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EVALUATION REPORT ON THE GAS QUALITY CONVERSION MECHANISM

Current as at January 2020

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DEFINITIONS

VIRTUAL CONVERSION QUANTITY

The quantity converted and invoiced for each balancing group portfolio under the cross-quality energy balancing mechanism, i.e. if the high CV and low CV gas balances determined for a master balancing group 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 reverse direction is defined as virtual conversion from low CV to high CV quality (L to H). The term "virtual conversion" may also refer to the sum of the virtual conversion quantities determined for the individual balancing groups.

SYSTEM-WIDE VIRTUAL CONVERSION QUANTITY

One of the alternative approaches for determining the actual overall conversion quantity: The sum of all inputs and offtakes across all balancing group portfolios with allocations for gas of both gas qualities is determined (separately) for each gas quality. If the resulting high CV and low CV gas balances are in opposite directions (different algebraic signs), then the smaller of the two quantities (as measured in terms of their absolute values) represents the system-wide virtual conversion quantity.

From the quantity thus obtained the technical conversion quantities that have been converted exclusively for virtual conversion purposes must be deducted. In this calculation all balancing group portfolios comprising at least one subordinate balancing group for gas of a quality different from the gas quality of the master balancing group are taken into account. Both the master balancing group and the subordinate balancing group must be actively used, i.e. both must have been declared as receiving data for 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 supplied/received as part of the external balancing actions carried out 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 smaller 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 or the “physical” approach. NCG uses the virtual conversion quantity.

Technical conversion

This refers to the gas quantities technically converted by means of mixing plants owned by the transmission system operators OGE and TG. OGE operates mixing plants converting between both gas qualities (from high CV to low CV quality and vice versa), whereas the Thyssengas mixing plants convert high CV gas to low CV gas only. The technical conversion quantity is composed of quantities used for system stability (shift of internal balancing gas and/or externally procured global balancing gas) and quantities used for balance-sheet grid-wide conversion.

Transportation conversion

Gas can be shifted between gas qualities by booking and nominating capacities in opposite directions at cross-border interconnection points with the Netherlands. The (intra-)day export of high CV gas to the Netherlands in combination with the simultaneous import of the same quantity of low CV gas from the Netherlands is referred to as transportation conversion in the "high-to-low CV" direction, while the import of high CV gas in combination with the export of low CV gas is referred to as transportation conversion in the "low-to-high CV" direction.

1. INTRODUCTION

NCG has been operating a multi-quality market area since 1 April 2011. The rules for the gas quality conversion mechanism were set out in an administrative ruling handed down by the German national regulatory authority Bundesnetzagentur (hereinafter referred to as the "Federal Network Agency") on 28 March 2012 (ref: BK7-11-002, the so-called "Konni Gas" decision), which was later amended by the Federal Network Agency's decision of 21 December 2016 (ref: BK7-16-050, below referred to as the "amended Konni Gas ruling").

NCG has an obligation under both the original as well as the amended Konni Gas rulings to submit an annual evaluation report on the development and evaluation of the conversion mechanism by 1 February every year. The present evaluation report describes the conversion developments with a focus on the fifteenth conversion period (CP) (1 October 2018 to 30 September 2019) 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 amended Konni Gas ruling came into force on 1 April 2017 and brought some important changes to the rules governing the conversion mechanism. While the amended Konni Gas ruling allows for the H-to-L conversion fee to be retained permanently, no conversion fee may be applied any longer for the conversion of gas from low CV to high CV quality (L to H).

Since April 2017 the conversion fee has been determined using an incentive-based approach. On the one hand, market participants are to be given sufficient incentives for using the virtual conversion mechanism available in the multi-quality market areas. On the other hand, it is to be avoided that the resulting commercial conversion measures to be taken by the market area manager (MAM) rise to such a scale as to make the MAM the main buyer of low CV gas in the course of its balancing activities. Another change related to the duration of the conversion fee validity period, which has been extended from six months to a full gas year effective 1 October 2017.

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. those 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 current gas year on the basis of the information available to date.

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 our market area became a multi-quality market area on 1 April 2011 (for further information, please refer to our previous evaluation reports). While in 2013 market participants temporarily tended to convert relatively large quantities from low CV to high CV quality (L to H), it was not until 2015 that a fundamental trend emerged, with market participants now using the system in the other direction to convert gas from high CV to low CV quality (H to L).

Since the start of the thirteenth conversion period, which began on 1 April 2017, the partially changed conversion rules as set out in the amended Konni Gas ruling have been in effect. In line with the newly defined fee cap, we set our conversion fee (H to L) at 0.45 EUR/MWh. Under the amended Konni Gas ruling no conversion fee was to be applied any longer in the opposite direction (L to H). In the thirteenth conversion period market participants' use of the conversion mechanism accelerated further and rose to the highest level since the multi-quality market area was launched. With the L-to-H conversion fee down to zero, the major share of these conversion activities took place in this direction. In the H-to-L direction, market participants made only little use of the virtual conversion mechanism. The fourteenth period showed a continuation of this behaviour. Again, large quantities are converted from low CV gas to high CV gas in the direction which is not subject to a conversion fee. The use of the opposite direction continues to lag behind and is basically limited to the winter months.

Table 1 shows the net virtual conversion quantities along with the conversion fees applicable in each direction for each conversion period.

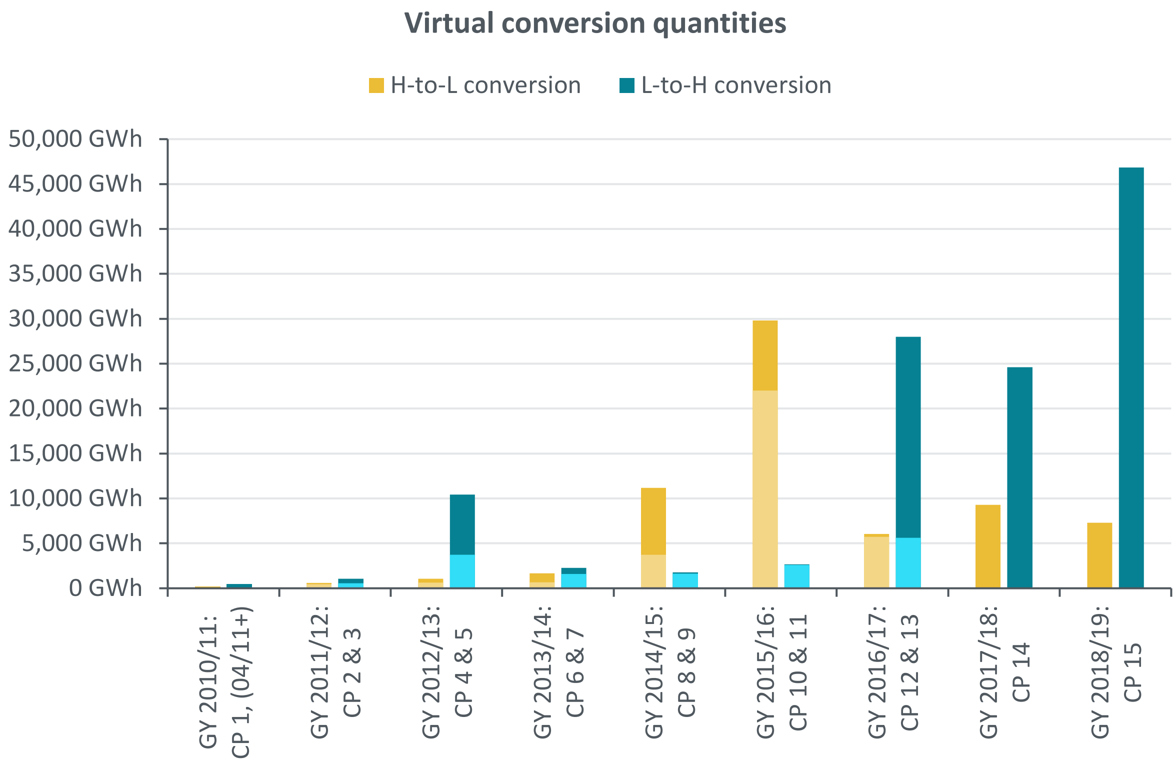
The aggregate virtual conversion quantities determined for the balancing group managers (BGMs) active in the market area and the actual overall conversion quantities (as determined according to the system-wide virtual approach) determined for the previous conversion periods are shown by gas year in Figure 1. The light colours in the chart represent the first conversion period and the dark colours the second conversion period falling within each gas year, respectively. From the fourteenth period onwards, they cover an entire gas year. Due to netting effects the actual overall conversion quantities are lower than the virtual conversion quantities. Netting effects result from the mutual offsetting of inputs and offtakes when calculating the sums for the entire market area in each gas quality.

In this context 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 takes place from high CV to low CV quality (H to L). The term "market shift" describes the proportion (in per cent) in which exit points using gas of one gas quality are supplied with gas of the other gas quality via the virtual conversion mechanism. Please note when comparing the related percentages that total gas demand in the high CV sectors of the

No.	Conversion period	Conversion fee (H→L)	Conversion fee (L→H)	Net virtual conversion quantity	Direction of conversion (net)
1	1/04/2011 - 30/09/2011	2.000 EUR/MWh	2.000 EUR/MWh	333 GWh	L→H
2	1/10/2011 - 31/03/2012	1.500 EUR/MWh	1.500 EUR/MWh	98 GWh	L→H
3	1/04/2012 - 30/09/2012	0.900 EUR/MWh	0.900 EUR/MWh	356 GWh	L→H
4	1/10/2012 - 31/03/2013	0.700 EUR/MWh	0.700 EUR/MWh	3,086 GWh	L→H
5	1/04/2013 - 30/09/2013	0.600 EUR/MWh	0.600 EUR/MWh	6,294 GWh	L→H
6	1/10/2013 - 31/03/2014	0.600 EUR/MWh	0.600 EUR/MWh	917 GWh	L→H
7	1/04/2014 - 30/09/2014	0.400 EUR/MWh	0.400 EUR/MWh	296 GWh	H→L
8	1/10/2014 - 31/03/2015	0.400 EUR/MWh	0.400 EUR/MWh	2,102 GWh	H→L
9	1/04/2015 - 30/09/2015	0.300 EUR/MWh	0.300 EUR/MWh	7,288 GWh	H→L
10	1/10/2015 - 31/03/2016	0.300 EUR/MWh	0.300 EUR/MWh	19,416 GWh	H→L
11	1/04/2016 - 30/09/2016	0.453 EUR/MWh	0.453 EUR/MWh	7,722 GWh	H→L
12	1/10/2016 - 31/03/2017	0.453 EUR/MWh	0.000 EUR/MWh	97 GWh	H→L
13	1/04/2017 - 30/09/2017	0.450 EUR/MWh	n/a	22,030 GWh	L→H
14	1/10/2017 - 30/09/2018	0.450 EUR/MWh	n/a	15,325 GWh	L→H
15	1/10/2018 - 30/09/2019	0.450 EUR/MWh	n/a	39,567 GWh	L→H

Table 1: Net virtual conversion quantities

market area significantly exceeds total gas demand in the low CV sectors, among other reasons due to transit transports. The market shift figures to date in each direction are shown in Figure 2 for an entire gas year.



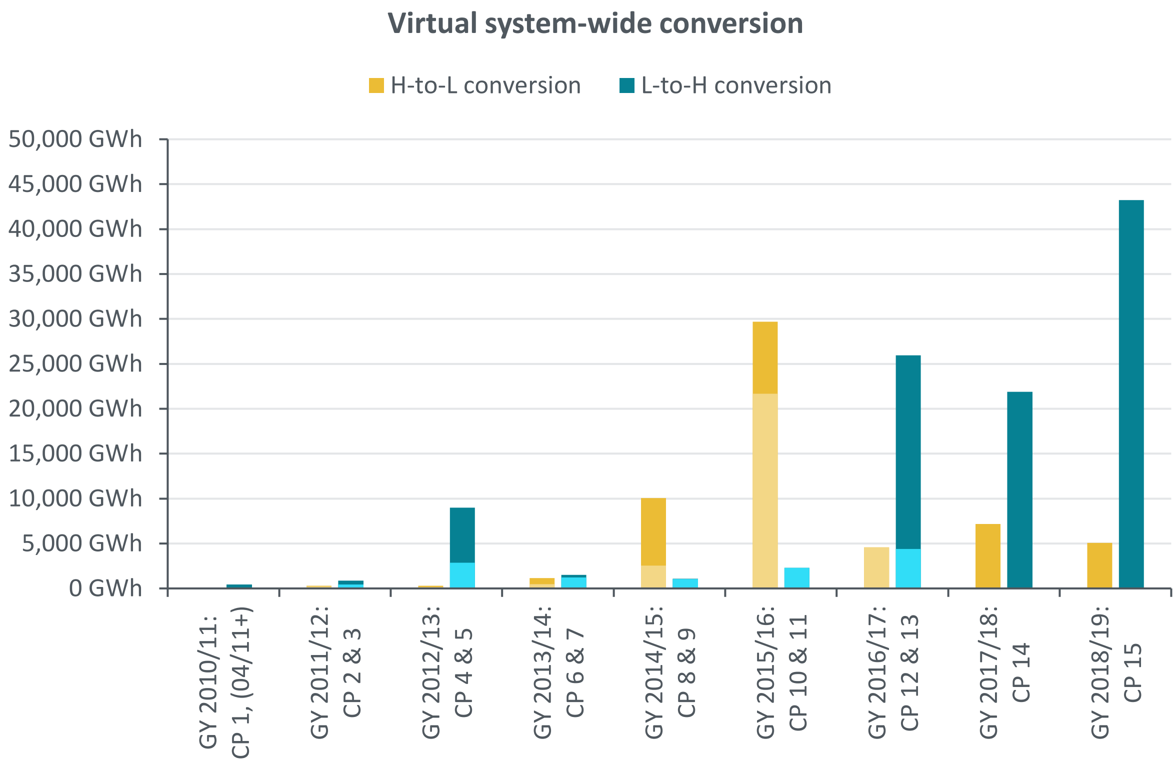


Figure 1: Virtual conversion quantities

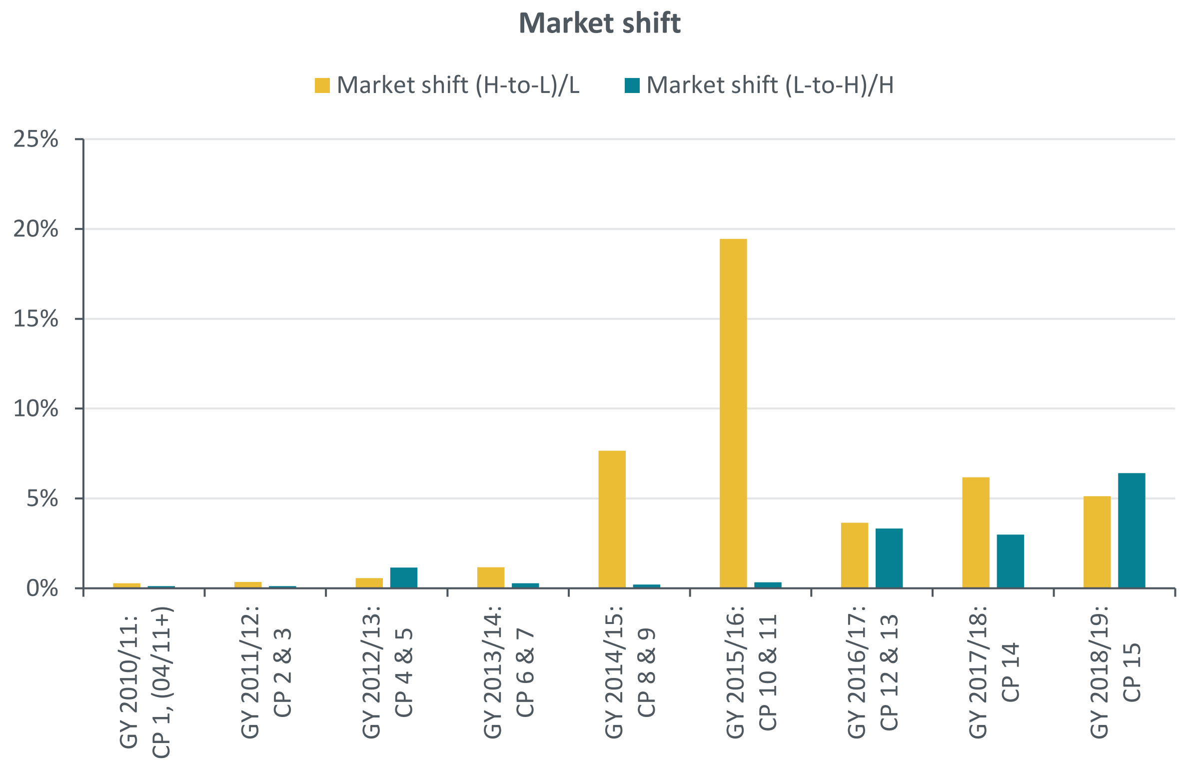


Figure 2: Market shifts

2.2. Technical conversion quantities

At present, OGE and TG own technical conversion facilities in the NCG market area. OGE's Werne gas mixing plant is capable of adding both low CV gas to the high CV system and high CV gas to the low CV system. OGE's Scheidt mixing plant adds low CV gas to the high CV system. TG, in contrast, has a gas-air mixing plant located in Broichweiden. The facility adds air to high CV gas in order to obtain low CV gas. No third-party conversion facilities are currently used. So far, the use of the OGE and TG mixing plants has not generated any additional costs that would need to be recovered through the conversion fee.

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. The resulting utilisation of the technical mixing plants in our market area is shown by gas year in Figure 3. The light colours in the chart represent the first conversion period and the dark colours the second conversion period falling within each gas year, respectively. From the fourteenth period onwards, they cover an entire gas year.

Since March 2015, there has been a considerable decline in the technical conversion capability for the conversion of gas from high CV to low CV quality, most notably at the Werne gas mixing plant. It is assumed that this development can be attributed to the increased technical conversion activities in the Dutch gas transmission system, where high CV gas is converted to

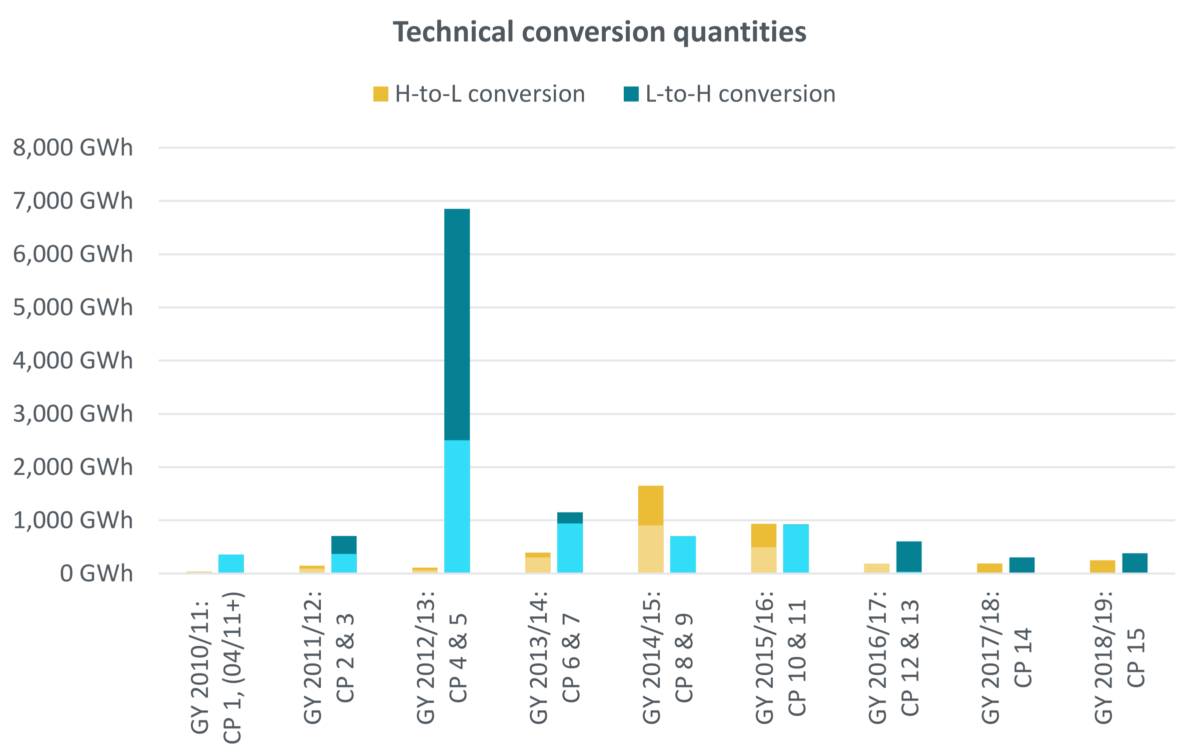


Figure 3: Technical conversion quantities

low CV gas through the addition of nitrogen. As nitrogen is added, the Wobbe Index of the low CV gas received from the Netherlands rises, which results in a higher calorific value. This in turn limits the high CV to low CV conversion capability of the Werne mixing plant. In view of the expected decline in Dutch low CV gas production volumes from the Groningen gas field, we assume that the conversion capability of the Werne mixing plant will continue to be subject to limitations.

TRANSPORTATION CONVERSION

Transportation conversion as a commercial technical conversion activity is always used when booking capacities in opposite directions to and from the Netherlands results in lower overall costs than the corresponding purchase and sale of balancing gas in opposite directions. This activity has been in use since September 2018 and accounts for only a very small proportion of total conversion. The days and quantities are shown in Table 2.

Gas day	Transportation conversion (H → L)		Transportation conversion (L → H)	
11.09.2018	24 GWh	€35,738.34	0 GWh	- €
29.09.2018	24 GWh	€35,738.34	0 GWh	- €
30.09.2018	24 GWh	€35,738.34	0 GWh	- €

Table 2: Transportation conversion quantities and costs

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 quantity converted through commercial conversion measures is to calculate the sums of the balancing quantities sold in the gas quality for which there is an oversupply and the balancing quantities purchased in the gas 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 even within one gas quality balancing actions have been taken in opposite directions, 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).

Developments in the conversion periods covered by this report

The extreme levels to which our commercial conversion activities rose in the spring of 2016 have not been seen again to date. As virtual conversion activities in the H-to-L direction decreased in January 2017, the scale of our commercial conversion measures in this direction also went down. However, the winter months of December 2017 to March 2018 have seen virtual conversion quantities of up to 400 GWh per day and over 3 TWh per month, resulting in commercial conversion quantities of over 200 GWh per day and 2 TWh per month.

Increased virtual conversion activities in the L-to-H direction, most notably in the summer months of the previous gas year, meant that our commercial conversion activities in this direction (L to H) also accelerated, albeit to a lesser extent. 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 we have to carry out fewer technical and/or commercial conversion measures. This effect was also observed in the fifteenth period and led to a decline in commercial conversion activities in the L-to-H direction despite a further increase in virtual conversion quantities.

Figure 4 summarises the commercial conversion quantities determined for each of the conversion periods by gas year and provides a graphical illustration of their development. The light colours in the chart represent the first conversion period and the dark colours the second conversion period falling within each gas year, respectively. From the fourteenth period onwards, they cover an entire gas year.

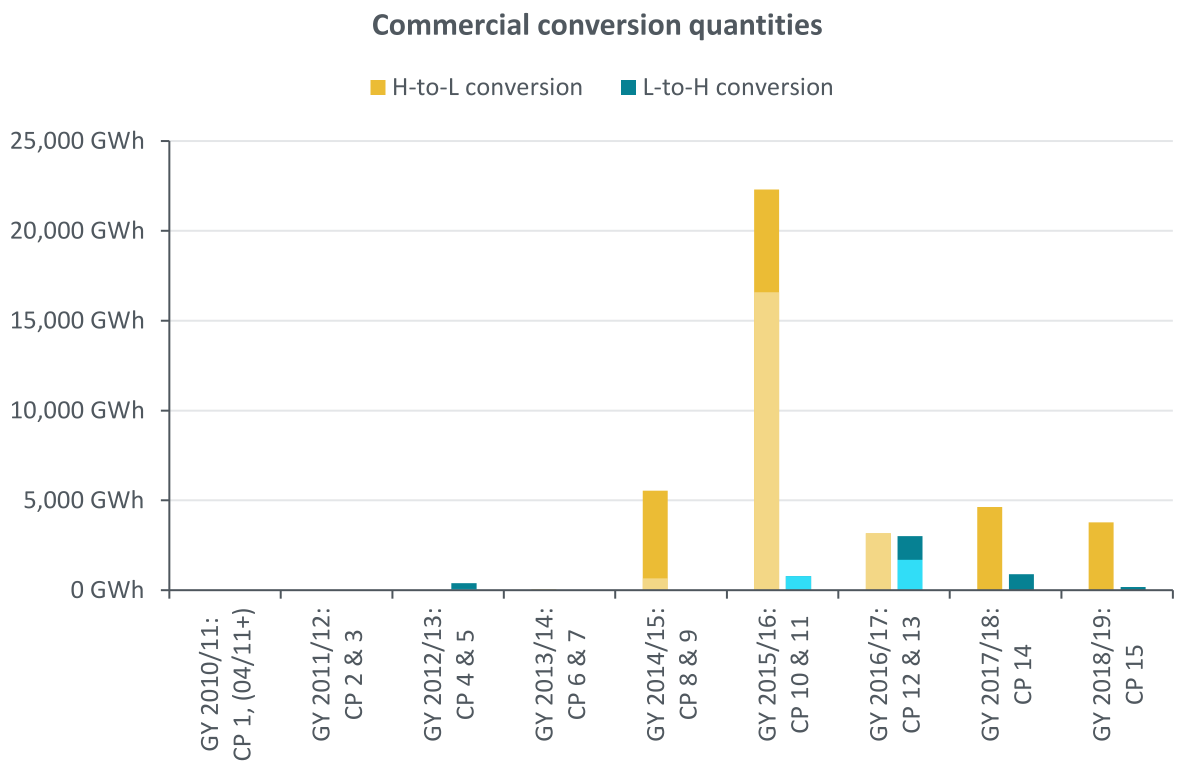


Figure 4: Commercial conversion quantities

2.4. Development of total physical inputs across all balancing groups

According to the Konni Gas ruling, the MAM may levy a conversion neutrality charge on BGMs if the revenues generated from conversion fee payments are insufficient to recover the costs incurred under the conversion mechanism. The conversion neutrality charge is levied on all physical inputs, or the relevant allocations, as allocated to a balancing group of the “FZK” type (i.e. freely allocable capacities not subject to any transportation route restrictions) or to a balancing group of the “DZK” type (i.e. directly allocable capacities). Purely virtual inputs, such as trades on the virtual trading point and physical inputs into a BZK balancing group are not taken into account.

Conversion neutrality charges are currently applied to the following input data series types:

- inputs of the “Entryso” type
- inputs of the “Entry Biogas” type
- inputs of the “Entry Wasserstoff” type

The relevant physical gas deliveries in each gas year are shown in Figure 5 , with the light colours in the chart representing the first conversion period and the dark colours representing the second conversion period falling within each gas year, respectively. From the fourteenth period onwards, they each cover an entire gas year.

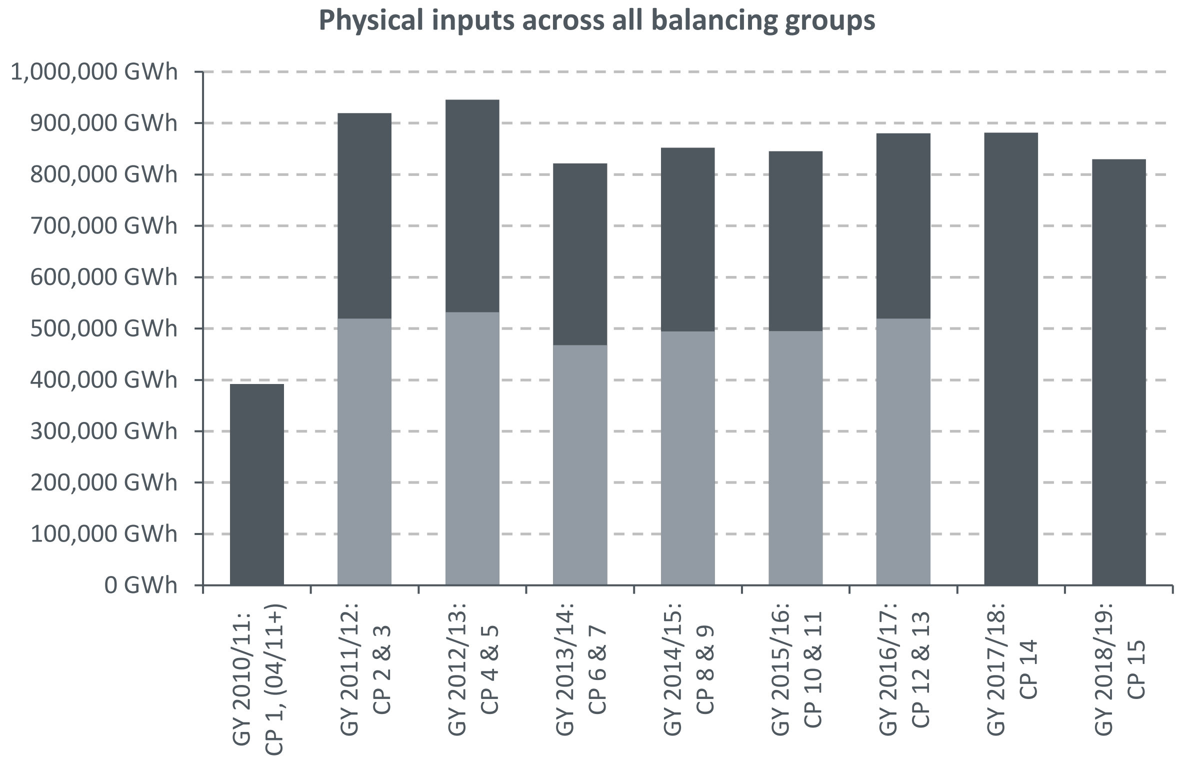


Figure 5: Physical inputs

3. EVALUATION OF THE CONVERSION SYSTEM ON THE BASIS OF THE INDICATORS USED FOR DETERMINING THE INCENTIVE-BASED CONVERSION FEE

Under the amended Konni Gas ruling we have to determine 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. Apart from the three indicators proposed by the BNetzA, NCG uses two additional indicators. The first four of these indicators also represent a suitable instrument for evaluating the conversion system and are therefore also used in the Evaluation Report:

- Virtual conversion quantities converted from high CV to low CV quality relative to the total low CV gas demand in the market area (Indicator 1)
- Balancing quantities supplied/received for H-to-L conversion purposes relative to total balancing quantities supplied/received (Indicator 2)
- Balancing quantities supplied/received for H-to-L conversion purposes relative to the total low CV gas demand in the market area (Indicator 3)
- Low CV gas quantities purchased for balancing purposes relative to the total low CV gas demand in the market area (Indicator 4)

The development of the cost parameters at the NCG and TTF VTPs and the transportation costs between the NCG and TTF market areas can be derived from indicator five:

- Determination of the "commercial break-even point" at which the cost of procuring low CV gas on the Dutch trading hub TTF and transporting it to the low CV gas networks of the NCG market area equals the cost of procuring high CV gas in the NCG market area and using the virtual conversion mechanism to meet a demand for low CV gas as a function of the conversion fee level (Indicator 5)

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) for each of the previous conversion periods. Figure 6 shows the maximum daily share in the respective month starting in October 2012. The graph also shows the conversion fee applicable in the respective month.

Indicator 1 clearly shows the dependence of the virtual conversion quantities on the given conversion fee. The reduction in April 2015 to 30 ct/MWh led to an increase in the low CV gas exits (maximum daily values) relying on high CV gas and quality conversion to over 50 %, rising even to over 70 % in the 2015/2016 winter season. After the fee was set at 45 ct/MWh, the share of low CV gas sales attributable to virtual conversion dropped to a level that can be handled by the system, which also reflects a relevant use of the conversion system.

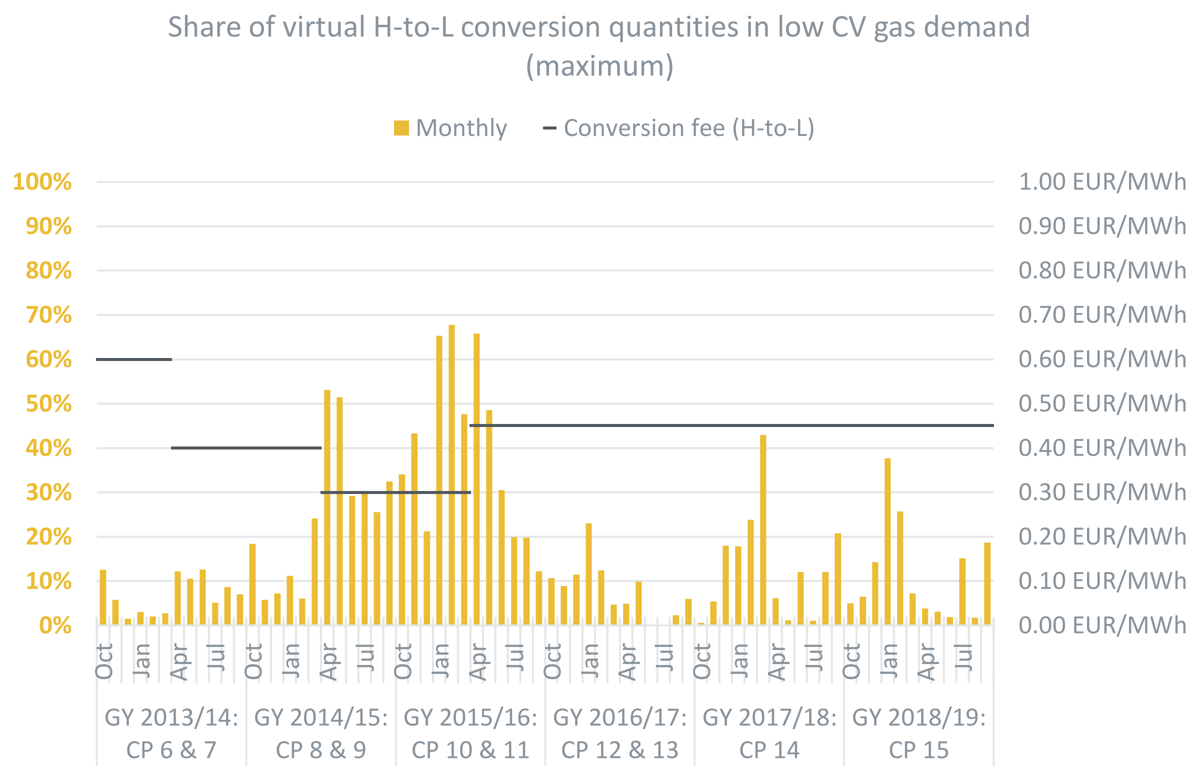


Figure 6: Indicator 1 - Virtual conversion quantities as a proportion of low CV gas demand

3.2. Indicator 2: Balancing quantities supplied/received for H-to-L conversion purposes relative to total balancing 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 for each of the previous conversion periods. Figure 7 shows the arithmetic mean across all daily shares for the respective month from October 2012 onwards. The graph also shows the conversion fee applicable in the respective month.

NCG 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 development similar to the other indicators can be seen in indicator 2: After the share of balancing gas used for commercial conversion had increased to monthly averages of over 40%, rising above 75% in the 2015/2016 winter season, as a result of a fee reduction to 30 ct/MWh in April 2015, they dropped back to averages the system can handle when the fee was raised to 45 ct/MWh. In the winter months in particular, commercial conversion still accounts for up to half of the balancing gas used.

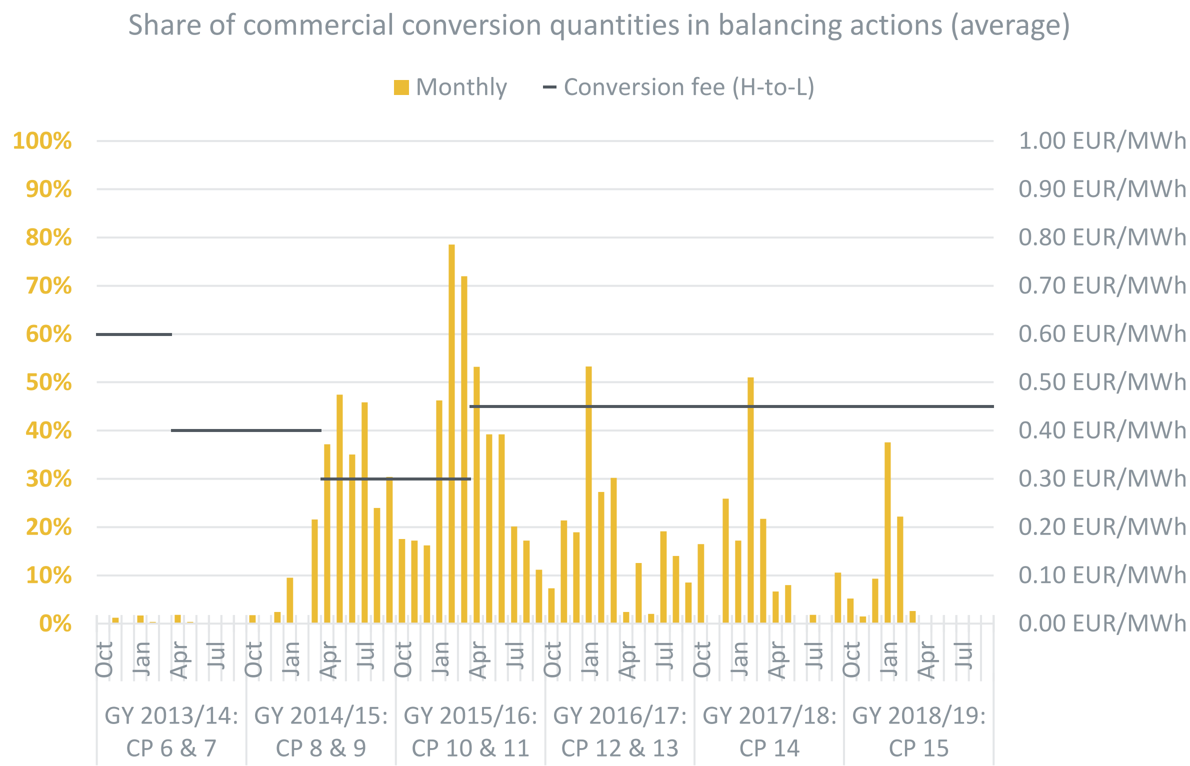


Figure 7: Indicator 2 - Commercial conversion quantities as a proportion of total balancing quantities supplied/received

3.3. Indicator 3: Balancing quantities supplied/received for H-to-L 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. Figure 8 shows the maximum daily share in the respective month from October 2012 onwards. The graph also shows the conversion fee valid in the respective month.

We believe that this indicator is suitable for helping us assess whether market participants' conversion behaviour might result in NCG becoming the main buyer of low CV gas. The trends observed for the indicators referred to above can also be found for indicator 3. Again, the share of low CV gas sales attributable to commercial conversion rises significantly when the conversion fee is reduced to 30 ct/MWh (maximum daily values of over 60%) and, after the conversion fee is raised to 45 ct/MWh, it falls back to a level of generally below 30% from April 2016, which the system can handle.

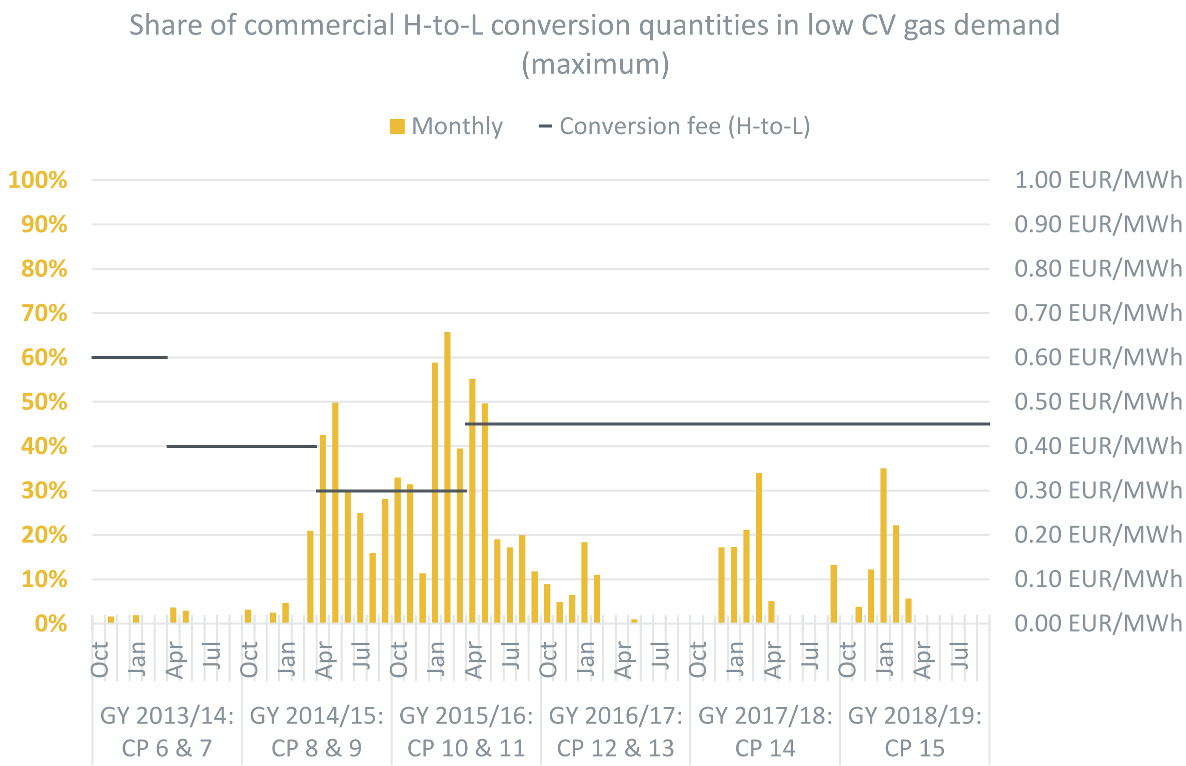


Figure 8: Indicator 3 – Commercial conversion quantities as a proportion of low CV gas demand

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. Figure 9 shows the maximum daily share in the respective month starting in October 2012. The graph also shows the conversion fee applicable in the respective month.

This indicator shows to what extent we procure gas for the supply of 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 which we purchase as part of our balancing actions as a proportion of total low CV gas demand thus shows directly to what degree NCG is becoming a buyer of low CV gas.

Indicator 4 also clearly reflects the effects of the reduction of the conversion fee in April 2015 to 30 ct/MWh: The share of low CV gas customers supplied with balancing gas had always been below 20% before, but after April 2015 it first rose to over 50% and then in the following winter period reached maximum values of almost 90%. When the conversion fee was raised to 45 ct/MWh in April 2016, the maximum quantities procured by NCG returned to an acceptable range (with the exception of the first two months of April/May 2016). However, especially in the winter season, the quantities of low CV gas we have to procure as balancing

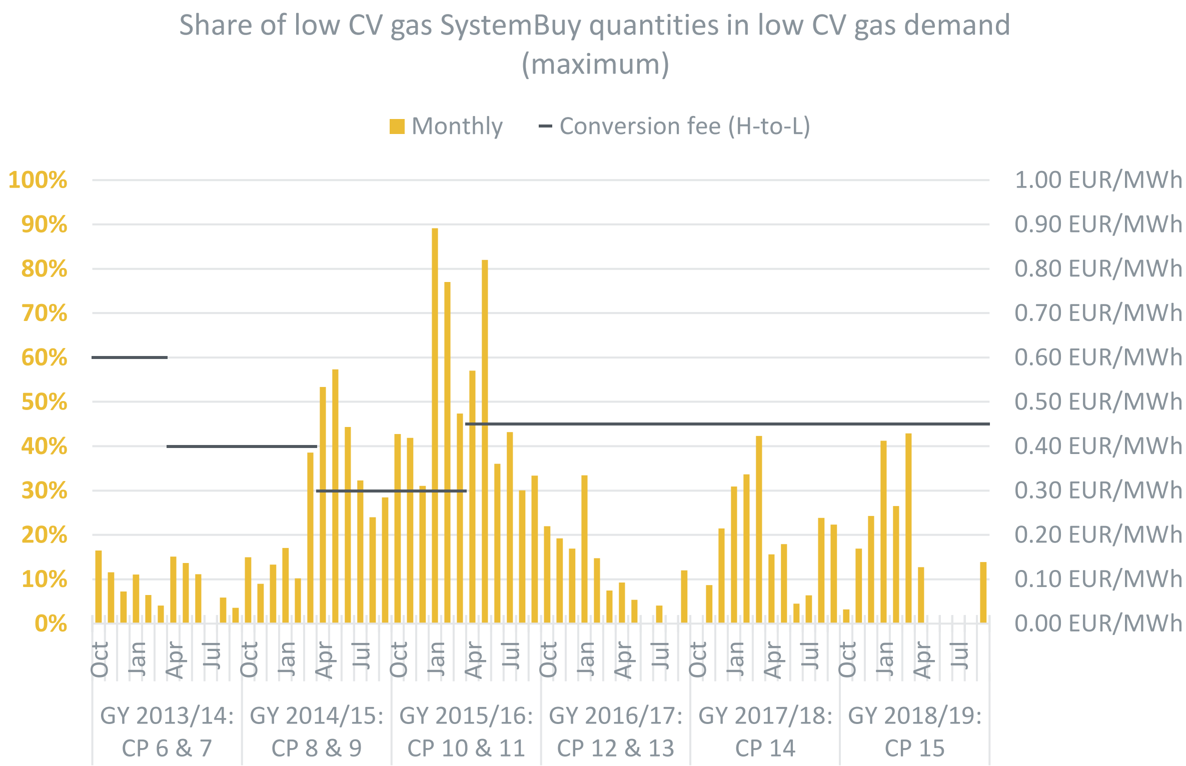


Figure 9: Indicator 4 – Low CV gas SystemBuy quantities as a proportion of low CV gas demand

gas continue to rise regularly to almost 50 %. If levels of 50 % or more continue for extended periods, then this would lead to high conversion system costs.

3.5. Indicator 5: Commercial break-even point

We calculated this indicator by determining in relation to the conversion fee level at what point the costs (including transportation costs) market participants incur when they physically provide low CV gas procured on the Dutch trading hub TTF are comparable to the costs they incur when providing high CV gas sourced from within the NCG market area, which is the point we refer to as the “commercial break-even point”. This point is reached when the following equation is true:

> TTF price + transportation costs (NL to DE) + conversion neutrality charge = NCG price + VTP fee + conversion fee

Solving this for the conversion fee gives the following equation for calculation of the fee:

> Conversion fee = (TTF price - NCG price) + transportation costs (NL to DE) + conversion neutrality charge - VTP fee

This indicator provided the basis for determining the conversion fee and the applicable fee cap in the context of the original Konni Gas ruling and in our view is the most important indicator. It takes account of the different procurement routes available for the supply of low CV gas to end users in our multi-quality market area and relates them to another. Market participants have the option to supply end users of low CV gas either by actually delivering low CV gas, especially low CV gas from the Netherlands, or by providing high CV gas and making use of the virtual conversion mechanism. It is likely that market participants would tend to seek to procure their gas in Germany if the costs for doing so and subsequently converting the required quantities are lower than for the other alternatives.

Figure 10 shows the development of the conversion fee thus determined on a monthly basis since October 2016. Due to the fluctuating transportation costs over the year, the calculated break-even values vary, albeit only slightly from year to year.

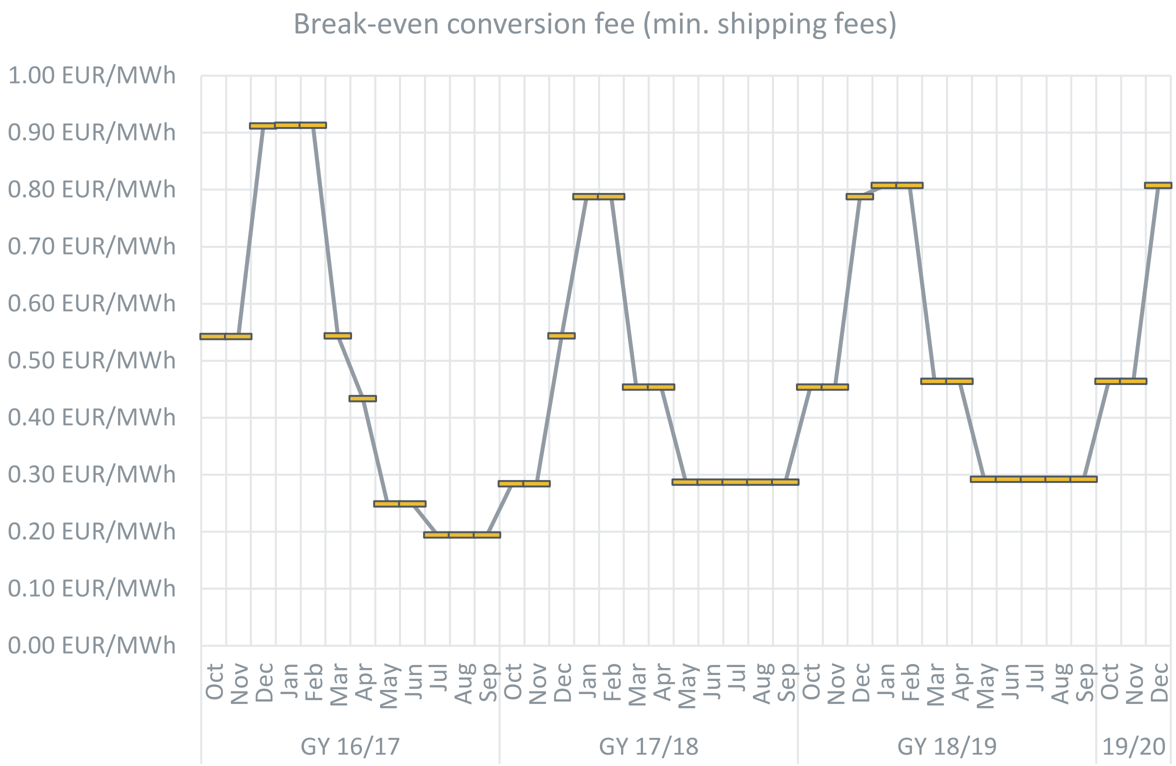


Figure 10: Indicator 5 - Economic "break even" point

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. To date no revenues have been generated from commercial conversion measures. Theoretically, such revenues could 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 mixing plants – the latter is not the case at NCG.

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.

After costs almost doubled in the fourteenth period, they have fallen back to the previous year's level in the current fifteenth period, contrary to forecasts. Setting the conversion neutrality charge at 0.15 EUR/MWh for the fifteenth period primarily generated revenues from the conversion neutrality charge. This resulted in a significant revenue increase due to the lower costs.

Our conversion costs and conversion revenues are shown by gas year in Figure 11, with the light colours in the chart representing the first conversion period and the dark colours representing the second conversion period falling within each gas year, respectively. The fourteenth and fifteenth period each cover the entire gas year.

4.2. CURRENT POSITION OF THE CONVERSION NEUTRALITY ACCOUNT

Under the rules introduced by the amended Konni Gas ruling, which came into force on 1 April 2017, the MAMs are allowed to factor in certain liquidity reserves when setting their conversion fees and conversion neutrality charges. The intended function of this so-called "liquidity buffer" is to take account of the uncertainty inherent to a system in part based on estimates and projections and to mitigate the MAMs' liquidity risks.

As required under the Konni Gas ruling, the MAMs publish the current position of their conversion neutrality accounts on a monthly basis (see Figure 12), with the preliminary account balances for each month 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.

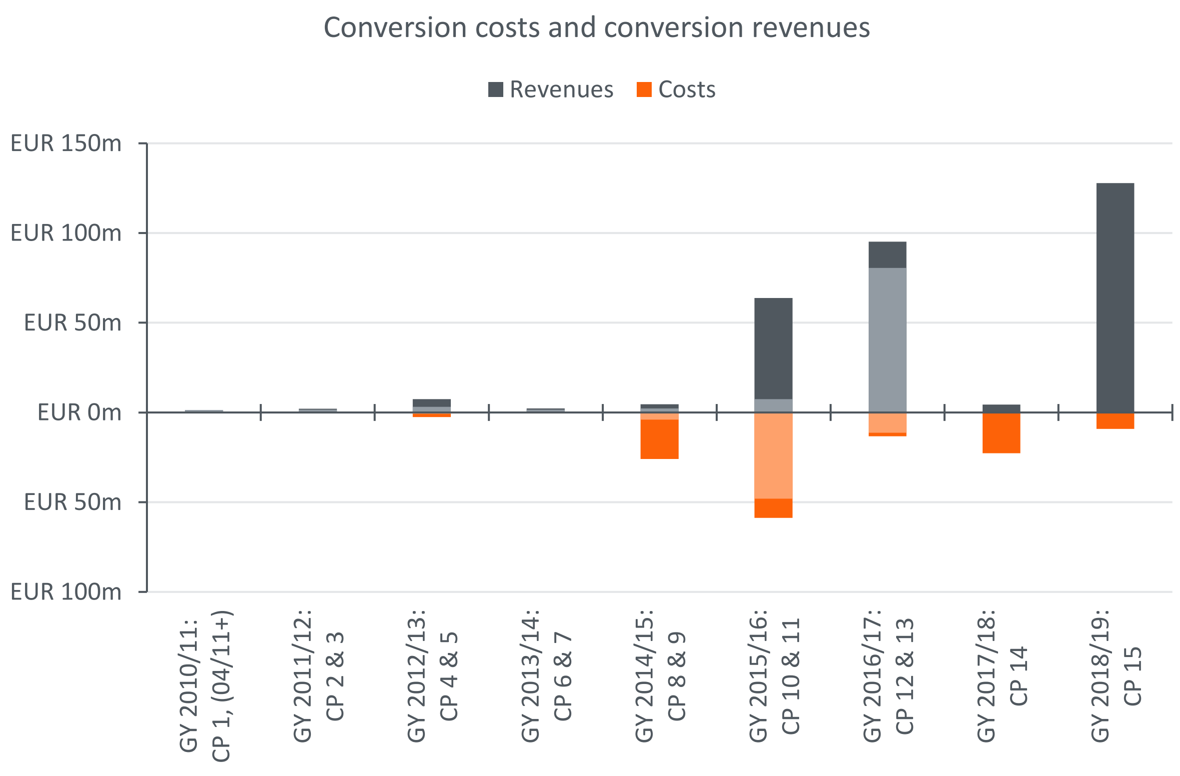


Figure 11: Conversion costs and revenues

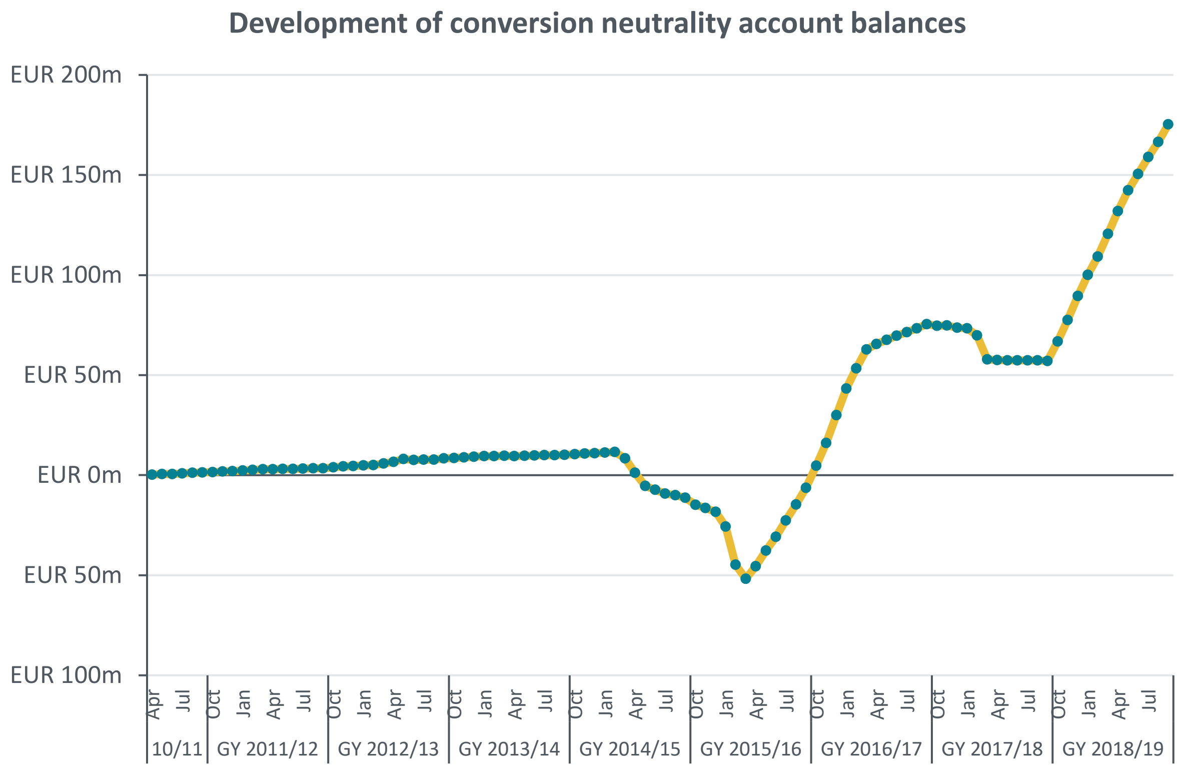


Figure 12: Development of conversion neutrality account balances

The final balance determined for the conversion neutrality account for GY 2018/19 was EUR 175million at the end of September 2019 (at the end of GY 2017/18 the balance was still EUR 57 million). Due to the significantly lower costs compared to the forecast, the balance thus exceeds the targeted liquidity buffer of EUR 140 million by approximately EUR 35 million. The cost/revenue forecast for the current GY 2019/20 shows a final balance which corresponds roughly to the liquidity buffer of EUR 145 million.

For the period from 1 October 2019 to 30 September 2020, the total liquidity buffer required for conversion purposes in the NCG market area amounts to EUR 145 million. The liquidity buffer is determined as part of an internal NCG risk assessments. These result in particular from risks associated with the procurement of balancing gas and the decline in production volumes in the Groningen gas field. Moreover, pre-financing effects, margin requirements, risks in contracting long-term options and other risk positions are also taken into account.

Risks associated with the procurement of balancing gas: With regard to the uncertainties surrounding the balancing gas quantity forecast, it should be noted that the balancing gas quantities attributable to commercial conversion measures fluctuate from year to year, in some cases by a factor of seven (cf. chapter 2.3 on the use of commercial conversion measures). The risks covered by the liquidity buffer for price forecasts correspond to the uncertainties between the futures prices valid at the time of planning and the prices charged in future for the quality-specific, local balancing actions. The different price premiums or discounts in the respective order books can lead to significant differences between forecast prices and actual prices. In addition, the liquidity buffer must take into account abrupt and significant price increases, the impact of which cannot be reasonably reflected by a day-based market price corridor as the basis for the forecast ("cold spell in February/March 2018"); even if the conversion fee remains the same, costs will fluctuate by a factor of two to three (cf. previous chapter 4.1).

Risks relating to the reduction of production volumes in the Groningen gas field and the associated supply of low CV gas from the Netherlands: Production of low CV gas from the Groningen field is to be discontinued by 2030. The reduction in production volumes comes with a price risk, as the prices for the procurement of low CV gas are much higher than the prices for high CV gas, especially in winter. This effect could be exacerbated quite considerably by the reduction in production volumes. In order to nevertheless be able to ensure security of supply in low CV gas market areas, the potential risk is covered by the current liquidity buffer. Further information on the reduction of production volumes in the Groningen gas field can be found in chapter 5 on the need to maintain the conversion system.

Risks associated with pre-financing effects: The commercial conversion costs are incurred directly by MAM due to the D+1 settlement of exchange-traded balancing products. Since the revenues from conversion fees only cover the high costs from commercial conversion measures, in particular, to a limited extent, there is no prompt balancing of the cost position. The costs can only be offset by income from the conversion neutrality charge. Until the charge has been calculated and determined, the MAM must have sufficient liquid funds to pre-finance the costs incurred until the charge is actually received.

Risks in connection with the increase of the clearing houses' margin requirements: The margin requirements of the clearing houses increase as a function of the amount of daily system balancing. Especially for short-term, very high balancing costs, the required margins increase sharply for a period of several weeks. If balancing actions are due to virtual conversion, the required margins must also be taken into account on a proportional basis in the liquidity buffer for the conversion system. The MAM must keep the necessary liquid funds available and deposit them with the relevant clearing house at short notice, which means they are no longer available to the MAM for operational purposes.

Risks in connection with the contracting of long-term options: In order to increase security of supply, the MAM contracts LTO capacities for the winter months in co-ordination with the Federal Ministry of Economics (BMWi). The cost of LTO capacity charges must be included in the respective cost/revenue forecast. The requirements for hedging against dynamic effects must be added to the calculated capacities per month. Under the principle of causation, costs or cost risks arising from the costs or cost risks for the contracting of long-term options in accordance with the previous year's key (monthly share of balancing gas for conversion purposes, see the previous chapter 4.1) in connection with commercial conversion are also included pro rata in the liquidity buffer for the conversion system. Here, too, there are risks relating to uncertainties in the development of capacity and prices. The capacity can only be determined after the cost forecast for the relevant neutrality charge period has been prepared. In turn, the capacity charges offered for the provision of capacity have increased by more than a factor of three in the last three years – with corresponding effects on the liquidity buffer to be taken into account.

Other risk positions: Apart from the risks mentioned above, the MAM has other, lower risk positions which must be taken into account when calculating the liquidity buffer. One of these risks NCG is exposed to is bad debt (insolvencies, conduct contrary to the system, etc.). With the approval of BNetzA, both the review process for admitting new market participants and the monitoring of existing customers have been significantly intensified. Nevertheless, the risk of bad debt losses still exists, also with regard to the conversion system, which the MAM must take into account accordingly when calculating the liquidity buffer. Furthermore, costs in connection with legal disputes relating to conversion, costs due to special clearing cases, conversion into biogas balancing groups, etc., are summarised as 'other risk items' in the liquidity buffer. These risks account for a rather small share of 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 NCG to consider in its annual evaluation report whether it will be necessary to retain the conversion fee. These considerations are provided in this chapter.

Supply security risks due 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. While in 2013 production output was still at approximately 60 bcm/a (billion cubic metres per year), a decision by the Dutch government of 23 September 2016[1] limited production to 24 bcm/a for the next five years, with a contingency to increase output in especially cold winter periods to up to 30 bcm/a. In April 2017, the production limit for GY 2017/18 was lowered by another 10%, down to 22 bcm/a. On 29 March 2018[2], it was announced that gas production in the Groningen field would be discontinued. In a first step, the production volume will be reduced to below 11.8 bcm/a in GY 2019/2020. In the following years, production is to be gradually reduced to zero after commissioning of the nitrogen blending plant in Zuidbroek (planned for April 2022).

The above cutbacks in production were ordered amid 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.

NCG 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.

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[1] Final Consent Decision on gas extraction in the Groningen gas field (https://www.government.nl/ministries/ministry-of-economic-affairs/documents/parliamentary-documents/2016/09/23/letter-to-the-parliament-final-consent-decision-on-gas-extraction-in-the-groningen-gas-field)

[2] Termination of natural gas extraction in Groningen (https://www.government.nl/latest/news/2018/03/29/dutch-cabinet-termination-of-natural-gas-extraction-in-groningen)

Costs incurred under the conversion mechanism

After the costs of the conversion system had fallen significantly in the twelfth and thirteenth conversion periods to EUR 13 million in comparison to the previous gas years (EUR 59 million in GY 15/16 and EUR 26 million in GY 14/15), they rose again to EUR 23 million in the fourteenth period. Since no conversion neutrality charge was applied, the liquidity buffer in the conversion account, which weakens financial risks from the conversion system, decreased, leading to a renewed application of a conversion neutrality charge of EUR 0.15/MWh from October 2018. The costs allocated to the conversion system were still comparatively moderate because 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 were not allocated to the Konni system due to the lack of simultaneous sales in high CV gas. Contrary to the forecast, however, the commercial conversion costs in GY 2018/19 of around EUR 9.5 million were lower than in previous years. This was partly due to the sharp overall drop in natural gas prices and the resulting narrowing of the price spread between the purchase and sale of low CV gas and high CV gas. On the other hand, the total virtual conversion quantity from low CV to high CV quality also fell, which is probably partly attributable to the lower sales volumes of low CV gas due to the moderate temperatures in the 2018/19 winter season.

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, 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 spring of 2016 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 the costs incurred under the conversion mechanism would surge again, resulting in a correspondingly high conversion neutrality charge which would then have to be borne by all market participants. Besides producing high costs, NCG 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 in the last three conversion periods, 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 2019/2020

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 2019/20 must be interpreted with reservation. The cut-off date for data collection is 22 January 2020.

With regard to the virtual conversion quantities (see Figure 13) , it can be observed that the conversion in the H-to-L direction, which usually reaches its peak in the months of January/February, already reaches highs in November and December 2019 and, in return, January 2020 shows an unusually high share of virtual conversion in the opposite direction (L to H). At this point one can only speculate whether this trend will continue in February or what the reasons could be.

The technical conversion quantities (cf. Figure 14) remain at a low level due to the reasons given in chapter 2.2. An increase in technical conversion quantities in the H-to-L direction, which is due to virtual conversions, can only be observed in November/December.

As expected, the development of the virtual and technical conversion quantities in the first months of GY 2019/20 is reflected in a similar trend for the commercial conversion quantities. As can be seen in Figure 15, there are more commercial conversions in the H-to-L direction, especially in the months of November and December 2019, but they will not reach the level of the quantities in January/February 2019. Due to the significantly lower prices for both low CV gas and high CV gas compared to the previous winter and based on this also lower price spreads between the gas qualities, commercial conversion costs in the gas year 2019/20 are unexpectedly low (see Figure 16).

It remains to be seen whether there will be a cold spell in February/March 2020 and/or whether conversion will then increase again 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.

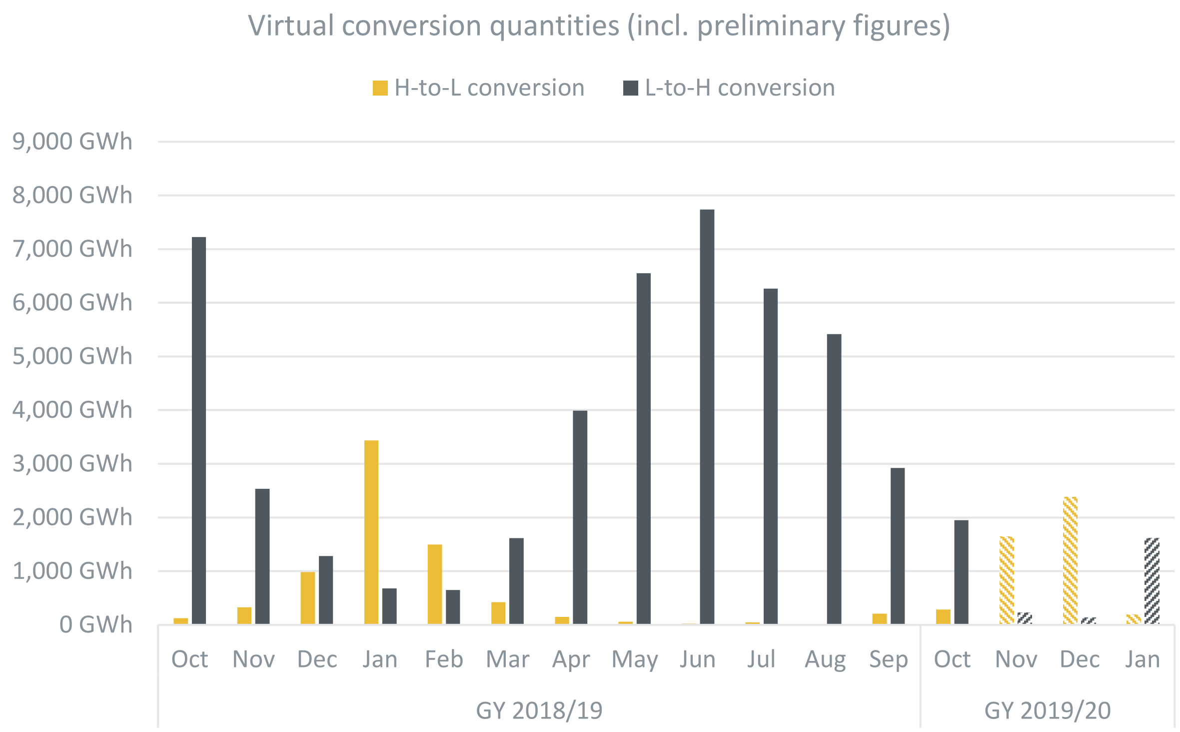

Figure 13: Outlook for virtual conversion quantities, including preliminary figures

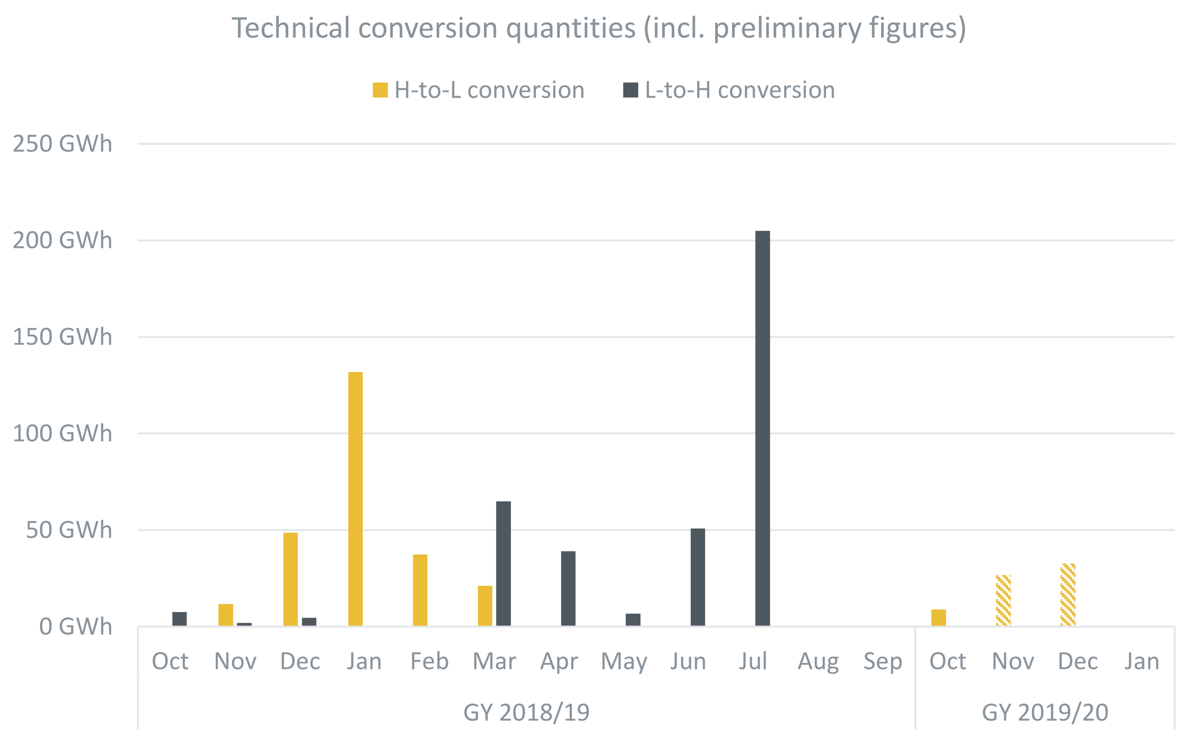

Figure 14: Outlook for technical conversion quantities, including preliminary figures

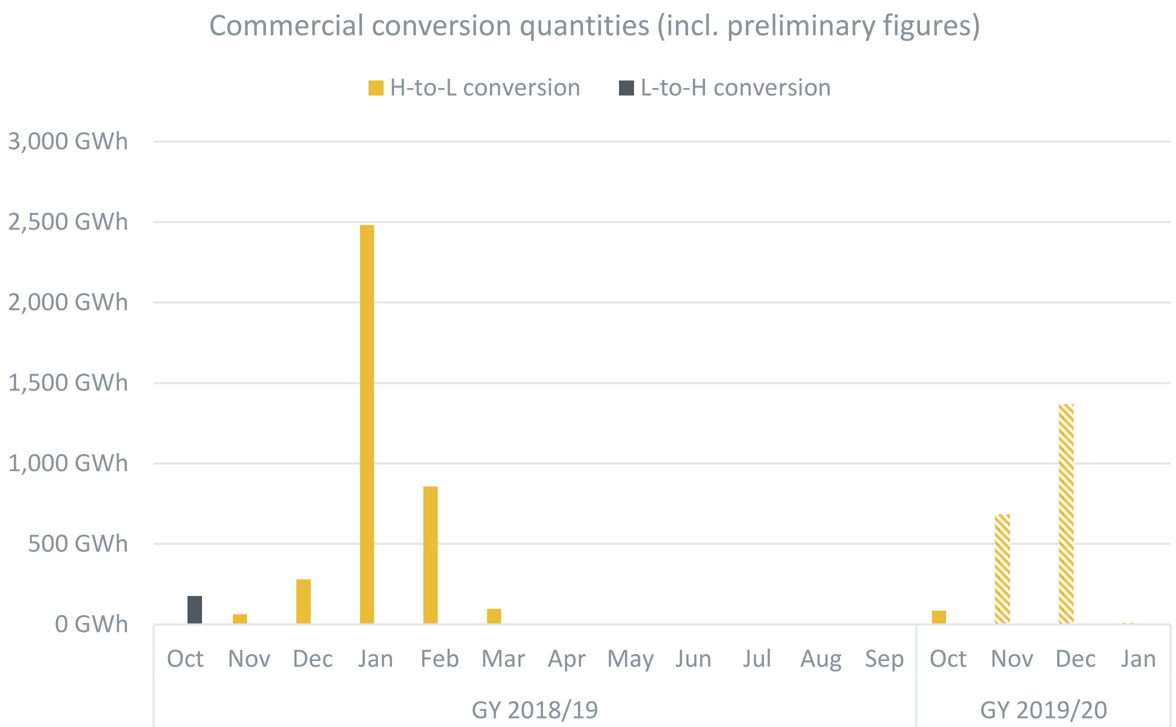

Figure 15: Outlook for commercial conversion quantities, including preliminary figures

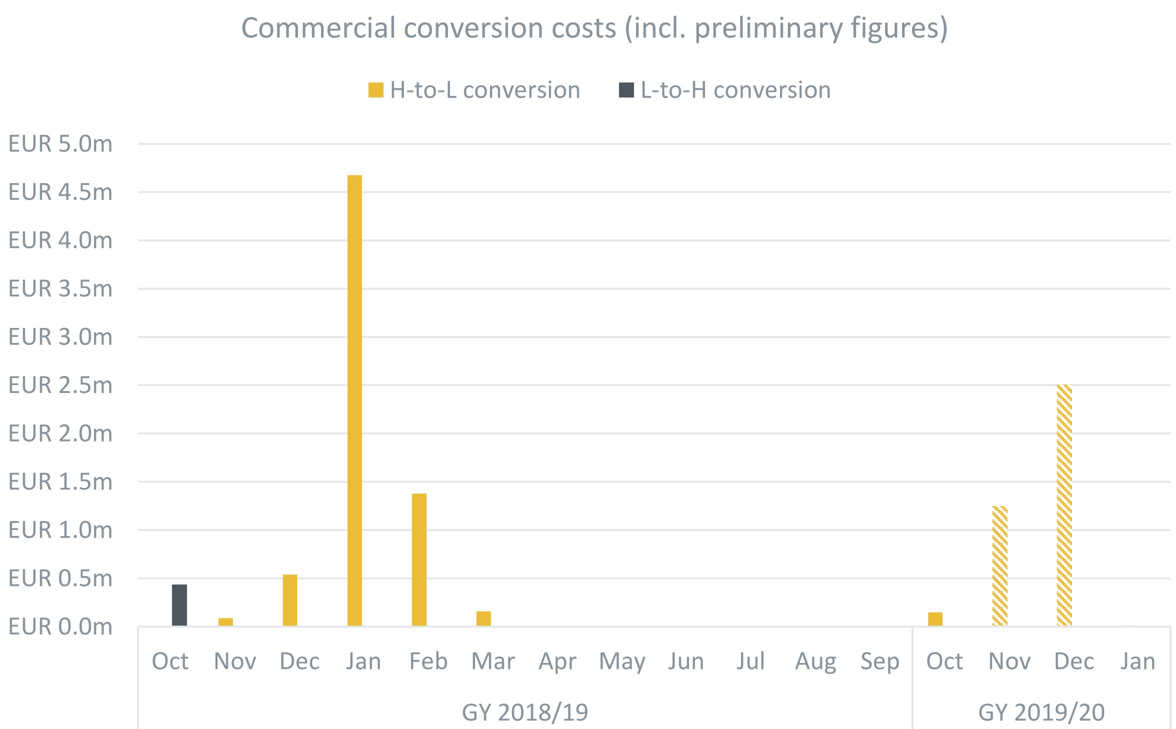

Figure 16: Outlook for commercial conversion costs, including preliminary figures

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