Anlagenkonvolut 3:

Gutachterliche Stellungnahmen, Analysen und Unterlagen vorgelegt im Rahmen der Arbeitsgruppe von Gazprom und Gazprom export

[...]

COMPASS LEXECON

Capacity of Transport Links from Gas Hubs to the Czech Republic

Thilo Klein Martin White

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Privileged and Confidential
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Section 1

Introduction

1.1 In a decision reached on 12 June 2009 ("**OPAL Decision**") the European Commission ("**Commission**") reached the view that the gas pipeline *Ostseepipeline-Anbindungsleitung* ("**OPAL**") did not meet all the conditions required for an exemption from third party access and tariff regulation according to Article 36 of Directive 2009/73/EC ("**Directive**").[1] In particular, the Commission found that the OPAL pipeline failed to meet the following two conditions:

a) that the investment must enhance competition in gas supply (Article 36(1)(a) of the Directive); and

b) that the exemption must not be detrimental to competition or the functioning of the internal market (Article 36(1)(e) of the Directive).

1.2 The Commission's findings triggered a review of the original exemption decision issued by the Bundesnetzagentur ("**BNA**") on 25 February 2009 ("**BNA Decision I**"). On 7 July 2009, the BNA issued a revised decision ("**BNA Decision II**") subjecting the exemption to substantial additional restrictions aimed at addressing the Commission's concerns. In particular, a firm that is dominant on any gas supply market in the Czech Republic is restricted to booking a maximum of 50% of OPAL's exit capacity at the Czech border, unless it offers 3bcm/y of gas to third parties by means of a gas release programme with a corresponding capacity release programme.

1.3 On 12 April 2013 Gazprom, Gazprom Export and OTG filed a formal request that the BNA reassess the BNA Decision II. In parallel to these discussions, a working group ("**OPAL Working Group**") including representatives of the Comission, the BNA and Gazprom was formed to discuss potential amendmends to the restrictions in the BNA Decision II.

1.4 In the second meeting of the OPAL Working Group on 22 April 2013 the situation of competition in the Czech Republic was discussed. In the course of that meeting:

> *"The participants discussed the possibilities for third parties to enter the Czech market, including availability of entry capacity into the Czech market and quality thereof. The EU side indicated that, to the extent firm entry capacity from Gaspool and/or NCG and/or CEGH into the Czech market is available, this should be taken into account positively for assessing the competitive situation in*

[1] Then Article 22 of Directive 2003/55/EC. In this paper we refer to the later version of the Directive for consistency.

the Czech market and potentially reviewing the conditions attached to the existing OPAL exemption decision. It was agreed that the Russian side would provide further detailed data on availability and quality of the aforementioned capacity."[2]

1.5 Against this background, Gazprom has asked Compass Lexecon to assess the capacities at the interconnectors relevant for transporting gas from the Gaspool, NCG and CEGH market areas to the Czech Republic.

1.6 This report presents our analysis. A previous version of this report and an addendum have been presented to the working group. This paper expands on these versions.

1.7 The paper is structured as follows.

1.8 Section 2 describes the available routes for transporting gas from the three hubs to the Czech Republic, including analysis of the liquidity of the hubs.

1.9 Section 3 assesses the capacities and spare capacities at the interconnectors on these transport routes. We find that abundant spare capacity is available:

a) Combined firm capacity, measured as technical capacity less firm bookings, at the interconnectors at Hora Svaté Kateřinyi ("HSK") (on the Czech-German border) and at Lanžhot (on the Slovakian-Czech border, through which gas from the Baumgarten hub can be imported) amounts to around 25-50% of Czech domestic consumption.

b) A substantial amount of additional spare capacity is available on an interruptible basis, inter alia at the Waidhaus interconnector on the Czech-German border. Waidhaus does not allow physical flow in Czech direction, but as part of an important transit pipeline continuoiusly transporting large volumes of Russian gas to Germany it offers very reliable virtual counterflow.

c) Total spare capacity, measured as technical capacity less flows at all relevant interconnectors, amounts to around twice Czech domestic consumption.

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2 Minutes of meeting.

Section 2

Transporting Gas from Hubs to the Czech Virtual Point

2.1 In this section we

a) assess the transport routes that gas suppliers can use to transport gas from the German and Austrian hubs to the Czech Virtual Point ("VOB");

b) review the existing institutional setting for allocating the capacity necessary to transport gas along these routes; and

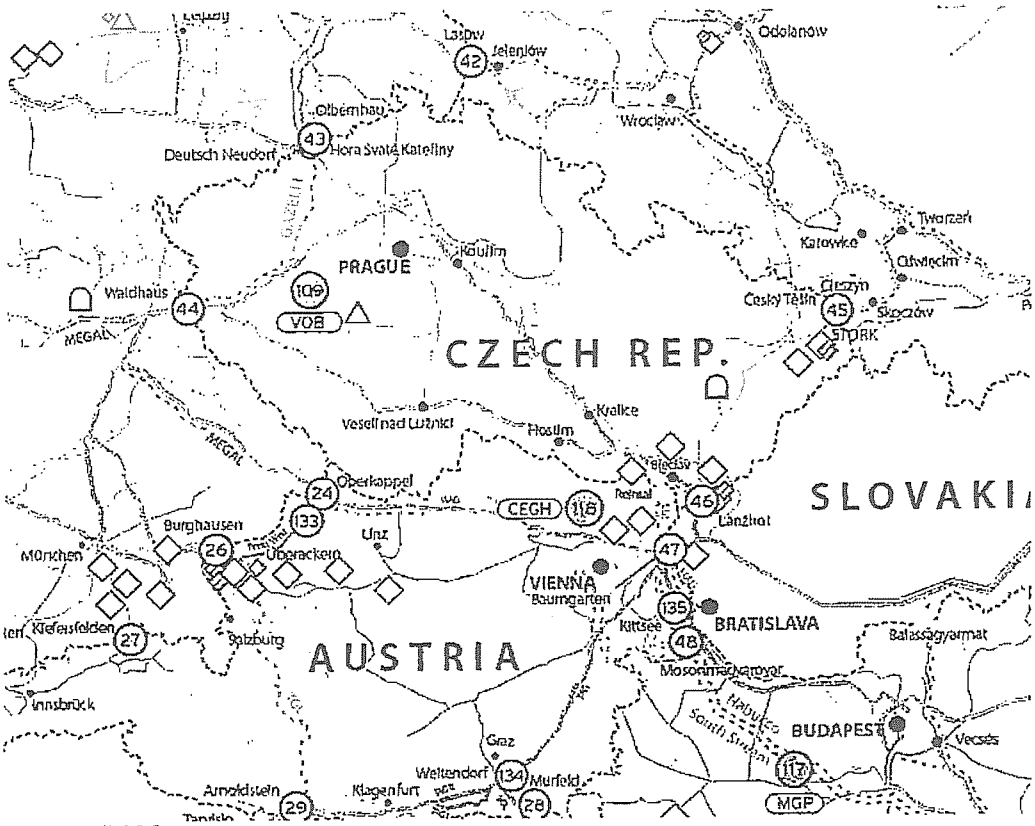
c) present data on the liquidity of the gas hubs in question.

A Transport routes

2.2 Figure 1 below shows the Czech gas transmission system and interconnectors with neighbouring countries. The Czech Republic is an important transit country for Russian gas. Traditionally, Russian gas entered the Czech Republic at the Lanžhot interconnector on the border with Slovakia and was released into Germany through the interconnectors at HSK, which connect to the German transmission systems of Ontras and Gascade, and Waidhaus, which connects to the Open Grid Europe ("OGE") system and the GRTgaz Deutschland ("GRTgaz DE") system.

2.3 Now that the Nordstream-OPAL-Gazelle system of pipelines has come on-stream, most of the transit gas from Russia enters the Czech Republic at the HSK-Brandov interconnector (which is part of that system) but still leaves at Waidhaus. However, the gas supplied under the long-term contract with RWE Transgas is delivered at the Velké Kapušany interconnector on the Ukrainian-Slovakian border. It is therefore to be expected that most of the gas imported for consumption within the Czech Republic will continue to enter at Lanžhot.

Figure 1: Czech Transmission Network



Source: ENTSOG.

2.4 The map below illustrates the most obvious ways of transporting gas from the NetConnect Germany ("**NCG**"), Gaspool and Central European Gas Hub ("**CEGH**") hubs to the Czech Republic. Appendix A provides links to the capacity tariff documentation for the relevant interconnectors. There are four routes to consider:

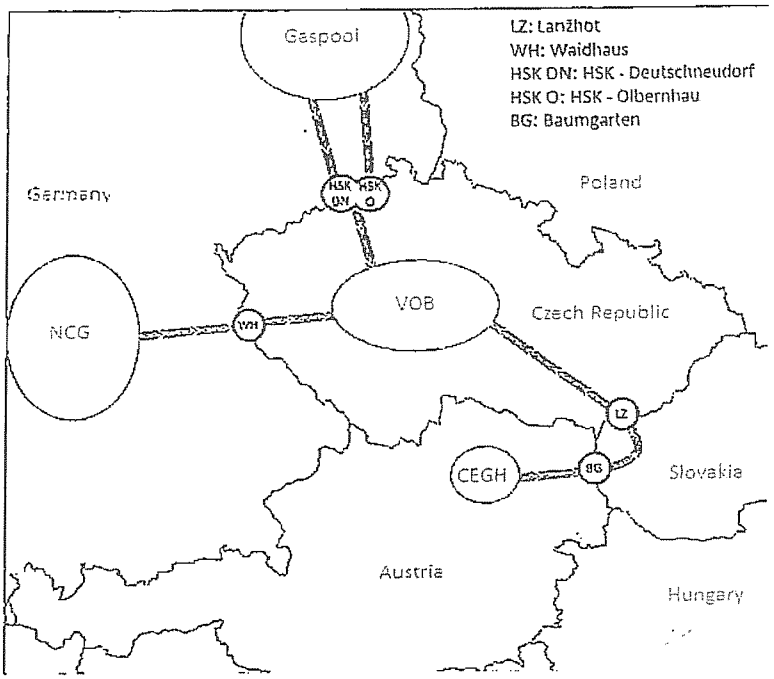
a) Imports from Gaspool via the Ontras transmission network in Germany and the Czech-German border point at HSK – Deutschneudorf;

b) Imports from Gaspool via the Gascade transmission network in Germany and the Czech-German border point at HSK – Olbernhau;

c) Imports from the NCG via the OGE transmission and GRTgaz DE networks in Germany and the Czech-German border point at Waidhaus; and

d) Imports from the CEGH via the Austro-Slovakian border point at Baumgarten, the Slovak transmission network and the Slovak-Czech border point at Lanžhot.

Figure 2: Links Between Gas Hubs and Czech VOB



2.5 All the interconnectors mentioned above are physically bi-directional (i.e. they can support physical gas flows in either direction), with the exception of Waidhaus. Waidhaus is not physically bi-directional on the German side (i.e. the German compressor stations cannot pump gas in the Czech direction). As a consequence, imports into the Czech Republic via this interconnector are feasible by means of virtual counterflow only.

2.6 In our view, this is no reason to discard the capacity available at Waidhaus when assessing the competitive constraints exerted by the German hub gas in the Czech Republic. Waidhaus is one of the main entry points of Russian gas into Germany, and flows in the German direction through this point are very substantial: at 22.1 bcm in 2011 and 18.2 bcm in 2012,[3] they amount to a multiple of Czech consumption.

2.7 Figure 3 below shows the daily nominations reported by the three TSOs at the Waidhaus interconnector.[4] We discuss the available data on nominations, allocations and flows at Waidhaus in more detail in Appendix B.

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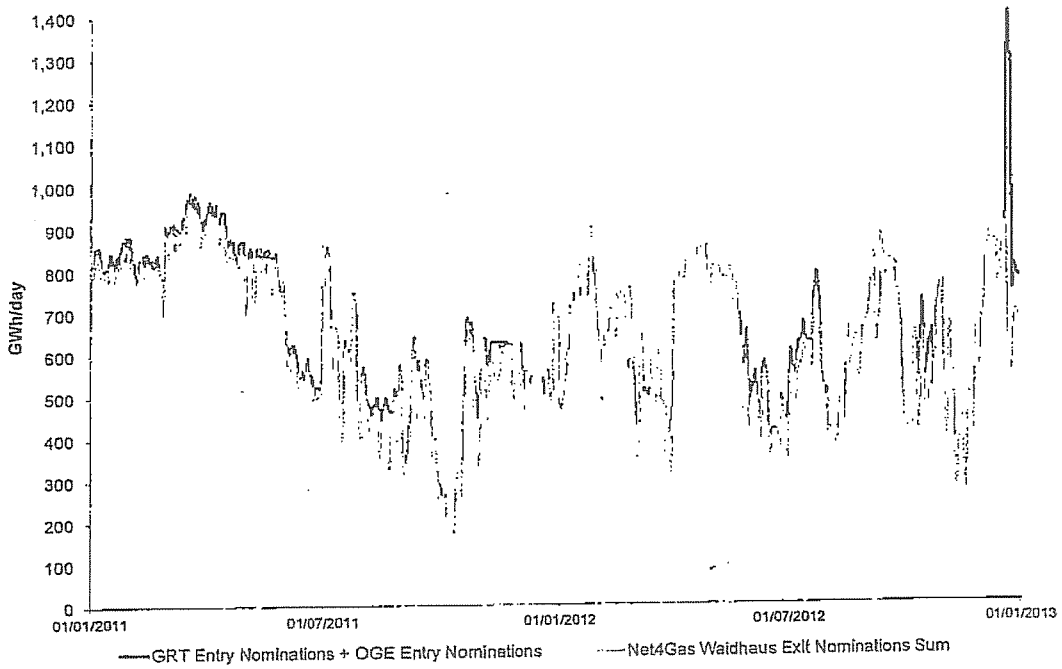
3 NET4GAS. Available at: http://www.net4gas.cz/en/media/2013_01_23_Historical_capacity_utilization_flows.pdf?iis=20130516120316.

4 OGE and GRTgaz DE each market a share (totaling 100%) of the capacity on the MEGAL pipeline at Waidhaus, but both publish data on total actual flows for the pipeline. They each publish their share of nominations and allocations at Waidhaus.

Figure 3: Reported Daily Nominations at the Waidhaus Interconnection Point



Source: Compass Lexecon calculation based on http://www.open-grid-europe.com/cps/rde/xchg/SID-17C85292-99AA0CE7/open-grid-europe-internet/hs.xsl/2100.htm, http://www.grtgaz-deutschland.de/de/content/lastflussdaten, http://extranet.net4gas.cz/nomination_ee.aspx and http://extranet.net4gas.cz/nomination_p2p.aspx.

2.8 Figure 3 above shows that there were continuous and substantial nominations from the Czech Republic to Germany. Therefore, a significant volume of contractual counterflow would have been available in 2011 and 2012. It seems implausible that wholesalers wishing to import gas into the Czech Republic via Waidhaus would see the small number of days of seemingly smaller nominations from the Czech Republic to Germany as a significant obstacle.

2.9 It is likely that sources of gas flexibility to deal with periods of limited counterflow potential are available. For example, storage facilities within the Czech Republic could be used, or large customers with flexible demand schedules could be interrupted. Table 1 below compares the working gas volume (i.e. the total volume of gas that can be stored in the storage facility) in the Czech Republic against annual end-user consumption in the Czech Republic.

Table 1: Working Gas Volume Compared to Annual Czech Demand, 2009-2010

		2009	2010	2011
Total Czech Working Gas Volume	bcm/year	2.32	2.55	2.76
Czech Annual End-user Consumption	bcm/year	8.16	8.98	8.09
Total WGV as share of Annual Czech Domestic Demand	%	28%	28%	34%

Source: RWE Gas Storage Annual Report 2009, p. 12; Annual report 2010, p. 12; Annual Report 2011, p. 14; MND Gas Storage http://gasstorage.cz/information-disclosure-requitements/capacity-and-output; OTE Yearly Report on Natural Gas Supply and Consumption in the Czech Gas System 2011, Table 1; ERO, The Czech Republic's National Report on the Electricity and Gas Industries 2009, p. 44.

2.10 Table 2 below shows that the working gas volume in the Czech Republic as a percentage of the gas demand is in the mid-range of countries in central and Western Europe.

Table 2: Working Gas Volume in 2010 in the Czech Republic compared to Western and Central Europe

	Natural Gas Consumption	Gas Storage Working Gas Volume	Working Gas Volume as share of end-consumption
	bcm	bcm	%
Poland	17.2	1.7	10%
Italy	83.0	14.4	17%
Germany	97.3	21.9	23%
France	49.8	12.4	25%
Czech Republic	9.3	2.5	27%
Austria	9.5	3.5	37%
Slovakia	6.3	2.8	44%
Hungary	12.1	5.8	48%

Source: IEA Natural Gas Information 2011,Table 3 and Table 29.

2.11 We consider that Waidhaus is, therefore, a suitable entry point for gas supplies to the Czech Republic. Waidhaus should not be disregarded on the basis that capacity bookings are only possible on an interruptible basis.

B Capacity allocation

2.12 Available capacities are typically offered to the market through an online portal, which requires registration in order to access the available capacities. Capacity may be allocated via auction or on a first-come-first-served ("**FCFS**") basis.

2.13 There are different types of firm capacity products available which provide access to the virtual trading point at different terms.[5] [6] These are:[7]

a) Free Allocable Capacity ("**FZK**") – allows firm transport in the whole market area as well as access to the virtual trading point.

b) Conditionally Firm Freely Allocable Capacity ("**bFZK**") – similar to FZK, except that capacity becomes interruptible if the physical flow at certain stations exceeds a particular limit defined by the TSO.

c) Restricted Allocable Capacity ("**BZK**") – transport capacities restricted to a certain route or set of routes. There is no access to the virtual trading point.

d) Dynamically Allocable Capacity ("**DZK**") – similar to FZK but with interruptible access to the virtual trading point. These are firm provided they are exclusively used for the purpose of a balanced transport between entry and exit points within the system without the inclusion of the virtual trading point.

2.14 Appendix C provides links to the capacity allocation information for the relevant interconnectors.

NET4GAS

2.15 NET4GAS adopt an online system, called tryGAS, for primary capacity booking. The tryGAS system provides information e.g. on available capacity to users. Secondary capacity can also be booked online via the NET4GAS website.[8]

2.16 Access to capacity is on a non-discriminatory and transparent basis. Users must register with NET4GAS before partaking.[9]

2.17 NET4GAS hold daily auctions for unused transmission capacity including at system border points. The NET4GAS Network Code states as follows:

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5 In addition to these firm capacity products, interruptible FZK is available. This allows interruptible transport in the whole market area as well as access to the virtual trading point.

6 In our analysis of spare capacity in Section 3, we consider all firm products, and make no distinction between the different types of firm product available.

7 PRISMA available at 'Interconnection points – Overview Interconnection Points (12 June 2013)' in ' Download' at https://primary.prisma-capacity.eu/center/about.xhtml?conversationContext=7

8 http://www.net4gas.cz/en/elektronic-notice-board/

9 http://www.net4gas.cz/en/services/

15.1. Under the conditions specified in this Section, the Transporter shall allow all Users of the System with a General Contract who satisfy the conditions of financial eligibility specified in Appendix No. 1 hereof (hereinafter referred to only as the "Bidders") to participate in daily auctions of the unused transmission capacity (hereinafter referred to only as the "Auction").

15.2. The Transporter shall organize the Auction if there is no Available Firm Transmission Capacity and at the same time there is unused firm transmission capacity on at least one entry or exit Border point (hereinafter referred to only as the "Auctioned Capacity"). The rules for the calculation of the Auctioned Capacity are described in Section 7 of the Gas Market Rules. The auction shall be organized in the Transporter's Information System separately for each entry or exit Border Point.[10]

2.18 The NET4GAS Network Code further states that any transporter has the right to reserve capacity on border points for which the adjacent TSO will also make available corresponding transmission capacity.

3.1. The Transporter enables to reserve:

3.1.1. to the clearing entity the following transmission capacities:

...

3.1.1.1.8. for the Border points, for which the adjacent transmission system operator will make transmission capacity reservation for the same period, same amount, and in the same moment based on the mutual agreement with the Transporter:

firm coordinated transmission capacity in the next day mode and interruptible coordinated transmission capacity in the next day mode ("day-ahead capacity").[11]

PRISMA

2.19 TSOs from seven countries including ONTRAS, GASCADE, OGE and GRTgaz DE from Germany and Gas Connect Austria auction capacity at all major network points through the joint European capacity platform PRISMA. PRISMA has operated online trading and marketing platforms for primary and secondary capacity rights for natural gas transport since April 2013.[12,13] Capacity allocation takes place on an Auction and FCFS basis.

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10 See paragraph 15.1 and 15.2: http://www.net4gas.cz/en/media/Novy_rad_provozovatele-aj(1).pdf?jis=20130528161913

11 See Section 3: http://www.net4gas.cz/en/media/Novy_rad_provozovatele-aj(1).pdf?jis=20130528161913

12 https://primary.prisma-capacity.eu/

13 https://secondary.prisma-capacity.eu/prisma/index.do

2.20 Those wishing to book or trade capacity on PRISMA must register with any PRISMA-affiliated TSO.[14] For registration it is necessary to have an Energy Identification Code ("EIC") along with providing general information (e.g. contact details).

2.21 PRISMA provides for cross-border gas transport for its seven TSOs, with shippers able to book capacities at European network points through a single platform. The stated goal of the platform is to handle harmonized capacity products.[15] Note that currently not all products are bundled, however there are plans to bundle those products that currently are not.[16]

GATRAC

2.22 GATRAC is a cross-border partnership of the European gas transmission system operators NET4GAS, ONTRAS and eustream. GATRAC simplifies cross-border transportation between the Czech Republic and both Germany and the Slovak Republic through an online click-and-book system on a FCFS basis. GATRAC promotes transparency by indicating available capacity, applicable tariff systems and any other relevant information.[17]

2.23 In order to book capacity via GATRAC it is necessary to register with a TSO involved in GATRAC, such as through the process stated above for NET4GAS. For registration it is necessary to have an EIC code (ENTSO Identification Number) and agree to the settlement of imbalances, along with providing general information (e.g. contact details).[18]

2.24 GATRAC provides a click-and-book system between the Czech Republic and:

a) eustream in Slovakia for both firm and interruptible capacity;

b) GASPOOL in Germany for firm capacity; and

c) NCG in Germany for interruptible capacity.[19]

2.25 Having registered with a TSO, only one contract is required to make a booking for cross-border capacity among the GATRAC partners.[20]

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14 See Article 5 of the GTCs as at 1 July 2013 at: https://primary.prisma-capacity.eu/center/download.xhtml?conversationContext=1#

15 https://primary.prisma-capacity.eu/

16 See Interconnection points at: https://primary.prisma-capacity.eu/center/download.xhtml?conversationContext=1#

17 http://www.gatrac.com/gatrac-web/gate/products.do

18 https://www.gatrac-ontras.com/gatrac-web/products.do

19 Interruptible capacity is only available if there is no firm capacity available: http://www.gatrac.com/gatrac-web/gate/products.do

20 http://www.gatrac.com/gatrac-web/gate/products.do

C Hub liquidity

2.26 This section provides information on liquity at the various hubs. The following indicators are often used to measure liquidity:

a) Volume traded. The larger the volume, the easier it is usually to find a trading partner.

b) Churn. Churn is the average number of times that a molecule of gas is traded, and can be calculated as the volume traded divided by the physical volume.

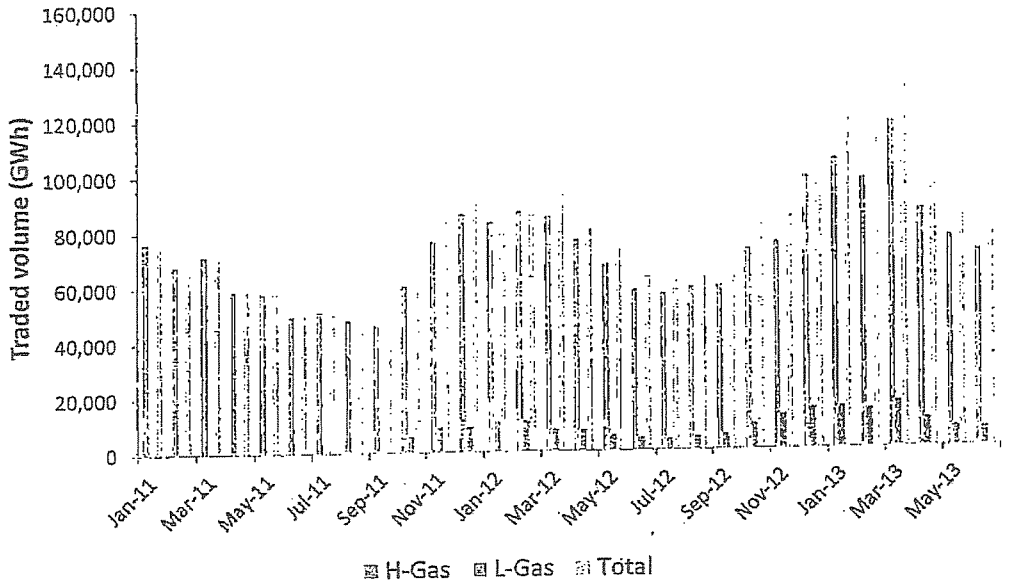
c) Bid-ask spread. The bid-ask spread is the difference between the bid price and the ask price. A wide spread indicates lower liquidity than a tighter spread. ICIS publishes a tradability index based upon bid-ask spreads. A score is given to each hub based on the size of the spread for 10 different gas contracts (e.g. day-ahead, next season, three years ahead). For each hub, ICIS assesses the bid-offer spread available to all interested parties on every day during the quarter. If a spread was available each day of less than 0.5 €/MWh, the hub receives one point. If a spread was available that was less than 0.3 €/MWh, the hub receives two points. The maximum score is 20.

Gaspool

Volume traded

2.27 Data for Gaspool are available on OTC trades for both L-gas and H-gas. However, we have seen no data on exchange traded volumes. Figure 4 below shows OTC-traded volumes on Gaspool from January 2011 to May 2013.

Figure 4: Monthly OTC Traded Volume on Gaspool

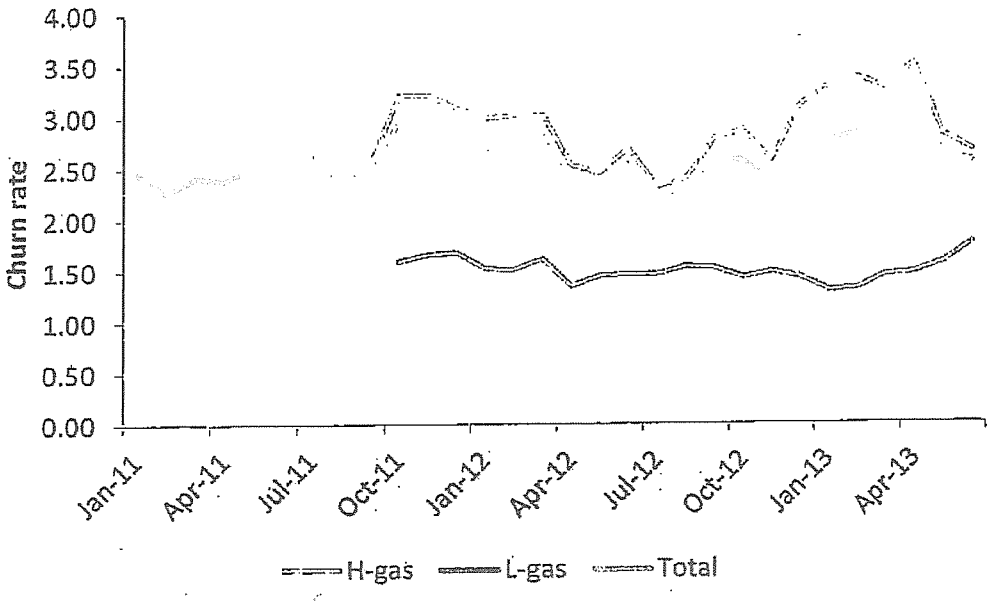


Source: Gaspool http://www.gaspool.de/hub_handelsvolumina.html?L=1

Churn

2.28 Figure 5 shows the churn rate for Gaspool over the same time period, on the basis of OTC trades (again, we have not seen data on trades and volume of trades over exchanges).

Figure 5: OTC Churn Rate on Gaspool



Source: Compass Lexecon analysis on the basis of Gaspool data
http://www.gaspool.de/hub_churn_rate.html?&L=1

Bid-ask spread

2.29 ICIS gave Gaspool a tradability score of 11 in Q1 2013. This was an increase of one point on Q4 2012. Table 3 below shows the breakdown of ICIS's tradability scores by Gaspool contract.

Table 3: ICIS Tradability Scores for Gaspool, Q1 2013

Contract	Width of spread	Availability
Within-day	< 0.5 €/MWh	0
Day-ahead	< 0.5 €/MWh	1
Balance-of-month	< 0.5 €/MWh	1
Month-ahead	< 0.5 €/MWh	1
Next quarter	< 0.5 €/MWh	1
Next season	< 0.5 €/MWh	1
Two seasons ahead	< 0.5 €/MWh	1
One year ahead	< 0.5 €/MWh	1
Two years ahead	< 0.5 €/MWh	1
Three years ahead	< 0.5 €/MWh	0
Within-day	< 0.3 €/MWh	0
Day-ahead	< 0.3 €/MWh	1
Balance-of-month	< 0.3 €/MWh	0
Month-ahead	< 0.3 €/MWh	1
Next quarter	< 0.3 €/MWh	1
Next season	< 0.3 €/MWh	0
Two seasons ahead	< 0.3 €/MWh	0
One year ahead	< 0.3 €/MWh	0
Two years ahead	< 0.3 €/MWh	0
Three years ahead	< 0.3 €/MWh	0

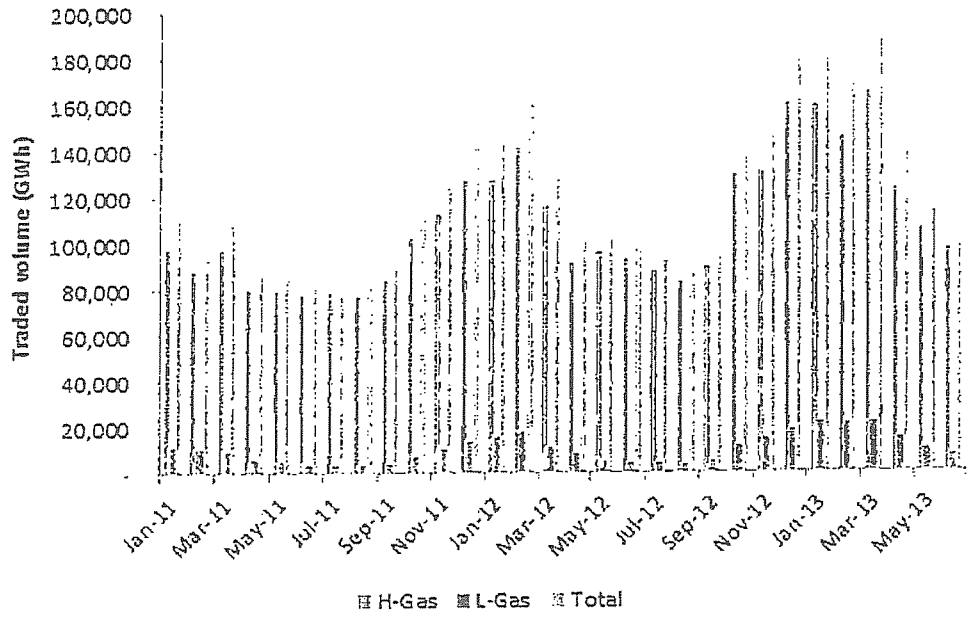
Source: ICIS European Gas Hub Report, Q1 2013 Update, p. 14.

NCG

Volume traded

2.30 Figure 6 below shows the OTC traded volume on NCG.

Figure 6: Monthly OTC Traded Volume on NCG

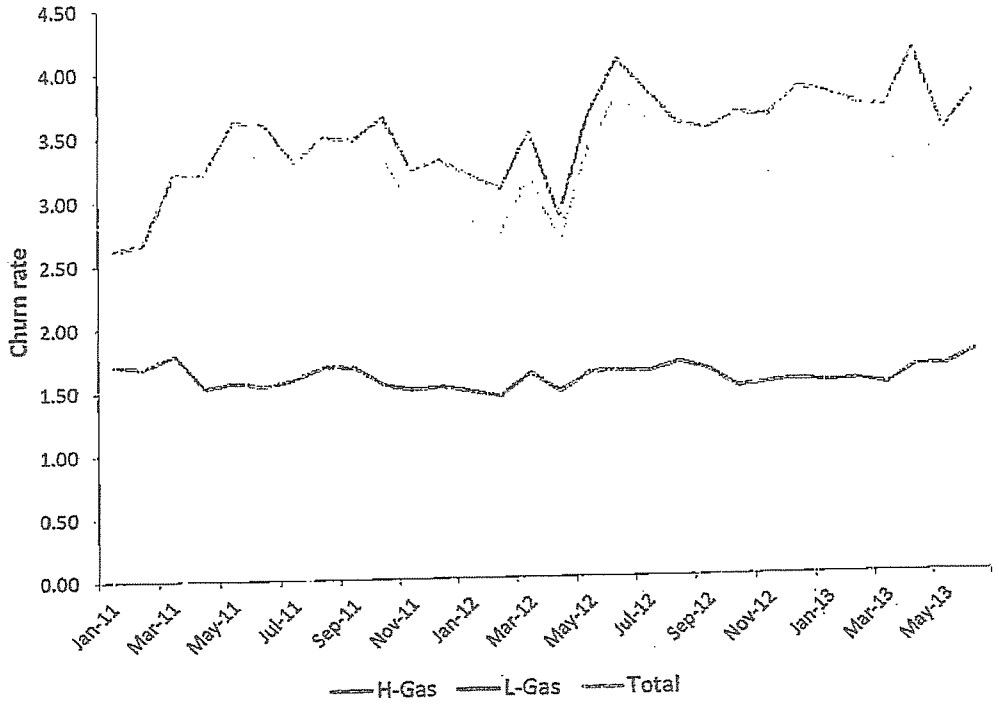


Source: NCG http://datenservice.net-connect-germany.de/Handelsvolumen.aspx?MandantId=Mandant_Ncg&rdeLocaleAttr=en

Churn

2.31 Figure 7 below shows the churn rate of the NCG OTC market. Data are available on OTC trades and physical volumes on the NCG. There are no exchange platform data available.

Figure 7: OTC Churn Rate on NCG



Source: NCG http://datenservice.net-connect-germany.de/ChurnRate.aspx?MandantId=Mandant_Ncg&rdeLocaleAttr=en

Bid-ask spread

2.32 ICIS gave NCG a tradability score of 16 in Q1 2013. This was the same as Q4 2012. Table 4 below shows the breakdown of ICIS's tradability scores by NCG contract.

Table 4: ICIS Tradability Scores for NCG, Q1 2013

Contract	Width of spread	Availability
Within-day	< €0.5/MWh	0
Day-ahead	< €0.5/MWh	1
Balance-of-month	< €0.5/MWh	1
Month-ahead	< €0.5/MWh	1
Next quarter	< €0.5/MWh	1
Next season	< €0.5/MWh	1
Two seasons ahead	< €0.5/MWh	1
One year ahead	< €0.5/MWh	1
Two years ahead	< €0.5/MWh	1
Three years ahead	< €0.5/MWh	1
Within-day	< €0.3/MWh	0
Day-ahead	< €0.3/MWh	1
Balance-of-month	< €0.3/MWh	0
Month-ahead	< €0.3/MWh	1
Next quarter	< €0.3/MWh	1
Next season	< €0.3/MWh	1
Two seasons ahead	< €0.3/MWh	1
One year ahead	< €0.3/MWh	1
Two years ahead	< €0.3/MWh	1
Three years ahead	< €0.3/MWh	0

Source: ICIS European Gas Hub Report, Q1 2013 Update, p. 8.

CEGH

2.33 The Central European Gas Hub ("CEGH") has developed from a physical hub in Austria where gas transmission pipelines met. The physical hub consisted of six tradable locations in Austria, of which Baumgarten was the largest. Therefore, the terms "Baumgarten" and "CEGH" are often used interchangeably. CEGH became a virtual trading point, rather than a physical hub, on 1 January 2013.[21] [22]

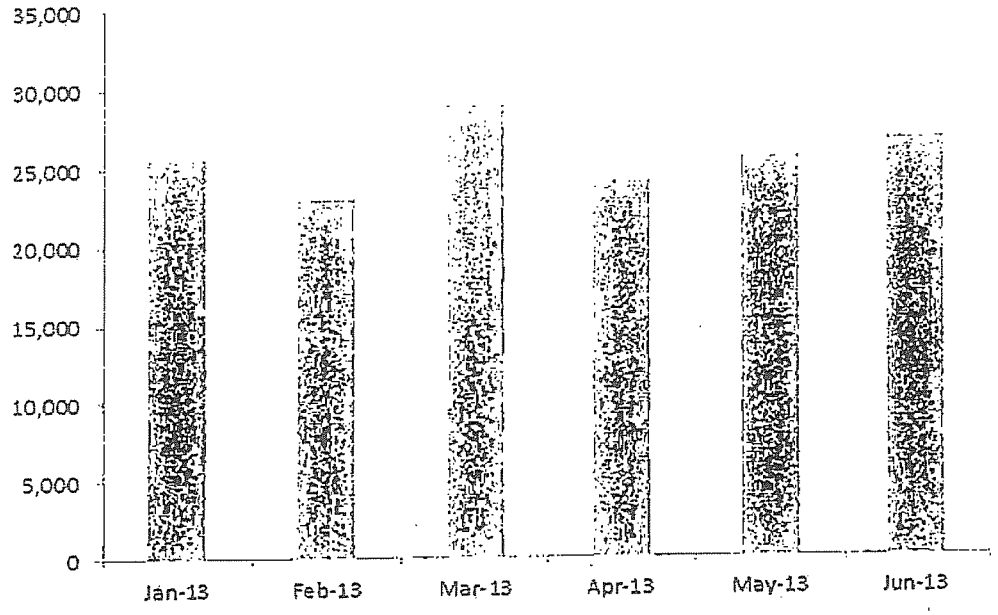
Volume traded

2.34 Figure 8 below shows the OTC-traded volume on CEGH. CEGH data were only available from 1 January 2013. Data on exchange traded volumes are not available.

[21] For an explanation of how the CEGH functions, see http://www.ceghex.com/index.php?eID=tx_nawsecured&u=0&file=fileadmin/Downloads/CEGH/GAS_Exchange/Company/About_us/cegh_image2012_lowRES.pdf&t=1374085866&hash=ae1f8ae3579d6e0bec7fd6ee78049fe5a39fb5fb

[22] CEGH exchange price data are available here http://www.ceghex.com/index.php?id=116 and CEGH OTC price data are available here http://www.ceghotc.com/index.php?id=359

Figure 8: OTC Traded Volume on CEGH (GWh)

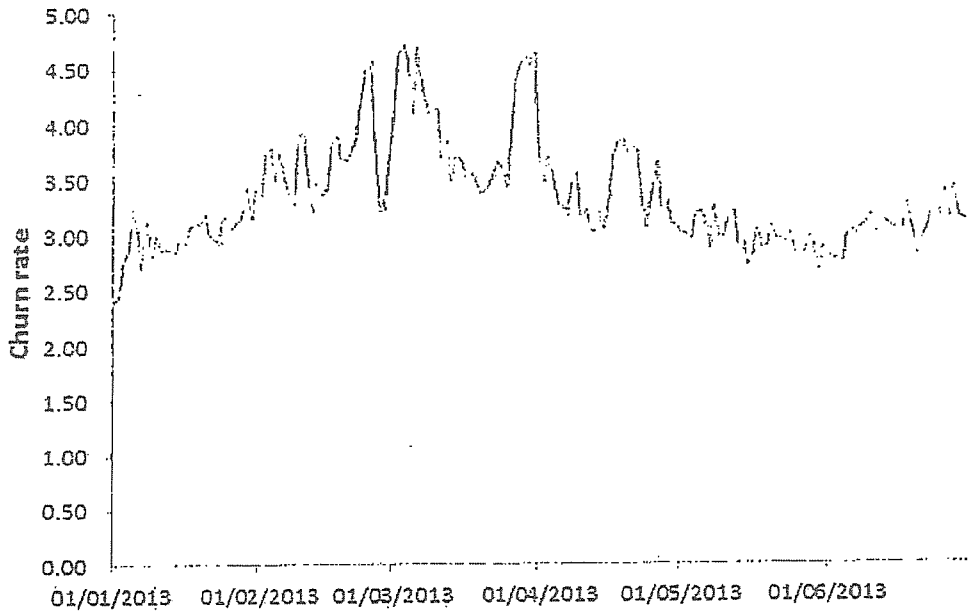


Source: CEGH http://www.ceghotc.com/index.php?id=360

Churn

2.35 Figure 9 below shows the churn rate of the CEGH OTC market. Data are available on OTC trades and physical volumes on the CEGH. Exchange platform data are not available. Data are only available from 1 January 2013, when the CEGH became a virtual trading point.

Figure 9: OTC Churn Rate on CEGH



Source: CEGH http://www.ceghotc.com/index.php?id=360

Bid-ask spread

2.36 ICIS gave CEGH a tradability score of 6 in Q1 2013. This was an increase of two points on Q4 2012. Table 5 below shows the breakdown of ICIS's tradability scores by CEGH contract.

Table 5: ICIS Tradability Scores for CEGH, Q1 2013

Contract	Width of spread	Availability
Within-day	< €0.5/MWh	0
Day-ahead	< €0.5/MWh	1
Balance-of-month	< €0.5/MWh	0
Month-ahead	< €0.5/MWh	1
Next quarter	< €0.5/MWh	1
Next season	< €0.5/MWh	1
Two seasons ahead	< €0.5/MWh	0
One year ahead	< €0.5/MWh	0
Two years ahead	< €0.5/MWh	0
Three years ahead	< €0.5/MWh	0
Within-day	< €0.3/MWh	0
Day-ahead	< €0.3/MWh	1
Balance-of-month	< €0.3/MWh	0
Month-ahead	< €0.3/MWh	1
Next quarter	< €0.3/MWh	0
Next season	< €0.3/MWh	0
Two seasons ahead	< €0.3/MWh	0
One year ahead	< €0.3/MWh	0
Two years ahead	< €0.3/MWh	0
Three years ahead	< €0.3/MWh	0

Source: ICIS European Gas Hub Report, Q1 2013 Update, p.16.

Section 3

Spare Capacity

3.1 In this section we:

a) show the historic technical capacity, firm bookings and actual flows for 2011-2012 for each route from the gas hubs to the Czech Republic;

b) calculate the historic spare firm and total spare capacity;

c) show the forward-looking technical capacity and firm bookings for each route from the gas hubs to the Czech Republic;[23] and

d) calculate the future spare firm capacity.

3.2 All data in this section are presented in bcm/y. In Appendix E we present the same information again in kWh/h terms.

A Gaspool via HSK Deutschneudorf

3.3 Data on entry capacity into the Czech transmission network at HSK Deutschneudorf are published by the Czech TSO, NET4GAS.[24]

Historic capacity 2011-2012

3.4 We have used data on daily technical capacity, firm bookings and actual flows to compute two measures of the excess capacity available at this border point for 2011 and 2012.

3.5 In particular, we have assessed:

a) Total spare capacity, computed as the difference between total annual technical capacity and total annual flows.

b) Spare firm capacity, computed as the difference between total annual technical capacity and total annual firm bookings.

3.6 We have contrasted those data with information on exit capacity from the Ontras transmission system in Germany for the same border point, as published on Ontras's

[23] We show all forward looking data available from the TSOs. We do not apply a cut-off point to the data.

[24] NET4GAS publishes this information on its website. Available at: http://extranet.net4gas.cz/capacity_ee.aspx http://extranet.net4gas.cz/gas_flow.aspx.

website.[25,26]

3.7 Table 6 and Table 7 below show the capacity and utilisation at HSK Deutschneudorf in 2012 and 2011, respectively.

Table 6: Capacity Utilisation at HSK Deutschneudorf, 2012 (bcm/y)

2012	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
HSK DN (DE) Exit	3.63	0.66	0.85	2.96	2.78
HSK-DN (CZ) Entry	4.03	1.39	0.85	2.64	3.19

Source: Compass Lexecon analysis on the basis of data from NET4GAS and Ontras. kWh are converted into m^3 using a conversion factor of 10.83 kWh=1m^3 (as per Eurogas Statistical Report 2012, p. 12). German and Czech flows, capacities, and bookings are the sums of the relevant daily values for 2012. German daily flows are counted from 6am on the day to 6am the next day.

Table 7: Capacity Utilisation at HSK Deutschneudorf, 2011 (bcm/y)

2011	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
HSK-DN (DE) Exit	3.64	3.64	0.77	0.00	2.87
HSK-DN (CZ) Entry	5.07	2.56	1.03	2.51	4.05

Source: Compass Lexecon analysis on the basis of data from NET4GAS and Ontras. kWh are converted into m^3 using a conversion factor of 10.83 kWh=1m^3. German and Czech flows, capacities, and bookings are the sums of the relevant daily values for 2012. German daily flows are counted from 6am on the day to 6am the next day.

Future capacity

3.8 We have used data on daily technical capacity and firm bookings to compute spare firm capacity (computed as the difference between total annual technical capacity and total annual firm bookings) available at this border point from 2013 onwards. Data were available up to 2022.

3.9 We have contrasted those data with information on exit capacity from the Ontras transmission system in Germany for the same border point, as published on Ontras's website.[27] Data were available up to 2023.

3.10 Table 8 below shows the capacity and utilisation at HSK Deutschneudorf from 2013 onwards.

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25 http://www.ontras.com/cms/index.php?id=transparenz-tool&L=2 .

26 The Commission states that it found inconsistencies regarding the technical and spare firm exit capacity from Germany at HSK Deutschneudorf between tables presented in an earlier version of this report and the data on the operator's website, and suggest the use of average values as a possible reason. We have re-checked our work against the raw data, and can find no such inconsistency. We do not use annual averages, but instead calculate annual values as a sum of reported daily values.

27 http://www.ontras.com/cms/index.php?id=transparenz-tool&L=2 .

Table 8: Capacity Utilisation at HSK Deutschneudorf (bcm/y)

Year	Exit from DE			Entry to CZ		
	Technical Capacity	Firm Bookings	Spare Firm	Technical Capacity	Firm Bookings	Spare Firm
2013	3.64	0.20	3.44	1.67	0.75	0.93
2014	3.64	0.00	3.64	1.64	0.63	1.01
2015	3.64	0.00	3.64	1.64	0.60	1.04
2016	3.33	0.00	3.33	1.65	0.60	1.04
2017	2.37	0.00	2.37	1.64	0.60	1.04
2018	2.37	0.00	2.37	1.64	0.60	1.04
2019	2.37	0.00	2.37	1.64	0.60	1.04
2020	2.37	0.00	2.37	1.65	0.60	1.04
2021	2.37	0.00	2.37	1.64	0.37	1.28
2022	2.37	0.00	2.37	1.64	0.00	1.64
2023	1.02	0.00	1.02	N/A	N/A	N/A

Source: Compass Lexecon analysis on the basis of data from NET4GAS and Ontras.
Notes: kWh are converted into m^3 using a conversion factor of 10.83 kWh=1m^3. German and Czech capacities and bookings are the sums of the relevant daily values. Ontras data for exit in 2023 are only available to 30 June 2023. From 4 August 2013, NET4GAS provides one set of indicative daily entry values for each month. We have assumed this represents uniform daily values throughout the month.

Daily and hourly utilisation

3.11 Although there is significant spare capacity on an annual basis, this may not allow gas from across the border to compete in the Czech Republic if there is not capacity available at peak hours. For example, there may be very little spare capacity in winter months or on certain peak days. This will limit the ability of firms to supply customers on a firm basis.

3.12 Therefore, we have also considered the number of days and hours each year where there is more than 90% of capacity utilisation. The table below shows the number of days with over 90% capacity utilisation. There are very few instances of high utilisation, which all occur in 2012.

Table 9: Daily Capacity Utilisation at HSK Deutschneudorf

	Exit from DE		Entry into CZ	
	Days with >90% Capacity Utilisation	Percentage of Days	Days with >90% Capacity Utilisation	Percentage of Days
2011	0	0.0%	0	0.0%
2012	10	2.7%	3	0.8%
Jan to Jun 2013	0	0.0%	0	0.0%

Source: Compass Lexecon analysis on the basis of data from NET4GAS and Ontras. Capacity utilisation rate is calculated by dividing gas flows by technical capacity. German daily flows are counted from 6am on the day to 6am the next day.

3.13 The table below shows the number of hours with over 90% capacity utilisation. Similarly to the daily data, there are a small number of instances of high utilisation in 2012. We have not seen data on hourly capacity utilisation on entry to the Czech Republic via HSK Deutschneudorf.

Table 10: Hourly Exit Capacity Utilisation from Germany at HSK Deutschneudorf

	Exit from DE	
	Hours with >90% Capacity Utilisation	Percentage of Hours
2011	0	0.0%
2012	240	2.7%
Jan to Jun 2013	0	0.0%

Source: Compass Lexecon analysis on the basis of data from Ontras. Hourly technical capacity was assumed to be uniform across each day. Capacity utilisation rate is calculated by dividing gas flows by technical capacity.

B Gaspool via HSK Olbernhau

3.14 We have computed similar indicators on capacity and spare capacity for the interconnector at HSK Olbernhau.

3.15 The analysis of entry capacity into the Czech transmission system is as in the analysis of transports from Gaspool via HSK Deutschneudorf.

Historic capacity 2011-2012

3.16 The analysis of the corresponding exit capacity from the Gascade transmission system on the German side relies on information published on Gascade's website.[28,29] Data on

[28] Gascade publishes this information on its website. Capacities available at: http://gascade.biz/ivo/gw/capacitybrreport/index.action?selectedReport=capacitybrreport; and flows available at: http://gascade.biz/ivo/gw/actualloadflowreport/index.action?selectedReport=actualloadflowreport.

capacities and bookings are available on a daily basis, flows are available on an hourly basis.

3.17 The results are presented in Table 11 and Table 12 below.

Table 11: Capacity Utilisation at HSK Olbernhau, 2012 (bcm/y)

2012	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
HSK-O (DE) Exit	9.55	8.13	5.71	1.41	3.83
HSK-O (CZ) Entry	8.20	6.32	5.72	1.88	2.48

Source: Compass Lexecon analysis on the basis of data from NET4GAS and Gascade. kWh are converted into m^3 using a conversion factor of 10.83 kWh=1m^3. Czech flows, capacities, and bookings are the sums of the relevant daily values for 2012, as are German capacities and bookings. German flows are the sums of the relevant hourly values within 2012. In a small number of cases, flows were not reported for all 24 hours of the day; we then scaled the posted flows to 24 hours (see Appendix D for details).

Table 12: Capacity Utilisation at HSK Olbernhau, 2011 (bcm/y)

2011	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
HSK-O (DE) Exit	9.40	7.63	3.69	1.77	5.71
HSK-O (CZ) Entry	8.24	6.20	3.70	2.04	4.54

Source: Compass Lexecon analysis on the basis of data from NET4GAS and Gascade. kWh are converted into m^3 using a conversion factor of 10.83 kWh=1m^3. Czech flows, capacities, and bookings are the sums of the relevant daily values for 2011, as are German capacities and bookings. For 72 days in 2011 (1 January to 1 March and 3-14 March) there were no Gascade data available on exit capacity from Germany. We have estimated an annual value by summing up the capacity for those days where data were available and annualising the results (i.e. scaling by a factor of 365/(365-72). German flows are the sums of the relevant hourly values within 2011. In a small number of cases, flows were not reported for all 24 hours of the day; we then scaled the posted flows to 24 hours (see Appendix D for details).

Future capacity

3.18 The analysis of the corresponding exit capacity from the Gascade transmission system on the German side relies on information published on Gascade's website.[30] Data on capacities and bookings are available on a daily basis up to 2023.

3.19 The results are presented in Table 13 below.

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29 The Commission states that it found inconsistencies regarding the technical and spare firm exit capacity from Germany at HSK Olbernhau between tables presented in an earlier version of this report and the data on the operator's website, and suggests the use of average values as a possible reason. We have re-checked our work against the raw data, and can find no such inconsistency. We do not use annual averages, but instead calculate annual values as a sum of daily values.

30 Gascade publishes this information on its website. Capacities available at: http://gascade.biz/ivo/gw/capacitybrreport/index.action?selectedReport=capacitybrreport; and flows available at: http://gascade.biz/ivo/gw/actualloadflowreport/index.action?selectedReport=actualloadflowreport.

Table 13: Capacity Utilisation at HSK Olbernhau (bcm/y)

Year	Exit from DE			Entry into CZ		
	Technical Capacity	Firm Bookings	Spare Firm	Technical Capacity	Firm Bookings	Spare Firm
2013	10.72	10.60	0.12	12.80	5.45	7.35
2014	10.77	10.68	0.10	13.82	0.00	13.82
2015	10.77	10.08	0.69	13.82	0.00	13.82
2016	10.80	9.12	1.68	13.86	0.00	13.86
2017	10.77	8.88	1.89	13.82	0.00	13.82
2018	10.77	8.88	1.89	13.82	0.00	13.82
2019	10.77	8.88	1.89	13.82	0.00	13.82
2020	10.80	8.91	1.90	13.86	0.00	13.86
2021	10.77	8.88	1.89	13.82	0.00	13.82
2022	10.77	8.88	1.89	13.82	0.00	13.82
2023	4.63	0.54	4.10	N/A	N/A	N/A

Source: Compass Lexecon analysis on the basis of data from NET4GAS and Gascade.
Notes: kWh are converted into m^3 using a conversion factor of 10.83 kWh=1m^3. Czech capacities and bookings are the sums of the relevant daily values, as are German capacities and bookings. Ontras data for exit in 2023 are only available to 6 June 2023. From 4 August 2013, NET4GAS provided one set of indicative daily entry values for each month. We have assumed that this represented uniform daily values throughout the month.

Daily and hourly utilisation

3.20 The table below shows the number of days with over 90% capacity utilisation. There are some instances of high utilisation, particularly for exit from Germany in 2013. We note the wide disparity between the 2013 results for exit from Germany on the one hand and entry into the Czech Republic on the other.

Table 14: Daily Capacity Utilisation at HSK Olbernhau

	Exit from DE		Entry into CZ	
	Days with >90% Capacity Utilisation	Percentage of Days	Days with >90% Capacity Utilisation	Percentage of Days
2011	6	2.0%	6	1.6%
2012	39	10.7%	54	14.8%
Jan to Jun 2013	85	47.0%	16	8.8%

Source: Compass Lexecon analysis on the basis of data from NET4GAS and Gascade.
Notes: Capacity utilisation rate is calculated by dividing gas flows by technical capacity. German capacity data were unavailable from 1 January 2011 to 1 March 2011 and from 3 to 14 March 2011. These days were therefore excluded from the analysis. In a small number of cases, flows were not reported for all 24 hours of the day; we then scaled the posted flows to 24 hours.

3.21 The table below shows the number of hours with over 90% capacity utilisation. Similarly to the daily data, there are a number of instances of high utilisation in 2013 (we note again the large disparaty between German and Czech data displayed in the previous table). Hourly data for entry into the Czech Republic via HSK Olbernhau are not available.

Table 15: Hourly Exit Capacity Utilisation from Germany at HSK Olbernhau

	Exit from DE	
	Hours with >90% Capacity Utilisation	Percentage of Hours
2011	164	2.3%
2012	1,004	11.4%
Jan to Jun 2013	2,063	47.8%

Source: Compass Lexecon analysis on the basis of data from Gascade.
Notes: Hourly technical capacity was unavailable from 1 January 2011 to 1 March 2011 and from 3 March 2011 to 14 March 2011. These days were therefore excluded from the analysis. Capacity utilisation rate is calculated by dividing gas flows by technical capacity.

c NCG via Waidhaus

Historic capacity 2011-2012

3.22 Table 16 below presents NET4GAS data on technical entry capacity into the Czech Republic, bookings and flows at the Waidhaus entry point. As pointed out above, Waidhaus is not physically bi-directional, and so we assume that bookings relate to interruptible capacity only (even though they are declared as "firm" on NET4GAS's website).

Table 16: Utilisation of Entry Capacity into the Czech Republic at Waidhaus (bcm/y)

Waidhaus	Technical Capacity	Firm* Bookings	Flows	Spare Firm*	Total Spare
2012	6.78	3.71	3.83	3.07	2.95
2011	5.71	3.94	2.49	1.78	3.23

Source: Compass Lexecon analysis on the basis of data from NET4GAS. kWh are converted into m^3 using a conversion factor of 10.83 kWh=1m^3. Flows are derived from the average daily flows reported for the year.
Capacities and bookings are the sums of the relevant daily values for the year.
** The information is labelled "firm" on NET4GAS's website, but given that the interconnector is not physically bi-directional we assume that these are interruptible bookings.*

3.23 Table 17 presents information on interruptible bookings of exit capacity from the OGE transmission system and flows at Waidhaus, computed from daily data published on the OGE website.[31]

[31] OGE publishes this hourly data on its website. However, daily data was previously available, and as explained in Appendix B, we prefer to use daily data from OGE. Data are available at: http://www.open-grid-europe.com/cps/rde/xchg/SID-94936668-0708FD18/open-grid-europe-internet/hs.xsl/2100.htm

Table 17: Bookings of Interruptible Exit Capacity from Germany at Waidhaus (bcm/y)

Waidhaus	Interruptible Bookings	Flows
2012	4.24	3.82
2011	2.81	3.66

Source: Compass Lexecon analysis on the basis of data from OGE. kWh are converted into m^3 using a conversion factor of 10.83 kWh=1m^3. Bookings and flows are the sums of the relevant daily values for each year.

Future capacity

3.24 Table 18 below presents NET4GAS data on technical entry capacity into the Czech Republic and at the Waidhaus entry point. As pointed out above, Waidhaus is not physically bi-directional, and so we assume that bookings relate to interruptible capacity only (even though they are declared as "firm" on NET4GAS's website). These data are available to 2022.

3.25 We could find no forward looking data on bookings of exit capacity from the OGE transmission system at Waidhaus.

Table 18: Capacity Utilisation at Waidhaus (bcm/y)

Year	Exit from DE			Entry into CZ		
	Technical Capacity	Firm Bookings	Firm Spare	Technical Capacity	Firm Bookings	Firm Spare
2013	N/A	N/A	N/A	12.77	2.08	10.70
2014	N/A	N/A	N/A	15.17	0.73	14.44
2015	N/A	N/A	N/A	15.17	0.53	14.64
2016	N/A	N/A	N/A	15.21	0.53	14.68
2017	N/A	N/A	N/A	15.17	0.53	14.64
2018	N/A	N/A	N/A	15.17	0.53	14.64
2019	N/A	N/A	N/A	15.17	0.26	14.90
2020	N/A	N/A	N/A	15.21	0.00	15.21
2021	N/A	N/A	N/A	15.17	0.00	15.17
2022	N/A	N/A	N/A	15.17	0.00	15.17

Source: Compass Lexecon analysis on the basis of data from NET4GAS.
Notes: kWh are converted into m^3 using a conversion factor of 10.83 kWh=1m^3. Capacities and bookings are the sums of the relevant daily values for the year. The information on bookings is labelled "firm" on NET4GAS's website, but given that the interconnector is not physically bi-directional we assume that these are interruptible bookings. No information is available on exit from Germany. From 4 August 2013, NET4GAS provides one set of indicative daily entry values for each month. We have assumed that this represents uniform daily values throughout the month.

Daily capacity

3.26 As Waidhaus is not physically bi-directional, it is not possible to calculate a capacity utilisation rate for flows from Germany to the Czech Republic equivalent to the calculation we have performed for other interconnectors.

D CEGH via Baumgarten and Lanžhot

3.27 A gas supplier wishing to transport gas from the CEGH to the Czech Republic requires capacity at two interconnectors: Baumgarten on the border between Austria and Slovakia and Lanžhot on the border between Slovakia and the Czech Republic.

Historic capacity 2011-2012

3.28 Table 19 and Table 20 show capacity and capacity utilisation for gas transport in the Czech direction at the Lanžhot border point in 2012 and 2011, respectively. The figures on entry into the Czech system have been calculated in the same way as for the other interconnectors above. The analysis of the corresponding exit capacity from the Slovak transmission system relies on information published on the website of eustream, the Slovakian TSO.[32] Data on capacities and bookings are available on a daily basis. Flow data are reported as annual averages of daily flows.

3.29 These tables show that, while abundant physical capacity to transport gas in the Czech direction was available at this interconnector, most of that capacity was booked, so that there was relatively little free spare firm capacity, especially on exit from the Slovakian system. We understand that the capacity was booked by Gazprom.

Table 19: Capacity Utilisation at Lanžhot, 2012 (bcm/y)

2012	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
Lanžhot (SK) Exit	44.27	44.13	16.51	0.15	27.77
Lanžhot (CZ) Entry	55.26	52.09	10.86	3.17	44.40

Source: Compass Lexecon analysis on the basis of data from NET4GAS and eustream. kWh are converted into m^3 using a conversion factor of 10.83 kWh=1m^3. Slovakian data are available from eustream in m^3. Czech flows, capacities, and bookings are the sums of the relevant daily values for 2012. Slovakian annual flows are derived from the average daily flow reported for 2012. Slovakian capacities and bookings are the sums of the relevant daily values for 2012.

32 eustream publishes this information on its website. Capacity data available at: https://lis.eustream.sk/TIS/#/?nav=bd.cap.l; flow data available at: https://lis.eustream.sk/TIS/#/?nav=rd.ocu.l.

Table 20: Capacity Utilisation at Lanžhot, 2011 (bcm/y)

2011	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
Lanzhot (SK) Exit	44.48	44.20	29.97	0.28	14.52
Lanzhot (CZ) Entry	57.62	52.73	24.56	4.89	33.06

Source: Compass Lexecon analysis on the basis of data from NET4GAS and eustream. kWh are converted into m^3 using a conversion factor of 10.83 kWh=1m^3. Slovakian data are available from eustream in m^3. Czech flows, capacities, and bookings are the sums of the relevant daily values for 2011. Slovakian annual flows are derived from the average daily flow reported for 2011. Slovakian capacities and bookings are the sums of the relevant daily values for 2011.

3.30 Table 21 shows the capacity situation at the Baumgarten border point in 2011 and 2012. Data on technical capacity, firm bookings and physical flows are published by eustream (see paragraph 3.28).[33]

Table 21: Utilisation of Entry Capacity into Slovakia at Baumgarten (bcm/y)

	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
2012	6.59	0.00	0.00	6.59	6.59
2011	6.57	0.00	0.00	6.57	6.57

Source: Compass Lexecon analysis on the basis of data from eustream. Flows are derived from the average daily flows within each year. Capacities and bookings are the sums of the relevant daily values for each year.

3.31 The available firm capacity for transporting gas from Slovakia to the Czech Republic via Lanžhot is smaller than the capacity available for gas transport from Austria to Slovakia via Baumgarten. The binding capacity constraint for firm gas transports from the CEGH to the Czech Republic therefore occurs at Lanžhot (exit from the Slovak transmission system). In the case of total spare capacity, the binding constraint is at Baumgarten.

Future capacity

3.32 Table 22 shows capacity and capacity utilisation for gas transport in the Czech direction at the Lanžhot border point from 2013 onwards. The figures on entry into the Czech system are available up to 2022. The analysis of the corresponding exit capacity from the Slovak transmission system relies on information published on the website of eustream, the Slovakian TSO.[34] Data on capacities and bookings are available on a daily basis up to 2027.

[33] We were unable to locate data for 2011 and 2012 on the corresponding exit capacities, bookings and flows on the Austrian side.

[34] eustream publishes this information on its website. Capacity data available at: https://tis.eustream.sk/TIS/#/?nav=bd.cap.l; flow data available at: https://tis.eustream.sk/TIS/#/?nav=rd.ocu.l.

Table 22: Capacity Utilisation at Lanžhot (bcm/y)

Year	Exit from SK			Entry into CZ		
	Technical Capacity	Firm Bookings	Spare Firm	Technical Capacity	Firm Bookings	Spare Firm
2013	27.38	25.92	1.45	55.28	27.01	28.27
2014	20.08	17.92	2.15	55.29	16.80	38.49
2015	20.08	17.92	2.15	55.29	12.73	42.56
2016	20.08	17.92	2.15	55.44	11.67	43.76
2017	16.43	12.81	3.61	55.29	6.76	48.53
2018	16.43	12.81	3.61	55.29	6.76	48.53
2019	16.43	12.81	3.61	55.29	6.76	48.53
2020	16.43	12.81	3.61	55.44	6.78	48.66
2021	16.43	3.94	12.48	55.29	3.74	51.55
2022	16.43	0.00	16.43	55.29	0.00	55.29
2023	16.43	0.00	16.43	N/A	N/A	N/A
2024	16.43	0.00	16.43	N/A	N/A	N/A
2025	16.43	0.00	16.43	N/A	N/A	N/A
2026	16.43	0.00	16.43	N/A	N/A	N/A
2027	16.43	0.00	16.43	N/A	N/A	N/A

Source: Compass Lexecon analysis on the basis of data from NET4GAS and eustream.
Notes: kWh are converted into m^3 using a conversion factor of 10.83 kWh=1m^3. Slovakian data are available from eustream in m^3. Czech capacities and bookings are the sums of the relevant daily values where daily data are available. Slovakian capacities and bookings are the sums of the relevant daily values where daily data are available. From 4 August 2013, NET4GAS provided one set of indicative daily entry values for each month. We have assumed this represents uniform daily values throughout the month. From 2015 onwards, eustream only provided one representative daily figure for capacity outlook in each year. This has been multiplied by 365 to determine the annual figure.

3.33

3.34 Table 23 shows the capacity situation at the Baumgarten border point from 2013 onward.

Table 23: Capacity Utilisation at Baumgarten (bcm/y)

Year	Exit from AT			Entry into SK		
	Technical Capacity	Firm Bookings	Spare Firm	Technical Capacity	Firm Bookings	Spare Firm
2013	8.30	3.15	5.15	7.64	0.02	7.61
2014	8.30	3.14	5.16	8.69	0.00	8.69
2015	8.31	4.48	3.83	8.69	0.00	8.69
2016	8.31	4.48	3.83	8.69	0.00	8.69
2017	8.31	4.48	3.83	8.69	0.00	8.69
2018	8.31	4.48	3.83	8.69	0.00	8.69
2019	8.31	4.48	3.83	8.69	0.00	8.69
2020	8.31	4.48	3.83	8.69	0.00	8.69
2021	8.31	4.48	3.83	8.69	0.00	8.69
2022	8.31	3.77	4.54	8.69	0.00	8.69
2023	8.31	3.68	4.63	8.69	0.00	8.69
2024	8.31	3.68	4.63	8.69	0.00	8.69
2025	8.31	2.94	5.37	8.69	0.00	8.69
2026	8.31	1.60	6.71	8.69	0.00	8.69
2027	8.31	1.60	6.71	8.69	0.00	8.69

Source: Compass Lexecon analysis on the basis of data from Gas Connect Austria and eustream.
Notes: kWh are converted into m^3 using a conversion factor of 10.83 kWh=1m^3. Slovakian data are available from eustream in m^3. Austrian capacities and bookings are determined by transforming an indicative hourly capacity value for each year into an annual rate. Slovakian capacities and bookings are the sums of the relevant daily values, where daily data are available. From 2015 onwards, eustream only provided one representative daily figure for capacity outlook in each year. This has been multiplied by 365 to determine the annual figure.

3.35 From 2013 to 2020, the available firm capacity for transporting gas from Slovakia to the Czech Republic via Lanžhot is smaller than the capacity available for gas transport from Austria to Slovakia via Baumgarten. The binding capacity constraint for firm gas transports from the CEGH to the Czech Republic therefore occurs at Lanžhot (exit from the Slovak transmission system) from 2013 to 2020. From 2021 to 2027, the binding constraint occurs at Baumgarten (exit from the Austrian transmission system).

Daily utilisation

3.36 The table below shows the number of days with over 90% capacity utilisation. Hourly data were not available for the Lanžhot interconnector. No data were available for exit capacity from Slovakia. There were no instances of high capacity utilisation on entry into the Czech Republic. eustream (Baumgarten's entry into Slovakia and Lanzhot's exit from Slovakia), provides aggregated daily flows data for each interconnector point. These data aggregate entry and exit flows, such that specific directional analysis is not possible.

Table 24: Daily Capacity Utilisation at Lanžhot

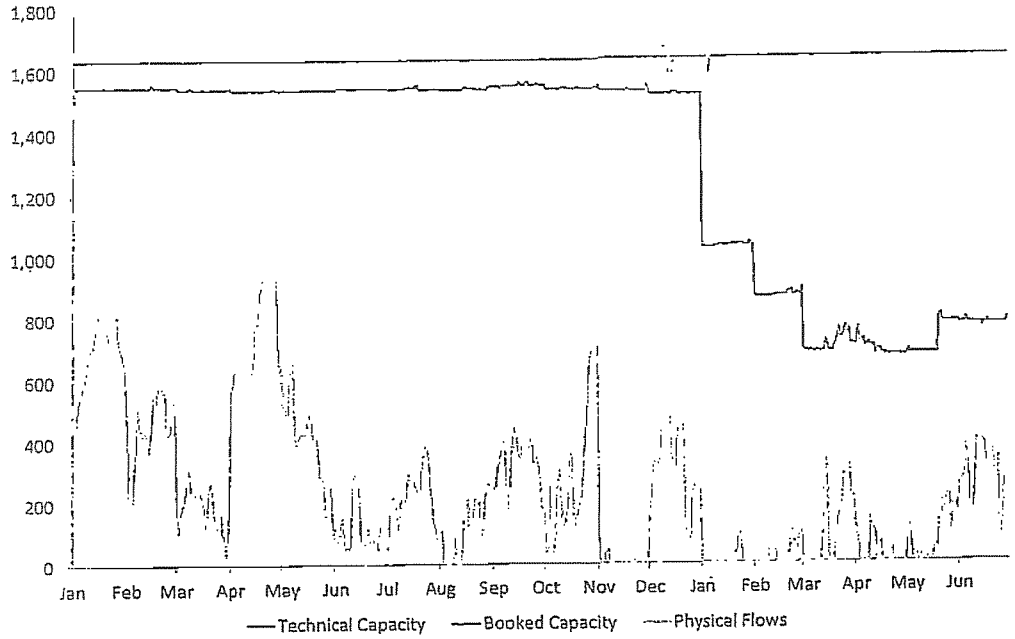
	Exit from SK		Entry into CZ	
	Days with >90% Capacity Utilisation	Percentage of Days	Days with >90% Capacity Utilisation	Percentage of Days
2011	N/A	N/A	0	0.0%
2012	N/A	N/A	0	0.0%
Jan to Jun 2013	N/A	N/A	0	0.0%

Source: Compass Lexecon analysis on the basis of data from NET4GAS. Capacity utilisation is calculated by dividing gas flows by technical capacity.

Additional details

3.37 Now that the pipeline system of Nordstream, OPAL and Gazelle has come onstream, Gazprom has diverted former transit flows to Germany via Lanžhot to that system. As a consequence, physical flows and firm bookings have diminished. Substantial amounts of firm entry capacity into the Czech transmission system are now available at Lanžhot (see Figure 10).

Figure 10: Daily Technical Capacity, Firm Bookings and Flows at Lanžhot – Entry into Czech Transmission System, 2012-2013 (GWh/d)



Source: NET4GAS data.

Table 25: Capacity Utilisation at Lanžhot – Entry into Czech Republic (bcm in period)

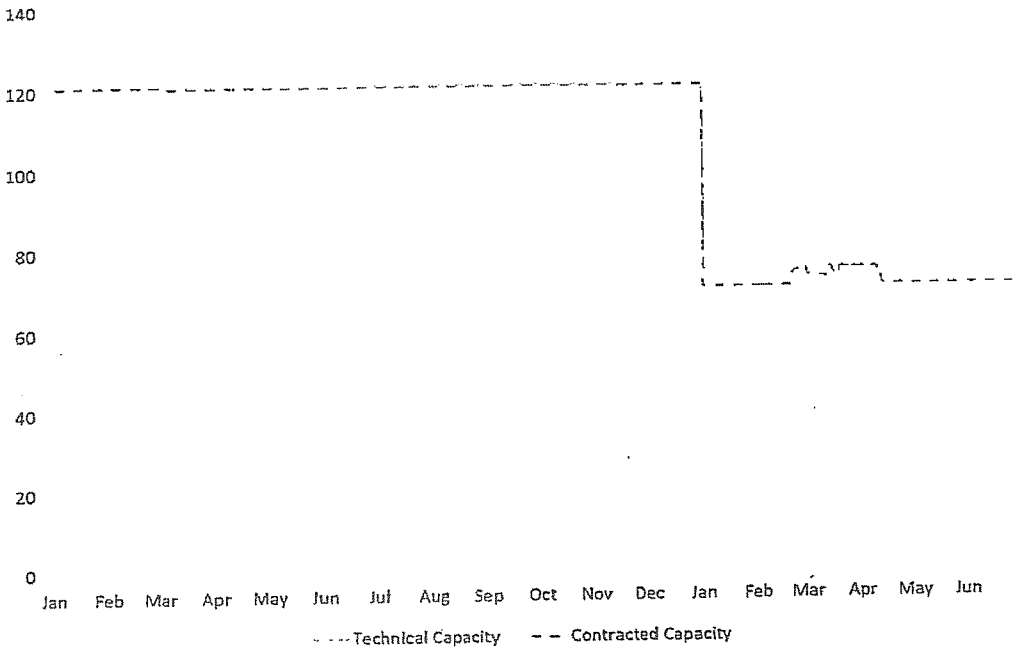
	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
Jan to Jun 2012	27.47	25.94	7.19	1.53	20.28
Jan to Jun 2013	27.41	13.38	1.54	14.03	25.87

Source: Compass Lexecon analysis on the basis of data from NET4GAS. kWh are converted into m^3 using a conversion factor of 10.83 kWh=1m^3. Czech flows, capacities, and bookings are the sums of the relevant daily values in the period under consideration.

3.38 However, eustream, the Slovakian TSO, has reacted to the gas diversion with a reconfiguration of its compressor park. Inter alia, eustream has substantially reduced the technical exit capacity from its transmission system at the Lanžhot interconnector.[35] Even so, spare firm capacity at that interconnector has increased in the first four months of 2013 (see Figure 11).

35 eustream Annual Report 2011, p. 5.

Figure 11: Daily Technical Capacity and Firm Bookings at Lanžhot – Exit from Slovak Transmission System, 2012-2013 (mcm/d)



Source: eustream data.

Table 26: Capacity Utilisation at Lanžhot – Exit from Slovakia (bcm in period)

	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
Jan to Jun 2012	21.15	21.08	N/A	0.07	N/A
Jan to Jun 2013	13.04	12.43	4.88	0.60	8.16

Source: Compass Lexecon analysis on the basis of data from eustream. Slovakian flows in period are derived from the average daily flow reported for each month. Flow data are only available up to May 2013. Slovakian capacities and bookings are the sums of the relevant daily values for the period under consideration.

E Interruptions

3.39 There are limited data on the interruptions at the relevant interconnectors. The table below presents data on interruptions for entry into the Czech Republic that we found on the NET4GAS website. This shows the number of times interruptible bookings were interrupted. Note that there is no indication of the length of period or volume of gas interrupted.

3.40 These data show that the number of interruptions was very small.

Table 27: Interruptions at Entry into Czech Republic

	2011	2012	Jan-Jun 2013
HSK-DN	0	0	0
HSK-Olb	0	0	1
Lanžhot	0	3	0
Waidhaus	0	1	0

Source: NET4GAS available at http://extranet.net4gas.cz/interruption.aspx

F Summary and conclusions

3.41 The tables below summarise the historic total spare capacity and the spare firm capacity, respectively, at the relevant interconnectors, as derived above. For each interconnector where data on both connecting transmission systems are available we report the lesser of spare entry capacity into the Czech transmission system and spare exit capacity from the transmission system of the neighbouring country.

Table 28: Total Spare Capacity at Relevant Interconnectors (bcm/y)

Interconnector	2011	2012
HSK – O	4.54	2.48
HSK – DN	2.87	2.78
Baumgarten	6.57	6.59
Waidhaus	3.23	2.95
Total	**17.21**	**14.80**

Source: Compass Lexecon analysis.

Table 29: Spare Firm Capacity at Relevant Interconnectors (bcm/y)

Interconnector	2011	2012
HSK - O	1.77	1.41
HSK - DN	0.00	2.64
Lanžhot	0.28	0.15
Total	**2.05**	**4.20**

Source: Compass Lexecon analysis.

3.42 The excess capacity available is very substantial when compared with data on gas consumption and sources of supply in the Czech Republic (see Table 30 below). The combined spare firm capacity is equivalent to around 25-50% of total consumption in the Czech Republic, depending on the year. Total spare capacity is around twice the consumption in the Czech Republic.

Table 30: Gas Consumption and Sources of Supply in the Czech Republic (bcm/y)

	2009	2010	2011
Consumption	8.2	9.3	8.4
Production	0.1	0.1	0.1
Imports - Norway	3.0	3.1	3.9
Imports – Russia	6.4	8.4	6.9
Imports - Other Europe	-	-	1.3
Imports – Total	9.4	11.5	12.0

Source: BP Statistical Review of World Energy 2010-2012. Production data are from Czech ERO Annual Reports.

3.43 The table below summarises the forward-looking spare firm capacity at the relevant interconnectors. This shows that, from 2014, spare firm entry capacity corresponds to more than a third of the Czech domestic consumption of 9 bcm/y. From 2016, spare capacity covers more than half of domestic consumption, and from 2017 it covers more than two thirds.

Table 31: Summary of Spare Firm Capacity (bcm/y)

Year	HSK-DN	HSK-Olb	Baumgarten	Lanžhot	Total known spare capacity
2013	0.93	0.12	5.15	1.45	2.49
2014	1.01	0.10	5.16	2.15	3.26
2015	1.04	0.69	3.83	2.15	3.89
2016	1.04	1.68	3.83	2.15	4.88
2017	1.04	1.89	3.83	3.61	6.55
2018	1.04	1.89	3.83	3.61	6.55
2019	1.04	1.89	3.83	3.61	6.55
2020	1.04	1.90	3.83	3.61	6.55
2021	1.28	1.89	3.83	12.48	6.99
2022	1.64	1.89	4.54	16.43	8.08
2023	1.02	4.10	4.63	16.43	9.75
2024	N/A	N/A	4.63	16.43	N/A
2025	N/A	N/A	5.37	16.43	N/A
2026	N/A	N/A	6.71	16.43	N/A
2027	N/A	N/A	6.71	16.43	N/A

Source: Compass Lexecon analysis on the basis of data from NET4GAS, Ontras, Gascade, Gas Connect Austria and eustream.

Notes: kWh are converted into m^3 using a conversion factor of 10.83 kWh=1m^3. When summing total spare firm capacity, we include the lesser of spare capacity at Baumgarten and Lanžhot as the binding constraint. For HSK-DN and HSK-Olb, Ontras and Gascade data for 2023 are only available up to 19 June 2023 and 6 June 2023, respectively. No Waidhaus capacities are included because the Waidhaus interconnector is not physically bi-directional so that only interruptible bookings are possible in the Czech direction.

Capacity Tariffs

A.1 The links below lead to the capacity tariff sheets published by the relevant TSOs.

NET4GAS

A.2 http://www.eru.cz/user_data/files/ERV/ERV7_2012.pdf

Ontras

A.3 http://www.ontras.com/cms/index.php?id=archiv&L=2

Gascade

A.4 http://www.gascade.de/index.php?id=download_netzzugang&L=1

Eustream

A.5 https://tis.eustream.sk/TIS/#/?nav=gi.trf

GRTgaz DE

A.6 http://www.grtgaz-deutschland.de/en/content/downloads

Open Grid Europe

A.7 https://www.open-grid-europe.com/cps/rde/xchg/SID-971D961C-160EC860/open-grid-europe-internet/hs.xsl/976.htm

Austria

A.8 http://www.e-control.at/portal/page/portal/medienbibliothek/recht/dokumente/pdfs/Entwurf%20GSNE-VO-2013-18092012REK-clean_en.pdf

Waidhaus Flows

B.1 The counterflow potential at Waidhaus corresponds to the transport in the main-flow direction from the Czech Republic to Germany. In order to determine the counterflow potential, we determine the transports in the main-flow direction.

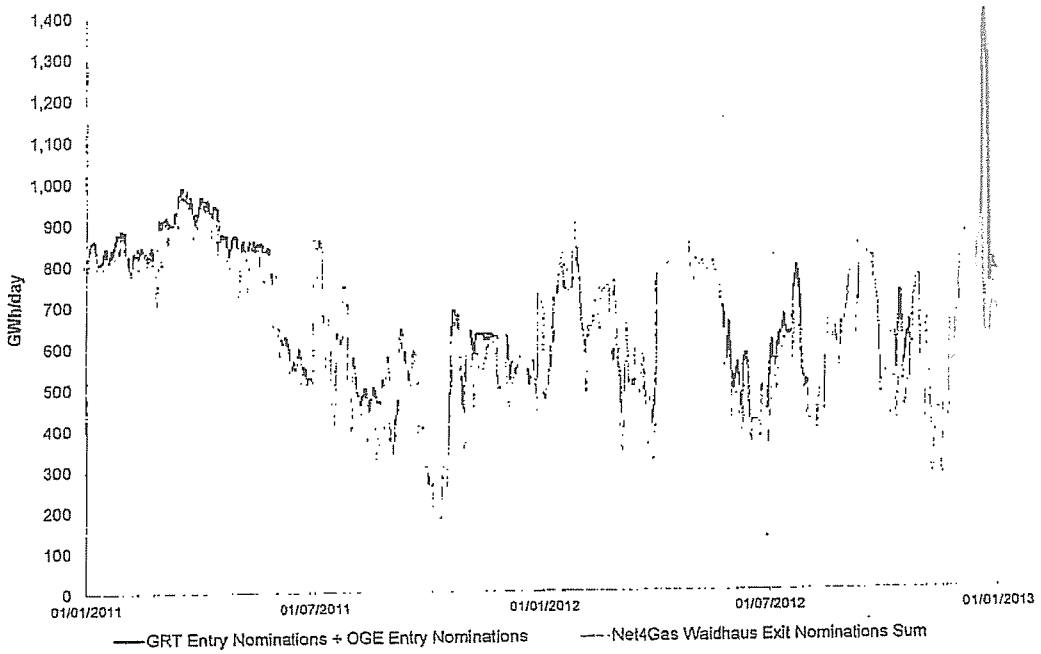
B.2 The Waidhaus interconnector is operated by three TSOs, NET4GAS in the Czech Republic and OGE and GRTgaz DE in Germany. Data are available from all three TSOs on nominations, allocations and flows.

B.3 There are inconsistencies between the data provided by the three TSOs for nominations, allocations and flows. For example, one would expect that the exit flows from Germany into the Czech Republic at an interconnector reported by the German TSO would roughly correspond to the entry flows into the Czech Republic from Germany at the same interconnector reported by the Czech TSO. However, this is not always the case. There are also discrepancies between the nominations, allocations and flows data for a given TSO. Therefore, it is not clear which data offer the most accurate view of the counterflow potential. In this Appendix we present data for nominations, allocations and flows to demonstrate this.

Nominations

B.4 Gas shippers must nominate the gas they request to flow through the interconnector. Counterflows can be nominated up to the amount of final nominations of main flows. Final nominations data is shown in Figure 12 below. Each of OGE and GRTgaz DE report nominations on their respective share of the pipeline only, so we sum data from OGE and GRTgaz DE to calculate entry nominations to Germany.

Figure 12: Reported Daily Nominations at the Waidhaus Interconnection Point



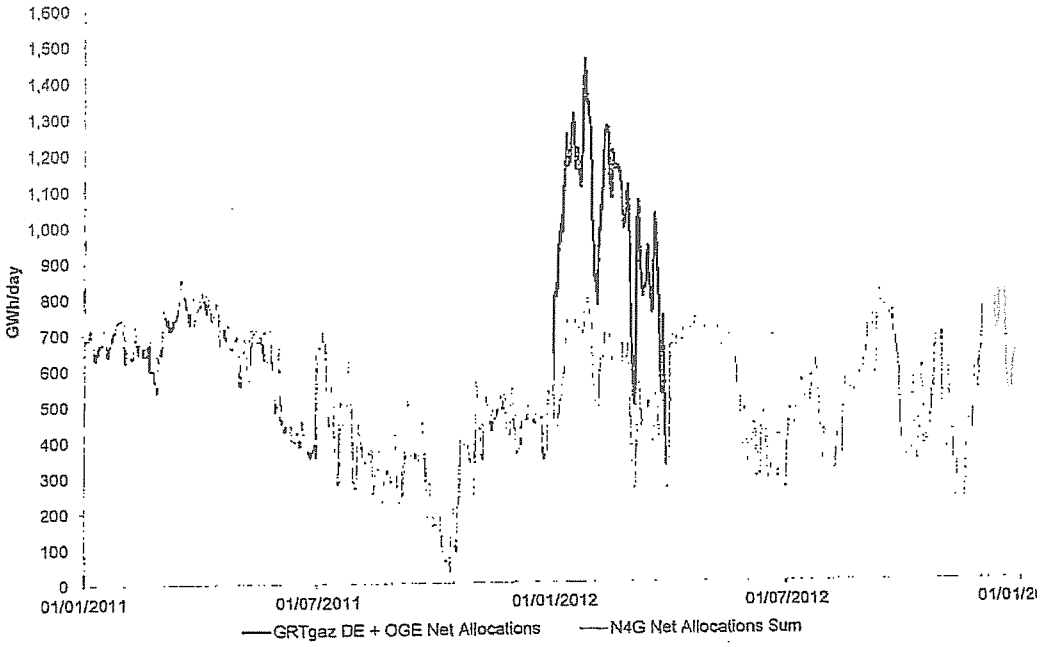
Source: Compass Lexecon calculation. http://www.open-grid-europe.com/cps/rde/xchg/SID-17C86292-99AA0CE7/open-grid-europe-internet/hs.xsl/2100.htm, http://www.grtgaz-deutschland.de/de/content/lastflussdaten, http://extranet.net4gas.cz/nomination_ee.aspx and http://extranet.net4gas.cz/nomination_p2p.aspx.

B.5 As Figure 12 above shows, there are some inconsistencies between the final nominations data on the Czech side of the interconnector and the German side of the interconnector; in particular there is a spike in German data in December 2012. In any event, these data show that there are always substantial nominations of gas flows from the Czech Republic to Germany.

Allocations

B.6 Allocation data show the sum of all gas actually transported for shippers by the respective TSO for a specific direction. As for nominations, OGE and GRTgaz DE publish allocation data only for their respective shares of the pipeline, so we sum the data for German entry allocations. However, GRTgaz DE only provides data for total allocations (i.e. allocations are not split by entry and exit). Therefore, we can only compare net allocations (i.e. nominations from the Czech Republic to Germany minus nominations from Germany to the Czech Republic).

Figure 13: Reported Daily Net Allocations at the Waidhaus Interconnection Point



Source: Compass Lexecon calculation, http://extranet.net4gas.cz/allocation_p2p.aspx http://extranet.net4gas.cz/allocation_ee.aspx http://extranet.net4gas.cz/allocation_p2p.aspx http://extranet.net4gas.cz/allocation_ee.aspx http://www.grtgaz-deutschland.de/de/content/lastflussdaten http://www.open-grid-europe.com/cps/rde/xchg/SID-17C86292-99AA0CE7/open-grid-europe-internet/hs.xsl/2100.htm http://www.open-grid-europe.com/cps/rde/xchg/SID-17C86292-99AA0CE7/open-grid-europe-internet/hs.xsl/2100.htm

B.7 Again, Figure 13 shows inconsistency between the German and Czech data; in particular, German entry allocations are approximately double Czech exit allocations in the first quarter of 2012. In any event, there is always substantial potential for counterflow, with the exception of a short period in October 2011. Note that as Figure 13 shows net allocations actual counterflow allocations have already been netted off.

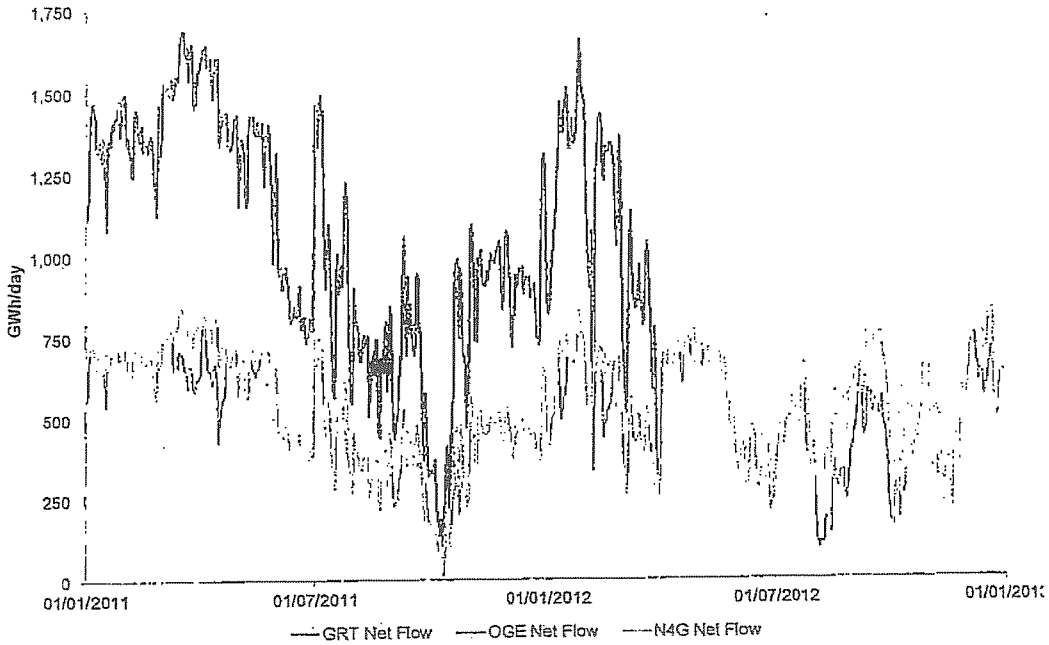
Flows

B.8 Physical flow data show the actual physical flows at the interconnection point. The differences in flow data between the TSOs are bigger than for the nominations or allocations data. In particular, data from OGE before April 2012 suggest much larger flows than the data from GRTgaz DE and NET4GAS. Data from OGE are based on a sum of hourly data.

B.9 Previously, daily data were available from OGE. However, OGE no longer publishes daily data on its website. The sum of the reported hourly flows before April 2012 is approximately double than what was suggested by the daily data that were previously available. The daily data from OGE were similar to the GRTgaz DE and NET4GAS data shown below. In our

previous report and addendum, and in our analysis presented elsewhere in this report, we use daily data from OGE as we consider this is more accurate than hourly OGE data based on Figure 14 below.

Figure 14: Reported Daily Flows at the Waidhaus Interconnection Point



Source: Compass Lexecon calculations http://extranet.net4gas.cz/gas_flow.aspx http://www.grtgaz-deutschland.de/de/content/lastflussdaten http://www.open-grid-europe.com/cps/rde/xchg/SID-79189C2D-E6C791B4/open-grid-europe-internet/hs.xsl/2100.htm?rdeLocaleAttr=en 0

B.10 Apart from a short period in October 2011, there are substantial flows recorded in the data for all three TSOs, indicating substantial counterflow potential.

B.11 There are noteworthy inconsistencies between the data of the three TSOs. For example, GRTgaz DE is the only TSO reporting that flows fell below 200 GWh/day on some days in the second half of 2012. It therefore seems quite likely that some instances of small flows reported by the TSOs are due to measurement errors.

Capacity Allocation Information

C.1 The links below lead to further information about the capacity allocation at the relevant interconnectors.

NET4GAS

C.2 http://www.net4gas.cz/en/1259/

GATRAC

C.3 http://www.gatrac.com/gatrac-web/gate/home.do

PRISMA

C.4 https://primary.prisma-capacity.eu/

Gascade Flow Data

D.1 There are some instances where the Gascade data report hourly information for less or more than 24 hours in a given day. In those cases, we have summed up the flows and then scaled to 24 hours. This is the case for 14 days over the two years of data considered. Table 32 below lists these days along with the recorded number of hours and identifies the hours that are either missing or duplicated depending on whether there are less or more than 24 hours recorded ("Specific Hours").

Table 32: Gascade Daily Flow Data without Exactly 24 Recorded Hours.

Day	Hours	Specific Hours
01/01/2011	18	00:00 - 05:00
14/03/2011	23	17:00
27/03/2011	23	02:00
09/05/2011	21	12:00 - 14:00
18/06/2011	22	7:00 - 8:00
28/06/2011	23	14:00
16/07/2011	22	20:00 - 21:00
26/07/2011	23	15:00
30/10/2011	25	02:00
25/03/2012	23	02:00
30/08/2012	23	07:00
28/10/2012	25	02:00
29/11/2012	23	06:00
08/12/2012	23	06:00

Source: Gascade

D.2 Days requiring adjustment are spaced out with no more than two in any given month.

Information in kWh/h Terms

E.1 The main text of this report presents information on capacities and flows in bcm/year. This appendix presents versions of all tables in kWh/h.

Table 33: Capacity Utilisation at HSK Deutschneudorf, 2012 (kWh/h)

2012	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
HSK-DN (DE) Exit	4,484,541	820,391	1,047,946	3,664,149	3,436,595
HSK-DN (CZ) Entry	4,987,802	1,723,367	1,048,297	3,264,436	3,939,505

Source: Compass Lexecon analysis on the basis of data from NET4GAS and Ontras. German and Czech flows, capacities, and bookings are the sums of the relevant daily values for 2012. German daily flows are counted from 6am on the day to 6am the next day.

Table 34: Capacity Utilisation at HSK Deutschneudorf, 2011 (kWh/h)

2011	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
HSK-DN (DE) Exit	4,498,400	4,498,400	945,979	0.00	3,552,421
HSK-DN (CZ) Entry	6,268,792	3,170,085	1,267,608	3,098,707	5,001,184

Source: Compass Lexecon analysis on the basis of data from NET4GAS and Ontras. German and Czech flows, capacities, and bookings are the sums of the relevant daily values for 2012. German daily flows are counted from 6am on the day to 6am the next day.

Table 35: Capacity utilisation at HSK Deutschneudorf (kWh/h)

	Exit from DE			Entry into CZ		
	Technical Capacity	Firm Bookings	Firm Spare	Technical Capacity	Firm Bookings	Firm Spare
2013	4,498,400	244,200	4,254,200	2,070,643	926,060	1,144,583
2014	4,498,400	0.00	4,498,400	2,030,500	777,264	1,253,236
2015	4,498,400	0.00	4,498,400	2,030,500	744,355	1,286,145
2016	4,102,639	0.00	4,102,639	2,030,500	745,477	1,285,023
2017	2,923,960	0.00	2,923,960	2,030,500	744,355	1,286,145
2018	2,923,960	0.00	2,923,960	2,030,500	744,355	1,286,145
2019	2,923,960	0.00	2,923,960	2,030,500	744,355	1,286,145
2020	2,923,960	0.00	2,923,960	2,030,500	745,477	1,285,023
2021	2,923,960	0.00	2,923,960	2,030,500	453,239	1,577,261
2022	2,923,960	0.00	2,923,960	2,030,500	0,00	2,030,500
2023	2,923,960	0.00	2,923,960	N/A	N/A	N/A

Source: Compass Lexecon analysis on the basis of data from NET4GAS and Ontras.
Notes: German and Czech capacities and bookings are the sums of the relevant daily values. Ontras data for exit in 2023 are only available to 19 June 2023. From 4 August 2013, NET4GAS provides one set of indicative daily entry values for each month. We have assumed this represents uniform daily values throughout the month.

Table 36: Capacity Utilisation at HSK Olbernhau, 2012 (kWh/h)

2012	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
HSK-O (DE) Exit	11,803,645	10,055,595	7,065,186	1,748,050	4,738,459
HSK-O (CZ) Entry	10,134,965	7,811,156	7,072,945	2,323,809	3,062,020

Source: Compass Lexecon analysis on the basis of data from NET4GAS and Gascade. Czech flows, capacities, and bookings are the sums of the relevant daily values for 2012, as are German capacities and bookings. German flows are the sums of the relevant hourly values within 2012. In a small number of cases, flows were not reported for all 24 hours of the day; we then scaled the posted flows to 24 hours (see Appendix D for details).

Table 37: Capacity Utilisation at HSK Olbernhau, 2011 (kWh/h)

2011	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
HSK-O (DE) Exit	11,624,065	9,436,650	4,567,334	2,187,415	7,056,731
HSK-O (CZ) Entry	10,188,581	7,662,556	4,570,688	2,526,026	5,617,893

Source: Compass Lexecon analysis on the basis of data from NET4GAS and Gascade. Czech flows, capacities, and bookings are the sums of the relevant daily values for 2011, as are German capacities and bookings. For 72 days in 2011 (1 January to 1 March and 3-14 March) there were no Gascade data available on exit capacity from Germany. We have estimated an annual value by summing up the capacity for those days where data were available and annualising the results (i.e. scaling by a factor of 365/(365-72). German flows are the sums of the relevant hourly values within 2011. In a small number of cases, flows were not reported for all 24 hours of the day; we then scaled the posted flows to 24 hours (see Appendix DAppendix B for details).

Table 38: Capacity utilisation at HSK Olbernhau (kWh/h)

	Exit from DE			Entry into CZ		
	Technical Capacity	Firm Bookings	Firm Spare	Technical Capacity	Firm Bookings	Firm Spare
2013	13,247,880	13,103,495	144,385	15,823,255	6,732,851	9,090,404
2014	13,320,000	13,200,337	119,663	17,083,333	0.00	17,083,333
2015	13,320,000	12,464,748	855,252	17,083,333	0.00	17,083,333
2016	13,320,000	11,246,148	2,073,852	17,083,333	0.00	17,083,333
2017	13,320,000	10,979,587	2,340,413	17,083,333	0.00	17,083,333
2018	13,320,000	10,979,587	2,340,413	17,083,333	0.00	17,083,333
2019	13,320,000	10,979,587	2,340,413	17,083,333	0.00	17,083,333
2020	13,320,000	10,979,587	2,340,413	17,083,333	0.00	17,083,333
2021	13,320,000	10,979,587	2,340,413	17,083,333	0.00	17,083,333
2022	13,320,000	10,979,587	2,340,413	17,083,333	0.00	17,083,333
2023	13,320,000	1,542,937	11,777,063	N/A	N/A	N/A

Source: Compass Lexecon analysis on the basis of data from NET4GAS and Gascade.
Notes: Czech capacities and bookings are the sums of the relevant daily values, as are German capacities and bookings. Ontras data for exit in 2023 are only available to 6 June 2023. From 4 August 2013, NET4GAS provided one set of indicative daily entry values for each month. We have assumed this represented uniform daily values throughout the month.

Table 39: Utilisation of Entry Capacity into the Czech Republic at Waidhaus (kWh/h)

Waidhaus	Technical Capacity	Firm* Bookings	Flows	Spare Firm	Total Spare
2012	8,387,796	4,591,893	4,738,125	3,795,903	3,649,671
2011	7,064,537	4,868,429	3,068,500	2,196,108	3,996,037

Source: Compass Lexecon analysis on the basis of data from NET4GAS. Flows are derived from the average daily flows reported for the year. Capacities and bookings are the sums of the relevant daily values for the year.
** The information is labelled "firm" on NET4GAS's website, but given that the interconnector not physically bi-directional we assume that these are interruptible bookings.*

Table 40: Bookings of Interruptible Exit Capacity from Germany at Waidhaus (kWh/h)

Waidhaus	Interruptible Bookings	Flows
2012	5,241,100	4,717,256
2011	3,474,250	4,520,262

Source: Compass Lexecon analysis on the basis of data from OGE. Bookings and flows are the sums of the relevant daily values for each year.

Table 41: Capacity Utilisation at Waidhaus (kWh/h)

	Exit from DE			Entry into CZ		
	Technical Capacity	Firm Bookings	Firm Spare	Technical Capacity	Firm Bookings	Firm Spare
2013	N/A	N/A	N/A	15,790,655	2,567,838	13,222,817
2014	N/A	N/A	N/A	18,750,000	903,627	17,846,373
2015	N/A	N/A	N/A	18,750,000	652,500	18,097,500
2016	N/A	N/A	N/A	18,750,000	652,500	18,097,500
2017	N/A	N/A	N/A	18,750,000	652,500	18,097,500
2018	N/A	N/A	N/A	18,750,000	652,500	18,097,500
2019	N/A	N/A	N/A	18,750,000	323,568	18,426,432
2020	N/A	N/A	N/A	18,750,000	0.00	18,750,000
2021	N/A	N/A	N/A	18,750,000	0.00	18,750,000
2022	N/A	N/A	N/A	18,750,000	0.00	18,750,000

Source: Compass Lexecon analysis on the basis of data from NET4GAS.
Notes: Capacities and bookings are the sums of the relevant daily values for the year. The information on bookings is labelled "firm" on NET4GAS's website, but given that the interconnector is not physically bi-directional we assume that these are interruptible bookings. No information is available on exit from Germany. From 4 August 2013, NET4GAS provided one set of indicative daily entry values for each month. We have assumed this represents uniform daily values throughout the month.

Table 42: Capacity Utilisation at Lanžhot, 2012 (kWh/h)

2012	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
Lanzhot (SK) Exit	54,735,265	54,554,271	20,407,132	180,995	34,328,133
Lanzhot (CZ) Entry	68,318,955	64,401,387	13,422,847	3,917,568	54,896,108

Source: Compass Lexecon analysis on the basis of data from NET4GAS and eustream. m^3 are converted into kWh using a conversion factor of 10.83 kWh=1m^3. Czech flows, capacities, and bookings are the sums of the relevant daily values for 2012. Slovakian annual flows are derived from the average daily flow reported for 2012. Slovakian capacities and bookings are the sums of the relevant daily values for 2012.

Table 43: Capacity Utilisation at Lanžhot, 2011 (kWh/h)

2011	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
Lanzhot (SK) Exit	54,992,539	54,646,375	37,047,625	346,164	17,944,914
Lanzhot (CZ) Entry	71,238,981	65,188,144	30,361,716	6,050,837	40,877,265

Source: Compass Lexecon analysis on the basis of data from NET4GAS and eustream. m^3 are converted into kWh using a conversion factor of 10.83 kWh=1m^3. Czech flows, capacities, and bookings are the sums of the relevant daily values for 2011. Slovakian annual flows are derived from the average daily flow reported for 2011. Slovakian capacities and bookings are the sums of the relevant daily values for 2011.

Table 44: Utilisation of Entry Capacity into Slovakia at Baumgarten (kWh/h)

	Technical Capacity	Firm Bookings	Flows	Spare Firm	Total Spare
2012	8,144,753	247	0	8,144,506	8,144,753
2011	8,122,500	0	0	8,122,500	8,122,500

Source: Compass Lexecon analysis on the basis of data from eustream. m^3 are converted into kWh using a conversion factor of 10.83kWh=1m^3. Flows are derived from the average daily flows within each year. Capacities and bookings are the sums of the relevant daily values for each year.

Table 45: Capacity Utilisation at Lanžhot (kWh/h)

	Exit from SK			Entry into CZ		
	Technical Capacity	Firm Bookings	Firm Spare	Technical Capacity	Firm Bookings	Firm Spare
2013	32,500,000	30,682,763	1,817,237	68,344,942	33,391,225	34,953,717
2014	23,768,037	21,233,333	2,534,703	68,350,560	20,769,150	47,581,410
2015	23,833,333	21,285,000	2,548,333	68,350,560	15,734,018	52,616,541
2016	23,833,333	21,285,000	2,548,333	68,350,560	14,393,690	53,956,870
2017	19,500,000	15,213,333	4,286,667	68,350,560	8,356,583	59,993,977
2018	19,500,000	15,213,333	4,286,667	68,350,560	8,356,583	59,993,977
2019	19,500,000	15,213,333	4,286,667	68,350,560	8,356,583	59,993,977
2020	19,500,000	15,213,333	4,286,667	68,350,560	8,356,583	59,993,977
2021	19,500,000	4,660,417	14,839,583	68,350,560	4,623,605	63,726,955
2022	19,500,000	0.00	19,500,000	68,350,560	0.00	68,350,560
2023	19,500,000	0.00	19,500,000	N/A	N/A	N/A
2024	19,500,000	0.00	19,500,000	N/A	N/A	N/A
2025	19,500,000	0.00	19,500,000	N/A	N/A	N/A
2026	19,500,000	0.00	19,500,000	N/A	N/A	N/A
2027	19,500,000	0.00	19,500,000	N/A	N/A	N/A

Source: Compass Lexecon analysis on the basis of data from NET4GAS and eustream.
Notes: m^3 are converted into kWh using a conversion factor of 10.83 kWh=1m^3. Czech capacities and bookings are the sums of the relevant daily values where daily data are available. Slovakian capacities and bookings are the sums of the relevant daily values where daily data are available. From 4 August 2013, NET4GAS provided one set of indicative daily entry values for each month. We have assumed this represents uniform daily values throughout the month. From 2015 onwards, eustream only provided one representative daily figure for capacity outlook in each year. This has been multiplied by 365 to determine the annual figure.

Table 46: Capacity Utilisation at Baumgarten (kWh/h)

	Exit from AUT			Entry into SK		
	Technical Capacity	Firm Bookings	Firm Spare	Technical Capacity	Firm Bookings	Firm Spare
2013	10,261,000	3,892,633	6,368,367	9,072,945	27,968	9,044,977
2014	10,261,000	3,882,633	6,378,367	10,333,333	0.00	10,333,333
2015	10,272,000	5,542,165	4,729,835	10,313,333	0.00	10,313,333
2016	10,272,000	5,542,165	4,729,835	10,313,333	0.00	10,313,333
2017	10,272,000	5,542,165	4,729,835	10,313,333	0.00	10,313,333
2018	10,272,000	5,542,165	4,729,835	10,313,333	0.00	10,313,333
2019	10,272,000	5,542,165	4,729,835	10,313,333	0.00	10,313,333
2020	10,272,000	5,542,165	4,729,835	10,313,333	0.00	10,313,333
2021	10,272,000	5,542,165	4,729,835	10,313,333	0.00	10,313,333
2022	10,272,000	4,657,081	5,614,919	10,313,333	0.00	10,313,333
2023	10,272,000	4,546,445	5,725,555	10,313,333	0.00	10,313,333
2024	10,272,000	4,546,445	5,725,555	10,313,333	0.00	10,313,333
2025	10,272,000	3,634,809	6,637,191	10,313,333	0.00	10,313,333
2026	10,272,000	1,975,276	8,296,724	10,313,333	0.00	10,313,333
2027	10,272,000	1,975,276	8,296,724	10,313,333	0.00	10,313,333

Source: Compass Lexecon analysis on the basis of data from Gas Connect Austria and eustream.
Notes: m^3 are converted into kWh using a conversion factor of 10.83 kWh=1m^3. Austrian capacities and bookings are determined by transforming an indicative hourly capacity value for each year into an annual rate. Slovakian capacities and bookings are the sums of the relevant daily values, where daily data are available. From 2015 onwards, eustream only provided one representative daily figure for capacity outlook in each year. This has been multiplied by 365 to determine the annual figure.

Table 47: Capacity Utilisation at Lanžhot – Entry into Czech Republic (kWh/h)

	Technical Capacity	Firm Bookings	Flows	Available Firm	Available Total
Jan to Jun 2012	68,102,083	64,312,542	17,828,466	3,789,541	50,273,618
Jan to Jun 2013	68,339,231	33,352,595	3,843,590	34,986,636	64,495,640

Source: Compass Lexecon analysis on the basis of data from NET4GAS. Czech flows, capacities, and bookings are the sums of the relevant daily values in the period under consideration.

Table 48: Capacity Utilisation at Lanžhot – Exit from Slovakia (kWh/h)

	Technical Capacity	Firm Bookings	Flows	Available Firm	Available Total
Jan to Jun 2012	52,443,681	52,263,278	N/A	180,403	N/A
Jan to Jun 2013	32,500,000	31,000,460	12,154,833	1,449,540	20,345,167

Source: Compass Lexecon analysis on the basis of data from eustream. Slovakian flows in period are derived from the average daily flow reported for each month. Flow data are only available up to May 2013. Slovakian capacities and bookings are the sums of the relevant daily values for the period under consideration.

Table 49: Total Spare Capacity at Relevant Interconnectors (kWh/h)

	2011	2012
HSK - Olb	5,617,893	3,062,020
HSK - DN	3,552,421	3,436,595
Baumgarten	7,851,000	7,872,510
Waidhaus	3,996,037	3,649,671
Total	21,288,851	18,293,039

Source: Compass Lexecon analysis.

Table 50: Firm Spare Capacity at Relevant Interconnectors (kWh/h)

	2011	2012
HSK - Olb	2,187,415	1,748,050
HSK - DN	0.00	3,264,436
Lanžhot	346,164	174,945
Total	2,533,579	5,187,430

Source: Compass Lexecon analysis.

Table 51: Gas Consumption and Sources of Supply in the Czech Republic (kWh/h)

(kWh/h)	2009	2010	2011
Consumption	10,115,418	11,472,877	10,401,003
Production	123,630	123,630	123,630
Imports - Norway	3,708,904	3,832,534	4,759,760
Imports - Russia	7,912,329	10,434,384	8,505,753
Imports - Other Europe	-	-	1,607,192
Imports - Total	11,621,233	14,266,918	14,872,705

Source: BP Statistical Review of World Energy 2010-2012. Production data are from Czech ERO Annual Reports. m^3 are converted into kWh using a conversion factor of 10.83 kWh=1m^3.

Table 52: Summary of Spare Firm Capacity (kWh/h)

	HSK-DN	HSK-Olb	Baumgarten	Lanzhot	Total Known Spare Capacity
2013	1,144,583	144,385	6,368,367	1,817,237	3,106,205
2014	1,253,236	119,663	6,378,367	2,534,703	3,907,602
2015	1,286,145	855,252	4,729,835	2,548,333	4,689,730
2016	1,285,023	2,073,852	4,729,835	2,548,333	5,907,209
2017	1,286,145	2,340,413	4,729,835	4,286,667	7,913,225
2018	1,286,145	2,340,413	4,729,835	4,286,667	7,913,225
2019	1,286,145	2,340,413	4,729,835	4,286,667	7,913,225
2020	1,285,023	2,340,413	4,729,835	4,286,667	7,912,103
2021	1,577,261	2,340,413	4,729,835	14,839,583	8,647,509
2022	2,030,500	2,340,413	5,614,919	19,500,000	9,985,832
2023	2,923,960	11,777,063	5,725,555	19,500,000	20,426,578
2024	N/A	N/A	5,725,555	19,500,000	N/A
2025	N/A	N/A	6,637,191	19,500,000	N/A
2026	N/A	N/A	8,296,724	19,500,000	N/A
2027	N/A	N/A	8,296,724	19,500,000	N/A

Source: Compass Lexecon analysis on the basis of data from NET4GAS, Ontras, Gascade, Gas Connect Austria and eustream.
Notes: m^3 are converted into kWh using a conversion factor of 10.83 kWh=1m^3. When summing total spare firm capacity, we include the lower of spare capacity at Baumgarten and Lanžhot as the binding constraint. For HSK-DN and HSK-Olb, Ontras and Gascade data for 2023 are only available up to 19 June 2023 and 6 June 2023, respectively. No Waidhaus capacities are included because the Waidhaus interconnector is not physically bi-directional so that only interruptible bookings are possible in the Czech direction.