to amend the Gas Act and the Mining Act to minimise gas extraction from the Groningen field, section 2.1
[54] In accordance with the Dutch Gas Act, Article 10(a)(9)(b)(2)
[55] In accordance with the Dutch Gas Act, Article 10(a)(9)(b)(1)
[56] *Definitief vaststellingsbesluit Groningen gasveld* 2019-2020 (Decree on the Groningen gas field 2019/2020), reference DGKE-PGG/ 19190924, dated 10 September 2019, Annex to Parliamentary Document 3529, number 803
[57] *Definitief vaststellingsbesluit Groningen gasveld* 2020-2021 (Decree on the Groningen gas field 2020/2021, dated 21 September 2020, your ref. DGKE-PGG / 20086572
[58] *Vaststellingsbesluit Groningen gasveld* 2021-2022 (Decree on the Groningen gas field 2021/2022), dated 24 September 2021, your ref. DGKE-PDG / 2120765
[59] *Vaststellingsbesluit Groningen gasveld* 2022-2023 (Decree on the Groningen gas field 2022/2023), dated 26 September 2022, your ref. PDGGO-DSGG / 22368536
[60] *Vaststellingsbesluit Groningen gasveld* 2023-2024 (Decree on the Groningen gas field 2023/2024), dated 22 September 2023, your ref. PDGGO / 26885468
[61] In accordance with the description in the Implementation Regulations of the Gas Act, Article 3a(2)

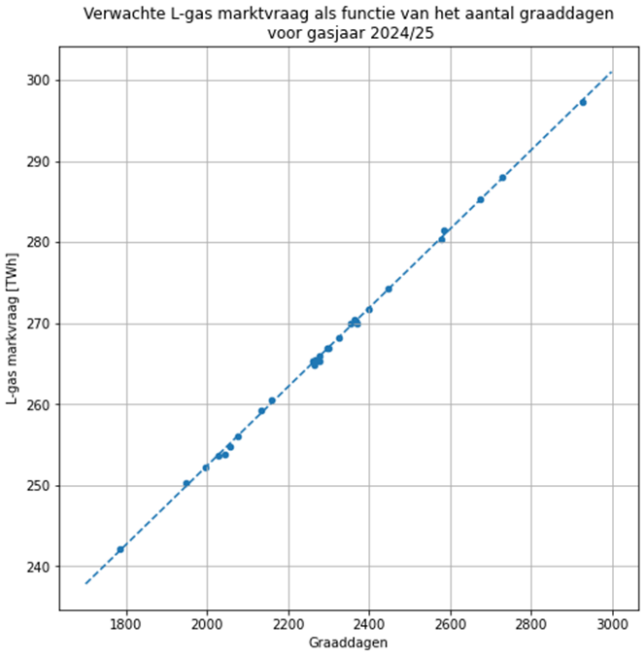

Figure 15: L-gas demand in 2023/2024 gas year that will need to be supplied from the Netherlands based on the temperature profiles of the last thirty gas years. The figures are based on the 2022 C&EO forecast, assuming a reduction of 10% in the gas demand of the regional TSOs, as well as on the task force figures.

The degree day comparison of the total L-gas market demand for the 2024/2025 gas year supplied by the Netherlands is described as follows:

Market demand [TWh] = 155.1 + 0.049 * dd

where 'dd' represents the number of degree days[62]. This calculation of the projected L-gas market does not include gas storage facilities: while these facilities meet part of the L-gas demand in the winter, they increase the L-gas demand in the summer because they need to be filled again.

Required volume to guarantee security of supply for the 2024/25 gas year

From the projection for the 2024/25 gas year based on the thirty temperature profiles, we see that in the realistic scenario, if the 2024/25 gas year follows a warm or average temperature profile, sufficient volume will remain in the gas storage facilities in the winter to close off the gas year with a fill level of at least 90%[63].

If the winter of the 2024/25 gas year follows a cold temperature profile, the gas stores will be so depleted by April 2025 that without additional measures there will be insufficient supply to refill the seasonal storage facilities in the summer to the targeted 90% for 2025. We expect that the storage facilities can be filled to approximately half capacity during the filling season months, meaning the Netherlands will start the following gas year with half-

[62] In accordance with the description in the Implementation Regulations of the Gas Act, Article 3a(2)(a)
[63] We base our calculations on the working volume of seasonal gas storage facilities in Norg, Grijpskerk, Alkmaar and Bergermeer, which totals 133.2 TWh.

filled gas storage facilities, which is visualised in Figure 16. This is in line with the conclusion from ENTSOG's Winter Supply Outlook[64].

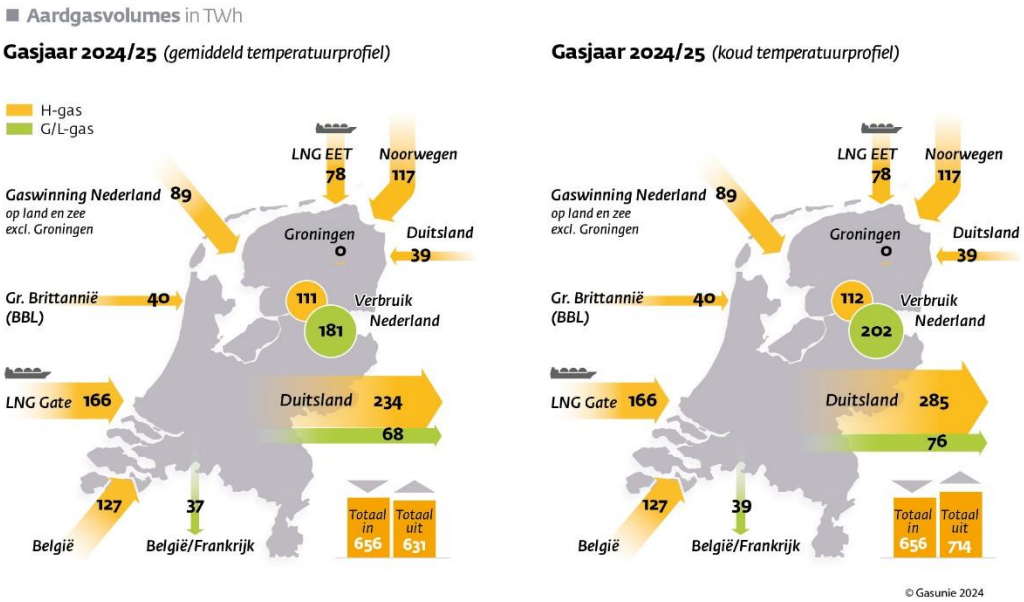

Figure 16: Volumes in a realistic scenario for the 2024/2025 gas year assuming this follows an average temperature profile (left) and a cold temperature profile (right).

The realistic scenario is visualised in the figure above. In the case of the optimistic scenario, which assumes a decline in exports to Germany by 2026/27, this volume shortfall will have been reduced to zero as of the same date. In the pessimistic scenario, which assumes a lower supply of LNG, we see that the volume shortfall is much greater. Not only will we see a shortfall in the winter as the gas storage facilities empty relatively quickly, there will also be insufficient gas to fill them again in the summer.

The risk that needs to be mitigated by measures is an possible volume shortage during the summer of 2025; though this is not an acute problem, it is a potential vulnerability that would gradually materialise over the winter. Given the extent of the volume shortfall (up to 60 TWh under what we consider a realistic scenario), demand reduction in the summer would not appear to be an adequate solution. Given that households use little gas in the summer, there is little room for savings on this demand. In the case of a high shortfall, reducing demand in industry would mean the entire industrial sector being without gas for months.

The eventual solution is extra LNG (in terms of both volume and capacity); however, as mentioned earlier, that extra LNG will only become available on the global market on a larger scale from 2026/27. To this end, sufficient additional import capacity for LNG through the existing terminals (Gate and EET) or another new terminal will need to be arranged. Without additional LNG import capacity, the summer filling problem may arise after the coming two gas years too.

[64] ENTSOG Winter Supply Outlook 2023/2024, Including Summer 2024 Overview, published on 16 October 2023

Required volume to guarantee security of supply for the coming gas years

Based on the current assumptions, we still foresee the possibility of gas supply shortages in the mid-long term, but also an increase in LNG import capacity and volume, and a steady decline in gas demand. The reduction in demand for low-calorific gas will continue, in line with expectations. This can be seen in Figure 17, which shows the anticipated development of the total low-calorific market from the 2024/25 to the 2029/30 gas year[65]. These figures are based on the 2022 C&EO and data from the task force. It should be noted that the loss of L-gas exports does not mean that gas demand abroad will disappear, given that that gas demand will be met with H-gas. In the case of Germany, this in fact means that they will be faced with higher H-gas demand in the coming years, which will have to be met through additional LNG.

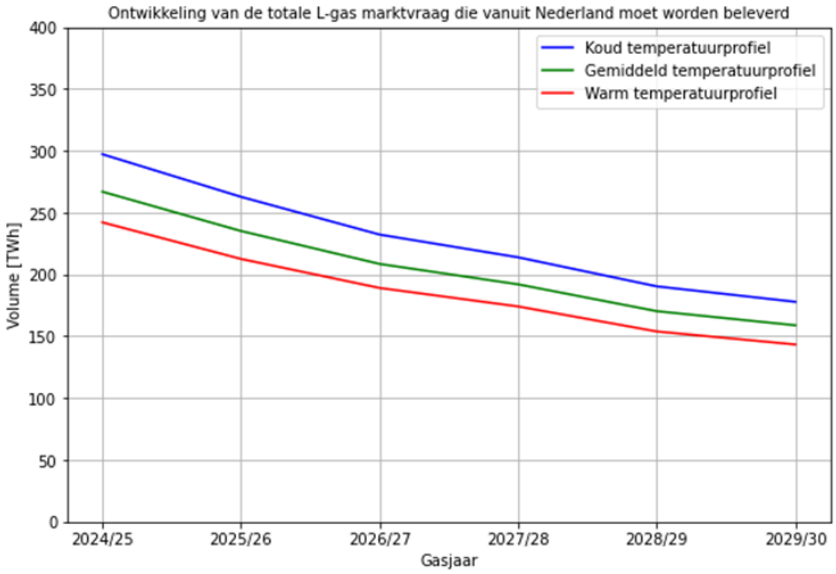

Figure 17: Development of the total L-gas demand that the Netherlands will need to meet, based on a cold temperature profile, an average temperature profile, and a warm temperature profile. The figures are based on the 2022 C&EO forecast, assuming a reduction of 10% in the gas demand of the regional TSOs, as well as on the task force figures.

The total L-gas market demand has been on the decline over the years. The total L-gas demand can be divided into three categories: Dutch end consumers with a connection smaller than 391 kW, Dutch end consumers with a connection larger than 391 kW, and demand from abroad (export). In Figure 18, this breakdown was made for an average temperature profile for the same period[66].

[65] In accordance with the Dutch Gas Act, Article 10(a)(1)(q)(2)
[66] In accordance with the Dutch Gas Act, Article 10(a)(9)(c)

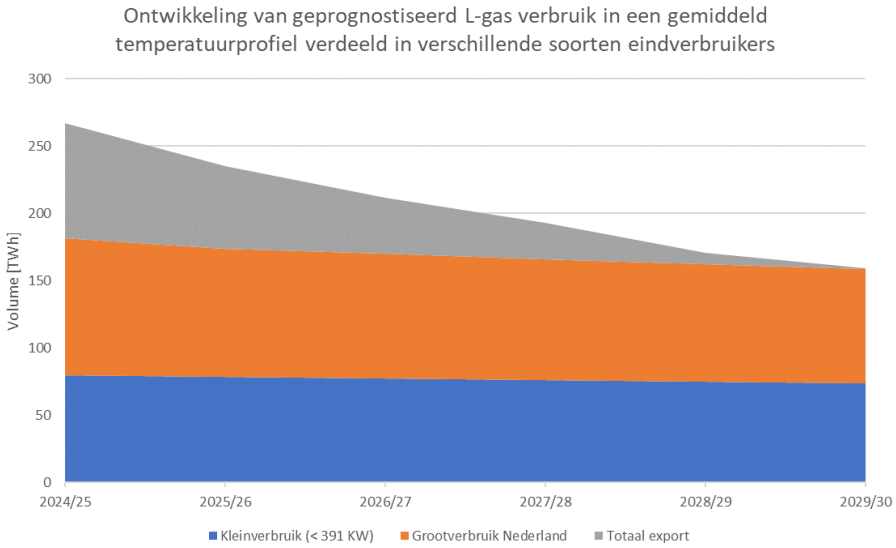

Figure 18: Development of gas demand for an average temperature profile, shown by end consumer type, i.e. small consumers, large consumers and exports. The figures are based on the 2022 C&EO forecast, assuming a reduction of 10% in the gas demand of the regional TSOs, as well as on the task force figures.

The forecast gas demand in the 2024/25 gas year for Dutch users who consume less gas than 391 kW is 80 TWh. The gas demand in an average year for Dutch users who consume more than 391 kW is 102 TWh, and for exports the gas demand is 85 TWh.