Evaluation Report on the Gas Quality Conversion Mechanism

TRADING HUB EUROPE

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List of abbreviations

BK7	Ruling Chamber 7
BNetzA	Federal Network Agency
DZK	capacity subject to dynamic transport route restrictions" ("dynamisch zuordenbare Kapazitäten")
FZK	capacity not subject to any transport route restrictions" ("frei zuordenbare Kapazitäten")
MAM	market area manager
NCG	NetConnect Germany GmbH & Co. KG
OGE	Open Grid Europe GmbH
MBG	master balancing group
RLM	end customer with recorded demand measurement
SLP	standard load profile end customer
TG	Thyssengas GmbH
THE	Trading Hub Europe GmbH

Definitions

Virtual Conversion

The term Virtual Conversion refers to the quantity converted and invoiced for each balancing group portfolio under the cross-quality energy balancing mechanism, i.e., where the high CV and low CV gas balances determined for a master balancing group (MBG) have opposing signs, the lower of the two quantities (as measured in terms of their absolute values) is billed as the conversion quantity. Where low CV gas deficits are balanced out by means of high CV gas inputs, this is referred to as Virtual Conversion taking place in the direction from high CV to low CV quality (H to L). The opposite direction is defined as Virtual Conversion from low CV to high CV quality (L to H). The term Virtual Conversion may be used both for each (M)BG and for the aggregate Virtual Conversion quantity calculated as the sum of the Virtual Conversion quantities determined for all individual balancing groups.

System-wide Virtual Conversion Quantity

One of the alternative approaches for determining the actual overall conversion quantity: The System-wide Virtual Conversion Quantity is calculated by summing all inputs and offtakes across all balancing group portfolios registered in the market area for which both high CV and low CV gas allocations are recorded, with these sums being calculated separately for each gas quality. If the resulting high CV and low CV gas balances are in opposite directions (different algebraic signs), then the lower of the two quantities (as measured in terms of their absolute values) represents the System-wide Virtual Conversion Quantity.

In this calculation all balancing group portfolios comprising at least one subordinate balancing group (SBG) for gas of a quality different from the gas quality of the relevant MBG are taken into account. Both the MBG and SBG must be actively used, i.e. both must have been allocated as receiving data for energy balancing purposes.

Commercial Conversion

In order to apply a commercial value to the System-wide Virtual Conversion Quantity the relevant figure is compared with the quantities of gas that were supplied/received as part of the market-based ("external") balancing actions taken on the day in question. For this purpose, it is assumed that quality-specific balancing sell transactions in the gas quality for which there is an oversupply and the quality-specific or locational balancing buy transactions in the quality for which there is an undersupply have been made for the purpose of Commercial Conversion, with the upper limit being represented by the System-wide Virtual Conversion Quantity.

Physical Conversion Quantity

One of the alternative approaches for determining the Actual Overall Conversion Quantity: Where balancing actions have been taken in opposite directions, i.e. where quality-specific (balancing criterion "Quality") or locational balancing buy transactions have been made in one gas quality whilst quality-specific or locational balancing sell transactions have been made in the other gas quality, the lower of the two quantities (as measured in terms of their absolute values) represents the actual overall conversion quantity.

Actual Overall Conversion Quantity

Umbrella term for the quantity determined according to either the "system-wide virtual" approach (System-wide Virtual Conversion Quantity) or the "physical" approach (Physical Conversion Quantity).

Technical Conversion

Refers to the process of converting gas quality by means of technical measures, with a distinction being made between Technical Conversion measures that are already included in the relevant network operators' transportation tariffs and other Technical Conversion measures which are only available to the MAM at extra costs (for example Technical Conversion via Third-party Conversion Facilities or Gas Imports and Exports Carried out for Conversion Purposes). An example of a Technical Conversion measure already included in network operators' transportation tariffs is the conversion of gas in technical blending plants operated by the gas transmission system operators (TSOs), provided that their use is fully included in the respective transportation tariffs.

Gas Imports and Exports Carried Out for Conversion Purposes

Sub-set of a Technical Conversion measure; In this case, capacities for gas of different qualities are booked at two cross-border interconnection points with the Netherlands, and gas of one quality is shipped into the Dutch network while gas of the other quality is shipped back out form the Netherlands.

1 Introduction

As the operator of a multi-quality market area, Trading Hub Europe GmbH is subject to the rules of the gas quality conversion mechanism resulting from a decision dated 28 March 2012 (ref. BK7-11-002, hereinafter "Konni Gas"), which was amended by decision of 21 December 2016 (ref. BK7-16-050, hereinafter "amended Konni Gas ruling").

For the respective balancing group managers, a multi-quality market area essentially means that inputs and offtakes of different gas qualities can be carried out in a balancing group portfolio and thus have to be balanced across qualities. Physically, however, even in a multi-quality market area, the separate high CV gas and low CV gas network areas must continue to be operated separately with the respective gas quality.

THE has an obligation under the original as well as the amended Konni Gas rulings to submit an annual report on the development and evaluation of the conversion mechanism by 1 February of each year. The evaluation report provides a review of the completed gas years, with THE acting as the successor to the two market area managers GASPOOL Balancing Services GmbH and NetConnect Germany GmbH & Co. KG. This evaluation report therefore describes the conversion developments in the two old GASPOOL and NCG market areas and sets out the reasons why we believe that a conversion fee is still necessary for the conversion of gas from high CV to low CV quality (H to L).

The period considered in this report covers all full-year conversion periods in accordance with the amended Konni Gas ruling, starting on 1 October 2017. It mainly allows for the H-to-L conversion fee to be retained permanently, and no conversion fee is applied any longer for the conversion of gas from low CV to high CV quality (L to H). The conversion fee is determined using an incentive-based approach. On the one hand, the market must be given sufficient incentive to take advantage of the virtual conversion option in the multi-quality market area. On the other hand, it is important to avoid a situation where the market area manager (MAM) becomes the main buyer of low CV gas in the course of its balancing activities as a result of the commercial conversion measures it has to take.

This report is structured as described below:

In Chapter 2 we examine the development of the virtual and technical as well as the actual overall conversion quantities in our market area. Chapter 3 describes the developments identified above using the indicators introduced to determine the incentive-based conversion fee. Chapter 4 outlines the commercial aspects of the conversion mechanism, i.e., the aspects related to the development of the relevant costs and revenues including the current position of our conversion neutrality account, with particular reference to the liquidity buffer. In Chapter 5 we provide an analysis of the reasons why we believe that it is necessary to retain the conversion fee. Chapter 6 provides an outlook on the development of the conversion system in the single German market area for the current gas year.

2 Review and evaluation of physical and technical developments

2.1 Development of virtual conversion quantities

Market participants' use of the virtual conversion mechanism has varied greatly since the introduction of the multi-quality market areas on 1 April 2011 (for further information, please refer to the evaluation reports of the previous market area managers GASPOOL Balancing Services and NetConnect Germany).

As part of the amendment to the Konni Gas ruling, the previous conversion fee was abolished for the direction from low CV gas to high CV gas (i.e., the supply of high CV gas to low CV gas exit points); this fee is now charged only in the direction from high CV gas to low CV gas (the supply of low CV gas to high CV gas exit points). With the conversion fee for the direction from low CV gas to high CV gas down to zero, this direction clearly predominated when aggregated across both market areas in the gas years up to and including GY 2019/20. Virtual conversion in the direction from high CV gas to low CV gas essentially took place in the winter months and was comparatively moderate. In GY 2020/21, the net conversion direction was reversed for the first time, so that the direction from high CV gas to low CV gas predominated. Table 1 shows the conversion fees per market area for each gas year and the calculated net conversion volumes for the single German market area.

Figure 1 provides an overview of the virtual conversion quantities for the two old market areas, with the dark colours representing the quantities in the direction from high CV gas to low CV gas and the light colours representing the opposite direction from low CV gas to high CV gas.

Quantity analysis in the direction from high CV gas to low CV gas

After the steady decline in virtual conversion quantities in the direction from high CV gas to low CV gas since the introduction of the amended Konni Gas ruling (aggregated over both market areas from 22 TWh to 15 TWh to 12 TWh (GY 17/18, 18/19, 19/20)), the last gas year showed a significant increase in the two old market areas to more than 41 TWh overall. In the NCG market area, this increase was essentially limited to the winter months of December 2020 to February 2021 while in the GASPOOL market area, this trend was observed throughout the year with the exception of the summer months of June to August 2021. For the GASPOOL market area, the quantity of 15 TWh represents the highest annual quantity since the introduction of the conversion system, while in the NCG market area, the quantity of 26 TWh is second only to the annual quantity of 30 TWh in gas year 2015/16 (even though this was recorded over a significantly shorter period: three months in GY 2020/21 compared to over five months in 2016).

Conversion period	Conversion fee H→L	Net virtual conversion quantity	Direction of conversion (net)
1.10.2017 - 30.09.2018	GASPOOL: 0.45 EUR/MWh NCG: 0.45 EUR/MWh	10,037 GWh	L → H
1.10.2018 - 30.09.2019	GASPOOL: 0.45 EUR/MWh NCG: 0.45 EUR/MWh	37,055 GWh	L → H
1.10.2019 - 30.09.2020	GASPOOL: 0,42 EUR/MWh NCG: 0.45 EUR/MWh	28,841 GWh	L → H
1.10.2020 - 30.09.2021	GASPOOL: 0.39 EUR/MWh NCG: 0.45 EUR/MWh	24,176 GWh	H → L

Table 1: Net virtual conversion quantities

Quantity analysis in the direction from low to high CV gas

While the virtual conversion quantities in the direction from low CV gas to high CV gas were regularly at a very high level of 30 TWh to over 50 TWh throughout Germany in the gas years after the abolition of the conversion fee, they fell to 17 TWh in the last gas year (2020/21). The drop is primarily due to the change in quantities in the NCG market area, as the virtual conversion quantities in the GASPOOL market area remained relatively constant at 5 TWh (GY 18/19) to 7 TWh (GY 2019/20 and 20/21) in all four years under review. The high conversion rates in the direction from low CV gas to high CV gas regularly observed in the NCG market area between April and September with monthly quantities reaching more than 7 TWh in some cases and annual quantities reaching more than 45 TWh were almost completely absent in 2021. Only from June to August did the quantities increase to a moderate 1.5 to 2 TWh per month, resulting in a total of only 10 TWh of virtual conversion for the entire GY 2020/21.

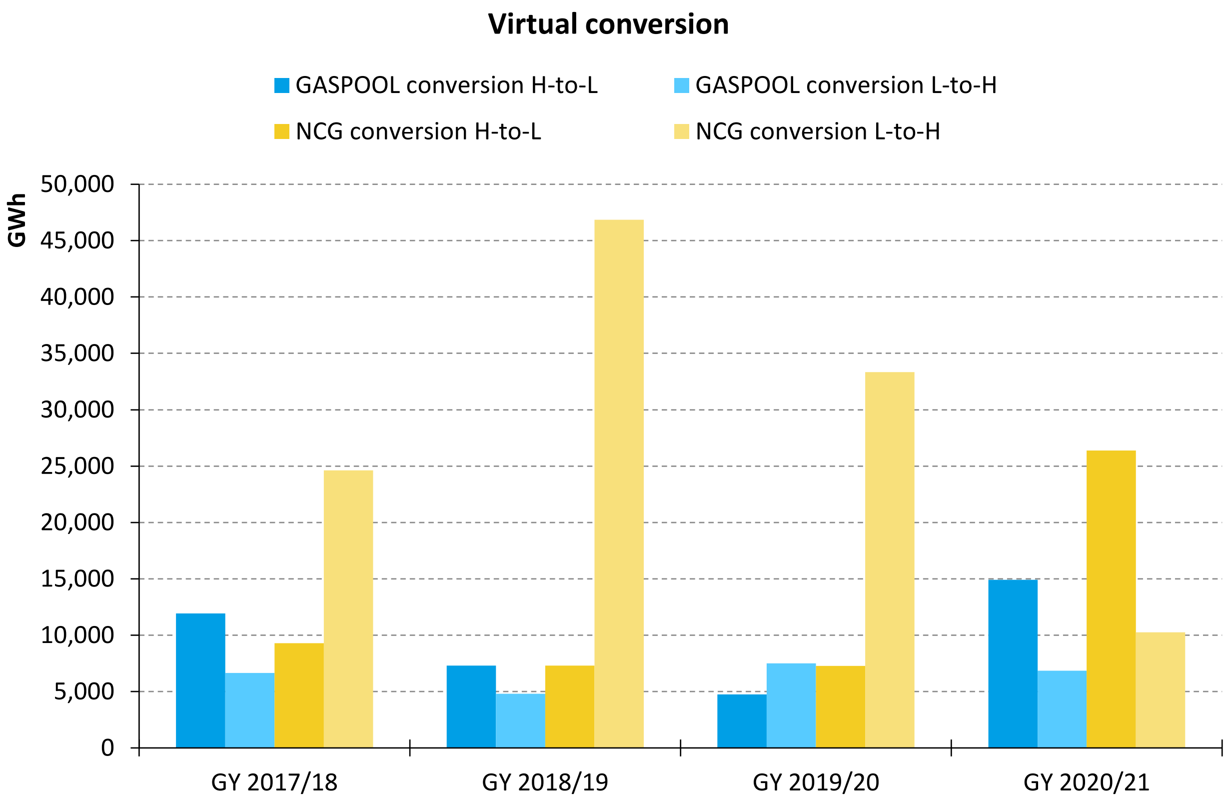

Figure 1: Virtual conversion quantities

System-wide virtual conversion

System-wide virtual conversion follows virtual conversion with slightly lower quantities due to netting effects. Only in GASPOOL's market area are last year's system-wide conversion quantities significantly lower than the virtual conversion quantities, which is mainly due to the high H to L conversion rates throughout the year because in the summer months a large part of the market continued to convert in the usual direction from low CV gas to high CV gas and the two effects compensate each other on a daily basis.

Figure 2 shows the system-wide virtual conversion quantities (actual conversion) for the two old market areas with the dark colours representing the quantities in the direction from high CV gas to low CV gas and the light colours representing the opposite direction from low CV gas to high CV gas.

Market shift

A market shift from low CV to high CV quality (L to H) refers to a situation where exit points using high CV gas are supplied via inputs of low CV gas. The reverse applies where a market shift occurs from high CV to low CV quality (H to L). When comparing the related percentages, it should be noted that total gas demand in the high CV sectors of the network area significantly exceeds total gas demand in the low CV sectors, among other reasons due to the sheer size of the network area and the transit quantities. Moreover, about two thirds of the total German low CV gas network is in the old NCG market area and only one third in the old GASPOOL market area.

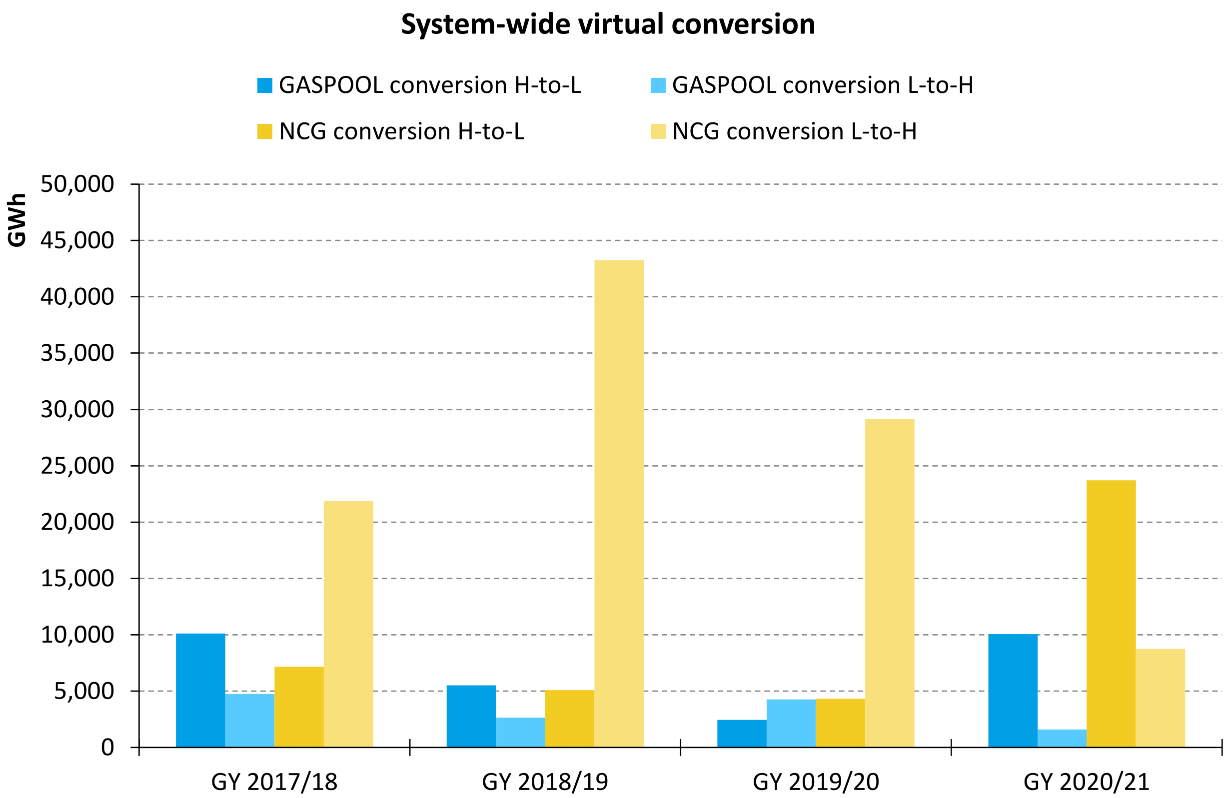

Figure 2: System-wide virtual conversion quantities

Since, apart from a slight downward trend which is due to the market area conversion, the exit quantities develop relatively uniformly, the changes in virtual conversion quantities are reflected in the market shift in a similar way. For the direction from high CV gas to low CV gas, there is a clear increase to approx. 20 % per market area, so the previous highest market shift of approx. 20 % in the NCG market area in GY 2015/16 is thus reached. At the same time, the market shift in the opposite direction from low to high CV gas towards high CV gas sales in the two old market areas also falls significantly to 0.7 % (GASPOOL) and 1.5 % (NCG), respectively.

Figure 3 shows the development of the market shift for each old market area, with the dark colours representing the quantities in the direction from high CV gas to low CV gas and the light colours representing the opposite direction from low CV gas to high CV gas.

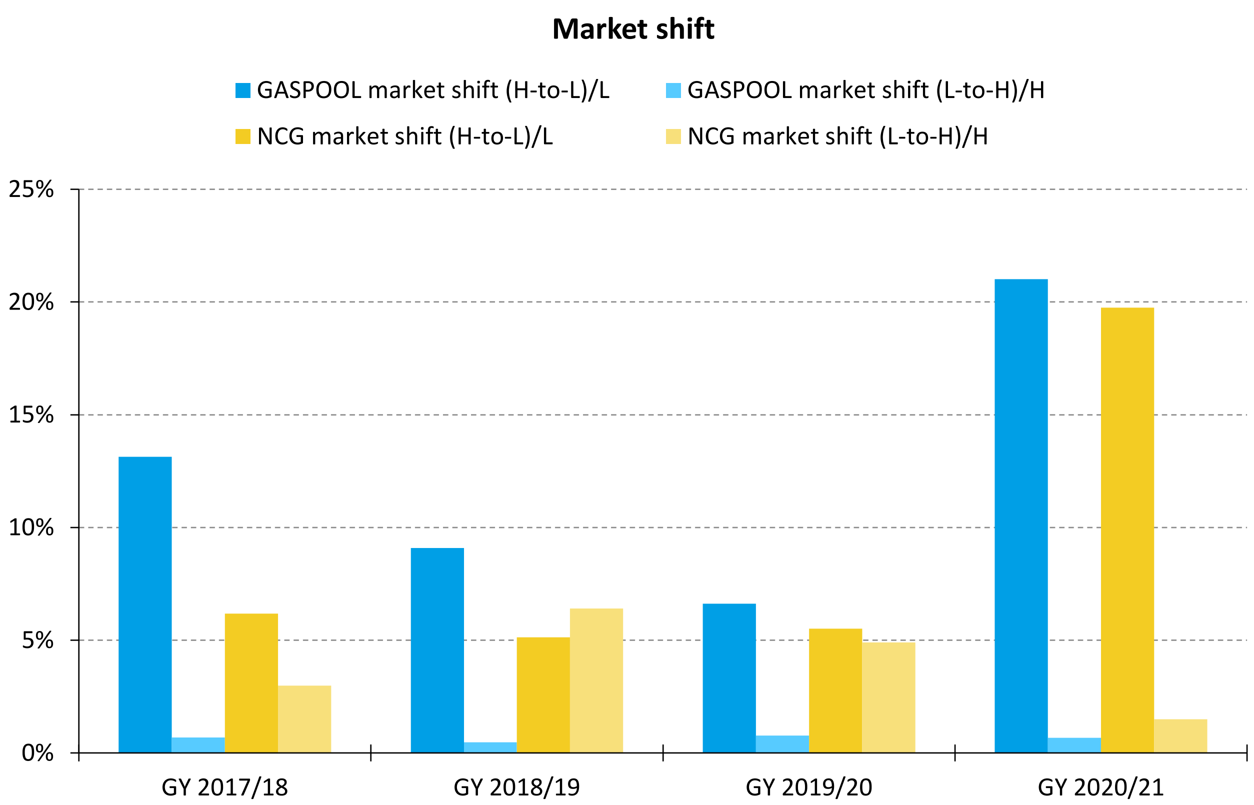

Figure 3: Market shift

2.2 Technical conversion quantities

Technical conversion includes the use of technical conversion facilities, which are already included in the transportation tariffs and facilities which are not included in the transportation tariffs, as well as the booking of reverse capacities to and from the Netherlands. Given that the conversion facilities that are included in network operators' transportation tariffs can be used by THE free of charge, they have to be deployed first, subject to their availability.

The TSOs generally use these conversion facilities for the purpose of maintaining system stability in the high and low CV network areas. They do not explicitly deploy for virtual conversion activities in the market. We follow a computational approach to determine what proportion of the quantities converted in the available technical conversion facilities can be attributed to the Konni Gas mechanism. To do so, we calculate the difference between the system-wide virtual conversion quantity and the commercial conversion quantity for each day, compare it with the quantity technically converted on the same day and then apply the minimum of these two quantities.

Swaps between TSOs, which can help reduce the market area's technical conversion needs, were not taken into account in projecting the future technical conversion quantities. Such swaps represent capacity-related measures that result in an exchange of gas quantities at certain system interconnection points and that are carried out with a view to ensuring certain gas flows. Swaps can be used to either avoid that technical conversion facilities need to be used in the first place or to reduce the quantities to be converted in these facilities.

2.2.1 Conversion facilities included in the transportation tariffs

In the old NCG market area, technical conversion facilities are currently provided by Open Grid Europe GmbH (OGE) and Thyssengas GmbH (TG). OGE can use its gas blending plant in Werne to add both low CV gas to the high CV system and high CV gas to the low CV system. In addition, OGE has a blending plant at its site in Scheidt which can be used to add low CV gas to the high CV system. TG has a gas-air blending plant located in Broichweiden. The facility adds air to high CV gas in order to obtain low CV gas.

In the old GASPOOL market area, Gasunie Deutschland Transport Services GmbH has blending capacity in its own network (both in the H-to-L direction and in the L-to-H direction direction), while Nowega GmbH has a conditioning plant (in the H-to-L direction) linking it to GASCADE Gastransport GmbH.

The increased technical conversion activities in the Dutch gas transmission system, where high CV gas is converted to low CV gas through the addition of nitrogen as a substitute for the reduced output from the Groningen field, have a limiting effect on the technical conversion capacity from high CV gas to Low CV gas in the old NCG market area which is dominated by imports from the Netherlands. As nitrogen is added, the Wobbe Index of the low CV gas received from the Netherlands rises, resulting in a higher gross calorific value and therefore only small quantities of high CV gas may be added to the low CV gas. In the old GASPOOL market area, these restrictions are not so significant due to the high proportion of natural gas produced in Germany. The opposite conversion direction from low CV to high CV quality is not affected by this development.

Figure 4 shows the quantities of the technical conversion facilities allocated to the conversion system which have already been taken into account in the transportation tariffs for the past gas years for each old market area. Dark colours represent the quantities in the direction from high CV gas to low CV gas, while light colours represent the opposite direction from low CV gas to high CV gas.

In accordance with the predominant conversion direction from high CV gas to low CV gas, the share of the gas quantity technically converted in this direction is also increasing. Due to the limited blending potential of the OGE facilities described above, the blending facilities in the old GASPOOL market area account for a large part of the quantity.

2.2.2 Conversion facilities not included in the transportation tariffs

Since January 2018, a technical conversion plant located in the Nowega GmbH network has also been used for conversion measures in the GASPOOL market area. This technical conversion plant, which produces low CV gas by adding nitrogen to the high CV gas, is not fully included in the network operators' transportation tariffs. No arrangements are currently in place in the NCG market area between NCG or THE and third parties that would permit the use of any technical conversion facilities that are not already included in the network operators' transportation tariffs. THE is reviewing whether and to what extent additional technical conversion capacity operated by third parties could be made available to THE and on what contractual terms.

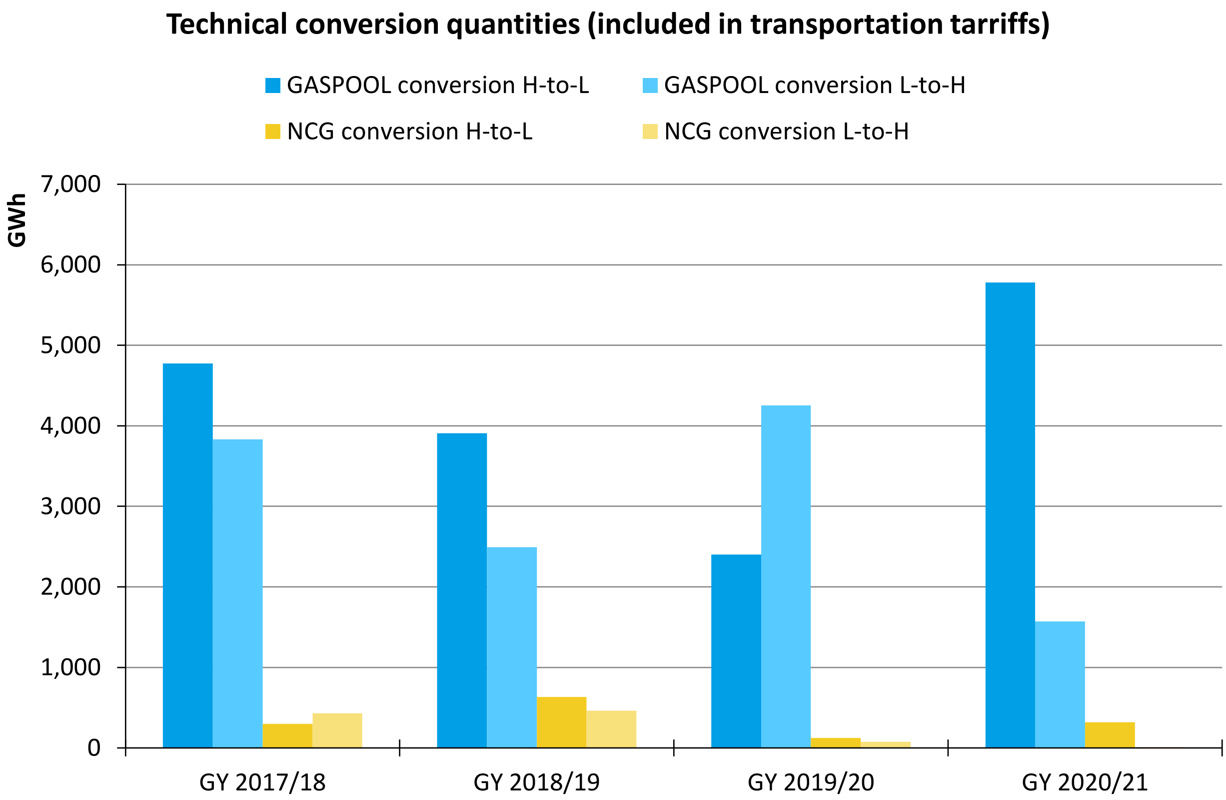

Figure 4: Technical conversion quantities (included in transportation tariffs)

In gas year 2020/21, use of the facility was around 80 GWh which corresponds roughly to the average level of the four gas years considered. However, this is only a small proportion compared to the quantities of over 6,000 GWh of the facilities already included in the network operators' transportation tariffs.

Figure 5 shows the technical conversion quantities of the previous gas years whose costs were not already included in the network operators' transportation tariffs for each old market area; no third-party facilities were used in the NCG market area. Given the current technical circumstances, conversion can only take place in the direction from high CV gas to low CV gas.

2.2.3 Gas imports and exports carried out for conversion purposes

One of the examples of technical conversion measures not covered by network operators' transportation tariffs cited by the Federal Network Agency in its Konni Gas ruling is the market area managers' option to export high CV gas to the Netherlands during the course of a day whilst simultaneously importing the same quantity of low CV gas from the Netherlands, which is what we mean by "Gas imports and exports carried out for conversion purposes". This conversion method cannot be considered a technical conversion measure in the strictest sense as it does not involve a modification of the physical composition of the gas itself but rather an exchange of gas quantities of different gas qualities between the market areas involved.

In order to be able to carry out such gas imports and exports for conversion purposes, THE has to book transportation capacity at interconnection points between the high CV and low CV network sectors of a German market area and the Netherlands, with capacity to be booked on a short-term basis where and

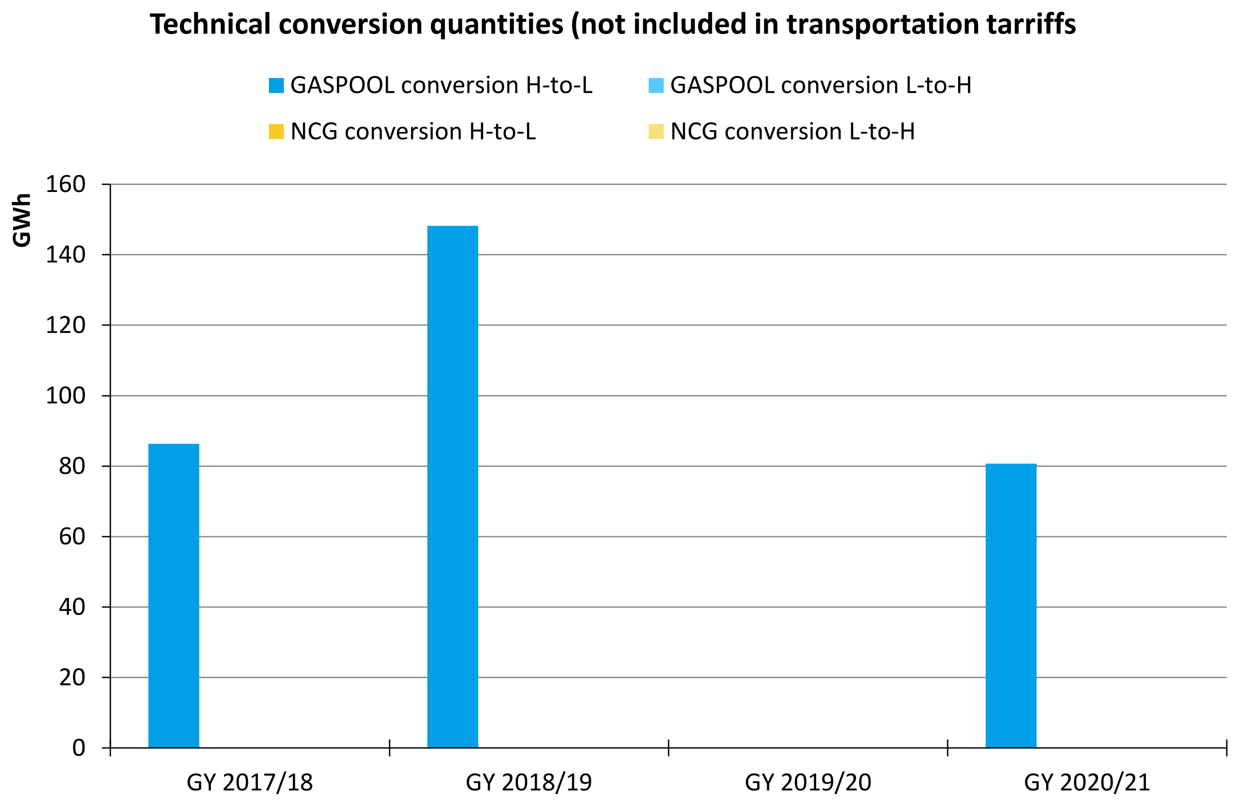

Figure 5: Technical conversion quantities (not included in transportation tariffs)

to the extent possible. In order to be able to decide based on cost considerations whether to export and import gas for conversion purposes or whether to take commercial conversion measures, we have to compare in each case the transportation costs associated with the gas imports and exports we carry out for conversion purposes with the commodity costs we incur at that time for taking the corresponding commercial conversion measures.

Gas imports and exports for conversion purposes as a commercial technical conversion measure are always used when the booking of capacities into and out of the Netherlands results in lower overall costs than the corresponding purchase and sale of balancing gas in opposite directions. This measure has been in use since 2018 and has so far accounted for a very small part of total conversion.

Figure 6 shows the gas imports and exports carried out for conversion purposes during the last few gas years for each market area. Dark colours represent the quantities in the direction from high CV gas to low CV gas while light colours represent the opposite direction from low CV gas to high CV gas (up until now, however, gas imports and exports carried out for conversion purposes have only taken place in the direction from high CV gas to low CV gas).

Even if the highest usage to date of approx. 90 GWh across both market areas was recorded in the 2020/21 gas year, the share of gas imports and exports carried out for conversion purposes remains very small.

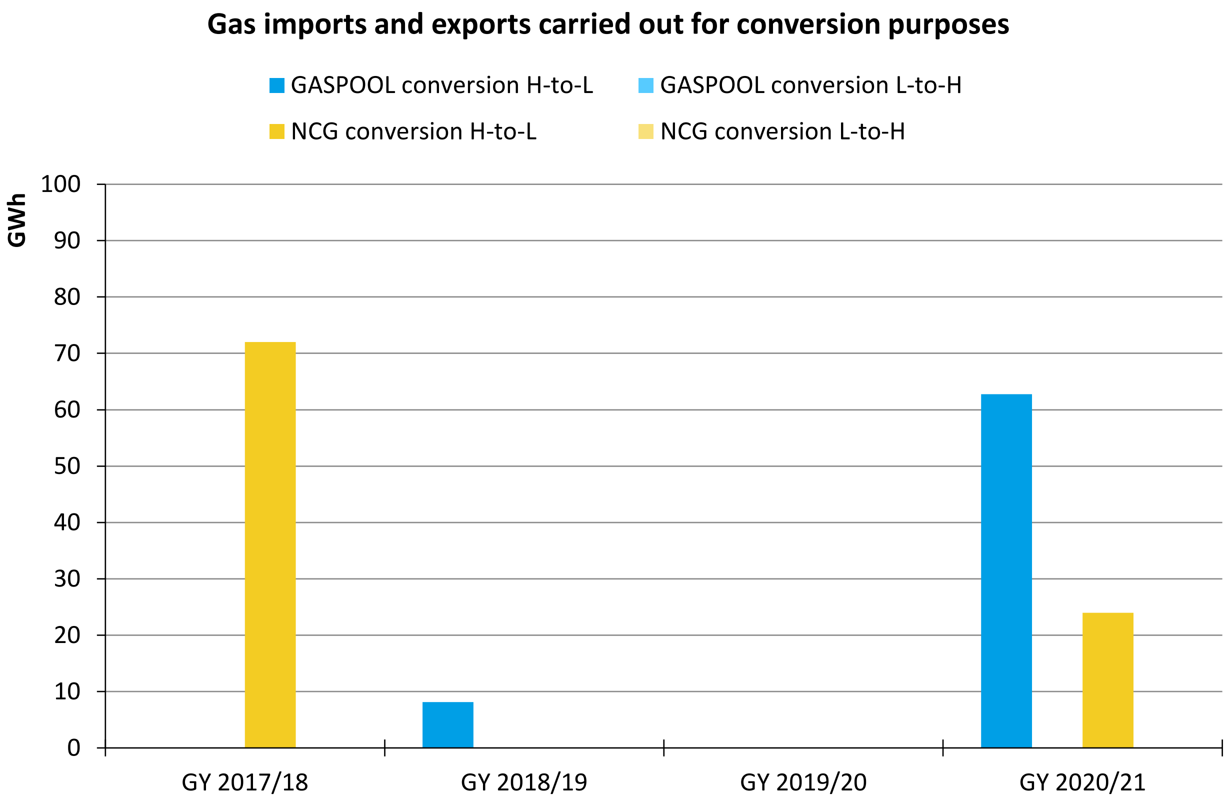

Figure 6: Gas imports and exports carried out for conversion purposes

2.3 Use of commercial conversion measures

Approach for calculating commercial conversion quantities

Commercial conversion measures need to be taken in situations where technical conversion measures are not sufficient to counterbalance market shifts.

The first step in determining the commercial conversion quantity is to calculate the sums of the balancing gas quantities sold in the quality for which there is an oversupply and the balancing gas quantities purchased in the quality for which there is an undersupply, respectively. In view of the fact that for “Global” balancing actions the gas quality is no relevant criterion, only rest-of-the-day (RoD) and day-ahead (DA) buy and sell transactions effected to meet “Quality” or “Local” balancing requirements are taken into account when calculating the overall commercial conversion quantity. Where the above calculations show that balancing actions have been taken in opposite directions in the two different gas qualities (e.g., sales of high CV gas and purchases of low CV gas), the relevant figure is compared with the direction of the system-wide virtual conversion quantity previously determined. If the direction of the relevant opposite balancing actions corresponds to the direction in which the system-wide virtual conversion quantity has been converted, then the smaller of the two values (as measured in terms of their absolute values) represents the quantity that was converted by way of commercial conversion measures in each direction.

Where balancing actions have been taken in opposite directions within one gas quality, the actual overall sell/buy figure is used, i.e., where there is an oversupply in the market area and gas has been both sold and purchased on that day, only the gas quantities sold in the relevant gas quality are taken into account, and not offset by the quantities bought in that quality. Any netting between quantities of the same quality would result in reduced sell or buy quantities, which would not reflect the actual balancing actions taken. The corresponding quantity for the other gas quality is determined following the same principles. The balancing quantity deployed in opposite directions is determined as the smaller of the two quantities (as measured in terms of their absolute values).

Given the calculation approach, the quality of the consumption forecasts for intra-day metered (RLM) and standard load profile (SLP) end costumers is another important factor in the delimitation of the use of system balancing actions for GaBi and Konni purposes. The quality of the consumption forecasts can significantly influence the gas quantities physically delivered to the market area by the market participants and therefore has a massive impact on the required balancing actions, and thus indirectly on the actual overall conversion quantities. For example, a general oversupply or undersupply to either or both the low CV or high CV systems as can result from imbalances in network operators’ network balancing accounts due to the mechanisms inherent to the current balancing regime has an impact on whether and to what extent we will have to take balancing actions in opposite directions.

Development of commercial conversion quantities

The gas year 2020/21 is characterised by an extensive use of the conversion system in both of the old market areas. For this reason, the volume of commercial conversion is also correspondingly high. Across both market areas, the commercial conversion quantity used in the direction from high CV gas to low CV gas adds up to 24 TWh. In the NCG market area alone, more than 500 GWh of commercial conversion quantities had to be used on two days each; of the ten days showing the highest commercial conversion quantities since the introduction of Konni Gas (all more than 400 GWh/d), seven were in February 2021. Overall (GASPOOL plus NCG), January 2021 has been the month with the highest commercial conversion quantities since the start of the multi-quality market areas, with almost 9 TWh of commercial conversion activities recorded in the direction from high CV gas to low CV gas.

Virtual conversion activities in the L-to-H direction, which despite some decline continue at a high level and were predominantly recorded in the summer months of the previous gas year, have not, or only very occasionally, resulted in commercial conversion activities in this direction (L to H). This was due to the fact that on the Dutch side market participants are looking to bring down low CV gas sales in view of the recent production cutbacks implemented in the Netherlands. In many cases, therefore, the transmission system operators operating the relevant cross-border interconnection points (IPs) now agree to swap the additional volumes of low CV gas made available by shippers for high CV gas, which is then delivered at other IPs. These swaps in turn mean that the market are managers have to carry out fewer technical and/or commercial conversion measures. This effect was also observed in the last gas year and led to minimum commercial conversion activities in the L-to-H direction.

Figure 7 shows the development of commercial conversion quantities in the past gas years for each old market area. Dark colours represent the quantities in the direction from high CV gas to low CV gas, while light colours represent the opposite direction from low CV gas to high CV gas.

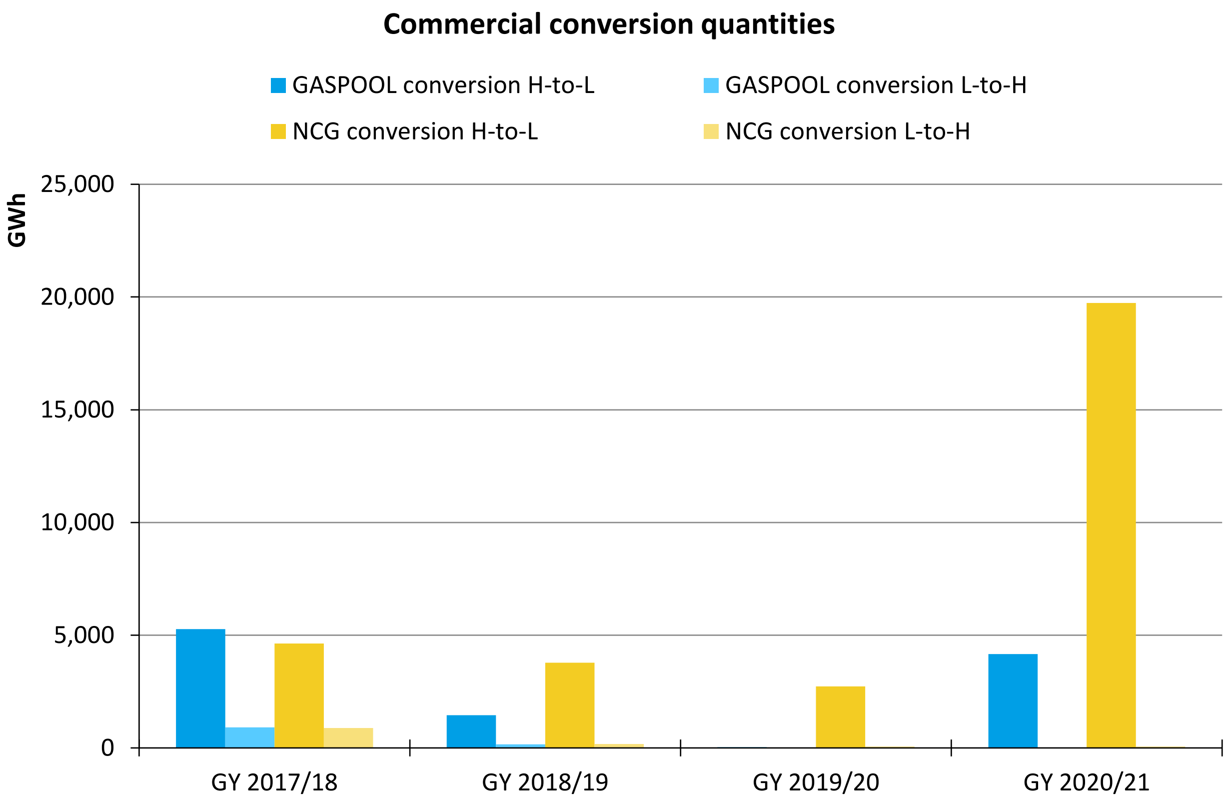

Figure 7: Commercial conversion quantities

2.4 Development of low CV gas quantities used for balancing purposes

Total expenditure on low CV gas used for balancing purposes is only in part made up of quantities for the conversion system; however, due to other factors, not all balancing actions are directly allocated to the Konni system (for details, please refer to the description of Indicator 4:Indicator 4: Low CV gas quantities purchased for balancing purposes relative to the total low CV gas demand in the market area). For this reason, the overall development of low CV gas quantities is shown here.

Here, too, the last gas year represents a new high with a low CV gas SystemBuy quantity of 42 TWh (across both market areas; without taking into account the hourly products for within-day structuring); the previous high of 40 TWh dates back to gas year 2015/16. Compared to the previous year (GY 2020/21 vs 19/20), the quantities have almost tripled from 15 to 42 TWh.

If one looks at the ratio of balancing gas purchases to low CV gas sales on a daily basis in order to assess the status of the MAM as a "single buyer", there is a new daily high of 92 % for the old NCG market area in GY 2020/21 and a seven-week period in January/February 2021 in which the average share of balancing gas in low CV gas sales was over 60 %. Given own production of low CV gas in the GASPOOL market area, the shares of procured low CV balancing gas in low CV gas sales tend to be lower there, but they, too, represent new highs and also reach 90 % towards the end of the gas year.

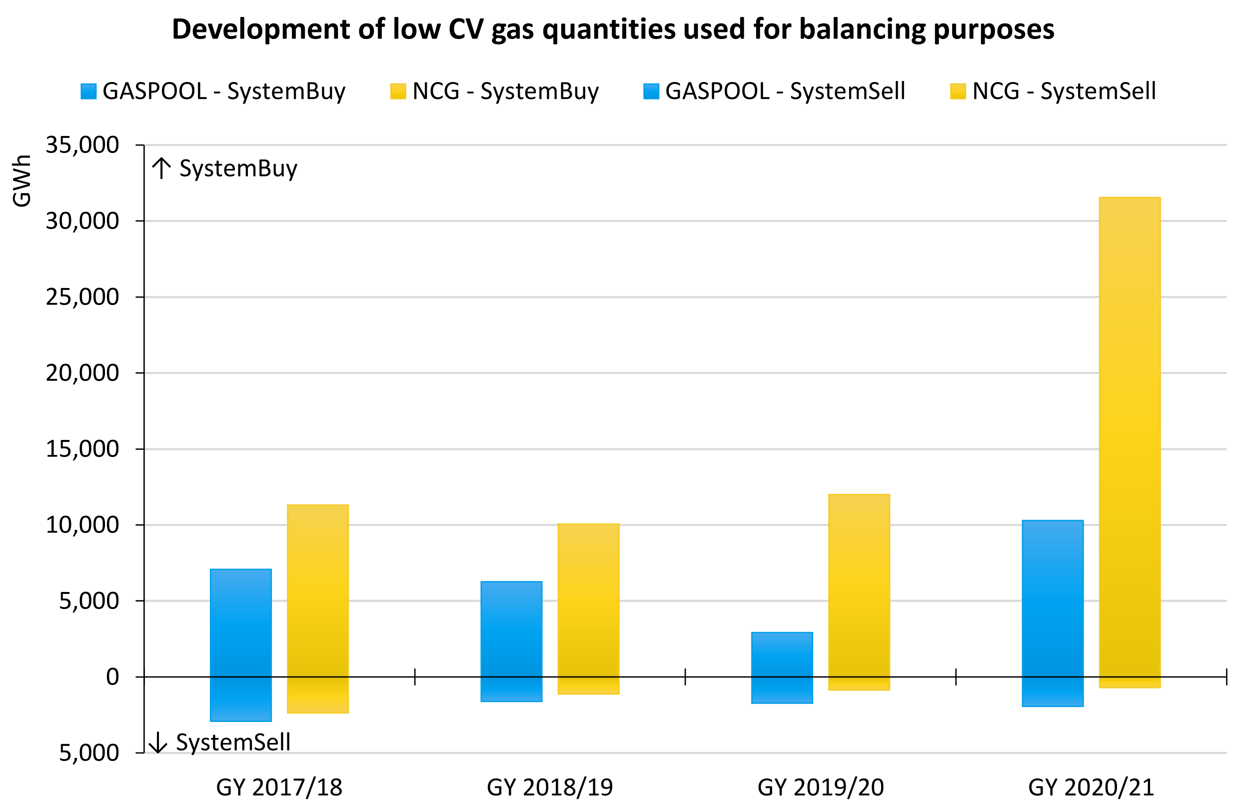

Figure 8: Development of low CV gas quantities used for balancing purposes

2.5 Development of physical inputs across all balancing groups

According to the Konni Gas ruling, the MAM may levy a conversion neutrality charge on the balancing group manager if the conversion system costs cannot be covered by the revenues received through conversion fees. The conversion neutrality charge is levied on all physical input quantities or on the allocations based on them which were included in an FZK balancing group or a DZK balancing group. The only quantities excluded are purely virtual inputs such as trading transactions at the virtual trading point and physical inputs included in a BZK balancing group.

Figure 9 shows the physical inputs in the past gas years for each old market area. The data provided is based on the data series types “Entryso”, “Entry Biogas” and “Entry Wasserstoff”. However, a conversion neutrality charge was only levied in the GASPOOL market area (see Chapter 4 -Commercial assessment).

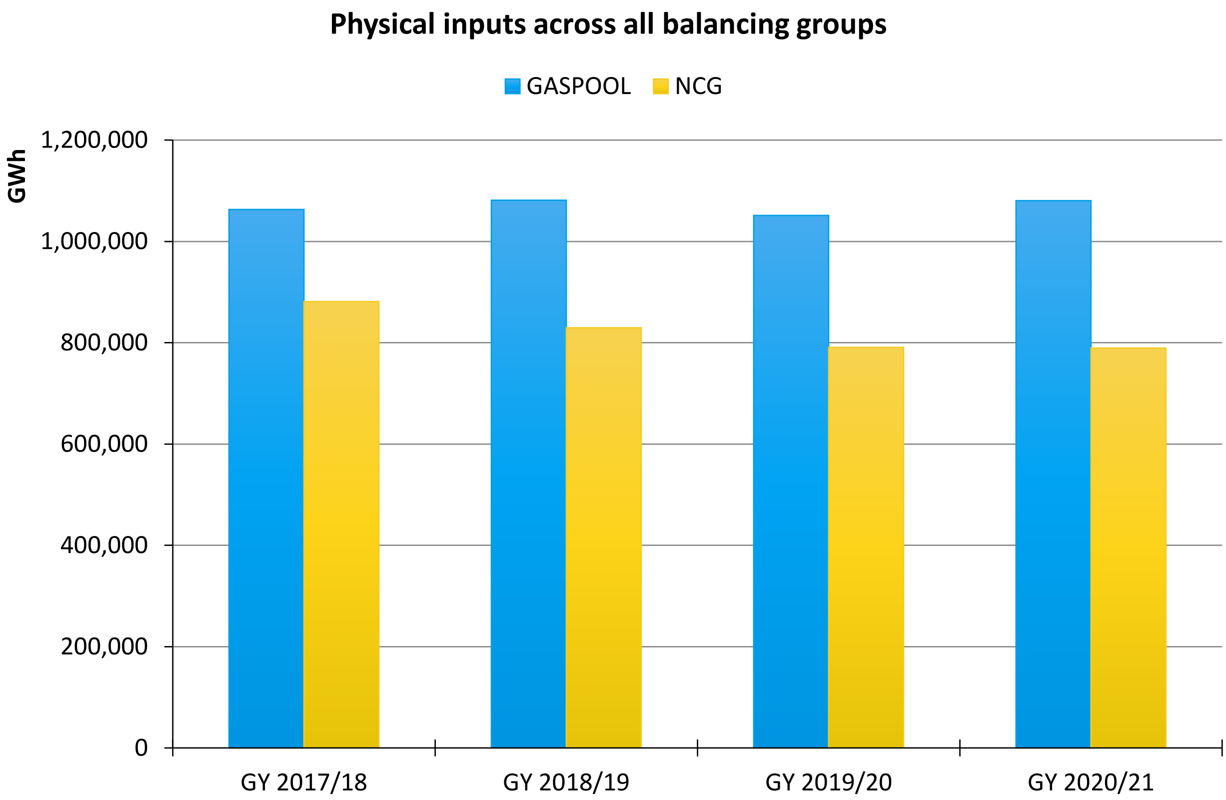

Figure 9: Physical inputs

3 Evaluation of gas quality conversion mechanism based on the indicators used for determining the applicable incentive-based conversion fee

According to the amended Konni Gas ruling we have to determine and show our incentive-based conversion fee based on a set of suitable indicators that duly reflect the conversion fee's intended purpose of influencing market participants' behaviour.

In its Konni Gas ruling the Federal Network Agency proposes the following three possible indicators:

- the quantities of gas that are virtually converted from high CV to low CV quality as measured relative to the total low CV gas demand in the market area (Indicator 1)
- the balancing quantities that are supplied/received for the purpose of converting gas from high CV to low CV quality as measured relative to the total balancing quantities supplied/received (Indicator 2)
- the balancing quantities that are supplied/received for the purpose of converting gas from high CV to low CV quality as measured relative to the total low CV gas demand in the market area (Indicator 3)

THE has to assess these indicators as to their suitability for the determination of an incentive-based conversion fee. THE further has an obligation to determine, assess and apply such additional indicators as it deems suitable for determining its conversion fee. The data base used to determine these indicators is to cover a period of at least 12 months so as to ensure that it provides a sound basis for drawing reliable conclusions as to the required level of an incentive-based conversion fee.

THE has identified one additional indicator other than the three proposed by the Federal Network Agency that we believe are a suitable reference for setting an incentive-based conversion fee:

- the quantities of low CV gas that are purchased for balancing purposes as measured relative to the total low CV gas demand in the market area (Indicator 4)

The indicators "Base case for virtual conversion from high CV gas to low CV gas" (GASPOOL) and "Commercial break-even point" (NCG) used previously in the old market areas are no longer used in THE's single German market area and are therefore also no longer considered in retrospect.

3.1 Indicator 1: Virtual conversion quantities converted from high CV to low CV quality relative to the total low CV gas demand in the market area

In order to calculate this indicator, we examined the relationship between the conversion fee level and the proportion of total low CV gas demand that was virtually converted by balancing group managers (BGMs) in each of the previous conversion periods. Starting in October 2017, Figure 10 shows the maximum daily proportion for each of the old market areas in the respective month. The chart also shows the conversion fee for each of the old market areas applicable in the respective month.

Indicator 1 clearly shows the dependence of the virtual conversion quantities on the given conversion fee for the old GASPOOL market area. Therefore, the reduction to 0.39 EUR/MWh in October 2020 led directly to a significant increase in offtakes of low CV gas (maximum daily values), and in April 2021, the maximum of almost 60 % was reached. Although the conversion fee was left unchanged at 0.45 EUR/MWh in the old NCG market area, a significant increase in the proportions compared to the previous gas year can be observed in the old NCG market area. In the months of January/February 2021 already highlighted in Chapter 2, Indicator 1 rises to over 65 %, reaching a new high of 72 % in May; previous highs from 2016 were around 65 %.

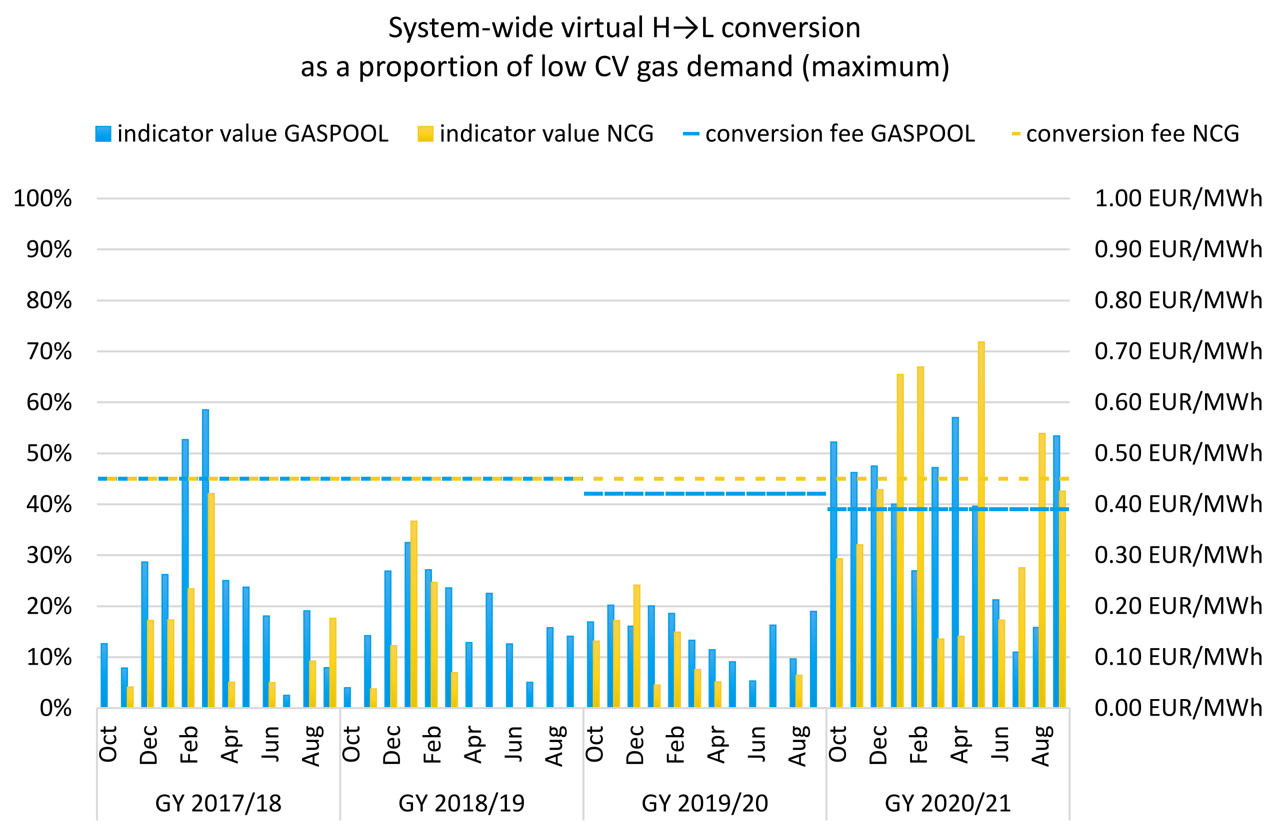

Figure 10: System-wide virtual H→L conversion as a proportion of low CV gas demand

3.2 Indicator 2: Balancing quantities supplied/received for high CV gas to low CV gas conversion purposes relative to the total balancing gas quantities supplied/received

In order to calculate this indicator, we examined the relationship between the conversion fee level and the proportion of our total balancing quantities (SystemBuy and SystemSell) that was used for the purpose of taking commercial H-to-L conversion measures in each of the previous conversion periods. Starting in October 2017, Figure 11 shows arithmetic mean of all daily proportions for each of the old market areas in the respective month. The chart also shows the conversion fee applicable in the respective month.

THE considers that this indicator is only of limited value as a reference, given that ultimately the results it provides depend strongly on the magnitude of the balancing actions we have to take. In situations where we have to balance very large system imbalances primarily driven by other effects, even comparably high levels of conversion activities and corresponding commercial conversion measures would represent a relatively small proportion of our total balancing actions.

Nevertheless, a similar development can be seen in Indicator 2 as in the other indicators: In the old GASPOOL market area the proportion of balancing actions used for commercial conversion purposes increased over several months to as much as 40%. These values were last exceeded in the 2017/2018 gas year. After the fee was set at 0.45 EUR/MWh in the old NCG market area, the proportion of low CV gas sales accounted for by balancing actions used for commercial conversion purposes had arrived at a

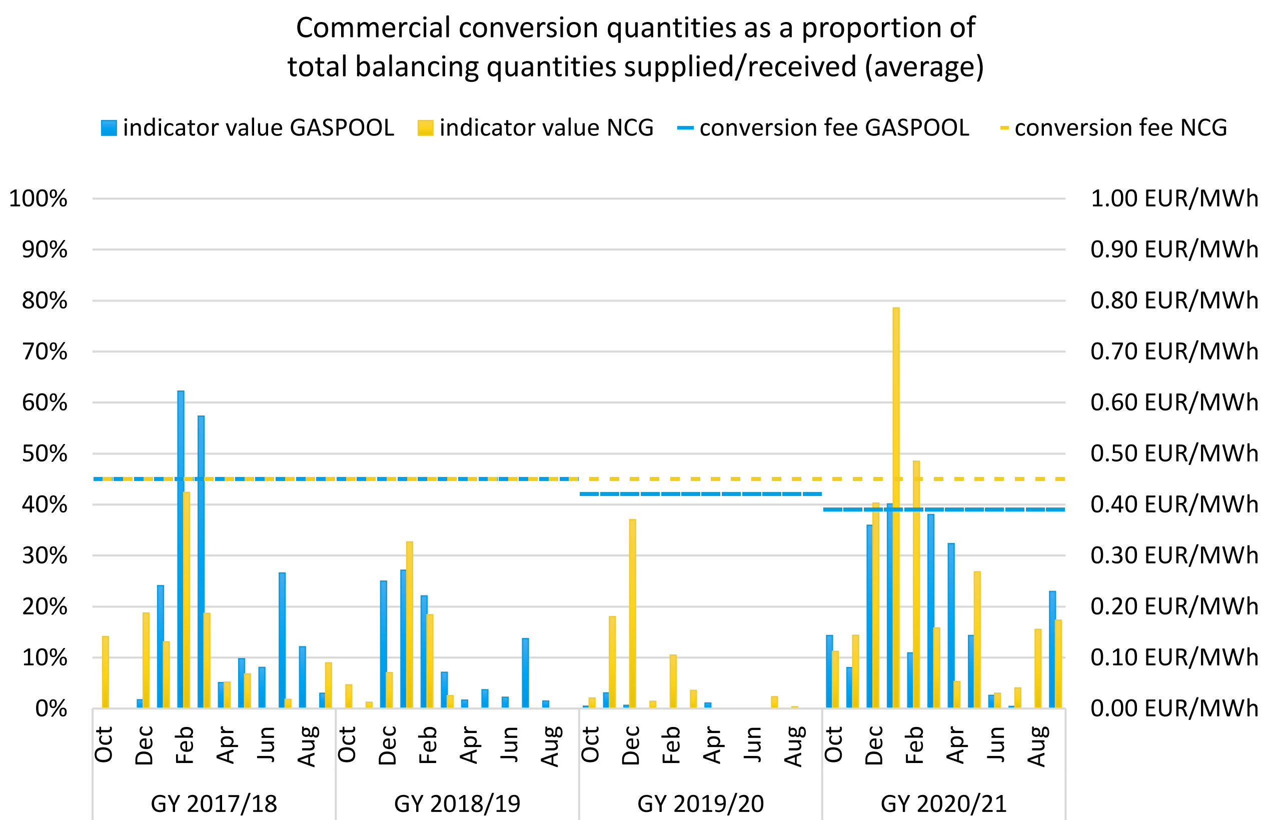

Figure 11: Commercial conversion quantities as a proportion of total balancing quantities supplied/received

level the system can cope with overall, even though proportions fluctuated in the individual fee periods while the fee remained unchanged and in January 2021 the maximum value of the proportion of balancing actions used for commercial conversion of almost 80% in 2016 was again reached. It is important to note that in the winter months in particular, commercial conversion still accounts for up to half of the balancing actions taken.

3.3 Indicator 3: Balancing gas quantities supplied/received for high CV to Low CV gas conversion purposes relative to the total low CV gas demand in the market area

In order to calculate this indicator, we examined the relationship between the conversion fee level and the proportion of low CV gas demand that was provided via commercial H-to-L conversion measures for each of the previous conversion periods. Starting in October 2017, Figure 12 shows the maximum daily proportion for each of the old market areas in the respective month. The chart also shows the conversion fee applicable in the respective month.

We believe that this indicator is suitable for helping us assess whether market participants' conversion behaviour might result in THE becoming the main buyer of low CV gas. The trends observed for the indicators listed above can also be found in Indicator 3. The proportion of low CV gas demand accounted for by commercial conversion, for example, rose significantly in October 2020 in the old GASPOOL market area. The monthly value then remained between 25 % and 35 % until the summer, presumably because

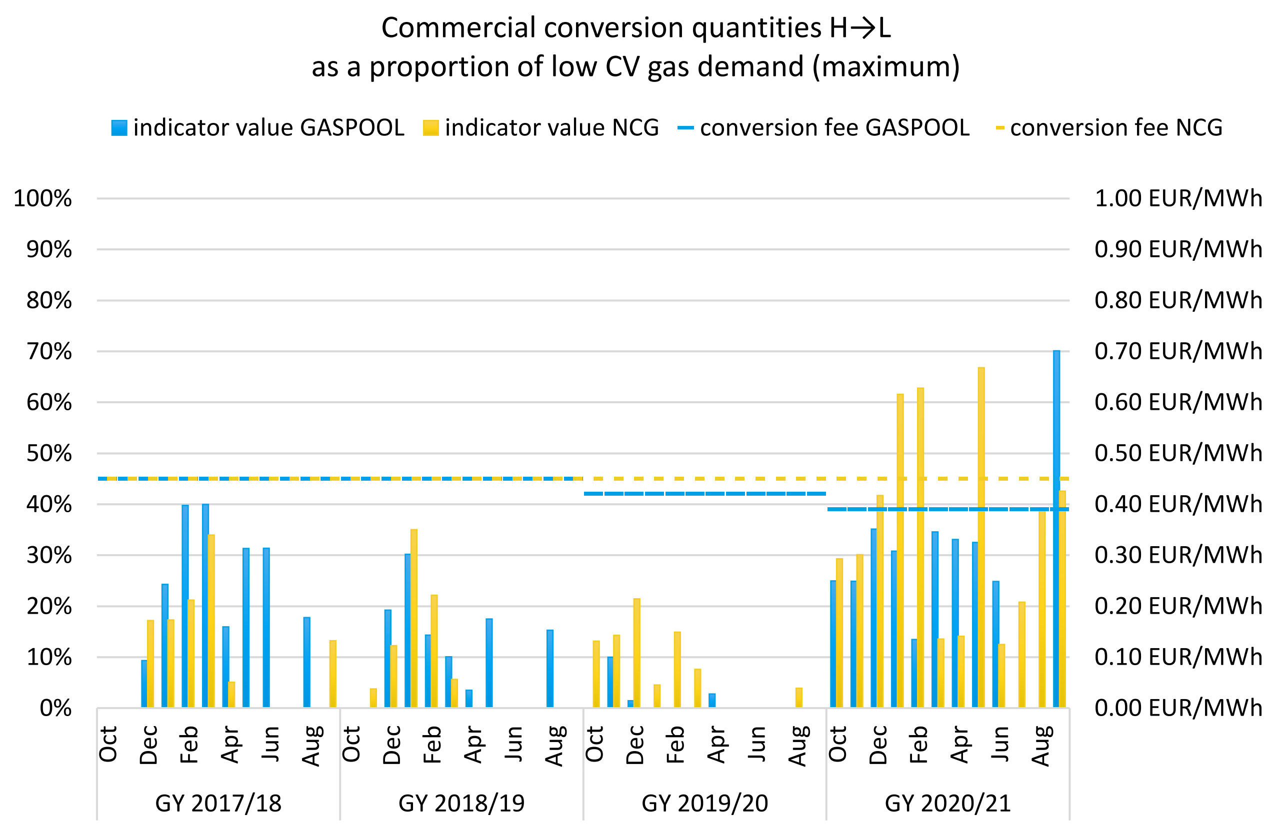

Figure 12: Commercial conversion quantities as a proportion of low CV gas demand

of the low conversion fee of 0.39 EUR/MWh, while in previous gas years they had been no higher than 10 %. In the old NCG market area where the fee has been constantly set at 0.45 EUR/MWh, the proportions had dropped to a level the system can cope with overall, even though some fluctuations could be observed. In the winter of 2020/2021, the proportion of balancing actions used for commercial conversion in low CV gas sales, however, rose to over 60 % in some cases, and in May the previous high value from 2016 of 67 % was again equalled.

3.4 Indicator 4: Low CV gas quantities purchased for balancing purposes relative to the total low CV gas demand in the market area

In order to calculate this indicator, we examined the relationship between the conversion fee level and the proportion of total low CV gas demand that corresponds to the low CV gas quantities we purchased for balancing purposes for each of the previous conversion periods. Starting in October 2017, Figure 13 shows the maximum daily proportion in the respective month for each of the old market areas. The chart also shows the conversion fee applicable in the respective month.

This indicator shows to what extent we procure gas for the supply low CV gas customers as part of our system balancing activities, even where this does not result in balancing actions in opposite directions and so is not considered a commercial conversion measure. Measuring the quantities of low CV gas we

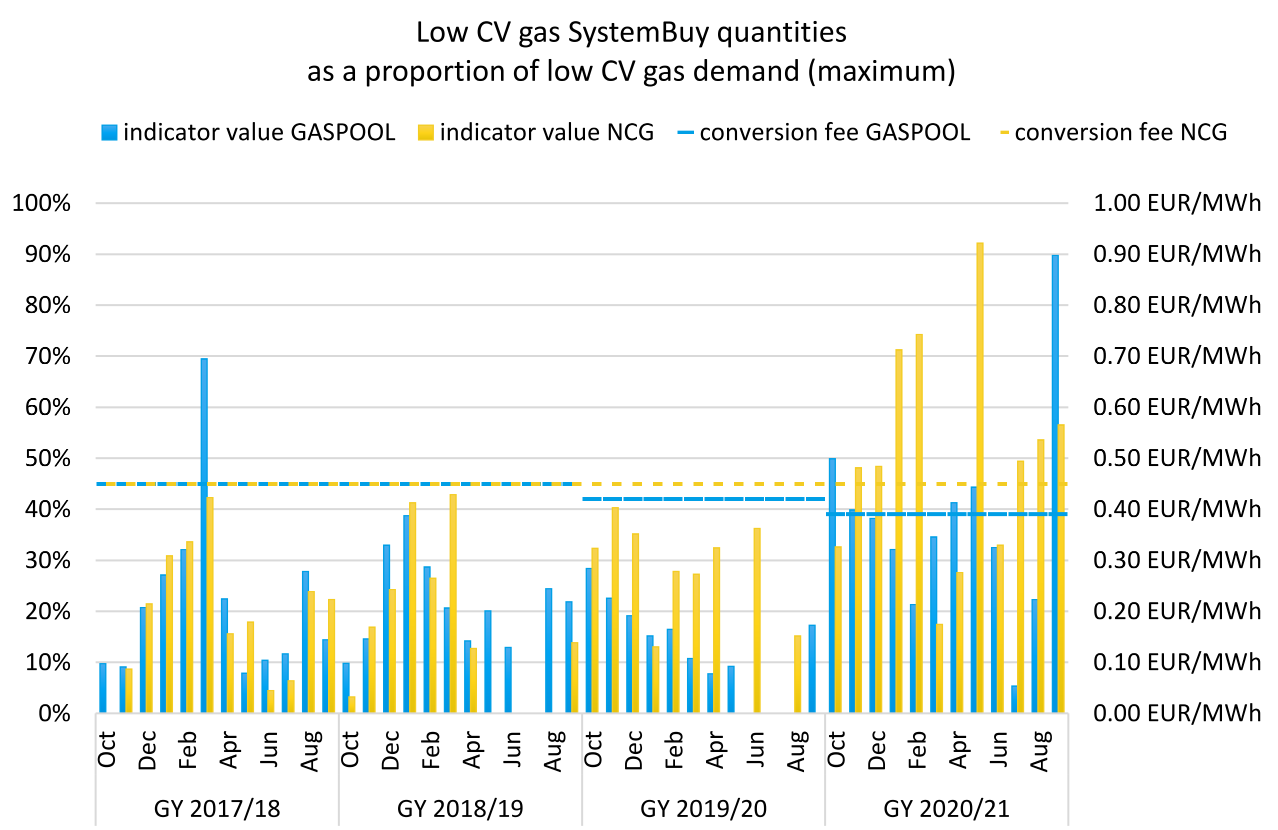

Figure 13: Low CV gas SystemBuy quantities as a proportion of low CV gas demand

purchase as part of our balancing actions as a proportion of total low CV gas demand shows directly to what degree THE is becoming a buyer of low CV gas.

Indicator 4 also clearly reflects the development that can also be seen in the other indicators: whilst the proportion of gas for the supply low CV gas customers in GASPOOL's old market area previously hardly ever reached 30 %, it rose immediately to 50 % after the fee was reduced in October 2020 and then remained between 30 % and 40 % continuously in some cases thereafter to then reach a new high of around 90 % towards the end of the gas year. In the old NCG market area where the fee was set at a constant 0.45 EUR/MWh, the maximum proportions procured were usually in an acceptable range. However, especially in the 6-month winter periods, the quantities of low CV gas procured as balancing gas regularly rose to almost 50 %, reaching over 70 % in some cases in the old NCG market area in the winter of 2020/2021. Thereafter, a new peak of over 90 % was reached in May 2021, and the monthly values in the last quarter of GY 2020/21 were again between 50 % and 60 %.

4 Commercial assessment

4.1 Revenues and costs under the conversion mechanism

Approach for calculating revenue and cost items

The level of the revenues earned under the conversion mechanism is determined by the conversion fees charged to BGMs for their individual virtual conversion quantities as well as by the conversion neutrality charges levied on BGMs' inputs. In the assessed periods no revenues have been generated from commercial conversion measures (but see Chapter 6. Conversion outlook for gas year 2021/2022). Such revenues result from positive price differences between simultaneous balancing sales and purchases (SystemSell commodity price less SystemBuy commodity price).

Conversion costs generally comprise the commodity costs incurred as a result of the relevant balancing buy and sell transactions effected in the two directions where balancing actions have been taken in opposite directions, plus a proportion of the costs incurred for transportation capacity contracts and availability contracts for long-term balancing products. In addition, there are technical conversion costs for transportation conversion (service costs of the booked capacities) and for the use of third-party blending plants.

In order to calculate the commodity costs, the commercial conversion quantities are first determined for each day. Subsequently, the weighted average prices paid/received in connection with the associated balancing buy and sell transactions are calculated for the relevant direction of conversion. In order to do so the price difference between quality-specific balancing sell transactions (SystemSell) and balancing buy transactions (SystemBuy) is multiplied by the net commercial conversion quantity determined to have been converted on the day in question (amount of the commercial conversion quantity calculated for one direction pursuant to chapter 2.3).

The next step is to calculate the allocation key which is used to apportion the costs incurred for availability contracts for long-term balancing products as well as the costs incurred for transportation capacity contracted to procure low CV gas on the Dutch TTF. In order to allocate the relevant cost items first the proportion of the balancing quantities supplied/received for conversion purposes (commercial conversion quantity) is determined in relation to the total balancing requirements on the day in question. This gives the allocation key. Then the availability contract costs for keeping balancing services available (per quarter) are distributed proportionally over all days within the quarter. Costs for capacity bookings, less the capacity costs directly assigned to the conversion system from transportation conversion, are also calculated on a daily basis. Following this, the allocation key is applied to the daily costs thus determined for the purpose of allocating the relevant proportional costs to the conversion mechanism.

Table 2 shows the charges and levies levied in the old market areas. Our conversion costs and conversion revenues are shown by gas year in Figure 14. The total costs in GY 2020/21 amount to over EUR 70 million, of which approx. EUR 50 million are attributable to the NCG market area. This also represents the highest value allocated to the conversion system to date (in GY 2015/16 and GY 2017/18, the total costs for both market areas were around EUR 60 million).

Conversion period	GASPOOL conversion fee	NCG conversion fee	GASPOOL conversion neutrality charge	NCG conversion neutrality charge
1.10.2017 - 30.09.2018	0.450 EUR/MWh	0.450 EUR/MWh	0.022 EUR/MWh	0.00 EUR/MWh
1.10.2018 - 30.09.2019	0.450 EUR/MWh	0.450 EUR/MWh	0.017 EUR/MWh	0.15 EUR/MWh
1.10.2019 - 30.09.2020	0.420 EUR/MWh	0.450 EUR/MWh	0.075 EUR/MWh	0.00 EUR/MWh
1.10.2020 - 30.09.2021	0.390 EUR/MWh	0.450 EUR/MWh	0.005 EUR/MWh	0.00 EUR/MWh

Table 2: Development of conversion fees and conversion neutrality charges

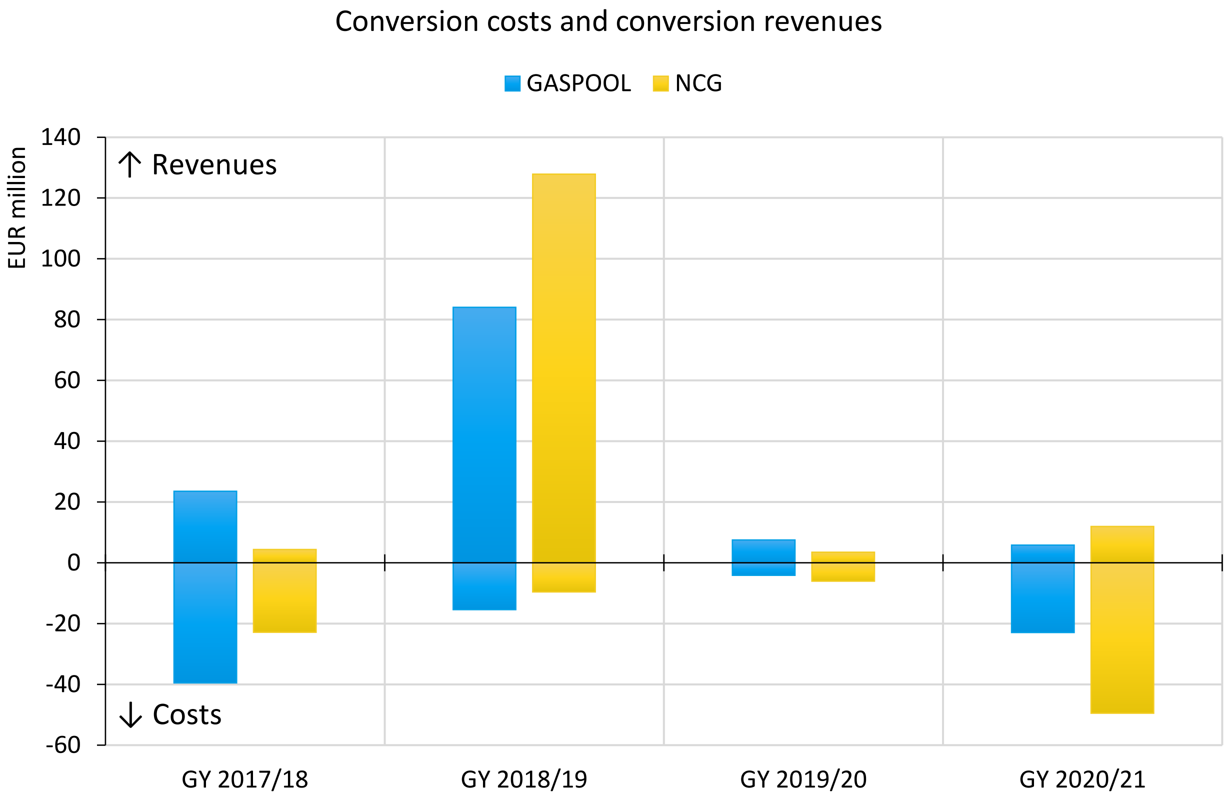

Figure 14: Conversion costs and conversion revenues

4.2 Position of conversion neutrality account and liquidity buffer

Under the amended Konni Gas ruling of 21 December 2016, market area managers have the right to allow for a liquidity buffer when setting their conversion fees and conversion neutrality charges. The intended function of this liquidity buffer is primarily to mitigate the liquidity risks that may arise due to the uncertainty inherent to projections or as a consequence of high conversion costs.

As required under the Konni Gas ruling, the MAMs publish the current position of their conversion neutrality accounts on a monthly basis (see Figure 15), with the preliminary account balances for each month

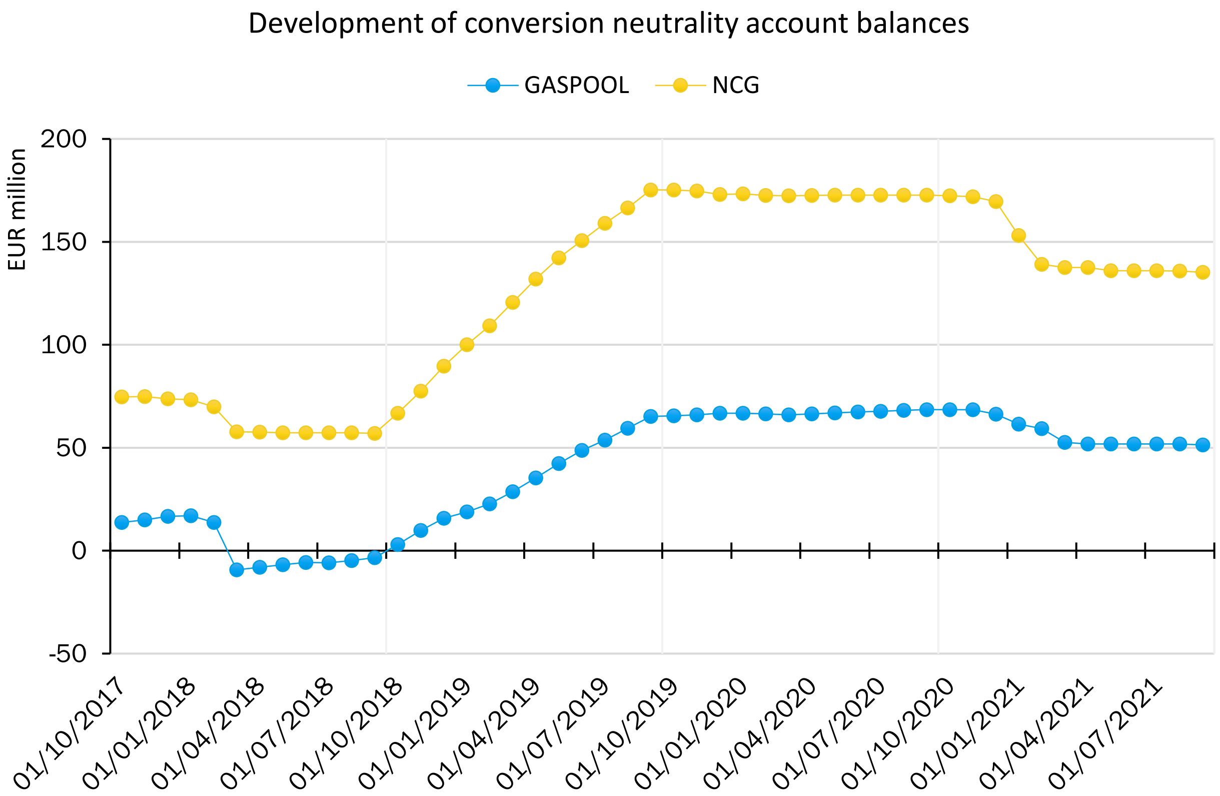

Figure 15: Development of conversion neutrality account balances

being published by the 5th business day of the following month. The account data provided for a month is updated once all final data required for the purpose of publication is available for that month, which is usually the case 10 business days after the end of the second month following the relevant month.

The actual costs caused by conversion activities can vary significantly, even though the general conditions shown in the model are almost the same. For example, the total commercial conversion costs across both of the old market areas were between EUR 5 million (GY 2019/20) and EUR 50 million (GY 2017/18 and 2020/21) without further costs such as shares in long-term bookings and costs of other conversion methods. In addition, there are periods in which very high costs were incurred for the procurement of low CV gas within a short space of time (for example, almost EUR 100 million within one week in February 2021). Even if these costs can only be attributed to the conversion system on a pro-rata basis, there are high margin requirements at the exchange, which must be taken into account as per the GaBi/Konni distribution.

The final balance determined for the combined conversion neutrality account for GY 2020/21 was EUR 186.5 million at the end of September 2021. This is made up of the conversion account balances of EUR 51.5 million in the GASPOOL market area and EUR 135 million in the NCG market area (at the end of GY 2019/20 the balances were still EUR 68.5 million (GASPOOL) and EUR 172.5 million (NCG)). Due to the higher costs compared to the forecast, the balance is thus below the liquidity buffer of EUR 212 million targeted for GY 2020/21.

The liquidity buffer is determined as part of internal THE risk assessments. In accordance with the ruling, this liquidity buffer serves to limit our risk exposure in the event of payment defaults and cases of insolvency, to pre-finance commercial conversion measures (incl. funds required for the pro-rata inclusion of costs for the contracting of long-term options and increased margin requirements of the clearing houses) and especially to manage the uncertainty associated with volume and price trends. In addition, the imminent termination of production of low CV gas from the Groningen field in the Netherlands poses a particular price risk. The prices for the procurement of low CV gas are far above the prices for the procurement of high CV gas, especially in winter. This effect could be further exacerbated by the reduction in low CV gas production volumes. However, in order to be able to ensure security of supply for low CV gas, the possible risk has been taken into account in the current liquidity buffer.

The market area merger will give rise to additional uncertainties with regard to future quantity and price development and a possible reorientation of market participants, which could have an impact on established processes (e.g., data exchange, procurement portfolio or billing processes). The resulting risks were taken into account in the liquidity buffer.

The influence of the individual risks on the liquidity buffer is shown in Table 3. Our risk assessment in this context covers both the full next conversion period (twelve months) as well as the winter season in the conversion period following the next conversion period, so that we can achieve the required balance in the conversion neutrality account by the start of that winter season.

THE aims to have **a liquidity buffer of EUR 98 million** at the end of the GY 2021/22 conversion period.

Risk	Explanation	Impact[1] on liquidity buffer
Volume risk	Uncertainties, especially due to weather conditions and the behaviour of market participants.	High
Price risk	Uncertainties, e.g., due to gas shortage or behaviour of market participants	High
Other model risks	Portfolio effects, MMMA, BKA	Medium
Margin increase	Margin requirement due to increased balancing gas demand	Low
Other risks	Legal disputes, payment delays, market area consolidation	Low

Table 3: Impact of the individual risks on the liquidity buffer

[1] The assessment of the individual risks results from the relation of the respective individual risk to the liquidity buffer of the conversion system

5 Necessity to retain the conversion fee

Section 3(c) of the operative provisions of the Konni Gas ruling imposes an obligation on THE to consider in its annual evaluation report whether it will be necessary to retain the conversion fee. These considerations are provided in this chapter.

5.1 Supply security risks dues to sharp drop in low CV gas production

Low CV gas production from the natural gas field in the Groningen area in the Netherlands has been impacted by unforeseeable cutdowns in production, which saw production output being scaled down enormously since 2013. On 29 March 2018[2], it was announced that gas production in the Groningen field would be discontinued. After a reduction in the production volume to below 11.8 bcm/a in GY 2019/2020, pro-duction is to be limited to 8.1 bcm/a for the gas year 2020/21 according to the decision of 21 September 2020[3]. After commissioning of the nitrogen blending plant in Zuidbroek (planned for April 2022), production is to be gradually reduced to zero.

The reason for the above cutbacks in/discontinuation of production is a rise in the frequency of earthquakes registered in the region around Groningen, the cause of which is assumed to be the extraction of natural gas from the field. On 8 January 2018 an earthquake with a magnitude of 3.4 on the Richter scale struck the Netherlands, the strongest since 2012. The reduction in low CV gas production could only be offset by creating additional technical conversion capacity or by reducing low CV gas demand. Legal claims to have sufficient supplies of low CV gas provided so that the demand of German end users can be met are only available under the existing long-term supply contracts signed by German gas suppliers and Dutch producers. For the security of the supply of German end users of low CV gas it is therefore essential that German gas suppliers do not terminate their existing long-term supply contracts for low CV gas prematurely.

THE is of the view that the conversion fee is one of the factors that will motivate German suppliers to uphold their existing long-term supply contracts for low CV gas. This effect results from the fact that the conversion fee provides an incentive for suppliers to physically provide low CV gas for the supply of low CV end users. The conversion fee can therefore contribute to preventing supply security risks in the German low CV network areas, also in the long term.

5.2 Costs incurred under the conversion mechanism

After the costs of the conversion system (viewed across Germany as a whole) had been rather low in GY 2018/19 and GY 2019/20 compared to 2017/18 (EUR 5 million and EUR 10 million, respectively), they

[2] Termination of natural gas extraction in Groningen (https://www.government.nl/documents/parliamentary-documents/2018/03/29/kamerbrief-over-gaswinning-groningen)
[3] Letter to Parliament on gas production in Groningen in gas year 2020-2021 (Dutch only, https://www.rijksoverheid.nl/onderwerpen/gaswinning-in-groningen/documenten/kamerstukken/2020/09/21/kamerbrief-gaswinningsniveau-groningen-gasjaar-2020-2021)

even exceeded the GY 2017/18 costs of EUR 48 million to reach EUR 51 million in GY 2020/21. Since no conversion neutrality charge was applied, the liquidity buffer in the conversion account, which weakens financial risks from the conversion system. Furthermore, due to trend situations such as under-supplied network accounts at very low temperatures, high proportions of balancing gas may not be allocated to the Konni system. Examples include the costs of procuring low CV gas of up to 400 GWh/day during the cold spell at the end of February/beginning of March 2018 and again at the end of January 2019, which were not allocated to the Konni system due to the lack of simultaneous sales in high CV gas.

Even so, our experiences in the NCG market area in spring 2016 and the strong increase in conversion volumes in both market areas in the last gas year have shown that there is a real risk of a full H-to-L market shift taking place – at least from a balancing perspective – if the H-to-L conversion fee is set too low. If this were to occur, it is likely that due to the large balancing requirements arising as a consequence especially in connection with the current gas prices, the costs incurred under the conversion mechanism would be high, resulting in a correspondingly high conversion neutrality charge which would then have to be borne by all market participants. Besides producing high costs, THE is of the view that such a development does not reflect the separate market roles as defined by law. The purpose of balancing actions should be to address gas imbalances on the gas networks but in no event should this mean that the MAM becomes the main buyer of gas in either gas quality.

In the other direction (L to H) we do not face such risks and problems on a comparable level. Despite the large-scale virtual conversion activities in this direction observed since the conversion fee for this direction is no longer charged, our conversion costs and technical and commercial conversion measures remained at a relatively low level.

As the above circumstances have not changed, it is our view that an appropriately priced H-to-L conversion fee – as defined in the amended Konni Gas ruling – remains a necessity.

6 Conversion outlook for gas year 2021/2022

As the current winter period is not yet complete at the time of publication of the Conversion evaluation report and final data are not yet available for most months, the evaluations in the outlook for the gas year 2021/22 must be interpreted with reservation. The cut-off date for data collection is 25 January 2022.

With regard to the virtual conversion quantities (see Figure 16) it can be observed that relatively large quantities have been converted in the direction from high CV to low CV quality (H to L) gas since October, which is untypical for the winter season. In the opposite direction from high CV gas to low CV gas, the quantities are below the cumulative quantity of the old market areas in the respective months of the previous year; in particular, the strong increase in January 2021 has not yet occurred in 2022. At this point one can only speculate whether this trend will continue in the further course of 2022 or what the reasons could be.

The technical conversion (see Figure 17, Figure 18 und Figure 19) remains at a low level due to the reasons mentioned in chapter 2.2. The net direction of the technical conversion of the facilities that are included in the transportation tariffs changes from month to month. With regard to the provisional values shown in Figure 17 it should be noted that the technical conversion quantities used for conversion purposes as part of Konni Gas have not yet been calculated. Figure 18 shows that so far it has not been necessary to use the blending facility in Nowega's network, for which THE has to pay. In November in particular, transportation conversion was used quite extensively (see Figure 19), which can be attributed to the generally high prices and thus also price differences between high CV gas and low CV gas for balancing actions taken in the opposite direction.

As expected, the development of the virtual and technical conversion quantities in the first months of GY 2021/22 is reflected in a similar trend for the commercial conversion quantities. As can be seen in Figure 20 it is rarely necessary to resort to take balancing actions in the opposite direction. Due to the strong increase in gas prices at the beginning of the gas year, comparatively high costs were incurred for the very small quantities (see also Figure 21). The enormously high but at times also rapidly fluctuating prices led to the curious situation in December that THE was even able to achieve revenues of approx. EUR 200,000 on one day (16 December) through commercial conversion in the L-to-H direction.

It remains to be seen whether there will be a cold spell in February/March 2022 and/or whether conversion will again increase further in the H-to-L direction. It is also not yet clear how the costs attributable to the conversion system will develop over the course of the gas year. If conversion volumes similar to the first quarter of 2021 should occur at the current high prices, the conversion account will probably be very heavily debited. In general, the conversion behaviour in the joint market area remains difficult to assess; the unusual price situation in connection during the phase in which all players have to become familiar with a joint market area does not currently allow any reliable predictions.

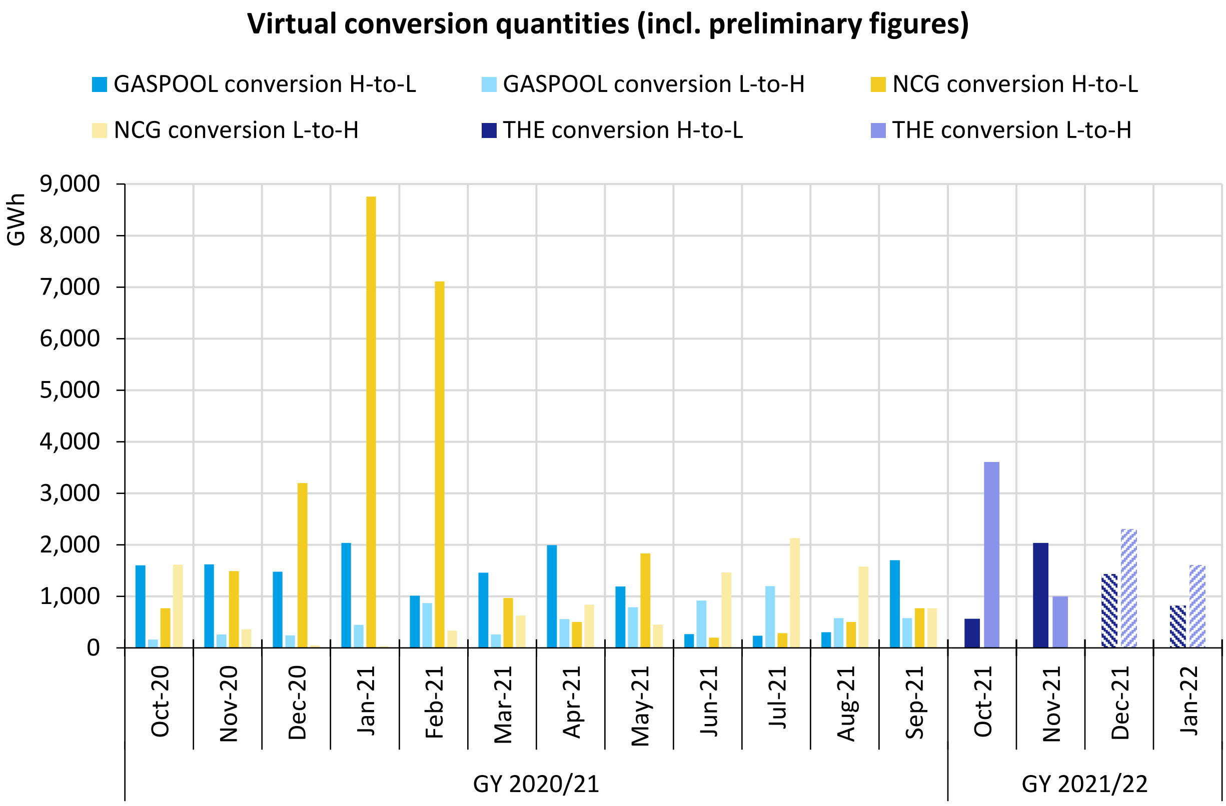

Figure 16: Virtual conversion quantities (incl. preliminary figures)

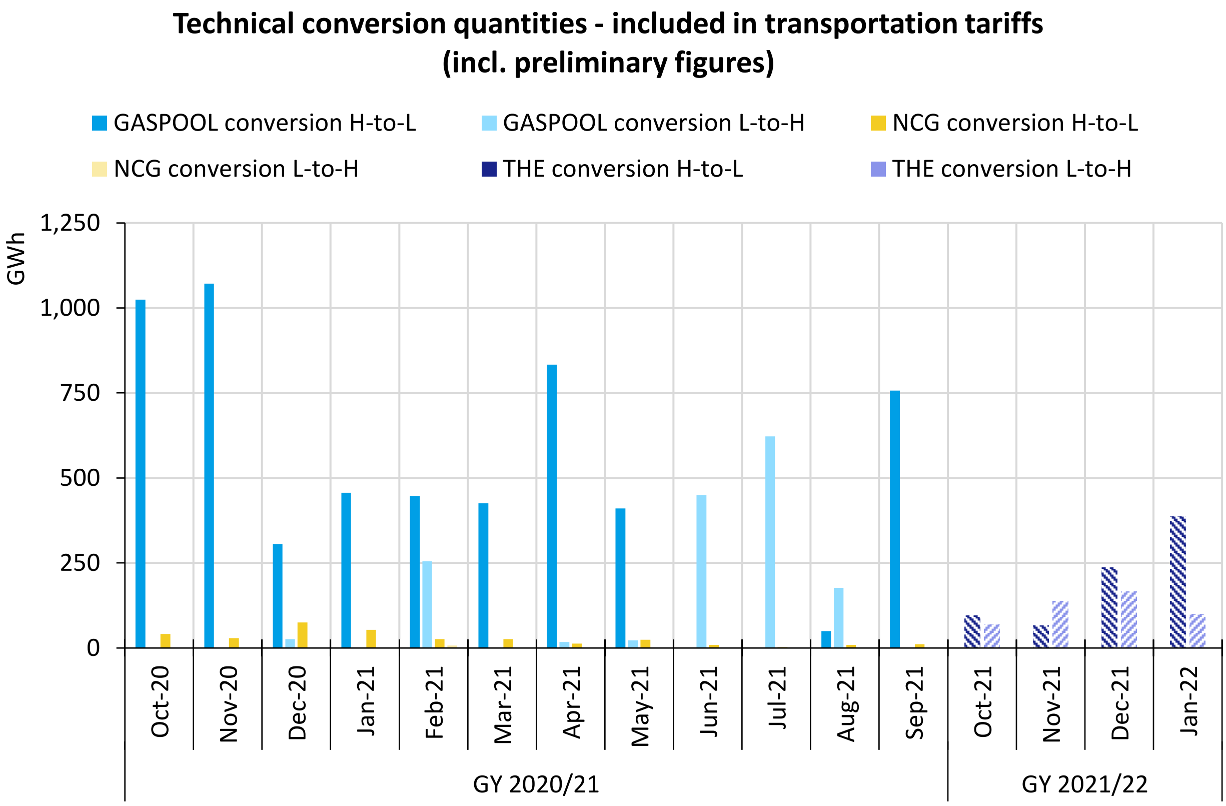

Figure 17: Technical conversion quantities - included in transportation tariffs (incl. preliminary figures)

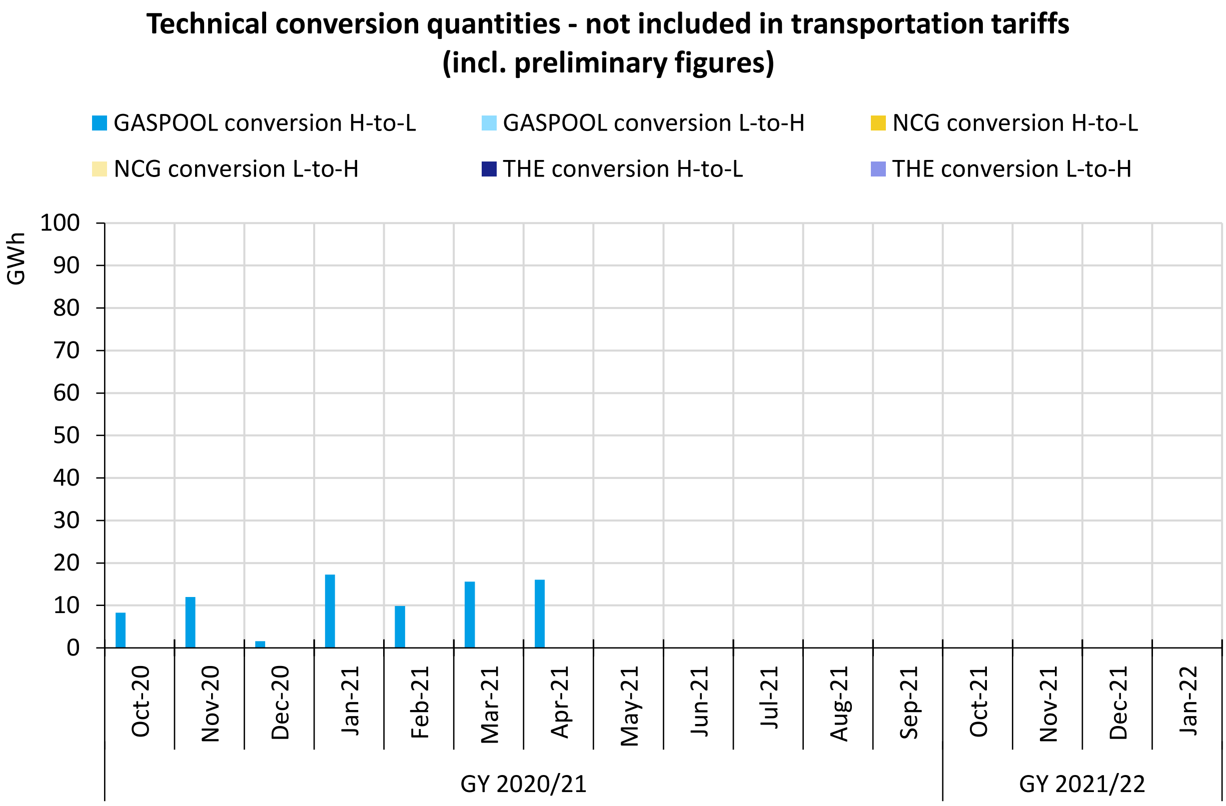

Figure 18: Technical conversion quantities - not included in transportation tariffs (incl. preliminary figures)

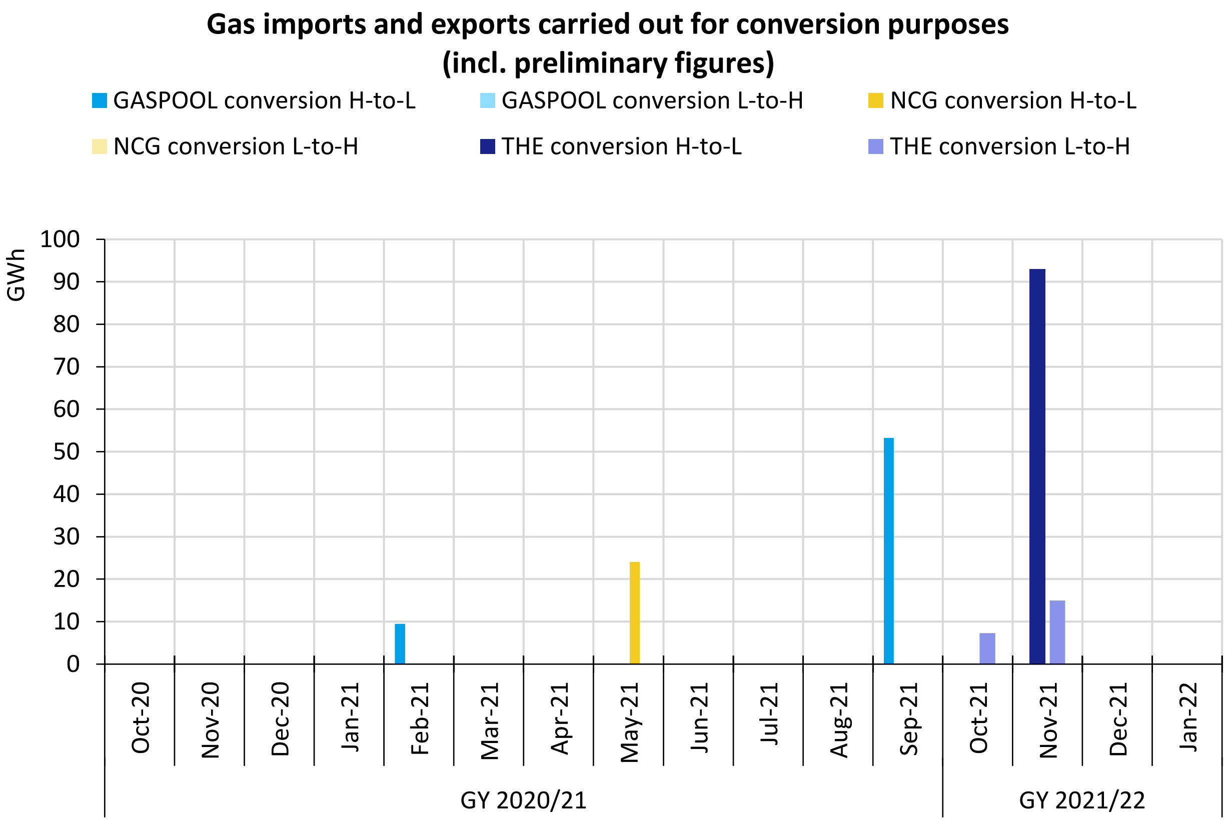

Figure 19: Gas imports and exports carried out for conversion purposes (incl. preliminary figures)

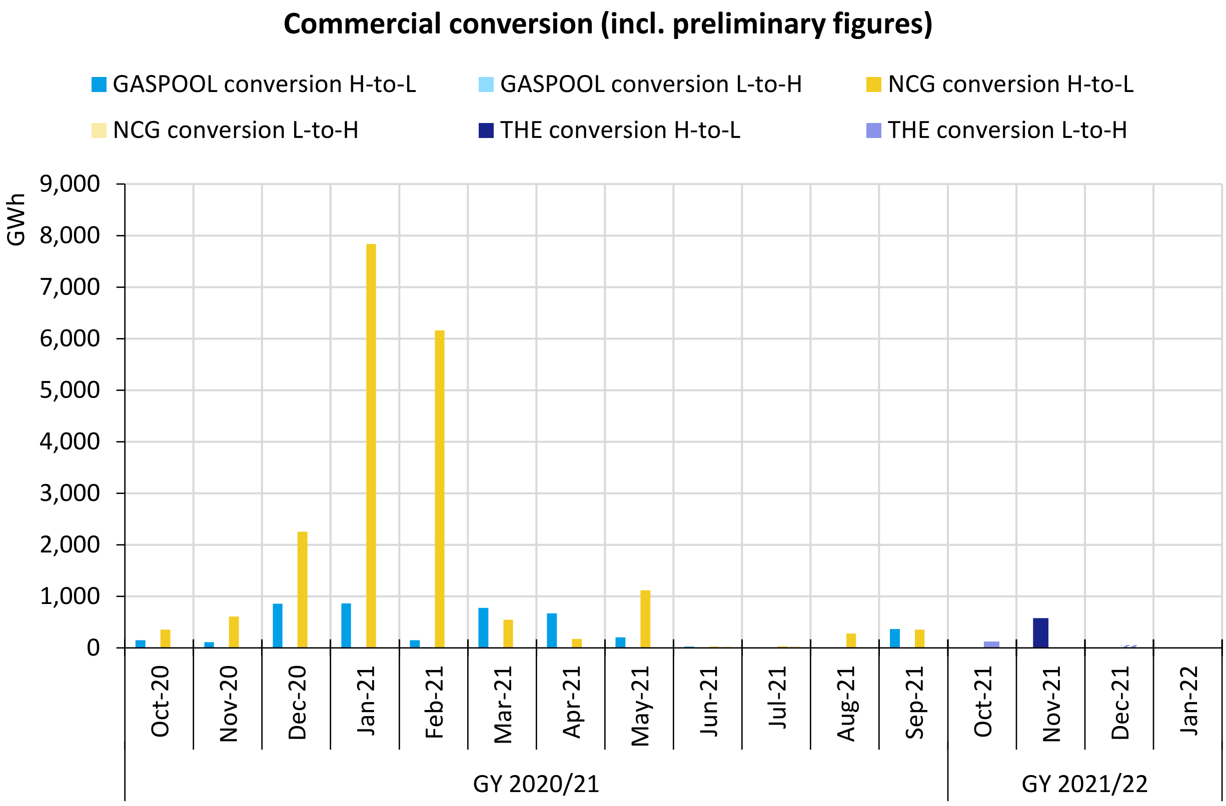

Figure 20: Commercial conversion quantities (incl. preliminary figures)

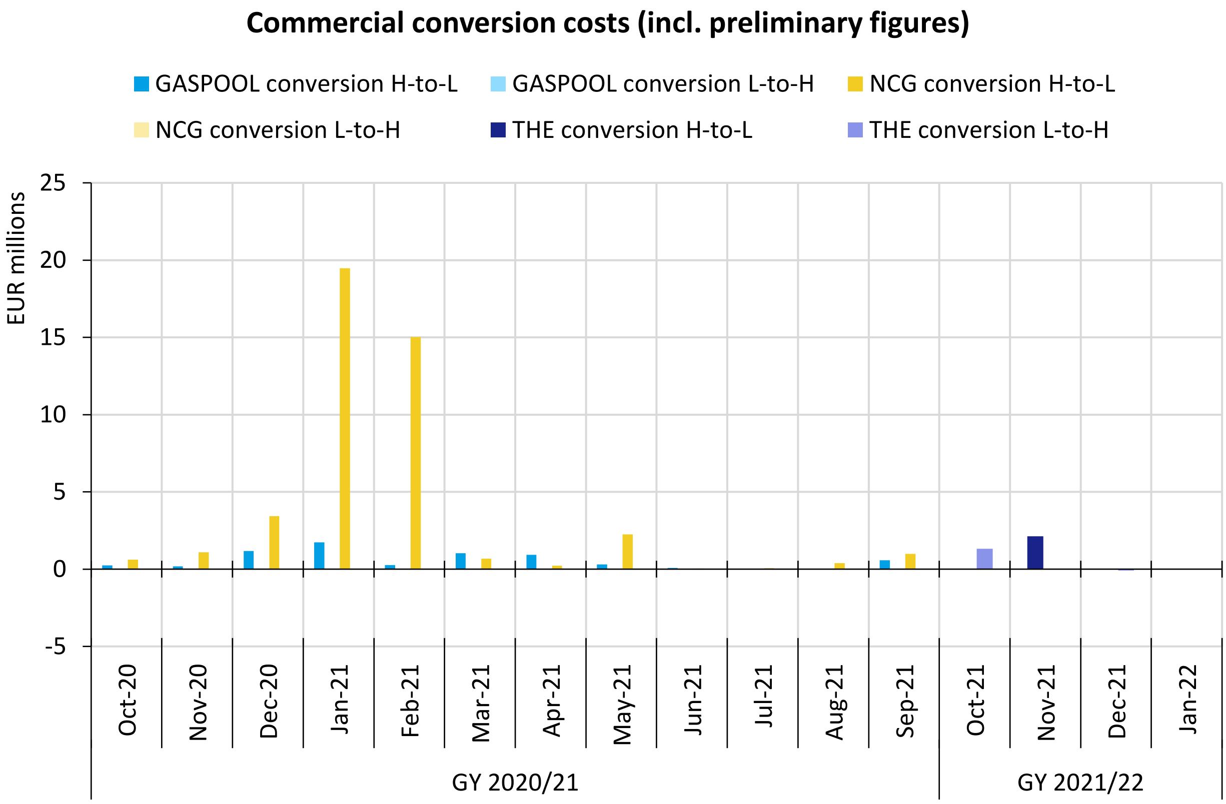

Figure 21: Commercial conversion costs (incl. preliminary figures)

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