FNB Gas
DIE FERNLEITUNGSNETZBETREIBER

Gas Network Development Plan 2020–2030

Implementation Report

Transmission system operators

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FNB Gas
DIE FERNLEITUNGSNETZBETREIBER

Implementation report

Gas Network Development Plan 2020–2030

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Legal disclaimer

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Date: 1 April 2021

bayernets GmbH
Munich

Customers: 48 downstream network operators (of which 13 are directly downstream) as well as national and international gas traders

Employees	137
Gas transmission network	1,659 km
Compressor stations	2
Compressor units	5
Total capacity of the compressor units	50 MW
Cross-border interconnection points	5
Exit points in the high-pressure network	186
Concurrent annual peak load	20,406 MWh/h
Annual exit quantity to final consumers and distributors	74 TWh

Ferngas Netzgesellschaft mbH
Schwaig b. Nürnberg

Customers: Gas distribution system operators, municipal utilities as well as industrial customers, traders and shippers

Employees	40 (group)
Gas transmission network	approx. 214 km
Compressor stations	0
Compressor units	0
Total capacity of the compressor units	0 MW
Cross-border interconnection points	0
Exit points in the high-pressure network	19
Concurrent annual peak load	7,533 MWh/h
Annual exit quantity to final consumers and distributors	21.6 TWh

Fluxys Deutschland GmbH
Düsseldorf

Customers: Gas traders

Employees	5
Gas transmission network	approx. 440 km
Compressor stations	0
Compressor units	0
Total capacity of the compressor units	0 MW
Cross-border interconnection points	1
Exit points in the high-pressure network	1, internal points in the market area
Concurrent annual peak load	1,394 MWh/h
Annual exit quantity to final consumers and distributors	7.18 TWh

Fluxys TENP GmbH
Düsseldorf

Customers: 40

Employees	11
Gas transmission network	1,010 km
Compressor stations	4
Compressor units	17
Total capacity of the compressor units	150 MW
Cross-border interconnection points	3
Exit points in the high-pressure network	22
Concurrent annual peak load	13,375 MWh/h
Annual exit quantity to final consumers and distributors	67.68 TWh

Information on company name, headquarters, customers, and employees: reporting date 31.12.2020
Other information: reporting date 31.12.2019

GASCADE Gastransport GmbH
Kassel (Hessen)

Customers: Regional companies, municipal utilities, industrial customers and gas traders

Employees	approx. 475
Gas transmission network	2,908 km
Compressor stations	9
Compressor units	29
Total capacity of the compressor units	approx. 486 MW
Cross-border interconnection points	10
Exit points in the high-pressure network	84
Concurrent annual peak load	113,270 MWh/h
Annual exit quantity to final consumers and distributors	146,9 TWh

Gastransport Nord GmbH
Oldenburg

Customers: Approximately 50 national and international shippers, regional companies and industrial customers

Employees	44
Gas transmission network	322 km
Compressor stations	0
Compressor units	0
Total capacity of the compressor units	0 MW
Cross-border interconnection points	1
Exit points in the high-pressure network	71
Concurrent annual peak load	8,470 MWh/h
Annual exit quantity to final consumers and distributors	30 TWh

Gasunie
Deutschland Transport Services GmbH
Hanover

Customers: 140 regional companies, municipal utilities, industrial customers and gas traders

Employees	248
Gas transmission network	3,795 km
Compressor stations	10
Compressor units	32
Total capacity of the compressor units	206 MW
Cross-border interconnection points	6
Exit points in the high-pressure network	181
Concurrent annual peak load	37,807 MWh/h
Annual exit quantity to final consumers and distributors	183 TWh

GRTgaz Deutschland GmbH
Berlin

Customers: 14 shippers

Employees	36
Gas transmission network	1,161* km
Compressor stations	6*
Compressor units	23*
Total capacity of the compressor units	347* MW
Cross-border interconnection points	3*
Exit points in the high-pressure network	15*
Concurrent annual peak load	69,292 MWh/h
Annual exit quantity to final consumers and distributors	245* TWh

* MEGAL value

Information on company name, headquarters, customers, and employees: reporting date 31.12.2020
Other information: reporting date 31.12.2019

Lubmin-Brandov Gastransport GmbH
Essen

Customers: Gas traders

Employees	3
Gas transmission network	472 km
Compressor stations	1
Compressor units	3
Total capacity of the compressor units	96 MW
Cross-border interconnection points	2
Exit points in the high-pressure network	1
Concurrent annual peak load	no details MWh/h
Annual exit quantity to final consumers and distributors	0 TWh

NEL Gastransport GmbH
Kassel (Hessen)

Customers: Municipal utilities, industrial customers and gas traders

Employees	6
Gas transmission network	441 km
Compressor stations	0
Compressor units	0
Total capacity of the compressor units	0 MW
Cross-border interconnection points	1
Exit points in the high-pressure network	1
Concurrent annual peak load	59,354 MWh/h
Annual exit quantity to final consumers and distributors	0,5 TWh

Nowega GmbH
Münster

Customers: Regional companies, municipal utilities, industrial customers and gas traders

Employees	110
Gas transmission network	1,545 km
Compressor stations	1
Compressor units	2
Total capacity of the compressor units	1 MW
Cross-border interconnection points	0
Exit points in the high-pressure network	102
Concurrent annual peak load	6,289 MWh/h
Annual exit quantity to final consumers and distributors	26 TWh

ONTRAS Gastransport GmbH
Leipzig

Customers: 74 national and international shippers

Employees	375
Gas transmission network	7,623 km
Compressor stations	2
Compressor units	5
Total capacity of the compressor units	38 MW
Cross-border interconnection points	4
Exit points in the high-pressure network	442
Concurrent annual peak load	39,355 MWh/h
Annual exit quantity to final consumers and distributors	162 TWh

Information on company name, headquarters, customers, and employees: reporting date 31.12.2020
Other information: reporting date 31.12.2019

OPAL Gastransport GmbH & Co. KG
Kassel (Hessen)

Customers: Gas traders

Employees	7
Gas transmission network	473 km
Compressor stations	1
Compressor units	3
Total capacity of the compressor units	99 MW
Cross-border interconnection points	2
Exit points in the high-pressure network	1
Concurrent annual peak load	50,698 MWh/h
Annual exit quantity to final consumers and distributors	0 TWh

Open Grid Europe GmbH
Essen

Customers: more than 450 national and international wholesale transmission companies, municipal utilities, industrial customers and gas traders

Employees	approx. 1,450
Gas transmission network	approx. 12,000 km
Compressor stations	27
Compressor units	100
Total capacity of the compressor units	approx. 1,150 MW
Cross-border interconnection points	19
Exit points in the high-pressure network	1,034
Concurrent annual peak load	125,732 MWh/h
Annual exit quantity to final consumers and distributors	approx. 289 TWh

terranets bw GmbH
Stuttgart*

Customers: more than 150 national and international customers – gas network operators, municipal utilities, industrial customers and traders*

Employees	252*
Gas transmission network	2,137 km
Compressor stations	2
Compressor units	8
Total capacity of the compressor units	approx. 38 MW
Cross-border interconnection points	3
Exit points in the high-pressure network	205
Concurrent annual peak load	21,869 MWh/h
Annual exit quantity to final consumers and distributors	80 TWh

* terranets bw has been a combined system operator since 1 January 2020. Information refers to the transmission system part up to market implementation on 1 January 2022

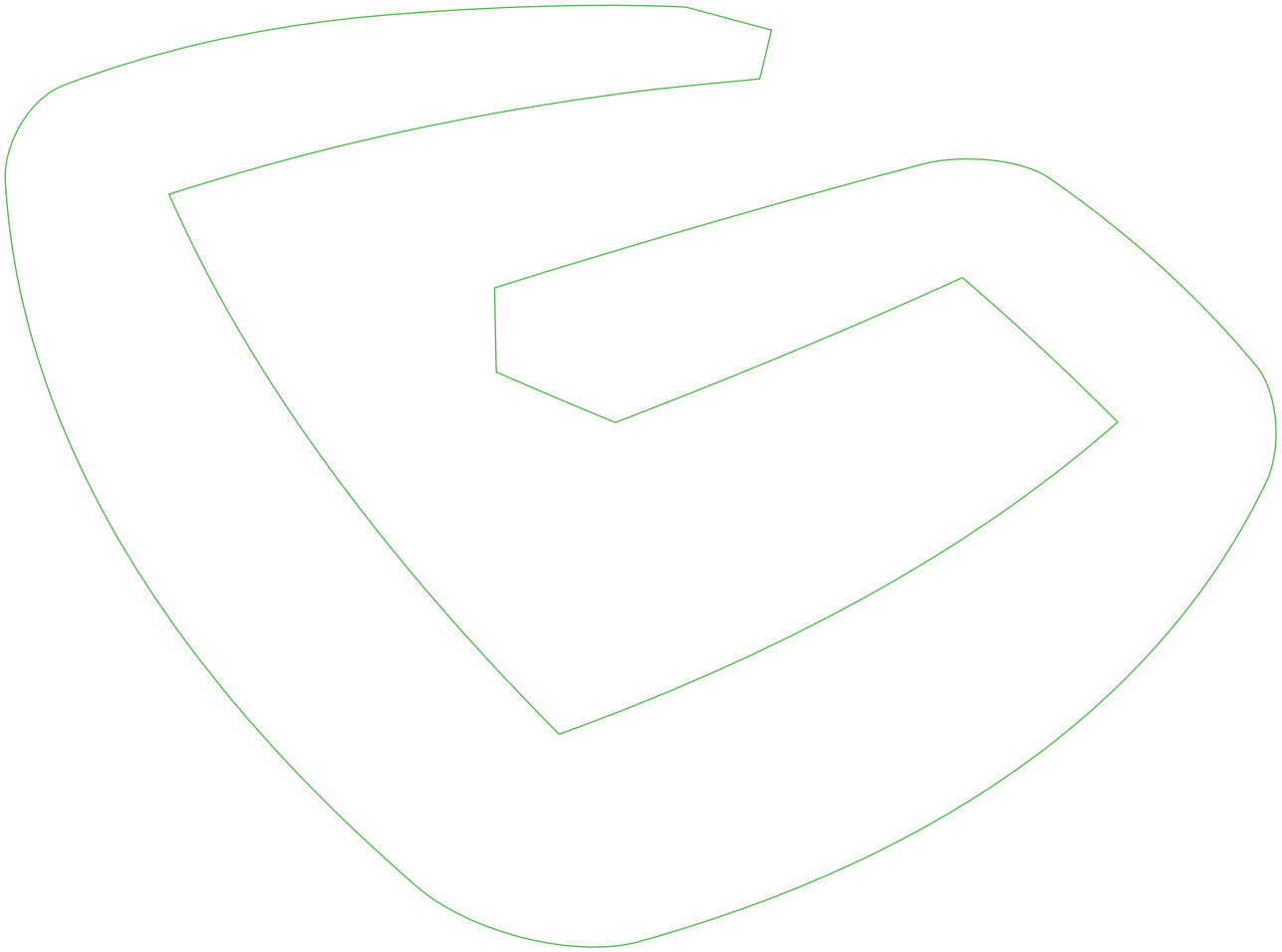
Thyssengas GmbH
Dortmund

Customers: 48 network interconnection partners
150 network connection customers with 185 NCPs

Employees	382
Gas transmission network	4,179 km
Compressor stations	6
Compressor units	17
Total capacity of the compressor units	149 MW
Cross-border interconnection points	5
Exit points in the high-pressure network	1,082
Concurrent annual peak load	22,359 MWh/h
Annual exit quantity to final consumers and distributors	64 TWh

Information on company name, headquarters, customers, and employees: reporting date 31.12.2020
Other information: reporting date 31.12.2019

Foreword | Executive summary



Foreword

Dear Reader,

Climate change is one of the greatest challenges we face this century. As before, global energy policy is based on the two-degree target that was agreed at the climate change conference of the United Nations held in Paris in 2015. The German transmission system operators firmly believe that the existing gas infrastructure can make a significant contribution to the successful implementation of the energy transition in Germany. Drawn up every two years, the Gas Network Development Plan presents the basis for demand-based natural gas infrastructure and sets out to advance the change to hydrogen infrastructure.

The ambitious targets of energy and climate policy in Germany call for a reduction in greenhouse gases of 80% to 95% by 2050. Sector coupling – the intelligent connection of gas, electricity, heating and mobility infrastructure – is a crucial lever for achieving these targets and offers demonstrably great potential. Robust, expanded gas infrastructure can serve as a transportation and storage system for gas generated from renewable sources in the future, so that fossil fuels and CO_2-intensive energy sources can be replaced in the long term. The German transmission system operators have described the first steps towards a growing and demand-based hydrogen infrastructure in the Gas Network Development Plan 2020–2030. Until sustainable hydrogen can be produced, shipped and used in significant quantities, natural gas constitutes an important and reliable technology in the areas of electricity generation and the supply of heating.

This implementation report on the Gas Network Development Plan 2020–2030 contains all the effective measures that will be required to operate the network reliably in the next ten years. In the report, the transmission system operators describe the current status of the activities and measures designed to maintain a demand-oriented and economic gas supply.

As a supplement to this, the transmission system operators provide the public with a user-friendly and easily accessible database at www.nep-gas-datenbank.de that is continually updated. In the database you can find data on the input parameters of the modelling, expansion measures, the market area conversion and other details about the Gas Network Development Plan.

The transmission system operators thank Prognos AG for its co-operation.

Yours faithfully

Your transmission system operators

Executive summary

The transmission system operators herewith present the implementation report on the Gas Network Development Plan 2020–2030 (2021 Implementation report) pursuant to section 15b of the Energiewirtschaftsgesetz (EnWG – German Energy Industry Act). This implementation report refers to the draft Gas Network Development Plan 2020–2030 that was published on 1 July 2020.

A total of 28 measures have reached the project status "Project conclusion/completion" or "Commissioning" compared to the draft Gas Network Development Plan 2020–2030. These involve three compressor station measures with a total capacity of 62 MW, twelve GPCM stations, eight valve stations and five other measures.

As a result of findings from the planning that have since been made, 15 measures are presented with a change, one measure has been discontinued and delays are shown for 13 measures in the 2021 implementation report. The other 172 measures are unchanged and are being continued in accordance with the plans in the draft Gas Network Development Plan 2020–2030.

In addition to the presentation of the current status of the measures, the transmission system operators report – along the same lines as the procedure for preparing the network development plans – on the status of the necessary market area conversion from L-gas to H-gas.

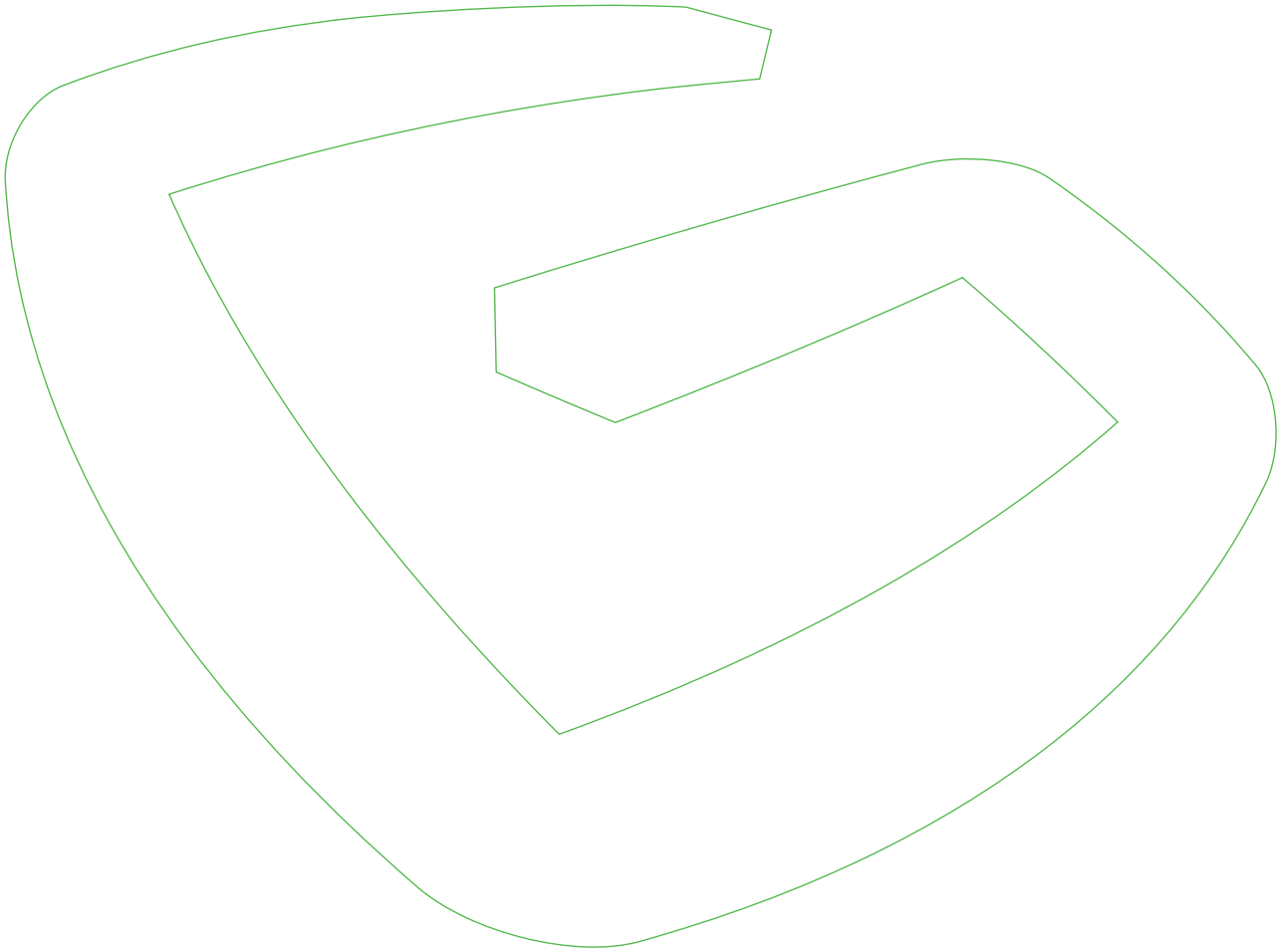
L-gas volumes and capacity balances for Germany are drawn up as part of the conversion plans. Forecasts for supply trends and consumption are prepared for these volumes and capacity balances. The supply trends that are assumed in this document also form an integral part of the Dutch network development planning and are thus also included in the plans for future L-gas production in the Netherlands.

Up to 2027, the number of appliances to be modified each year remains at a similarly high level as in the draft Gas Network Development Plan 2020–2030. Significant changes in the long-term conversion planning result from the fact that the Salzgitter conversion area is brought forward from after 2030 to the years from 2028 to 2030. To date, around 980,000 appliances have been successfully modified from L-gas to H-gas, which means that, despite the uncertainties caused by the corona pandemic, the targets are being met. The transmission system operators therefore regard their planning basis as confirmed up to now.

The transmission system operators furthermore point out that the scheduled completion of measures to provide H-gas depends among other things on how long the official approval processes take. To carry out the conversion process on schedule while maintaining the security of supply, it is necessary that all the parties involved in the process are provided with the appropriate resources.

The transmission system operators have expanded the database for the 2021 implementation report by the NDP gas database cycle "2020 – IR on the NDP"). The database can be accessed by the general public at www.nep-gas-datenbank.de.

Introduction 1



1 Introduction

1.1 Legal basis, tasks and objectives

Having drawn up and submitted the 2021 implementation report (IR 2021) to the Federal Network Agency (BNetzA) on 1 April 2021, the transmission system operators have fulfilled their obligations pursuant to section 15b EnWG.

The 2021 implementation report is essentially designed to provide an update of the implementation reporting from the most recently published network development plan. The subject of the report is all current network expansion measures.

The BNetzA reviews and publishes the implementation report and gives all actual and potential network users the opportunity to comment on it. The results of the comments can be incorporated in requirements for the next network development plan or in other regulatory processes.

1.2 Procedure and schedule

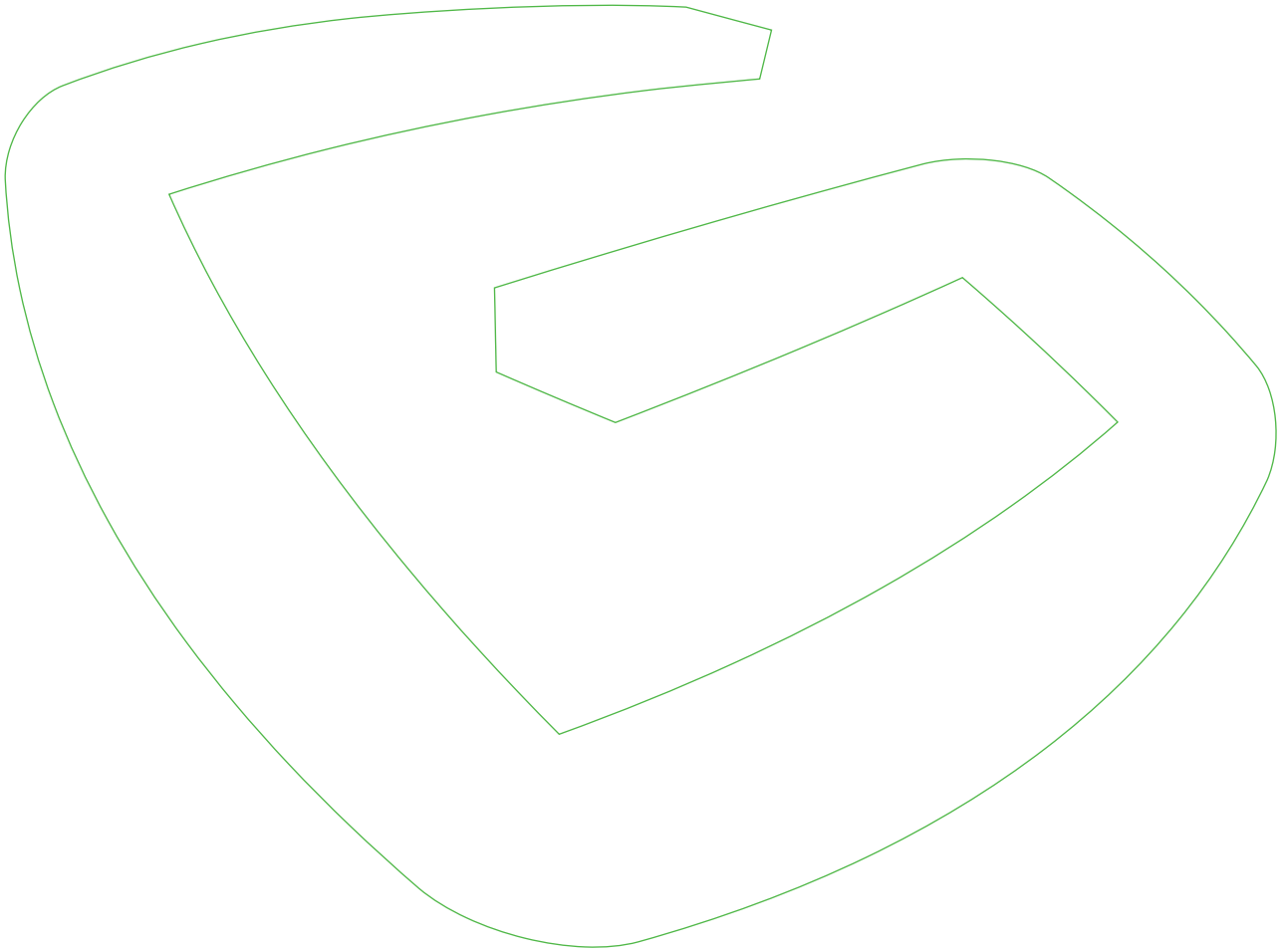
This 2021 implementation report has been jointly developed by the German transmission system operators. The basis of this 2021 implementation report is provided by the draft Gas Network Development Plan 2020–2030.

The document is structured as follows:

- Chapter 2 provides an overview of the measures in the draft Gas Network Development Plan 2020–2030.
- In Chapter 3, the transmission system operators report on the implementation status of the measures in the draft Gas Network Development Plan 2020–2030.
- Chapter 4 deals with the market area conversion from L-gas to H-gas while looking at the development of the L-gas supply. It additionally contains L-gas balances up to 2030 and a presentation of the conversion areas.

Measures in the Gas Network Development Plan 2020–2030

2



2 Measures in the Gas Network Development Plan

The 2021 implementation report looks at the measures in the network expansion proposal of the transmission system operators in the draft Gas Network Development Plan 2020–2030, as the Federal Network Agency's change request had not yet been submitted at the time this implementation report went to press. Accordingly, this implementation report includes both the confirmed measures in the Gas Network Development Plan 2018–2028 and the modified and additional measures (including green gas measures) in the transmission system operators' network expansion proposal in the draft Gas Network Development Plan 2020–2030, which was published on 1 July 2020.

Several measures have been discontinued in the draft Gas Network Development Plan 2020–2030 and in the 2019 implementation report compared to the last confirmed Gas Network Development Plan 2018–2028. The reasons for their cancellation are described in these two documents, which is why these measures are not given further consideration here.

Reference is made to the particular situation of the South Elbe-Achim pipeline in the transmission system operators' network expansion proposal in the draft Gas Network Development Plan 2020–2030:

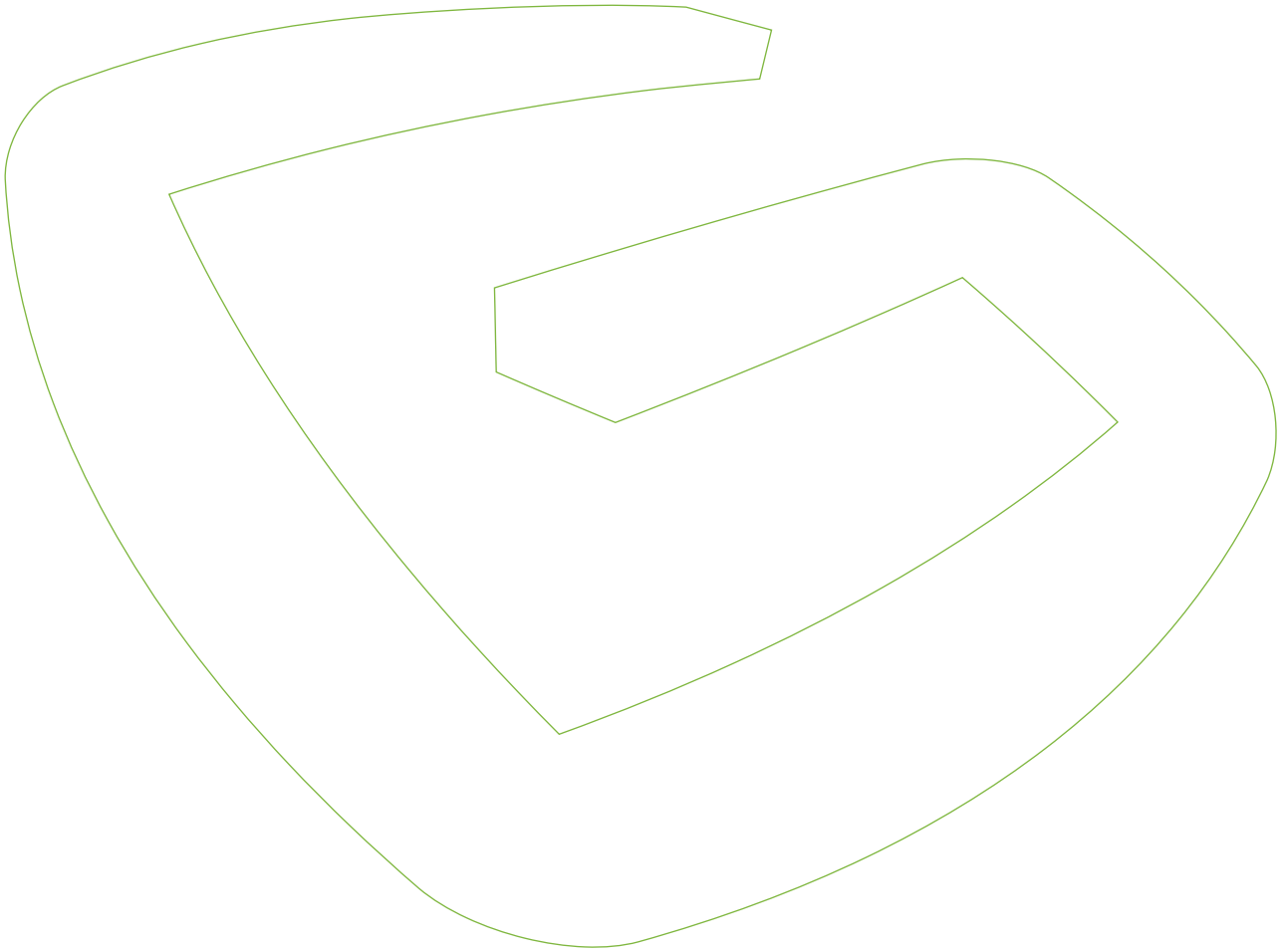
"The 'South Elbe–Achim pipeline' measure is dimensioned with a smaller pipeline diameter in the base variant (ID 636-01) than in the green gas variant (ID 767-01). If the measures to construct hydrogen infrastructure cannot yet be confirmed at the time the BNetzA makes the decision on the Gas Network Development Plan 2020–2030, the measure under ID 636-01 would be necessary to cover the demand of the base variant."

For this reason, the transmission system operators have also included the South Elbe-Achim pipeline measure with ID number 636-01 in the 2021 implementation report.

The LNG connection measures are presented in Chapter 3.2.6 in the draft Gas Network Development Plan 2020–2030. These measures are reported on in a separate Chapter 3.6 in this implementation report.

Implementation status of the Gas Network Development Plan 2020–2030

3



3 Implementation status of the Gas Network Development Plan

In accordance with section 15b EnWG, the implementation report has to contain information on the implementation status of the most recently published network development plan and the key reasons for any delays in implementation. The following statements refer in every case to the network expansion proposal in the draft of the Gas Network Development Plan 2020–2030.

- In Chapter 3.1, the transmission system operators show the implementation status of the measures in full in tabular form and, additionally, the key pipeline and compressor station construction measures graphically in a map.
- The measures that have successfully put into operation in the meantime are listed in Chapter 3.2.
- Chapter 3.3 looks at measures subject to a change. Each sub-chapter draws a distinction between the measures where a change to the technical parameters is planned and the measures where a change to the commissioning dates is planned and reports on these changes accordingly.
- Chapter 3.4 reports on measures that can be discontinued.
- Chapter 3.5 presents measures subject to a delay and provides information on the key reasons for the delay. A distinction is drawn in the respective sub-chapter between the measures where a delay has occurred and the measures where a delay can be foreseen.
- Chapter 3.6 reports on measures that were presented for information purposes in the draft Gas Network Development Plan 2020–2030.

The reporting date for the considerations in this 2021 implementation report is 1 January 2021.

Measures that were shown as in operation in the draft Gas Network Development Plan 2020–2030 are no longer listed in the 2021 implementation report or in the NDP gas database. This applies to the measures in Table 2. Measures 221-01, 432-02b and 507-01h had the status “Commissioning” in the draft Gas Network Development Plan 2020–2030. As commissioning status can encompass lengthy periods, the measures had not yet come into operation as of the 1 January 2021 reporting date and must therefore continue to be included as an integral part of the 2021 implementation report.

Table 1: Measures no longer considered in the 2021 implementation report (reporting date: 1 January 2020)

The following measures are no longer considered in the 2021 implementation report, as they have already been shown as in operation in the draft Gas Network Development Plan 2020–2030.

No.	ID number	Network expansion measure	Transmission system operator
1	028-04a	Forchheim-Finsing pipeline	OGE
2	028-04b	Finsing 3 GPCM station and connecting pipeline	OGE
3	036-04	Wertingen compressor station	bayernets/OGE
4	207-03	Obermichelbach GPCM station reverse flow	OGE/GRTD
5	209-02a	Gernsheim GPCM station (MEGAL)	OGE/GRTD
6	209-02b	Gernsheim GPCM station (OGE)	OGE
7	222-02	Conversion to H-gas (area: Bremen/Achim/Delmenhorst)	GUD
8	324-01	Niederpleis valve station and connecting pipeline	OGE
9	406-01	Amerdingen GPCM station	bayernets/OGE
10	407-01	Schnaitsee GPCM station	bayernets/OGE
11	412-04	Lubmin II natural gas receiving station	Fluxys D/GASCADE/GUD/ONTRAS
12	503-02a	Hetlingen valve station expansion	GUD
13	507-01b	North European Natural Gas Pipeline (NEL) link	Fluxys D/GASCADE/GUD/ONTRAS
14	507-01c	Lubmin-NEL GPCM station	Fluxys D/GASCADE/GUD/ONTRAS
15	507-01f	Deutschneudorf-EUGAL GPCM station	Fluxys D/GASCADE/GUD/ONTRAS
16	507-01g	Kienbaum II GPCM station including connecting line to the EUGAL	ONTRAS
17	507-02i	Steinitz GPCM station	GUD/ONTRAS
18	507-01j	Groß Köris GPCM station	ONTRAS
19	507-02k	Sülstorf GPCM station	Fluxys D/GUD/NEL Gastransport

Source: Transmission system operators

3.1 Implementation status of the Gas Network Development Plan

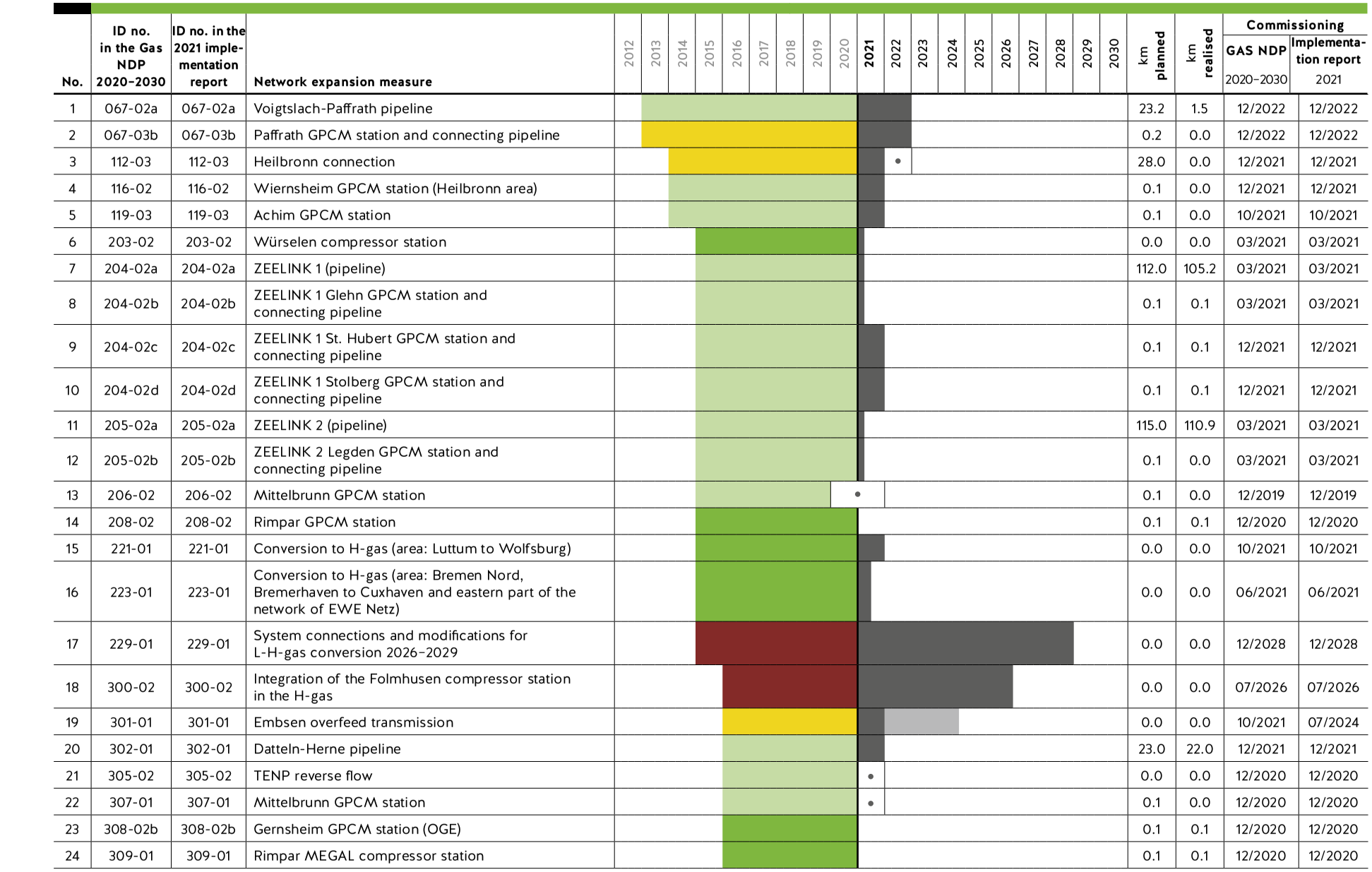
The implementation status of the measures in the network expansion proposal in the draft Gas Network Development Plan 2020–2030 is presented in Table 2.

A column in Table 2 shows “km realised” for the measures. “km realised” refers to the pipeline sections laid in pipe trenches as part of a measure. These are not necessarily subsections that are fully connected to each other and ready for operation. Especially in pipeline measures covering longer distances, it is not possible for construction to be carried out in chronological sequence from a start point to an end point, for example because of conditions of the approval such as restrictions on construction periods or for technical reasons. Therefore, the specification of the operational length would not do justice to the respective progress of the project.

Table 2: Implementation status of the NDP measures (reporting date: 1 January 2021)

Date: 1 April 2021

No.	ID no. in the Gas NDP 2020–2030	ID no. in the 2021 implementation report	Network expansion measure	km planned	km realised	Commissioning GAS NDP 2020–2030	Commissioning Implementation report 2021
1	067-02a	067-02a	Voigtslach-Paffrath pipeline	23.2	1.5	12/2022	12/2022
2	067-03b	067-03b	Paffrath GPCM station and connecting pipeline	0.2	0.0	12/2022	12/2022
3	112-03	112-03	Heilbronn connection	28.0	0.0	12/2021	12/2021
4	116-02	116-02	Wiernsheim GPCM station (Heilbronn area)	0.1	0.0	12/2021	12/2021
5	119-03	119-03	Achim GPCM station	0.1	0.0	10/2021	10/2021
6	203-02	203-02	Würselen compressor station	0.0	0.0	03/2021	03/2021
7	204-02a	204-02a	ZEELINK 1 (pipeline)	112.0	105.2	03/2021	03/2021
8	204-02b	204-02b	ZEELINK 1 Glehn GPCM station and connecting pipeline	0.1	0.1	03/2021	03/2021
9	204-02c	204-02c	ZEELINK 1 St. Hubert GPCM station and connecting pipeline	0.1	0.1	12/2021	12/2021
10	204-02d	204-02d	ZEELINK 1 Stolberg GPCM station and connecting pipeline	0.1	0.1	12/2021	12/2021
11	205-02a	205-02a	ZEELINK 2 (pipeline)	115.0	110.9	03/2021	03/2021
12	205-02b	205-02b	ZEELINK 2 Legden GPCM station and connecting pipeline	0.1	0.0	03/2021	03/2021
13	206-02	206-02	Mittelbrunn GPCM station	0.1	0.0	12/2019	12/2019
14	208-02	208-02	Rimpar GPCM station	0.1	0.1	12/2020	12/2020
15	221-01	221-01	Conversion to H-gas (area: Luttum to Wolfsburg)	0.0	0.0	10/2021	10/2021
16	223-01	223-01	Conversion to H-gas (area: Bremen Nord, Bremerhaven to Cuxhaven and eastern part of the network of EWE Netz)	0.0	0.0	06/2021	06/2021
17	229-01	229-01	System connections and modifications for L-H-gas conversion 2026–2029	0.0	0.0	12/2028	12/2028
18	300-02	300-02	Integration of the Folmhusen compressor station in the H-gas	0.0	0.0	07/2026	07/2026
19	301-01	301-01	Embsen overfeed transmission	0.0	0.0	10/2021	07/2024
20	302-01	302-01	Datteln-Herne pipeline	23.0	22.0	12/2021	12/2021
21	305-02	305-02	TENP reverse flow	0.0	0.0	12/2020	12/2020
22	307-01	307-01	Mittelbrunn GPCM station	0.1	0.0	12/2020	12/2020
23	308-02b	308-02b	Gernsheim GPCM station (OGE)	0.1	0.1	12/2020	12/2020
24	309-01	309-01	Rimpar MEGAL compressor station	0.1	0.1	12/2020	12/2020

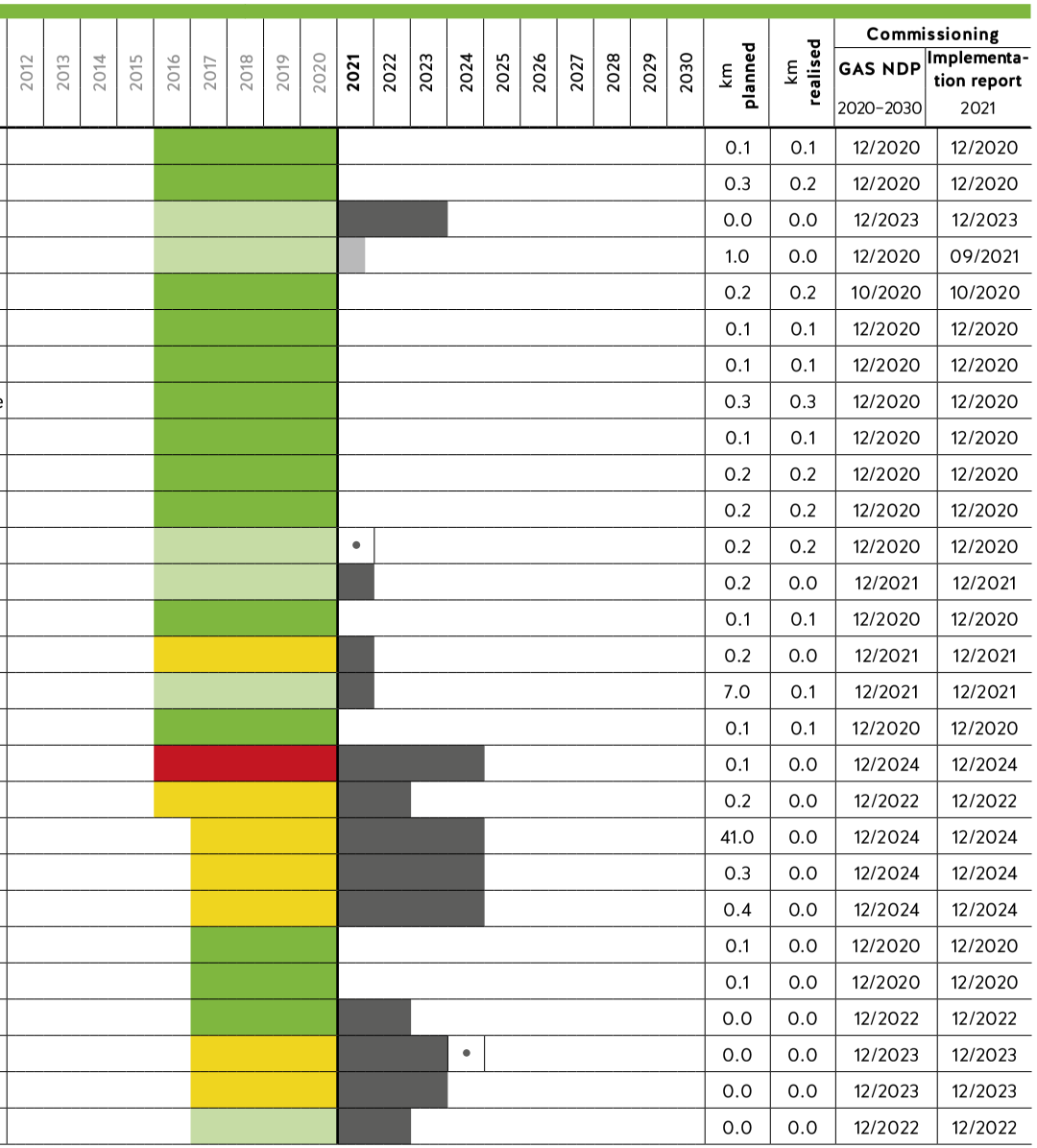


1 Project idea
2 Basis evaluation/ feasibility study
3 Design planning/ regional planning procedure
4 Detailed/approval planning/planning approval procedure/planning permission procedure/approval process pursuant to the Federal Immissions Control Act (BImSchG)/acquisition of rights of way
5 Procurement of materials and services/ construction preparation and start of construction/installation/construction
6 Commissioning project conclusion/completion

Future project stages
(Foreseeable) delay if progress is not optimal
Planned change

Source: Transmission system operators

No.	ID no. in the Gas NDP 2020–2030	ID no. in the 2021 implementation report	Network expansion measure	km planned	km realised	Commissioning GAS NDP 2020–2030	Commissioning Implementation report 2021
25	310-02	310-02	Reichertsheim GPCM station and connecting pipeline	0.1	0.1	12/2020	12/2020
26	311-02	311-02	Schlüchtern-Rimpar pipeline	0.3	0.2	12/2020	12/2020
27	312-02	312-02	Rimpar MEGAL compressor station	0.0	0.0	12/2023	12/2023
28	320-01	320-01	Conversion of the Bergheim 1 network area to H-gas	1.0	0.0	12/2020	09/2021
29	323-02	323-02	Aggertal network area conversion	0.2	0.2	10/2020	10/2020
30	325-01	325-01	Neukirchen valve station and connecting pipeline	0.1	0.1	12/2020	12/2020
31	326-02	326-02	Horrem valve station and connecting pipeline	0.1	0.1	12/2020	12/2020
32	327-03	327-03	Niederschelden GPCM station and connecting pipeline	0.3	0.3	12/2020	12/2020
33	328-03	328-03	Langenscheid GPCM station and connecting pipeline	0.1	0.1	12/2020	12/2020
34	329-03	329-03	Siegwiesen GPCM station and connecting pipeline	0.2	0.2	12/2020	12/2020
35	330-02	330-02	Elsdorf GPCM station and connecting pipeline	0.2	0.2	12/2020	12/2020
36	331-01	331-01	Scheidt GPCM station	0.2	0.2	12/2020	12/2020
37	333-02	333-02	Asbeck GPCM station and connecting pipeline	0.2	0.0	12/2021	12/2021
38	334-02	334-02	Rauschendorf valve station and connecting pipeline	0.1	0.1	12/2020	12/2020
39	335-02a	335-02a	Kempershöhe GPCM station and connecting pipeline	0.2	0.0	12/2021	12/2021
40	335-02b	335-02b	Wipperfürth-Niederschelden pipelines	7.0	0.1	12/2021	12/2021
41	336-02	336-02	Oberaden valve station and connecting pipeline	0.1	0.1	12/2020	12/2020
42	337-02	337-02	Porz GPCM station	0.1	0.0	12/2024	12/2024
43	338-02	338-02	Paffrath GPCM station	0.2	0.0	12/2022	12/2022
44	402-02a	402-02a	AUGUSTA (Wertingen-Kötz pipeline)	41.0	0.0	12/2024	12/2024
45	402-02b	402-02b	Wertingen 2 GPCM station	0.3	0.0	12/2024	12/2024
46	402-02c	402-02c	Kötz GPCM station	0.4	0.0	12/2024	12/2024
47	410-02a	410-02a	Rehden GPCM station	0.1	0.0	12/2020	12/2020
48	410-02b	410-02b	Drohne GPCM station	0.1	0.0	12/2020	12/2020
49	415-01	415-01	Krummhörn compressor station	0.0	0.0	12/2022	12/2022
50	416-02	416-02	Legden compressor station	0.0	0.0	12/2023	12/2023
51	417-02	417-02	Northern Black Forest pipeline compressor station	0.0	0.0	12/2023	12/2023
52	418-02	418-02	Scharenstetten compressor station expansion	0.0	0.0	12/2022	12/2022



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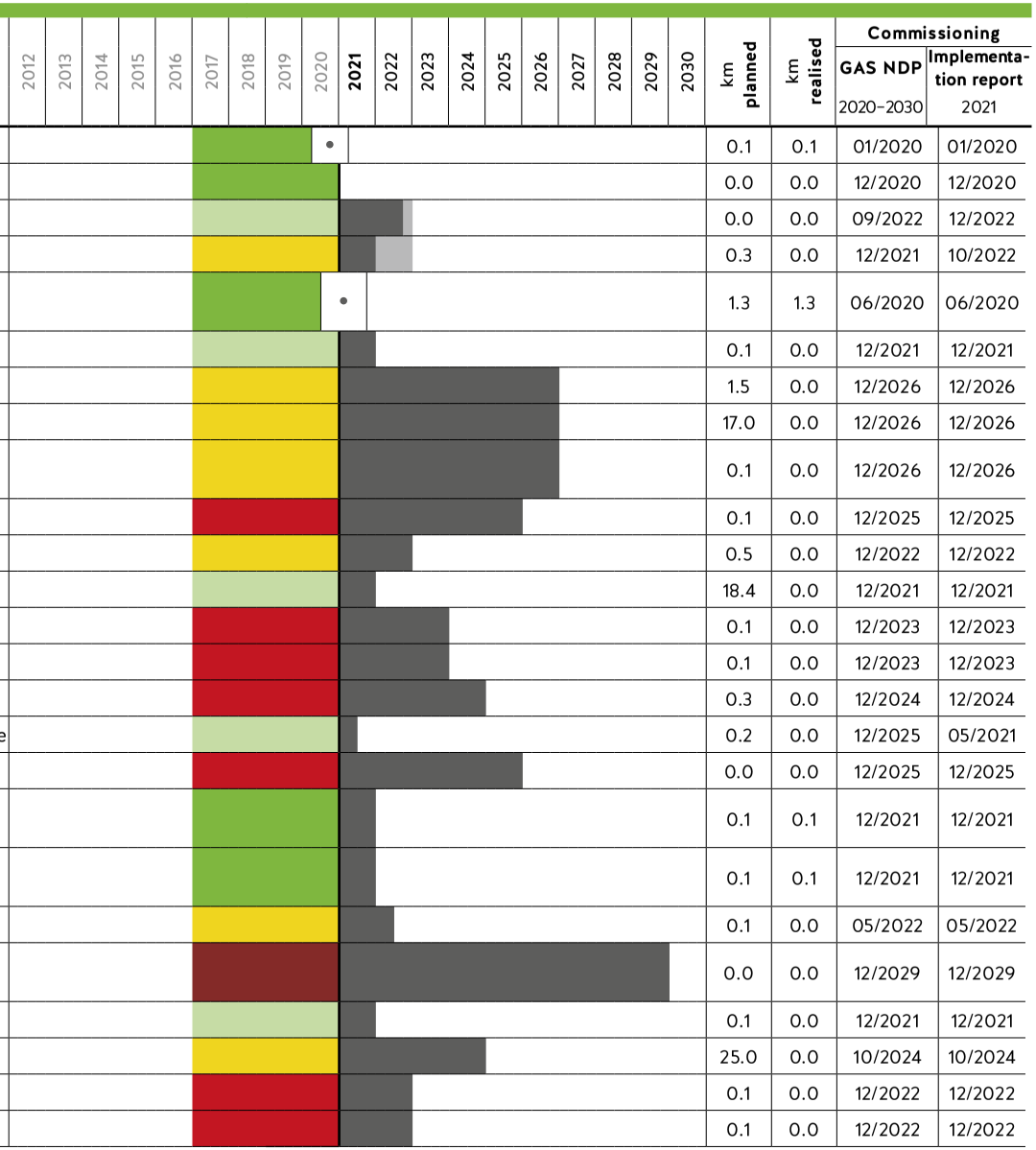
53	419-02	419-02	Hamborn GPCM station expansion	0.1	0.1	01/2020	01/2020
54	420-01	420-01	Emsbüren compressor station	0.0	0.0	12/2020	12/2020
55	422-01	422-01	Elten compressor station	0.0	0.0	09/2022	12/2022
56	431-02	431-02	Emstek GPCM station	0.3	0.0	12/2021	10/2022
57	432-02b	432-02b	Bunde-Landschaftspolder GPCM station and H-L-gas blending facility	1.3	1.3	06/2020	06/2020
58	435-03	435-03	Altena GPCM station and connecting pipeline	0.1	0.0	12/2021	12/2021
59	436-02a	436-02a	Heiden Marbeck-Heiden Borken pipeline	1.5	0.0	12/2026	12/2026
60	436-02b	436-02b	Heiden Borken-Dorsten pipeline	17.0	0.0	12/2026	12/2026
61	437-01	437-01	Heiden-Borken GPCM station and connecting pipeline	0.1	0.0	12/2026	12/2026
62	438-01	438-01	Epe storage facility pipeline link remodelling	0.1	0.0	12/2025	12/2025
63	439-01	439-01	Pattscheid GPCM station and connecting pipeline	0.5	0.0	12/2022	12/2022
64	440-02	440-02	Erftstadt-Euskirchen pipeline	18.4	0.0	12/2021	12/2021
65	441-02	441-02	Vinnhorst valve station and connecting pipeline	0.1	0.0	12/2023	12/2023
66	442-02	442-02	Ahlten GPCM station and connecting pipeline	0.1	0.0	12/2023	12/2023
67	443-02	443-02	Drohne GPCM station and connecting pipeline	0.3	0.0	12/2024	12/2024
68	444-01	444-01a	Werne/Stockum GPCM station and connecting pipeline	0.2	0.0	12/2025	05/2021
69	444-01	444-01b	Werne GPCM station and connecting pipeline	0.0	0.0	12/2025	12/2025
70	445-01a	445-01a	St. Hubert-Voigtslach valve stations and connecting pipeline (NETG)	0.1	0.1	12/2021	12/2021
71	445-01b	445-01b	St. Hubert-Voigtslach valve stations and connecting pipeline (OGE)	0.1	0.1	12/2021	12/2021
72	446-01	446-01	Wipperfürth-Niederschelden conversion	0.1	0.0	05/2022	05/2022
73	447-01	447-01	System connections and modifications for L-H-gas conversions (previously not specified more precisely)	0.0	0.0	12/2029	12/2029
74	448-01	448-01	Euskirchen GPCM station and connecting pipeline	0.1	0.0	12/2021	12/2021
75	449-02	449-02	Heilbronn connection extension (SEL 1)	25.0	0.0	10/2024	10/2024
76	450-01	450-01	Steinhäule GPCM station expansion	0.1	0.0	12/2022	12/2022
77	451-02	451-02	Au am Rhein GPCM station expansion	0.1	0.0	12/2022	12/2022



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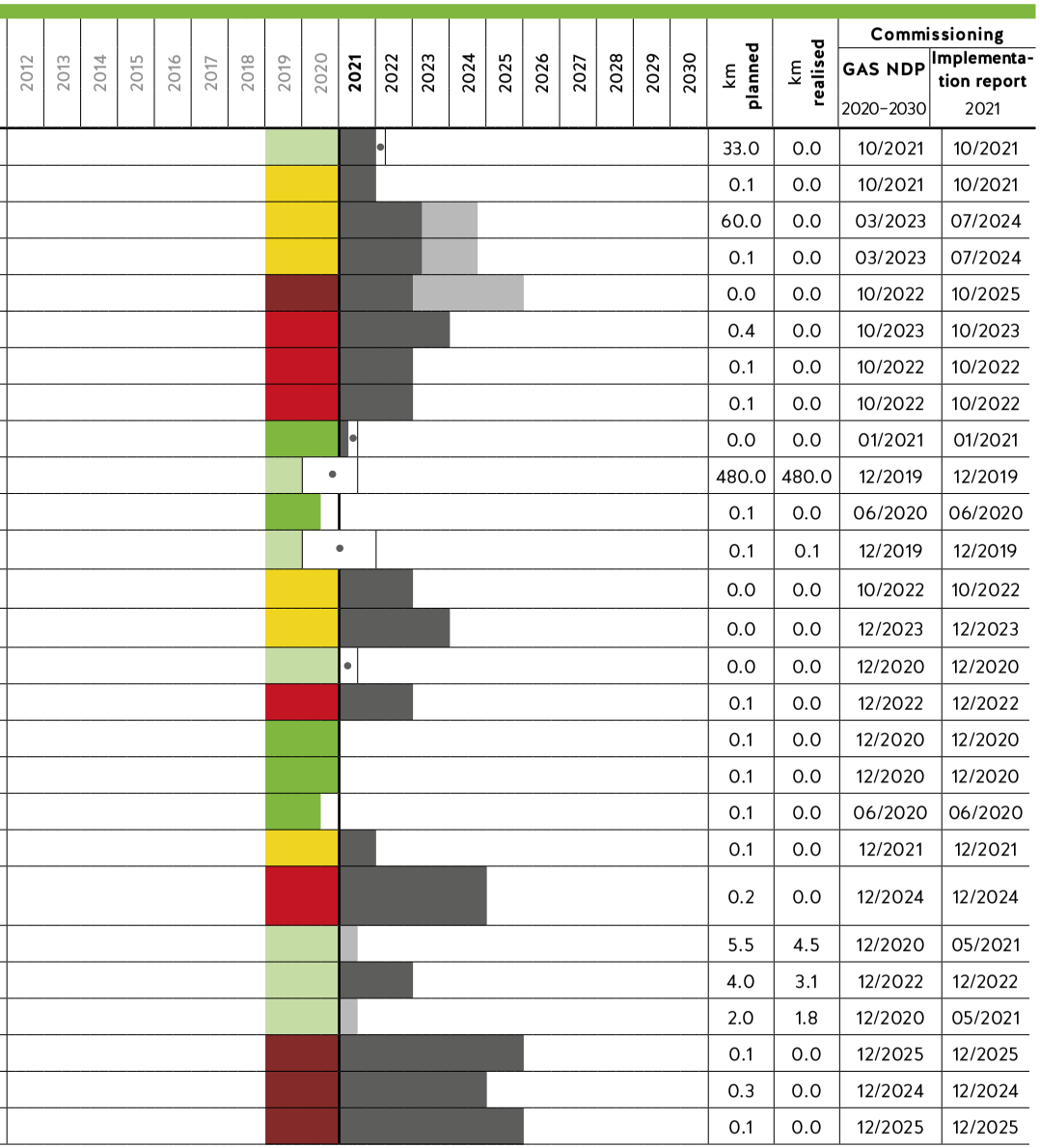
78	501-02a	501-02a	Walle-Wolfsburg pipeline	33.0	0.0	10/2021	10/2021
79	501-02e	501-03e	Unterlüß GPCM station expansion	0.1	0.0	10/2021	10/2021
80	502-02a	502-02a	Brunsbüttel–Hetlingen pipeline	60.0	0.0	03/2023	07/2024
81	502-02b	502-02b	Hetlingen GPCM station	0.1	0.0	03/2023	07/2024
82	503-02b	503-02b	Embsen compressor station expansion	0.0	0.0	10/2022	10/2025
83	504-01a	504-01a	EPT-Rysum – Rysum-Folmhusen pipeline connection	0.4	0.0	10/2023	10/2023
84	504-02b	504-02b	Folmhusen GPCM station expansion	0.1	0.0	10/2022	10/2022
85	504-02c	504-02c	Emden GPCM station	0.1	0.0	10/2022	10/2022
86	505-01	505-01	Rehden conversion expansion	0.0	0.0	01/2021	01/2021
87	507-01a	507-01a	EUGAL long-distance gas pipeline	480.0	480.0	12/2019	12/2019
88	507-01e	507-01e	Radeland II GPCM station	0.1	0.0	06/2020	06/2020
89	507-01h	507-01h	Börnicke GPCM station (pressure security system)	0.1	0.1	12/2019	12/2019
90	507-01l	507-01l	Holtum compressor station reverse flow	0.0	0.0	10/2022	10/2022
91	507-01m	507-01m	Sayda compressor station	0.0	0.0	12/2023	12/2023
92	507-02d	507-02d	Radeland II compressor station	0.0	0.0	12/2020	12/2020
93	508-01	508-01	Leonberg-West GPCM station expansion	0.1	0.0	12/2022	12/2022
94	520-01	520-01	Visbek Astrup valve station	0.1	0.0	12/2020	12/2020
95	521-01	521-01	Twistringen Ehrenburg valve station	0.1	0.0	12/2020	12/2020
96	523-01	523-01	Gergedorf GPCM station system modification	0.1	0.0	06/2020	06/2020
97	524-01	524-01	Steinfeld-Düpe GPCM station system modification	0.1	0.0	12/2021	12/2021
98	525-01	525-02	Meerbusch Osterrath GPCM station and connecting pipeline (Willich-Meerbusch pipeline)	0.2	0.0	12/2024	12/2024
99	526-01	526-01	Hamm-Bergkamen pipeline	5.5	4.5	12/2020	05/2021
100	527-01	527-01	Stockum-Bockum Hövel pipeline	4.0	3.1	12/2022	12/2022
101	528-01	528-01	Merschhoven-Daberg pipeline	2.0	1.8	12/2020	05/2021
102	529-01	529-01	Elten – St. Hubert valve stations	0.1	0.0	12/2025	12/2025
103	530-01	530-01	Cologne – Dormagen conversion	0.3	0.0	12/2024	12/2024
104	531-01a	531-01a	Appeldorn GPCM station	0.1	0.0	12/2025	12/2025



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105	531-01b	531-01b	Xanten valve stations																				0.1	0.0	12/2025	12/2025
106	532-01	532-01	Leer GPCM station and connecting pipeline																				0.1	0.0	12/2023	12/2023
107	552-01	552-01	Mittelbrunn-Schwanheim pipeline																				38.0	0.0	12/2024	12/2024
108	554-01	554-01	Hügelheim-Tannenkirch pipeline																				16.0	0.0	12/2024	12/2024
109	555-03	555-03	TENP I to TENP II interconnections																				0.1	0.0	12/2021	12/2021
110	601-01	601-01	Lauchhammer GPCM station pipeline																				0.1	0.0	12/2021	12/2021
111	602-01	602-02	Schwanheim-Au am Rhein pipeline (Schwanheim-Elchesheim pipeline)																				13.0	0.0	12/2025	12/2025
112	603-01	603-01	Schwarzach-Eckartsweier pipeline																				28.5	0.0	12/2025	12/2025
113	604-01	604-01	Tannenkirch-Hüsingen pipeline																				16.0	0.0	12/2025	12/2025
114	605-01	605-01	Wesseling-Knapsack pipeline																				12.5	0.0	12/2026	12/2026
115	609-01	609-01	Wirtheim-Lampertheim pipeline																				115.0	0.0	10/2027	10/2027
116	610-01	610-01	Wirtheim GPCM station																				0.1	0.0	10/2027	10/2027
117	611-01	611-01	Lampertheim GPCM station																				0.1	0.0	10/2027	10/2027
118	612-01	612-01	Löchgau-Altbach pipeline (SEL 2)																				44.0	0.0	12/2025	12/2025
119	613-01	613-01	Bietigheim GPCM station																				0.1	0.0	10/2024	10/2024
120	614-01	614-01	Heidelberg-Heilbronn pipeline (SEL 3)																				60.0	0.0	12/2026	12/2026
121	616-01	616-01	Heidelberg GPCM station																				0.1	0.0	12/2026	12/2026
122	618-01	618-01	Heilbronn GPCM station																				0.1	0.0	12/2026	12/2026
123	620-01	620-01	Kirchheim unter Teck GPCM station																				0.1	0.0	12/2025	12/2025
124	621-01	621-01	Hittistetten GPCM station																				0.1	0.0	12/2025	12/2025
125	622-01	622-01	Eichstegen GPCM station																				0.1	0.0	12/2025	12/2025
126	624-01	624-01	Weißensberg 2 GPCM station																				0.1	0.0	12/2025	12/2025
127	625-01	625-01	Scharrenstetten GPCM station																				0.3	0.0	12/2025	12/2025
128	626-01	626-01	Aalen-Essingen pipeline																				2.0	0.0	12/2026	12/2026
129	627-01	627-01	MIDAL Middle North pipeline																				22.0	0.0	12/2026	12/2026
130	628-01	628-01	MIDAL Middle South pipeline																				39.0	0.0	12/2026	12/2026
131	629-01	629-01	Reckrod compressor station																				0.0	0.0	10/2027	10/2027
132	630-01	630-01	Lampertheim 5 GPCM station																				0.1	0.0	10/2027	10/2027

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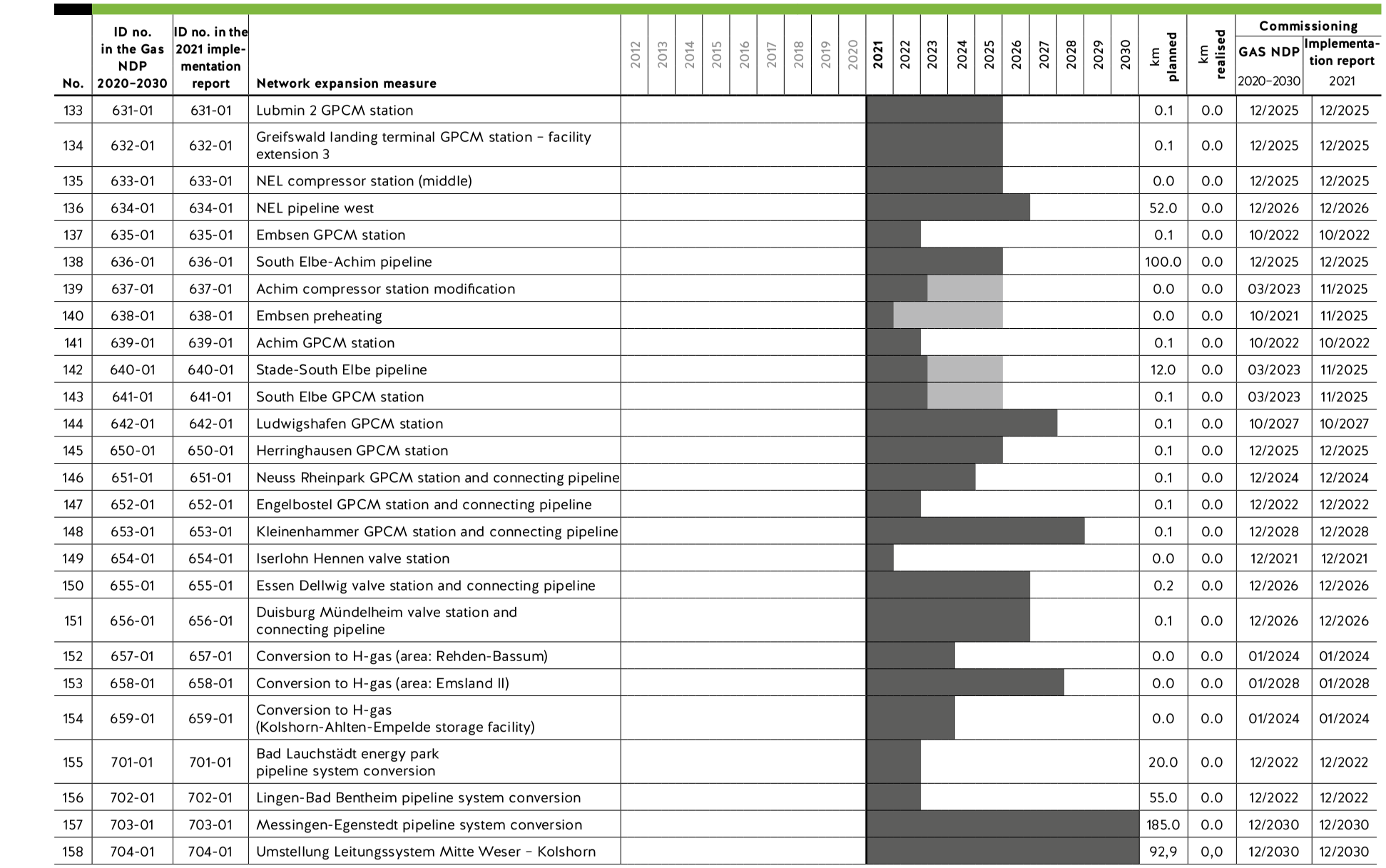
133	631-01	631-01	Lubmin 2 GPCM station	0.1	0.0	12/2025	12/2025
134	632-01	632-01	Greifswald landing terminal GPCM station – facility extension 3	0.1	0.0	12/2025	12/2025
135	633-01	633-01	NEL compressor station (middle)	0.0	0.0	12/2025	12/2025
136	634-01	634-01	NEL pipeline west	52.0	0.0	12/2026	12/2026
137	635-01	635-01	Embsen GPCM station	0.1	0.0	10/2022	10/2022
138	636-01	636-01	South Elbe-Achim pipeline	100.0	0.0	12/2025	12/2025
139	637-01	637-01	Achim compressor station modification	0.0	0.0	03/2023	11/2025
140	638-01	638-01	Embsen preheating	0.0	0.0	10/2021	11/2025
141	639-01	639-01	Achim GPCM station	0.1	0.0	10/2022	10/2022
142	640-01	640-01	Stade-South Elbe pipeline	12.0	0.0	03/2023	11/2025
143	641-01	641-01	South Elbe GPCM station	0.1	0.0	03/2023	11/2025
144	642-01	642-01	Ludwigshafen GPCM station	0.1	0.0	10/2027	10/2027
145	650-01	650-01	Herringhausen GPCM station	0.1	0.0	12/2025	12/2025
146	651-01	651-01	Neuss Rheinpark GPCM station and connecting pipeline	0.1	0.0	12/2024	12/2024
147	652-01	652-01	Engelbostel GPCM station and connecting pipeline	0.1	0.0	12/2022	12/2022
148	653-01	653-01	Kleinenhammer GPCM station and connecting pipeline	0.1	0.0	12/2028	12/2028
149	654-01	654-01	Iserlohn Hennen valve station	0.0	0.0	12/2021	12/2021
150	655-01	655-01	Essen Dellwig valve station and connecting pipeline	0.2	0.0	12/2026	12/2026
151	656-01	656-01	Duisburg Mündelheim valve station and connecting pipeline	0.1	0.0	12/2026	12/2026
152	657-01	657-01	Conversion to H-gas (area: Rehden-Bassum)	0.0	0.0	01/2024	01/2024
153	658-01	658-01	Conversion to H-gas (area: Emsland II)	0.0	0.0	01/2028	01/2028
154	659-01	659-01	Conversion to H-gas (Kolshorn-Ahlten-Empelde storage facility)	0.0	0.0	01/2024	01/2024
155	701-01	701-01	Bad Lauchstädt energy park pipeline system conversion	20.0	0.0	12/2022	12/2022
156	702-01	702-01	Lingen-Bad Bentheim pipeline system conversion	55.0	0.0	12/2022	12/2022
157	703-01	703-01	Messingen-Egenstedt pipeline system conversion	185.0	0.0	12/2030	12/2030
158	704-01	704-01	Umstellung Leitungssystem Mitte Weser – Kolshorn	92,9	0,0	12/2030	12/2030



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159	705-01	705-01	Löningen-Emsbüren pipeline system conversion										■	■	■	■	■	■	■	■	■	■	55.0	0.0	12/2030	12/2030
160	706-01	706-01	Emsbüren-Bad Bentheim pipeline system conversion										■	■	■	■	■	■					15.0	0.0	12/2026	12/2026
161	707-01	707-01	Bad Bentheim-Legden pipeline system conversion										■										31.0	0.0	12/2022	12/2022
162	708-01	708-01	Legden-Dorsten pipeline system conversion										■	■	■	■	■	■					38.0	0.0	12/2026	12/2026
163	709-01	709-01	Rheine-Wettringen pipeline system conversion										■	■	■	■	■	■	■	■	■	■	3.5	0.0	12/2030	12/2030
164	710-01	710-01	Wettringen-Albachten pipeline system conversion										■	■	■	■	■	■	■	■	■	■	43.2	0.0	12/2030	12/2030
165	711-01	711-01	Elten-Sonsbeck pipeline system conversion (NETG)										■	■	■	■	■	■	■	■	■	■	42.3	0.0	12/2030	12/2030
166	712-01	712-01	Sonsbeck-Hamborn pipeline system conversion										■	■	■	■	■	■	■	■	■	■	34.0	0.0	12/2030	12/2030
167	713-01	713-01	Kalle-Ochtrup pipeline system conversion										■	■	■	■	■	■					48.8	0.0	12/2025	12/2025
168	714-01	714-01	South Elbe-Heidenau pipeline system conversion										■	■	■	■	■	■					41.1	0.0	12/2025	12/2025
169	715-01	715-01	Eckel-Achim pipeline system conversion										■	■	■	■	■	■					73.4	0.0	12/2025	12/2025
170	716-01	716-01	Oude Statenzijl-Ganderkesee pipeline system conversion										■	■	■	■	■	■	■	■	■	■	89.4	0.0	12/2030	12/2030
171	717-01	717-01	Ganderkesee-Achim pipeline system conversion										■	■	■	■	■	■					40.8	0.0	12/2025	12/2025
172	718-01	718-01	Ganderkesee-Bremen pipeline system conversion										■	■	■	■	■	■					17.1	0.0	12/2025	12/2025
173	719-01	719-01	Folmhusen-Nüttermoor pipeline system conversion										■	■	■	■	■	■	■	■	■	■	18.4	0.0	12/2030	12/2030
174	720-01	720-01	Barßel-Rheine pipeline system conversion										■	■	■	■	■	■	■	■	■	■	108.5	0.0	12/2030	12/2030
175	721-01	721-01	Ganderkesee-Drohne pipeline system conversion										■	■	■	■	■	■	■	■	■	■	80.4	0.0	12/2030	12/2030
176	722-01	722-01	Ganderkesee GPCM station										■	■	■	■	■	■	■	■	■	■	0.1	0.0	12/2030	12/2030
177	723-01	723-01	Barßel GPCM station										■	■	■	■	■	■	■	■	■	■	0.1	0.0	12/2030	12/2030
178	724-01	724-01	South Bavaria pipeline system conversion (anonymous)										■	■	■								9.2	0.0	12/2023	12/2023
179	730-01	730-01	Schlootdamm/Steinfeld GPCM station										■	■	■	■	■	■	■	■	■	■	0.1	0.0	12/2030	12/2030
180	731-01	731-01	New Frensdorfer Bruchgraben-Frenswegen pipeline construction										■	■	■	■	■	■					1.4	0.0	12/2025	12/2025
181	732-01	732-01	New Egenstedt-Hallendorf pipeline construction										■	■	■	■	■	■	■	■	■	■	30.0	0.0	12/2030	12/2030
182	733-01	733-01	New Dorsten-Hamborn pipeline construction										■	■	■	■	■	■					37.0	0.0	12/2026	12/2026
183	734-01	734-01	New Epe-Ochtrup pipeline construction										■	■	■	■	■	■					10.0	0.0	12/2026	12/2026
184	735-01	735-01	New Dorsten-Marl pipeline construction										■	■	■	■	■	■					8.0	0.0	12/2026	12/2026
185	736-01	736-01	Elten GPCM station and connecting pipeline										■	■	■	■	■	■	■	■	■	■	0.1	0.0	12/2030	12/2030
186	737-01	737-01	Sonsbeck GPCM station and connecting pipeline										■	■	■	■	■	■	■	■	■	■	0.1	0.0	12/2030	12/2030

■ 1 Project idea
■ 2 Basis evaluation/ feasibility study
■ 3 Design planning/ regional planning procedure
■ 4 Detailed/approval planning/planning approval procedure/planning permission procedure/approval process pursuant to the Federal Immissions Control Act (BImSchG)/acquisition of rights of way
■ 5 Procurement of materials and services/ construction preparation and start of construction/installation/construction
■ 6 Commissioning project conclusion/completion

■ Future project stages
(Foreseeable) delay if progress is not optimal
■ Planned change

Source: Transmission system operators

Date: 1 April 2021

No.	ID no. in the Gas NDP 2020–2030	ID no. in the 2021 implementation report	Network expansion measure	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	km planned	km realised	Commissioning: GAS NDP 2020–2030	Commissioning: Implementation report 2021
187	738-01	738-01	Hamborn GPCM station and connecting pipeline										■	■	■	■	■	■	■	■	■	■	0.1	0.0	12/2030	12/2030
188	739-01	739-01	Dorsten GPCM station and connecting pipeline										■	■	■	■	■	■					0.1	0.0	12/2026	12/2026
189	740-01	740-01	Bad Bentheim GPCM station and connecting pipeline										■										0.1	0.0	12/2026	12/2022
190	741-01	741-01	Emsbüren GPCM station and connecting pipeline										■	■	■	■	■	■	■	■	■	■	0.1	0.0	12/2030	12/2030
191	742-01	742-01	Wettringen valve station and connecting pipeline										■	■	■	■	■	■	■	■	■	■	0.3	0.0	12/2030	12/2030
192	743-01	743-01	New Vlieghuis-Kalle pipeline construction										■	■	■	■	■	■					6.7	0.0	12/2025	12/2025
193	760-01	760-01	Rehden-Diepholz pipeline										■	■	■	■	■	■	■	■	■	■	9.0	0.0	12/2030	12/2030
194	761-01	761-01	Egenstedt-Clauen pipeline										■	■	■	■	■	■	■	■	■	■	17.0	0.0	12/2030	12/2030
195	762-01	762-01	Wallach-Alpen pipeline										■	■	■	■	■	■	■	■	■	■	3.5	0.0	12/2030	12/2030
196	763-01	763-01	Budberg-Eversael pipeline										■	■	■	■	■	■	■	■	■	■	1.5	0.0	12/2030	12/2030
197	764-01	764-01	Sonsbeck-Oberhausen pipeline link remodelling										■	■	■	■	■	■	■	■	■	■	1.0	0.0	12/2030	12/2030
198	765-01	765-01	Glehn II GPCM station										■	■	■	■	■	■	■	■	■	■	0.1	0.0	12/2030	12/2030
199	766-01	766-01	Hamborn 1 GPCM station										■	■	■	■	■	■	■	■	■	■	0.1	0.0	12/2030	12/2030
200	767-01	767-01	South Elbe-Achim pipeline										■	■	■	■	■	■					100.0	0.0	12/2025	12/2025
201	768-01	768-01	Hassel-Westen pipeline										■	■	■	■	■	■	■	■	■	■	8.0	0.0	12/2030	12/2030

■ 1 Project idea ■ 2 Basis evaluation/ feasibility study ■ 3 Design planning/ regional planning procedure ■ 4 Detailed/approval planning/planning approval procedure/planning permission procedure/approval process pursuant to the Federal Immissions Control Act (BImSchG)/acquisition of rights of way ■ 5 Procurement of materials and services/ construction preparation and start of construction/installation/construction ■ 6 Commissioning project conclusion/completion

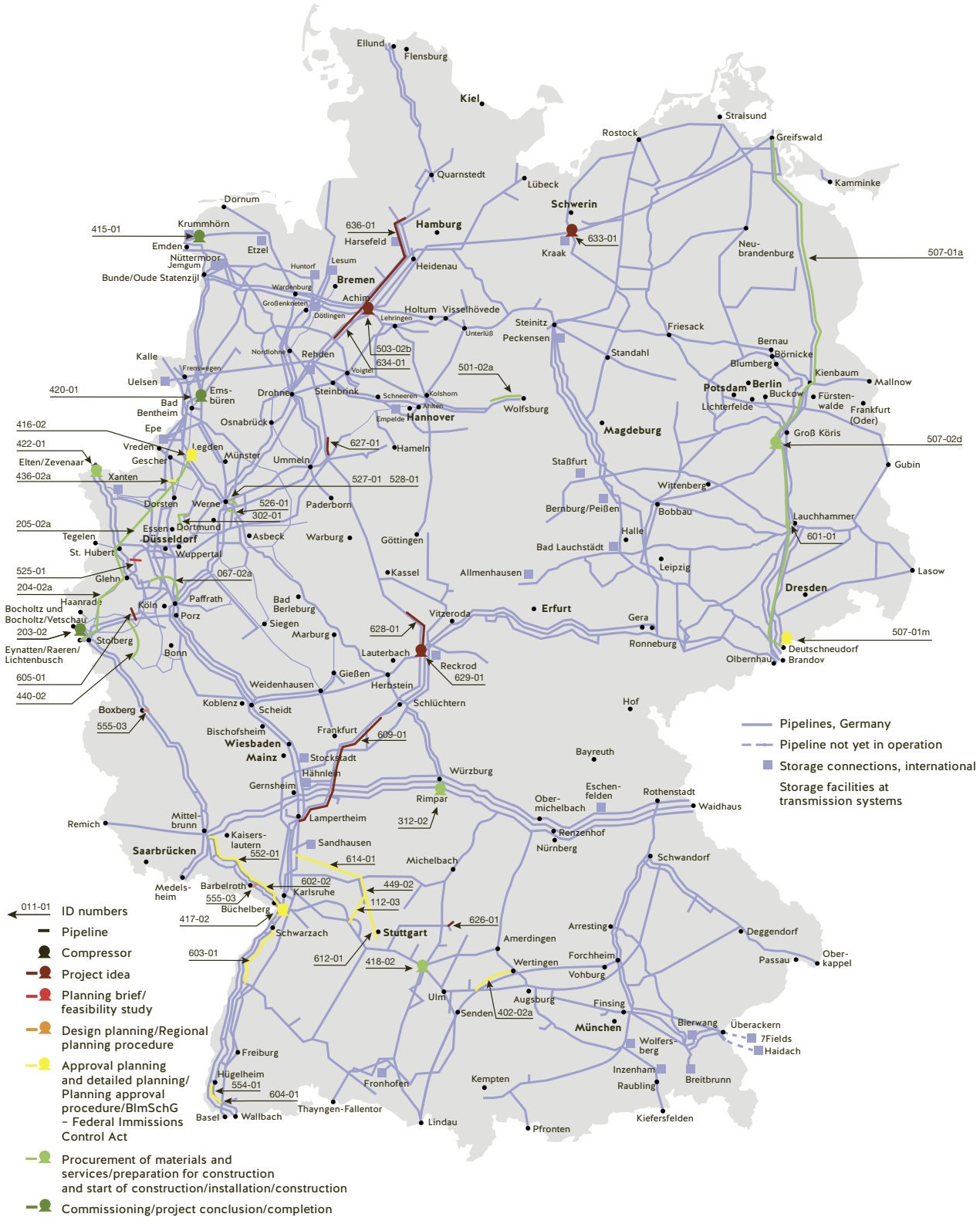
■ Future project stages ⊙ (Foreseeable) delay if progress is not optimal ■ Planned change

Date: 1 April 2021

Source: Transmission system operators

Figure 1: Implementation status of the measures in the Gas Network Development Plan (base variant)

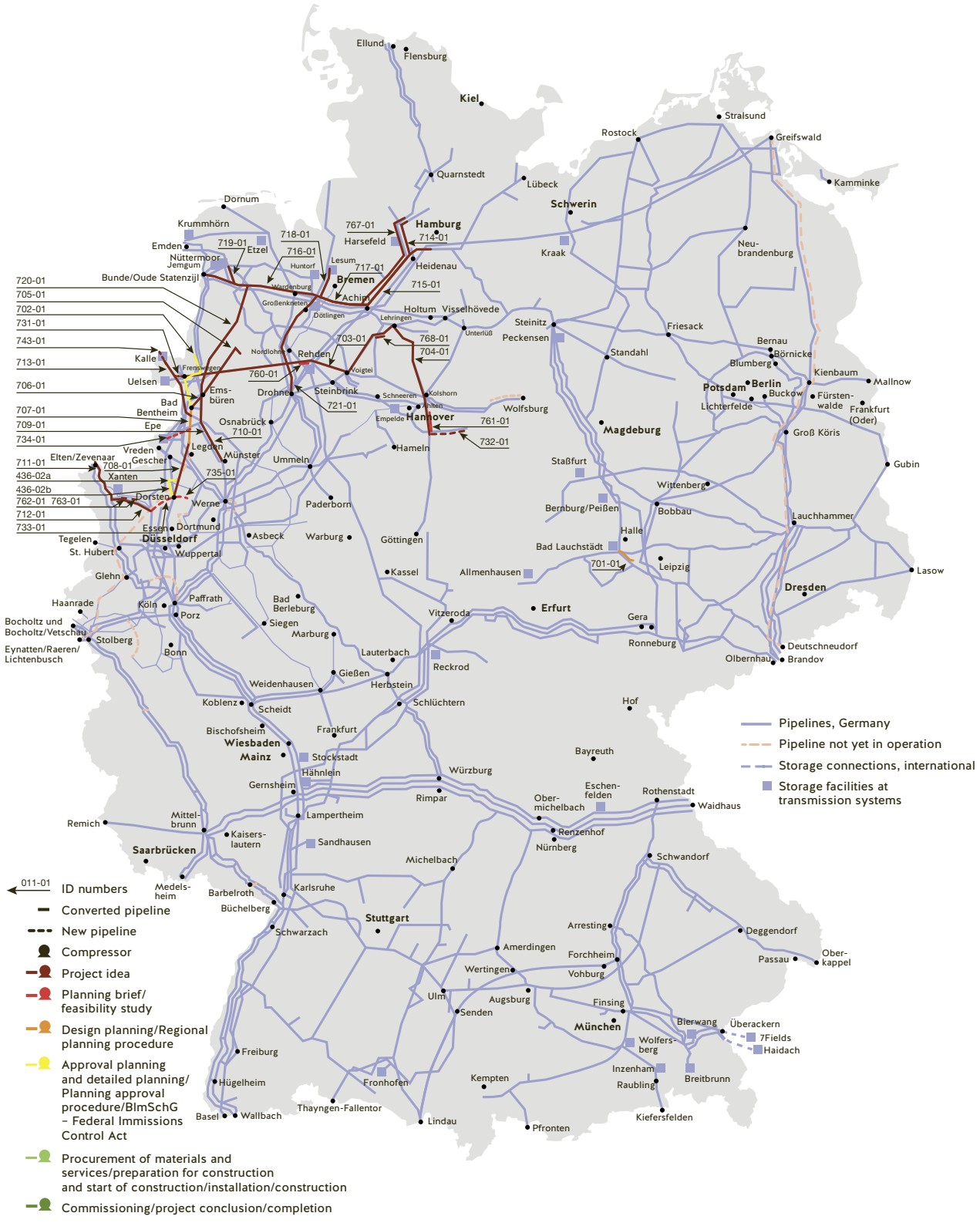
For greater clarity, the map presents the pipelines and compressor stations shown under the attribute "Type of measure" in the NDP gas database.



Source: Transmission system operators, reporting date: 1 January 2021

Figure 2: Implementation status of the measures in the Gas Network Development Plan (green gas variant)

For greater clarity, the map presents the pipelines and compressor stations shown under the attribute “Type of measure” in the NDP gas database.



Source: Transmission system operators, reporting date: 1 January 2021

3.2 Measures that have come on stream since the draft Gas Network Development Plan 2020–2030

The following tables show the measures that currently have the status "Commissioning" and "Project conclusion/completion" in the 2021 implementation report.

Table 3: Project status "Project conclusion/completing" (reporting date: 1 January 2021)

No.	ID number	Network expansion measure	Transmission system operator
1	308-02b	Gernsheim GPCM station (OGE)	OGE
2	309-01	Rimpar MEGAL compressor station	OGE (44.96%) / GRTD (55.04%)
3	310-02	Reichertsheim GPCM station and connecting pipeline	OGE
4	323-02	Aggertal network area conversion	Thyssengas
5	327-03	Niederscheiden GPCM station and connecting pipeline	OGE
6	330-02	Elsdorf GPCM station and connecting pipeline	OGE
7	334-02	Rauschendorf valve station and connecting pipeline	OGE
8	420-01	Emsbüren compressor station	OGE
9	520-01	Visbek Astrup valve station	GTG Nord
10	521-01	Twistringen Ehrenburg valve station	GTG Nord
11	523-01	Bergedorf GPCM station system modification	GTG Nord

Source: Transmission system operators

Table 4: Project status "Commissioning" (reporting date: 1 January 2021)

No.	ID number	Network expansion measure	Transmission system operator
1	203-02	Würselen compressor station	OGE (75%) / Thyssengas (25%)
2	208-02	Rimpar GPCM station	OGE (44.96%) / GRTD (55.04%)
3	221-01	Conversion to H-gas (area: Luttum to Wolfsburg)	GUD
4	223-01	Conversion to H-gas (area: Bremen Nord, Bremerhaven to Cuxhaven and eastern part of the network of EWE Netz)	GUD
5	311-02	Schlüchtern-Rimpar pipeline	OGE
6	325-01	Neukirchen valve station and connecting pipeline	OGE (68.4%) / Thyssengas (31.6%)
7	326-02	Horrem valve station and connecting pipeline	OGE (69.4%) / Thyssengas (30.6%)
8	328-03	Langenscheid GPCM station and connecting pipeline	OGE
9	329-03	Siegwiesen GPCM station and connecting pipeline	OGE
10	336-02	Oberaden valve station and connecting pipeline	OGE
11	410-02a	Rehden GPCM station	GASCADE
12	410-02b	Drohne GPCM station	GASCADE
13	415-01	Krummhörn compressor station	OGE
14	432-02b	Bunde-Landschaftspolder GPCM station and H-L-gas blending facility	GTG Nord
15	445-01a	St. Hubert-Voigtslach valve stations and connecting pipeline (NETG)	OGE (50%) / Thyssengas (50%)
16	445-01b	St. Hubert-Voigtslach valve stations and connecting pipeline (OGE)	OGE
17	507-01e	Radeland II GPCM station	Fluxys D (16.5%) / GASCADE (50,5%) / GUD (16.5%) / ONTRAS (16.5%)

Source: Transmission system operators

A total of 28 measures have reached the project status "Project conclusion/completion" or "Commissioning" compared to the draft Gas Network Development Plan 2020–2030. These involve three compressor station measures with a total capacity of 62 MW, twelve GPCM stations, eight valve stations and five other measures.

3.3 Measures that have changed compared to the draft Gas Network Development Plan 2020–2030

3.3.1 Measures where a change to the technical parameters is planned

The following measures have changes of the technical parameters when compared to the draft Gas Network Development Plan 2020–2030.

Unterlüß GPCM station expansion (ID 501-03e)
The need for a larger nominal diameter (DN) in order to obtain the targeted capacity increase in the East Hanover region was identified in the course of the detailed planning.

Meerbusch Osterrath GPCM station (Willich-Meerbusch pipeline) (ID 525-02)
In the course of the basic evaluation as well as feasibility study and during the preparation of the documents for the approval process, an alternative to the construction of a new pipeline resulted from a connection of the pipeline to be converted from L-gas to H-gas with a Thyssengas H-gas pipeline.

The plans for implementing the measure with the Meerbusch Osterrath GPCM station and connecting pipeline will therefore be continued.

Schwanheim-Au am Rhein pipeline (Schwanheim-Elchesheim pipeline) (ID 602-02)
Investigations on the integrity of the TENP I pipeline showed that a subsection of the existing pipeline between Klingenmünster and Au could be put back into operation. This recommissioning has the effect of reducing by 18 km the planned length, which will now be implemented between Schwanheim and Au am Rhein.

3.3.2 Measures where a change to the commissioning dates is planned

The measures specified below where a change to the commissioning date is planned (e.g. because of a change to the L-to-H-gas conversion area plan) refer to changes from the scheduled commissioning deadlines shown in the draft Gas Network Development Plan 2020–2030.

Embsen overflow transmission (ID 301-01)
The measure described here involves the expansion of the preheating at the Embsen station in order derive the volumes from the Brunsbüttel LNG plant for the market area conversion and increased long-term forecasts. According to the change to the commissioning of the Brunsbüttel LNG plant announced by the operator, the commissioning of the measure can also be changed to July 2024.

Conversion of the Bergheim 1 network area to H-gas (ID 320-01)
The conversion concept envisages necessary commissioning in September 2021. The project plan was subsequently amended. No delays in providing capacity are expected.

Emsteck GPCM station (ID 431-02)
The conversion concept provides for necessary commissioning in 10/2022. The project plan was subsequently amended. No delays in providing capacity are expected.

Elten compressor station (ID 422-01)
The date determined in the modelling for the provision of the capacity is December 2022. The project plan was subsequently amended. No delays in providing capacity are expected.

**Werne/Stockum GPCM station and connecting pipeline (ID 444-01a),
Werne GPCM station and connecting pipeline (444-01b)**
The Werne GPCM station and connecting pipeline measure was divided into two measures when the L-to-H-gas conversion plan was finalised.

- The Werne/Stockum GPCM station and connecting pipeline (ID 444-01a) is required to create and ensure the technical requirements for converting the Oberaden and Werne – Ummeln – Drohne areas from L-gas to H-gas with a commissioning date in the middle of 2021.
- The Werne GPCM station and connecting pipeline (ID 444-01b) is required to create and ensure the technical requirements for converting the Werne – Ummeln – Drohne, Münsterland and Gescher areas from L-gas to H-gas with a commissioning date in the middle of 2025.

Embsen compressor station expansion (ID 503-02b)
The expansion of the Embsen compressor station by a third compressor unit serves to provide the capacity specified in the long-term forecast in direction of Schleswig-Holstein and fulfils the increased usage requirements and usage probabilities of the compressors. The measure will be required as part of these requirements from October 2025 onwards.

Hamm-Bergkamen pipeline (ID 526-01) and Merschhoven-Daberg pipeline (ID 528-01)
The Hamm-Bergkamen pipeline and the Merschhoven-Daberg pipeline as well as a subsection of the Stockum-Bockum Hövel pipeline measure (ID 527-01) are required for the conversion from L-gas to H-gas. The conversion stages are planned for the middle of 2021. The pipelines will therefore come on stream at the end of May 2021.

The adjustment of the time when this expansion measure is implemented does not affect the planned time when the capacity will be provided.

Achim compressor station modification (ID 637-01)
According to the change to the commissioning dates of the Stade and Brunsbüttel LNG plants announced by the operator, the commissioning of the measure to derive the gas volumes can also be changed to November 2025.

Embsen preheating (ID 638-01)
The measure described here involves the expansion of the preheating at the Embsen station in order derive the volumes from the Stade LNG plant, for the market area conversion and increased long-term forecasts. According to the change to the commissioning of the Stade LNG plant announced by the operator, the commissioning of the measure can also be changed to November 2025.

Bad Bentheim GPCM station and connecting pipeline (ID 740-01)
In case of the Bad Bentheim GPCM station and connecting pipeline (ID 740-01) measure, the commissioning date was modified from December 2026 to December 2022 when the plans were finalised.

3.4 Discontinued measures compared to the draft Gas Network Development Plan 2020–2030

The following measure is discontinued compared to the draft Gas Network Development Plan 2020–2030:

Kolshorn GPCM station expansion (ID 501-02d)
In the course of the overall project progress and the draft planning of the measures to increase capacity in the Hanover East area, it was possible to dispense with the adaptation and expansion of the Kolshorn GPCM station, while maintaining the planned sizes.

3.5 Measures subject to a delay

3.5.1 Measures where a delay has occurred

The following measures present delays in comparison with the draft Gas Network Development Plan 2020–2030:

Mittelbrunn GPCM station (ID 206-02 and ID 307-01)
The measures under ID numbers 206-02 and 307-01 have to be implemented in Mittelbrunn in order to increase the overfeed capacity between the MEGAL and the TENP pipeline systems.

The measures to reinforce the overflow between MEGAL and TENP progressed according to plan up to the separation on the construction site and the capacity reinforcement of the systems. Due to the unclear situation caused by the pandemic (COVID-19) in March 2020, it was not possible to ensure that the system connection could be restored on schedule. Fluxys/OGE decided for reasons of the security of supply for Baden-Württemberg and also for Switzerland and Italy to extend the operation of the temporary solution for one year and to complete the measure in 2021.

The adjustment of the time when this expansion measure is implemented does not affect the planned time when the capacity will be provided.

TENP reverse flow (ID 305-02)
The measure included the South-North reverse flow of the Hügelheim compressor station, a infrastructure expansion at the Mittelbrunn compressor station and the construction of a deodorising plant in the area of the Schwörstadt municipality near the German-Swiss border. The reverse flow of the Hügelheim compressor station and the construction of the deodorising plant were completed according to plan. The expansion sub-measure at the Mittelbrunn compressor station will be carried out together with the previously mentioned measures in Mittelbrunn (ID 206/ID 307) in 2021.

The adjustment of the time when this expansion measure is implemented does not affect the planned time when the capacity will be provided.

Scheidt GPCM station (ID 331-01)
The expansion and reverse flow of the GPCM station in Scheidt in order to utilise the L-gas infrastructure in the H-gas transmission system at the Scheidt station is well advanced. The part of the measure planned for the first conversion stage in May 2021 is available apart from the residual work. The construction measures for the further conversion stages will be carried out in 2021.

The adjustment of the time when this expansion measure is implemented does not affect the planned time when the capacity will be provided.

Hamborn GPCM station expansion (ID 419-02)
It has not yet been possible to complete the takeover of ancillary facilities and the control technology. This does not affect the planned time when the capacity will be provided.

Bunde-Landschaftspolder GPCM station and H-L-gas blending facility (ID 432-02b)
The Bunde-Landschaftspolder GPCM station and H-L-gas blending facility measure has not been fully completed. The construction of the station has been completed. However, the station has not yet been connected to the GTS H-gas network. The reason for the delay that has occurred is difficulties in the procurement of materials. The connection to the H-gas network and thus the start of mixed operation is scheduled for 2021.

The adjustment of the time when this expansion measure is implemented does not affect the planned time when the capacity will be provided.

Walle-Wolfsburg pipeline (ID 501-02a)
The Walle-Wolfsburg pipeline was planned to be commissioned by October 2021. As a result of unforeseeable delays in the approval process, commissioning and the provision of capacity will now take place in January 2022.

Rehden conversion expansion (ID 505-01)
The cause of the new schedule is unforeseen delays in the commissioning of the conversion facility in Rehden. The facility will be commissioned in the second quarter of 2021.

The adjustment of the time when this expansion measure is implemented does not affect the planned time when the capacity will be provided.

Radeland II compressor station (ID 507-02d) and EUGAL long-distance pipeline (ID 507-01a)
The reason of the new schedule is unforeseen delays in the construction of the Radeland II compressor station. The EUGAL long-distance gas pipeline will reach full transport capacity in the second quarter of 2021.

Börnicke GPCM station (pressure security system) (ID 507-01h)
The pipeline engineering was completed for the Börnicke facility, which is now in operation, but it cannot currently be regulated yet. It has not yet been possible to achieve complete functionality of the adjustable pressure security system that was originally planned because a component is missing. The installation of the missing sensor and the final commissioning of the expanded regulation are planned for 2021.

The adjustment of the time when this expansion measure is implemented does not affect the planned time when the capacity will be provided.

3.5.2 Measures with a foreseeable delay

The measures with a foreseeable delay compared with the draft Gas Network Development Plan 2020–2030 that are specified below refer exclusively to delays from the scheduled commissioning dates shown in the NPD gas database.

Heilbronn connection (ID 112-03)
The commissioning of the Heilbronn connection measure will be postponed on account of the ongoing planning approval procedure. The laying of the roughly 28-km-long pipeline requires the route to be prepared. Provisions under nature conservation and wildlife protection legislation have to be complied with for some of this preparatory work. For example, logging can be carried out only between October and February. This in turn requires that a planning approval decision has been made. As the planning approval decision in the administrative district of Stuttgart was not yet available by February 2021, the work on preparing the route described above can be started there only from October 2021 onwards. It is therefore no longer possible to lay the pipeline in administrative district of Stuttgart in 2021.

As a result of the unforeseeable delay, the commissioning and the provision of capacity will now take place in December 2022.

Legden compressor station (ID 416-02)
The measure is required for the transmission of additional import capacity in accordance with the H-gas source distribution and is currently at the planning approval stage. Commissioning is planned for December 2023 according to the Gas Network Development Plan 2020–2030: It is foreseen that commissioning will be able to take place only in the middle of 2024.

The foreseeable delay in the commissioning of this expansion measure will affect the planned time when the capacity will be provided. Impacts on the L-to-H-gas conversion are not expected.

3.6 Measures contained in the draft Gas Network Development Plan 2020–2030 for information purposes

Some measures have been listed for information purposes in the draft Gas Network Development Plan 2020–2030. They are reported on accordingly in the implementation report.

For the following measures, the planned commissioning has changed in comparison with the draft Gas Network Development Plan 2020–2030:

Brunsbüttel – Hetlingen pipeline (ID 502-02a) and Hetlingen GPCM station (ID 502-02b)
The measures described here are required to connect the planned LNG plant in Brunsbüttel. According to the change to the commissioning of the LNG plant announced by the operator, the commissioning of the measures can also be changed to July 2024.

Stade-South Elbe pipeline (ID 640-01) and South Elbe GPCM station (ID 641-01)
The measures described here are required to connect the planned LNG plant in Stade. According to the change to the commissioning of the LNG plant announced by the operator, the commissioning of the measures can also be changed to November 2025.

The following measures have been discontinued compared to the draft Gas Network Development Plan 2020–2030:

WAL (ID 606-01), Wilhelmshaven GPCM station and connecting pipeline (ID 607-01) and Friedeburg-Etzel GPCM station and connecting pipeline (ID 608-01)

The transmission system operators had to take capacity reservations and capacity expansion claims pursuant to sections 38 and 39 GasNZV for planned LNG plants into consideration for the Gas Network Development Plan 2020–2030. The capacity reservation pursuant to section 38 GasNZV has since been withdrawn for the planned LNG plant in Wilhelmshaven. The measures for the connection to the pipeline system of the transmission system operators listed in the network development plan for information purposes are therefore discontinued.

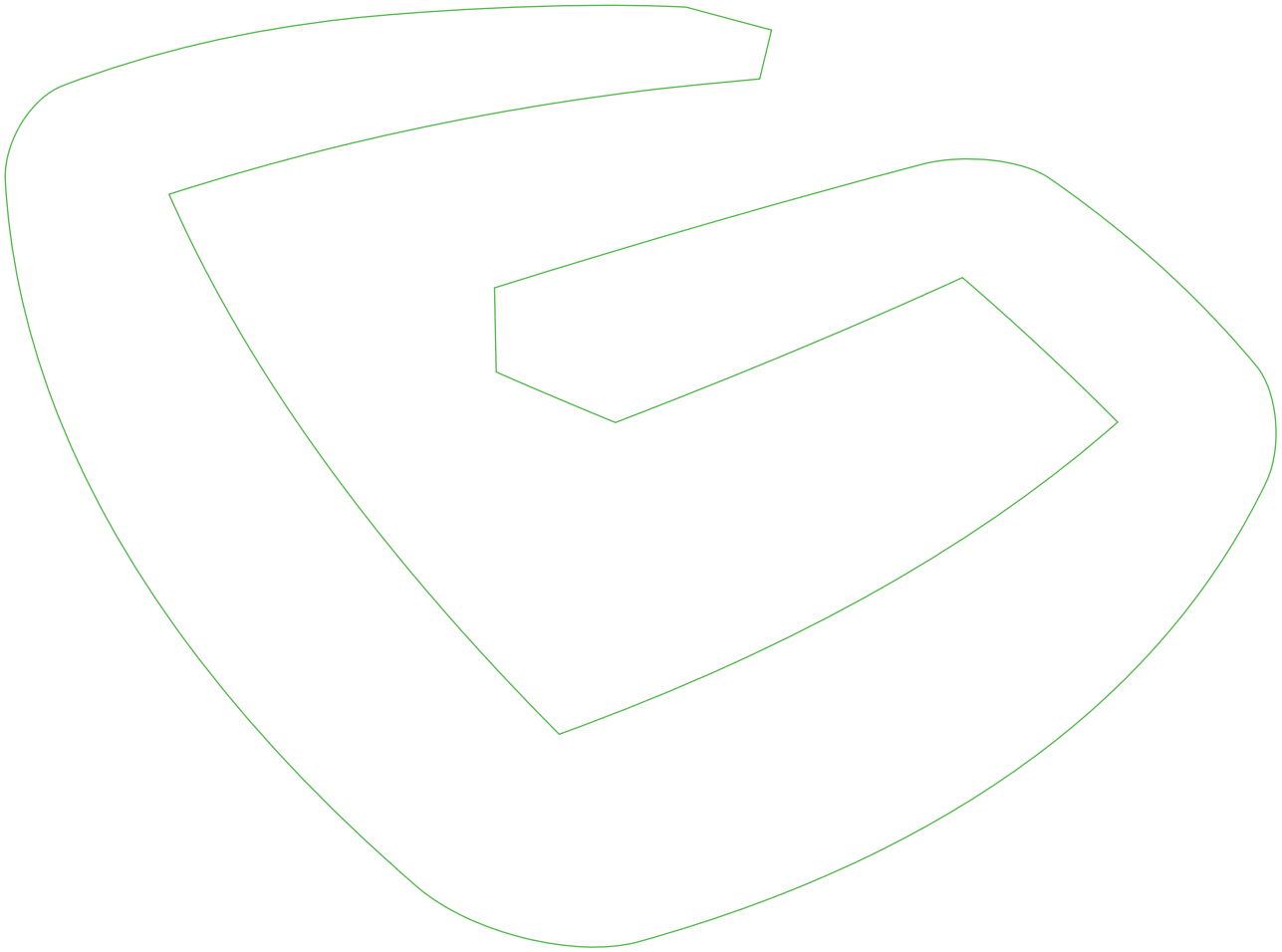
3.7 Summary of the implementation status

The following results can be recorded on the implementation status of the draft Network Development Plan 2020–2030:

A total of 28 measures have reached the project status “Project conclusion/completion” or “Commissioning” compared to the draft Gas Network Development Plan 2020–2030. These involve three compressor station measures with a total capacity of 62 MW, twelve GPCM stations, eight valve stations and five other measures.

- 201 measures have been considered in the 2021 implementation report. The implementation status was updated at the reporting date of 1 January 2021. The transmission system operators have expanded the database for the 2021 implementation report by the NDP gas database cycle “2020 – IR on the NDP”).
- A total of 28 measures have reached the project status “Project conclusion/completion” or “Commissioning” compared to the draft Gas Network Development Plan 2020–2030.
- As a result of findings from the planning that have since been made, 15 measures have been changed.
- One measure has been discontinued compared to the draft Gas Network Development Plan 2020–2030.
- Delays have been shown in 13 measures. In the case of five measures, this has an impact on the planned date of capacity supply.
- The other 172 measures are unchanged and are being continued in accordance with the plans in the draft Gas Network Development Plan 2020–2030.

Development of the L-gas supply/ L-to-H-gas conversion 4



4 Development of the L-gas supply/L-to-H-gas conversion

4.1 Description of the situation

Part of the German gas market is supplied with low calorific value natural gas (L-gas). L-gas originates entirely from production in Germany and the Netherlands. High calorific value natural gas (H-gas) comes primarily from Norway and Russia or arrives in Germany via LNG facilities. The two different groups of natural gas must be transported in separate systems within defined limits for technical and calibration reasons. Action has to be taken for areas of the network that are to be supplied with gas of a different quality, which includes modifying the consumer appliances that use the gas.

L-gas production in Germany is in continual decline. Where possible, the remaining German L-gas reserves will continue to be extracted and injected into the natural gas transmission network.

The decline in L-gas production has significant impacts in terms of both the annual volumes available in Germany and the capacity that is available. The L-gas capacity available from the Netherlands has additionally experienced a steady decline since October 2020. For this reason, the German transmission system operators take part in regular exchanges with the Dutch transmission system operator Gasunie Transport Services B.V. (GTS) in order to harmonise and update the planning assumptions for future L-gas imports.

The following section provides an update to the L-to-H-gas conversion plans that have been outlined in the previous network development plans and implementation reports. In addition, experiences from previous conversions and a current view of the situation involving gas imports from the Netherlands are included in the Gas Network Development Plan 2020–2030.

All assessments and figures are based on the status of the conversion plans as at the reporting date of 1 November 2020; this is shown in the NDP gas database. Section 4.8.3 describes the changes to the L-to-H-gas conversion planning relative to the Gas Network Development Plan 2020–2030. Chapter 4.8.4 explains possible changes. The transmission system operators will elaborate on the effects of these changes to the figures and network expansion measures in the Gas Network Development Plan 2022–2032.

4.2 Converted areas and experiences from the previous conversion

Converted areas

22 areas featuring a total of around 980,000 appliances have been converted since the L-to-H-gas conversion was launched in 2015 (cf. Table 5).

In GUD's network, work was started as early as 2015, with Schneverdingen the first area to be converted. The conversion of the major areas of Walsrode and Fallingbostel followed in 2016, as did the first conversion of an industrial customer with a direct connection. Another five conversion areas from Nienburg to Hanover (including the conversion of power plant and industrial locations) and the Bremen/Achim region were successfully converted from L-gas to H-gas in 2017. The conversion of further areas in the Bremen region and the conversion in the region of Hanover/Peine followed in the period from 2018 to 2020. A total of around 125,000 appliances were successfully converted from L-gas to H-gas in GUD's network area in 2020.

In OGE's network, work was started in 2017, with Teutoburger Wald 1 the first area to be converted. Conversions in a total of 15 conversion areas were carried out in OGE's network area up to and including 2020. A total of around 162,000 appliances were successfully converted from L-gas to H-gas in 2020. The Middle Hesse area, with around 92,000 appliances and 13 industrial customers connected directly to the TSO network, was the focus of the conversion activities at OGE in 2020. The upstream supply of gas for the cities of Gießen and Wetzlar was also converted to H-gas here. Furthermore, the conversion areas of Bonn and Teutoburger Wald 5 were also converted at OGE, as were 7,000 appliances in the conversion area of the Aggertal pipeline.

The conversion areas of Emsland I (Nowega), Hüthum (Thyssengas) as well as Posthausen I and Posthausen II (GTG Nord) were successfully converted between 2017 and 2019. The conversion areas EWE Zone part I with 60,000 appliances (GTG), the Aggertal pipeline with 39,000 appliance (TG) and Teutoburger Wald 5 (Nowega) were additionally converted in 2020.

In total, the conversion volume that has been realised in Germany since 2015 corresponds to an annual consumption volume of around 58.5 TWh and a capacity of 15.0 GWh/h.

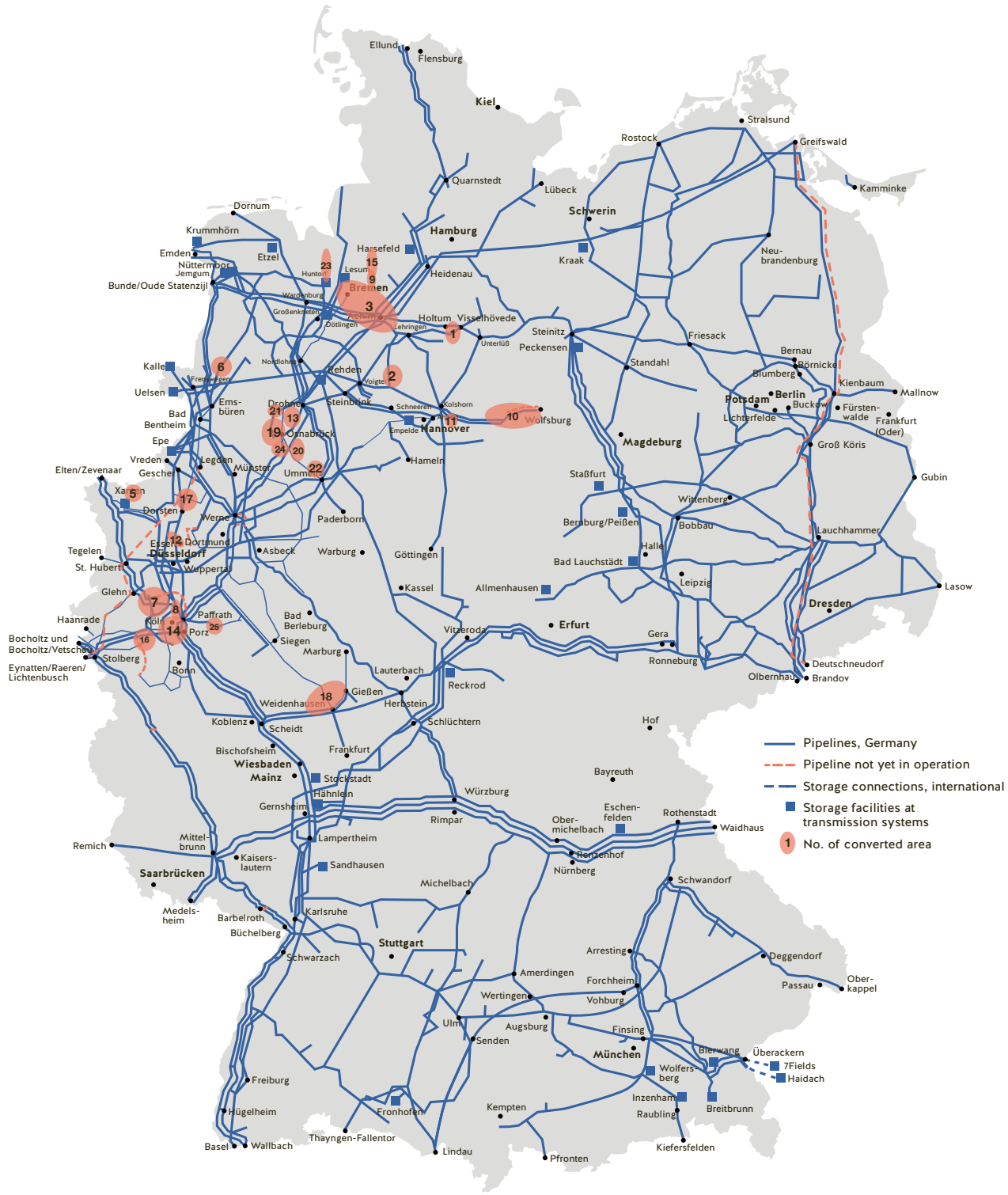
Table 5: Converted areas 2015–2020

No. in the Gas NDP 2020–2030	Conversion area	Transmission system operator	Time of conversion	Estimated number of appliances
1	Schneverdingen	GUD	2015	8,000
1	Walsrode/Fallingbostel	GUD	2016	12,000
3	Achim	GUD	2017	23,000
2	Nienburg/Neustadt/Hannover Nord	GUD	2017	44,000
3	Bremen/Delmenhorst	GUD	2017	15,000
4	Teutoburger Wald 1	OGE	2017	2,000
5	Hüthum	Thyssengas	2017	10,000
6	Emsland 1*	Nowega	2017	–
7	Dormagen*	OGE	2017	–
8	Leverkusen*	OGE	2017	–
9	Posthausen I	GTG	2018	4,000
3	Bremen/Delmenhorst	GUD	2018	77,000
10	Hannover Ost/Wolfsburg	GUD	2018	61,000
11	Peine	GUD	2018	15,000
12	Essen*	OGE	2018	–
13	Teutoburger Wald 2	OGE	2018	5,000
14	Köln*	OGE	2018	–
15	Posthausen II	GTG	2019	48,000
3	Bremen/Delmenhorst	GUD	2019	42,000
10	Hannover Ost/Wolfsburg	GUD	2019	60,000
16	Bonn	OGE	2019	11,000
17	Marl*	OGE	2019	–
18	Mittelhessen	OGE	2019	63,000
19	Osnabrück	OGE	2019	64,000
20	Teutoburger Wald 3	OGE	2019	15,000
21	Teutoburger Wald 4	OGE	2019	3,000
22	Teutoburger Wald 6	OGE	2019	13,000
23	EWE Zone part 1	GTG	2020	60,000
3	Bremen/Delmenhorst	GUD	2020	52,000
10	Hannover Ost/Wolfsburg	GUD	2020	74,000
24	Teutoburger Wald 5	Nowega	2020	0
24	Teutoburger Wald 5	OGE	2020	39,000
25	Aggertalleitung	OGE	2020	7,000
25	Aggertalleitung	OGE	2020	39,000
16	Bonn	OGE	2020	25,000
18	Mittelhessen	OGE	2020	92,000

* no distribution networks

Source: Transmission system operators

Figure 3: Converted areas 2015–2020



Note: The base map was updated for the 2021 implementation report (1 January 2021 reporting date). Measures currently under construction are presented in light red. With regard to the information on the initial network, no changes compared to the Gas Network Development Plan 2020–2030 have been made in the NDP gas database ("2020 – IR on the NDP" cycle). The initial network will be updated in the Gas Network Development Plan 2022–2032.

Source: Transmission system operators

Experiences from the previous conversion

The technical network expansion measures necessary for the L-to-H-gas conversion were completed on schedule by the transmission system operators. The areas were converted on the switching dates defined in the conversion timetables in agreement between the participants. Distribution system operators, power plants and industrial customers were affected. The conversion of a storage facility will take place for the first time in 2021. Around 980,000 appliances have been modified in the course of the conversion to date.

The conversion has to be notified to the customer by the transmission system operator at least 38 months before the conversion is carried out. Where possible, a longer period should be chosen in order to ensure the optimal co-ordination between all the parties involved and to implement any technical expansions that may be necessary.

In the conversion of very large networks, network sections can be identified as pilot conversion areas. These pilot conversion areas that are converted in a preliminary stage can establish greater confidence to the participants about the process of the market area conversion.

Regular co-ordination between the transmission system operators and the distribution system operators is necessary in order to adhere to the switching dates and to provide capacity. After the conversion concept has been finalised, the detailed plan is generally drawn up by the distribution system operators and their conversion service providers. Changes resulting from these plans have to be co-ordinated with the transmission system operators. Any capacity demand that may have changed should be taken into consideration by the relevant distribution system operators when the internal orders are issued.

Fluctuating gas qualities have led to challenges in the conversion at some distribution system operators, as gas-fired appliances have to be set to a reference Wobbe Index after the gas quality has been converted. The provision of data, possibly automated, on the quality parameters calorific value and Wobbe Index allows the process to be optimised on both sides.

It has furthermore been shown that the processing of “residuals” can be especially critical for the smooth execution of the conversion. “Residuals” is the term used to describe consumers who the distribution system operators were unable to contact in good time. This can result in situations where it was not possible to convert the relevant appliances until shortly before the switchover or where it was not yet possible even to survey some of them. The punctual initiation of suitable measures, even including suspension processes, is necessary to be able to keep to the agreed switching date.

In the previous switches, there was a preference for the H-gas to arrive in the morning hours. The reason for this is the modification work that arises directly especially in industrial enterprises as well as the utilisation of the morning peak to transmit the H-gas as quickly as possible in the distribution systems. The arrival of the H-gas is dependent especially in longer pipeline sections on various parameters (e.g. pipeline pressure, acceptance by the connected network points with or without temperature dependence). It was possible in the past to make a good estimate of the time period for the arrival of the H-gas on the basis of the purchases forecast by the consumers. Longer intervals can also arise in individual cases, or configurations can emerge where the forecast time periods do not meet the preferences of all the consumers connected to the pipeline system.

4.3 Current area situation in the 2021 conversion year (COVID-19)

The COVID-19 pandemic and the lockdown resulted in 2020 in minor changes to the original conversion plans presented in the Gas Network Development Plan 2020–2030. Conversion stages had to be postponed in various conversion areas by one to three months across the whole of Germany in coordination with the respective distribution system operators (DSOs). It has proved possible to catch up on most of these delays, with the result that the conversions planned throughout Germany for 2020 could be implemented almost entirely. Only one conversion operation, with 6,000 appliances, was postponed from 2020 to 2021. The last conversion operations in 2020 were carried out in November, where the renewed increase in the number of COVID-19 infections did not have any material impacts on the implementation of these conversions.

Transmission and distribution system operators have jointly established a forward-looking system in which they “play it by ear” when it comes to handling the COVID-19 situation in the market area conversion. There have also been good experiences of market area conversion communication specific to COVID-19.

It remains to be seen in 2021 whether COVID-19 will again lead to delays in the market area conversion. Only minor COVID-19-related problems were reported up to and including February 2021 in the early appliance modifications that have been carried out. It is not possible, however, to give a final statement at the time of the editorial deadline of this implementation report (middle of March 2021). It should be noted, however, that the increase in appliance numbers in 2021 (+45% over the previous year) represents a major challenge for the service industry even without COVID-19.

4.4 Situation involving gas imports from the Netherlands

The last few years have seen an increase in the number of earthquakes in the area around the Groningen field, which are regarded as being linked to the extraction of natural gas. Earthquakes measuring 3.4 on the Richter scale shook the Groningen region on both 8 January 2018 and 22 May 2019. The earthquake in 2019 in particular triggered significant political pressure in the Netherlands to end production in the Groningen field as quickly as possible.

In order to take the risks arising from natural gas production into consideration, the Dutch Ministry of Economic Affairs and Climate Policy announced that the regular production of natural gas in the Groningen area would be suspended from 2022 onwards. The Groningen field remains active with minimal production so as to be able to safeguard the security of supply also in particular situations at the same time. It is currently being examined whether the Dutch "Grijpskerk" natural gas storage facility can be used as capacity reservation from 2022 onwards as an alternative, for example for shortfalls in the gas infrastructure during a cold period [Ministerie van Economische Zaken en Klimaat 2020a].

A production volume in Groningen of initially 11.8 billion m^3 was planned for the 2019/2020 gas year [Ministerie van Economische Zaken en Klimaat 2019], which was then reduced in March 2020 to 10.7 billion m^3 [Ministerie van Economische Zaken en Klimaat 2020b]. In fact, a gas volume of 8.7 billion m^3 [GTS 2020] was produced, benefiting essentially from the mild temperatures in the 2019/2020 gas year.

The Dutch Ministry of Economic Affairs and Climate Policy has set a production volume of 8.1 billion m^3 for the 2020/2021 gas year, while the prospect of a figure of around 4 billion m^3 is held out for the subsequent 2021/2022 gas year. These volumes each apply for average annual temperatures, where the permitted production volume will be adjusted up or down on the basis of a defined formula according to how temperatures actually develop.

According to information from the Dutch Ministry of Economic Affairs and Climate Policy, the following four conditions have to be fulfilled in order to be able to guarantee that regular Groningen production will be discontinued from 2022 onwards [Ministerie van Economische Zaken en Klimaat 2020a]:

1. Commissioning of an additional conversion facility in Zuidbroek
2. Scheduled reduction in L-gas demand in the L-gas consumer countries of Belgium, Germany and France
3. Sufficient H-gas import options
4. Further availability of the Norg gas storage facility beyond 2022

The transmission system operators maintain close contacts with GTS in this context and also in order to co-ordinate the respective plans in the Netherlands and Germany. Since 2019 in particular, there has also been exchanges at the international level through the "Task Force Monitoring L-Gas Market Conversion", which was established on the initiative of the Dutch Ministry of Economic Affairs. This task force, under the leadership of the respective economic ministries of the Netherlands, Belgium, France and Germany, produces a report semi-annually to report to the Dutch parliament on matters including measures to reduce L-gas sales/production. The task force's third report was published in February 2021. The task force offers an ideal platform for guaranteeing harmonised planning assumptions with high transparency. It is thus ensured that the Germany-wide demand for L-gas capacity and volume shown in the following chapters is included as an integral element of Dutch production planning.

4.5 L-gas capacity balance 2030

The L-gas capacity balance sets the L-gas capacity demand that is expected according to the current conversion planning against the entry capacity available from production, imports, storage and conversion.

The individual items of the L-gas balance 2030 are explained in more detail below.

4.5.1 Domestic production

The development of the production capacity presented in Table 6 is based on information from the Bundesverband Erdgas, Erdöl und Geoenergie e.V. (BVEG – German Federal Association of Natural Gas, Petroleum and Geoenergy) of 1 October 2020. The production capacity is adjusted with a constantly increasing safety margin of 8% in 2020 to 20% in 2031 by the BVEG for the consideration in the L-gas balance (cf. Figure 5 among others).

In comparison with the forecast from 2019, which formed the basis for the Gas Network Development Plan 2020–2030, the capacity forecast for the sum of the Elbe-Weser and Weser-Ems areas has undergone a minor reduction up to 2022 (–1% to –3% depending on the year), while a production capacity that is 1% to 4% higher than the forecast from 2019 is expected for the period from 2023 onwards.

Table 6: Capacity forecast in accordance with BVEG

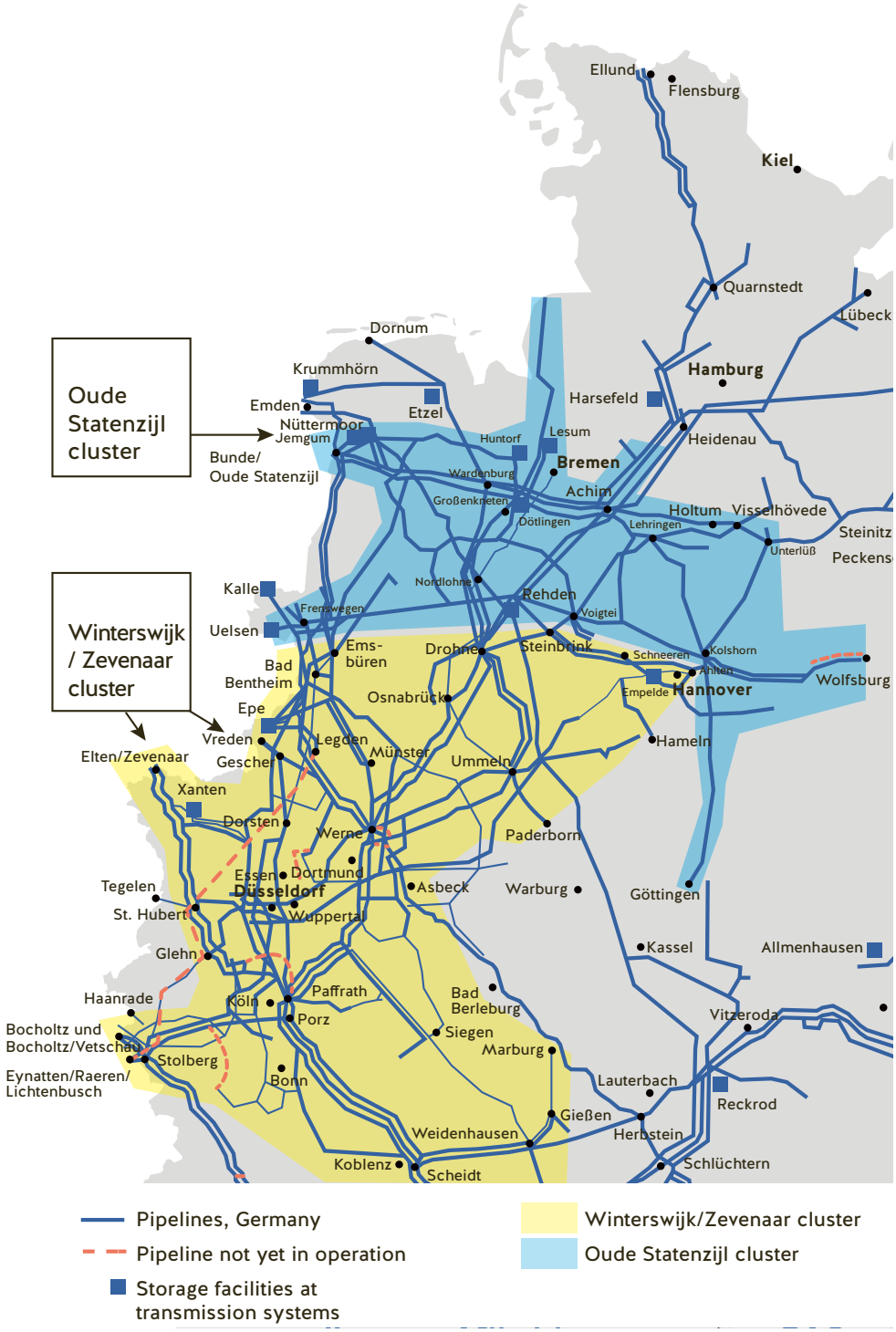
Year	Germany	Elbe-Weser region	Elbe-Weser region with safety margin in accordance with BVEG	Weser-Ems region	Weser-Ems region with safety margin in accordance with BVEG
	Million m³/h				
2020	0.68	0.31	0.28	0.36	0.33
2021	0.67	0.27	0.25	0.39	0.36
2022	0.63	0.25	0.23	0.38	0.35
2023	0.62	0.25	0.23	0.35	0.33
2024	0.57	0.24	0.22	0.32	0.29
2025	0.53	0.21	0.19	0.29	0.26
2026	0.48	0.20	0.18	0.26	0.23
2027	0.44	0.18	0.16	0.23	0.20
2028	0.39	0.17	0.15	0.20	0.17
2029	0.35	0.15	0.13	0.18	0.15
2030	0.31	0.14	0.12	0.16	0.13
2031	0.26	0.12	0.10	0.13	0.10

Source: Transmission system operators on the basis of BVEG 2020

4.5.2 Imports from the Netherlands

The largest contribution on the entry side is provided by the imports from the Netherlands, which account for more than 60% of the L-gas supply capacity in the 2020/2021 gas year. A distinction has to be drawn here between the Oude Statenzijl and Winterswijk/Zevenaar import clusters (cf. Figure 4).

Figure 4: Import points from the Netherlands



Source: Transmission system operators

Part of this import capacity from the Netherlands is provided on the German side through interruptible capacity, as the required capacity for winter peak demand cannot be safely transported in weak load summer situations.

The decline in production in the Netherlands leads to a gradual reduction in the L-gas export capacity for Germany. For this reason, the capacity is recognised in the L-gas capacity balance as decreasing on a linear basis (by 10% of the initial value per year).

The import capacity totalling 43.0 GWh/h shown in Table 7 is based on the concurrently occurring maximum flow in the years from 2010–2013 at the three import points of Oude Statenzijl, Winterswijk/Vreden and Elten/Zevenaar totalling 47.7 GWh/h. This import capacity was initially taken into consideration at 10.3 Gwh/h via Oude Statenzijl and at 37.4 GWh/h via Winterswijk/Vreden und Elten/Zevenaar and has been reduced by 10% in the 2020/2021 gas year.

Table 7: Distribution of the L-gas import capacity to the cross-border interconnection points

Gas year	Oude Statenzijl (GASPOOL)	Zevenaar, Winterswijk (NCG)	Total
	GWh/h		
2020/2021	7.3	35.7	43.0
2021/2022	7.0	31.2	38.2
2022/2023	7.0	26.4	33.4
2023/2024	7.0	21.6	28.6
2024/2025	7.0	16.9	23.9
2025/2026	7.0	12.1	19.1
2026/2027	3.0	11.3	14.3
2027/2028	2.2	7.3	9.5
2028/2029	2.2	2.6	4.8
2029/2030	0.0	0.1	0.1
2030/2031	0.0	0.1	0.1

Source: Transmission system operators

The blending of H-gas has not been taken into consideration in the L-gas capacity balance or in the L-gas quantity balance. It is possible to blend Groningen gas with H-gas in order to maintain an L-gas in accordance with the DVGW G260 specification with a high calorific value and Wobbe Index number. Operationally, the blending is used where and when possible.

Possibilities for blending H-gas into the L-gas system are available in the Netherlands and on the GUD network. An additional blending facility has been completed in the GTG Nord network, but is not in operation, as the necessary H-gas connection has not yet been produced.

4.5.3 L-gas storage facilities

The exit capacity taken into consideration in the L-gas balance of the storage facilities listed in Table 8 is 19.6 GWh/h in the 2020/2021 gas year. The capacity in the L-gas balance that can be realised technically with today's L-gas network is taken into account here. This is composed as follows:

Table 8: Storage capacity of the L-gas storage facilities on the TSO network that is taken into consideration in the L-gas balance

Gas year 2020/2021	Empelde	Epe	Lesum	Nüttermoor/ Huntorf	Total
Capacity taken into consideration in the L-gas balance	GWh/h				
	1.6	9.0	2.1	6.9	19.6

Source: Transmission system operators

Every additional capacity requirement would lead to a network expansion in the L-gas network and possibly to a reallocation of capacity at cross-border interconnection or German production points. The expansion in the L-gas network necessary for this is not regarded as sustainable by the transmission system operators against the background of the L-to-H-gas conversion.

Table 9 shows the development over time of the withdrawal capacity recognised by the transmission system operators for the Empelde, Epe, Lesum and Nüttermoor/Huntorf storage facilities.

Table 9: Development of the recognised withdrawal capacity of the L-gas storage facilities

Gas year	Empelde	Epe	Lesum	Nüttermoor/ Huntorf	Total
	GWh/h				
2020/2021	1.6	9.0	2.1	6.9	19.6
2021/2022	1.6	9.0	0.0	6.4	17.0
2022/2023	1.6	9.0	0.0	5.0	15.6
2023/2024	1.6	7.0	0.0	3.7	12.3
2024/2025	1.6	5.5	0.0	1.9	9.0
2025/2026	1.6	5.0	0.0	0.2	6.8
2026/2027	1.6	3.5	0.0	0.0	5.1
2027/2028	1.6	2.5	0.0	0.0	4.1
2028/2029	1.6	2.0	0.0	0.0	3.6
2029/2030	1.6	0.0	0.0	0.0	1.6
2030/2031	0.0	0.0	0.0	0.0	0.0

Source: Transmission system operators

With the exception of the Empelde storage facility, the recognised withdrawal capacity is unchanged in comparison with the Gas Network Development Plan 2020–2030: The changes at the Empelde storage facility for the 2030/2031 gas year are required because of the adjustment of the concept for the Salzgitter conversion area.

The transmission system operators maintain a continual dialogue with the storage system operators and the Federal Network Agency concerning the conversion of the L-gas storage facilities. Further discussions have taken place on this subject since the draft Gas Network Development Plan 2020–2030 was published. The transmission system operators will also continue these co-ordination meetings in the future with the aim of coordinating jointly developed conversion concepts for the L-gas storage facilities.

4.5.4 Conversion

Another option for compensating for the decline in the L-gas supply and imports is the use of technical conversion facilities. Conditioning to L-gas can be carried out here by blending nitrogen or air into an H-gas stream in accordance the DVGW Worksheet G 260.

The transmission system operators have compared an L-to-H-gas conversion and a conversion for special network situations and have planned a technical conversion to present exit capacity in the following two cases:

Nowega conversion facility in Rehden The conversion facility in Nowega's network area is currently being expanded and will have a total capacity of a maximum of 2.4 GWh/h in the second quarter of 2021.

Thyssengas conversion facility in Broichweiden
The existing conversion facility now has firm capacity. This means it is possible to safely feed in 250 MWh/h to a regional L-gas system during demand peaks until this system is also converted to H-gas in 2027.

4.5.5 Demand for exit capacity

The distribution system operator's capacity demand corresponds to the verified long-term forecasts underlying the Gas Network Development Plan 2020–2030. The capacity demands of industrial customers and power plants have also been taken into consideration without any changes.

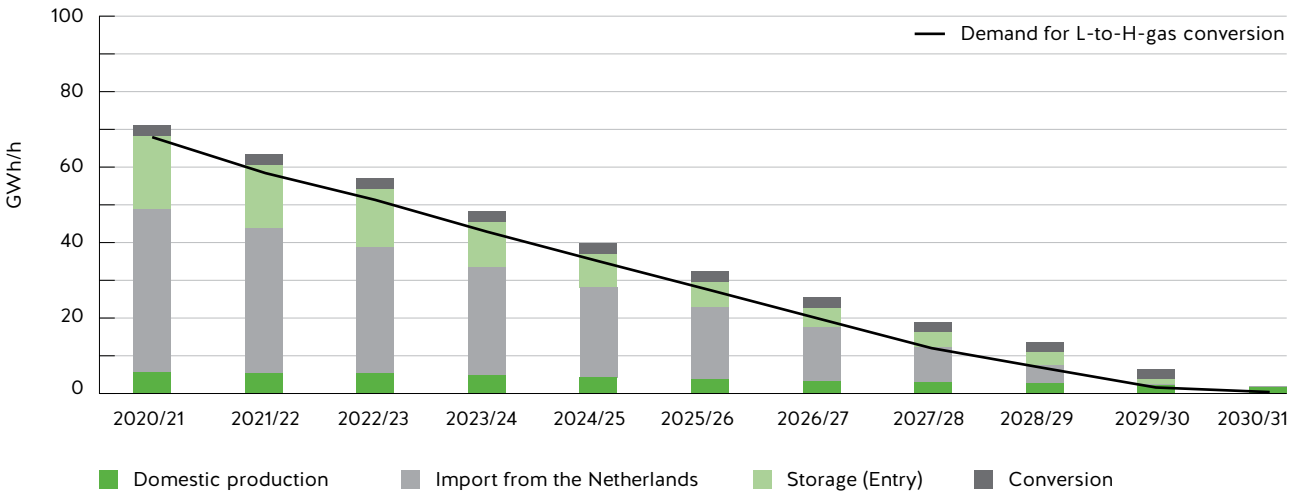
In comparison with the Gas Network Development Plan 2020–2030, minor changes to the remaining L-gas demand up to the 2027/2028 gas year are produced by the advanced conversion plans and postponements in certain conversion areas.

From the 2028/2029 gas year onwards, the effect of bringing forward the Salzgitter conversion area with around 310,000 appliances to the 2028–2030 years will reduce the demand for capacity. As a result, there will be virtually no more L-gas market after 2030.

4.5.6 L-gas capacity balance, Germany

Figure 5 and Table 10 show the Germany-wide L-gas capacity balance.

Figure 5: Germany-wide L-gas capacity balance



Source: Transmission system operators

Table 10: Germany-wide L-gas capacity balance

Gas year	Domestic production	Imports from Netherlands	Storage facility Entry	Conversion	Total presentation	L-gas demand	L-gas demand excluding L-to-H-gas conversion
	GWh/h						
2020/2021	5.8	43.0	19.6	2.7	71.0	67.9	70.7
2021/2022	5.5	38.2	17.0	2.7	63.3	58.4	71.9
2022/2023	5.3	33.4	15.6	2.7	57.0	51.3	72.8
2023/2024	4.8	28.6	12.3	2.7	48.4	42.9	73.2
2024/2025	4.3	23.9	9.0	2.7	39.8	35.1	73.2
2025/2026	3.9	19.1	6.8	2.7	32.4	27.4	73.4
2026/2027	3.4	14.3	5.1	2.7	25.5	19.7	73.3
2027/2028	3.0	9.5	4.1	2.4	19.1	12.1	73.5
2028/2029	2.7	4.8	3.6	2.4	13.4	6.8	73.8
2029/2030	2.4	0.1	1.6	2.4	6.4	1.7	73.9
2030/2031	1.9	0.1	0.0	0.0	2.0	0.1	73.9

Source: Transmission system operators

Overall, the updates to the planning premises in this 2021 implementation report set against the results of the Gas Network Development Plan 2020–2030 produce only minor changes to the L-gas capacity balance.

4.6 L-gas quantity balance

An updated L-gas quantity balance is drawn up in this 2021 implementation report in order to take into consideration the developments since the Gas Network Development Plan 2020–2030 was published, especially the results of the analysis of the 2019/2020 gas year, in the same way as in the preparation of the L-gas capacity balance.

The transmission system operators would like to ensure by doing so that, in addition to the capacity peaks (capacity balance) that can be expected, the availability of sufficient L-gas volumes (quantity balance) is also presented transparently during the entire period of the market area conversion.

4.6.1 Basic procedure

As before in the Gas Network Development Plan 2020–2030, the trends in demand in accordance with the EUCO30 scenario in the scenario framework are used as the basis. With the help of a temperature adjustment (cf. Chapter 4.6.3), a distinction is drawn here between a cold year and an average year in order to take into consideration the greatest possible range of trends in the demand for volume. Furthermore, the approach of the Dutch Ministry of Economic Affairs, where the permissible annual production volume in Groningen depends on the temperatures in the year in question, is also taken into account here.

4.6.2 Analysis of the 2019/2020 gas year and impacts on the L-gas quantity balance

Analysis of the 2019/2020 gas year

The 2019/2020 gas year was considerably warmer than an average year. L-gas consumption in Germany was therefore considerably lower than had been assumed.

The L-gas demand from final consumers totalled 194.8 TWh and was thus 16.1 TWh lower than the planning assumptions of 210.9 TWh used in the Gas Network Development Plan 2020–2030. Converted to the temperatures in the 2019/2020 gas year, the planned volume in the Gas Network Development Plan 2020–2030 amounts to 198.4 TWh for the 2019/2020 gas year.

At 3.6 TWh, the difference between the planned volume and the actual demand thus amounts to only around 2% and can be attributed to fluctuations in consumption at final customers and power plants.

At 41.1 TWh, the share of L-gas in the German production was around 0.5 TWh lower in the 2019/2020 gas year than the transmission system operators' planning assumptions of 41.6 TWh (taking into consideration the TSO safety margin).

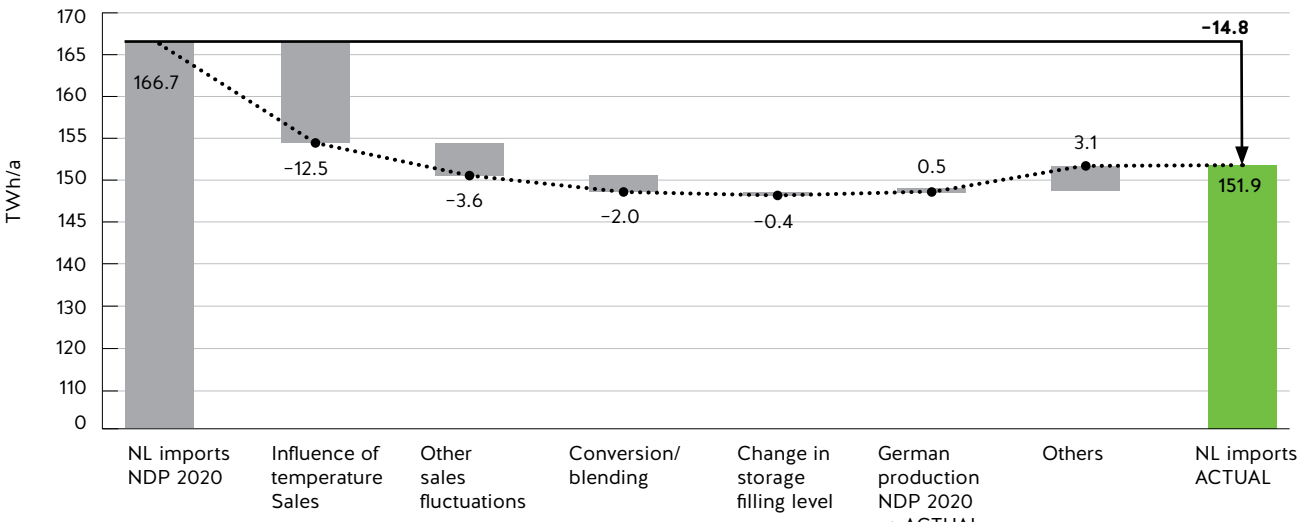
At the 1 October 2020 reporting date, the filling level of the natural gas storage facilities recorded a value that was 0.4 TWh lower compared to the planning assumption, while the technical conversion of H-gas to L-gas showed a value that was 2.0 TWh higher than the assumption.

In summary, the effects described above meant that the imports from the Netherlands in the 2019/2020 gas year totalling 151.9 TWh were 14.8 TWh lower than the planning assumptions of 166.7 TWh. Of this difference, 12.5 TWh can be attributed to the influence of the temperature.

Converted to a year with average temperatures, the analysis of the 2019/2020 gas year shows good consistency between the planned demand and the assumed import volumes.

Figure 6 shows the factors influencing the import volumes from the Netherlands in the 2019/2020 gas year in graphical form.

Figure 6: Import volumes from the Netherlands: actual flows from the 2019/2020 gas year and planning assumptions



Source: Transmission system operators

Impacts on the L-gas quantity balance

The deviations between the planned volumes and the actual volumes that were observed in the 2019/2020 gas year can essentially be attributed to the influence of the temperature and, adjusted by this temperature influence, confirm the plans of the German transmission system operators.

In terms of the import trends, the German transmission system operators and the Dutch network operator GTS continue to regard the planning assumptions in the Gas Network Development Plan 2020–2030 to be reliable planning parameters.

4.6.3 L-gas quantity balances for Germany

The individual items of the L-gas quantity balances up to 2030 take the analysis results of the 2019/2020 gas year into consideration and are explained in more detail below.

L-gas demand

Parts of the L-gas volumes are replaced each year by H-gas as a result of the market area conversion that has been launched, and the demand for L-gas is thus continually falling overall. The decline in volumes in the final energy demand that has to be taken into consideration in parallel is assumed in two different variants:

- **Cold year:** In this variant, the L-gas volume demand for the period from April 2012 to March 2013 is recognised as the initial value for the 2020/2021 gas year. A temperature adjustment to a cold year is subsequently made. Finally, a decline in volume in accordance with scenario II of the scenario framework for the Gas Network Development Plan 2020–2030 is assumed.
- **Average year:** In this variant, the L-gas volume demand for the period from April 2012 to March 2013 is recognised as the initial value for the 2020/2021 gas year. A temperature adjustment to the average temperature for the years from 1991 to 2013 is subsequently made. Finally, a decline in volume in accordance with scenario II of the scenario framework for the Gas Network Development Plan 2020–2030 is assumed.

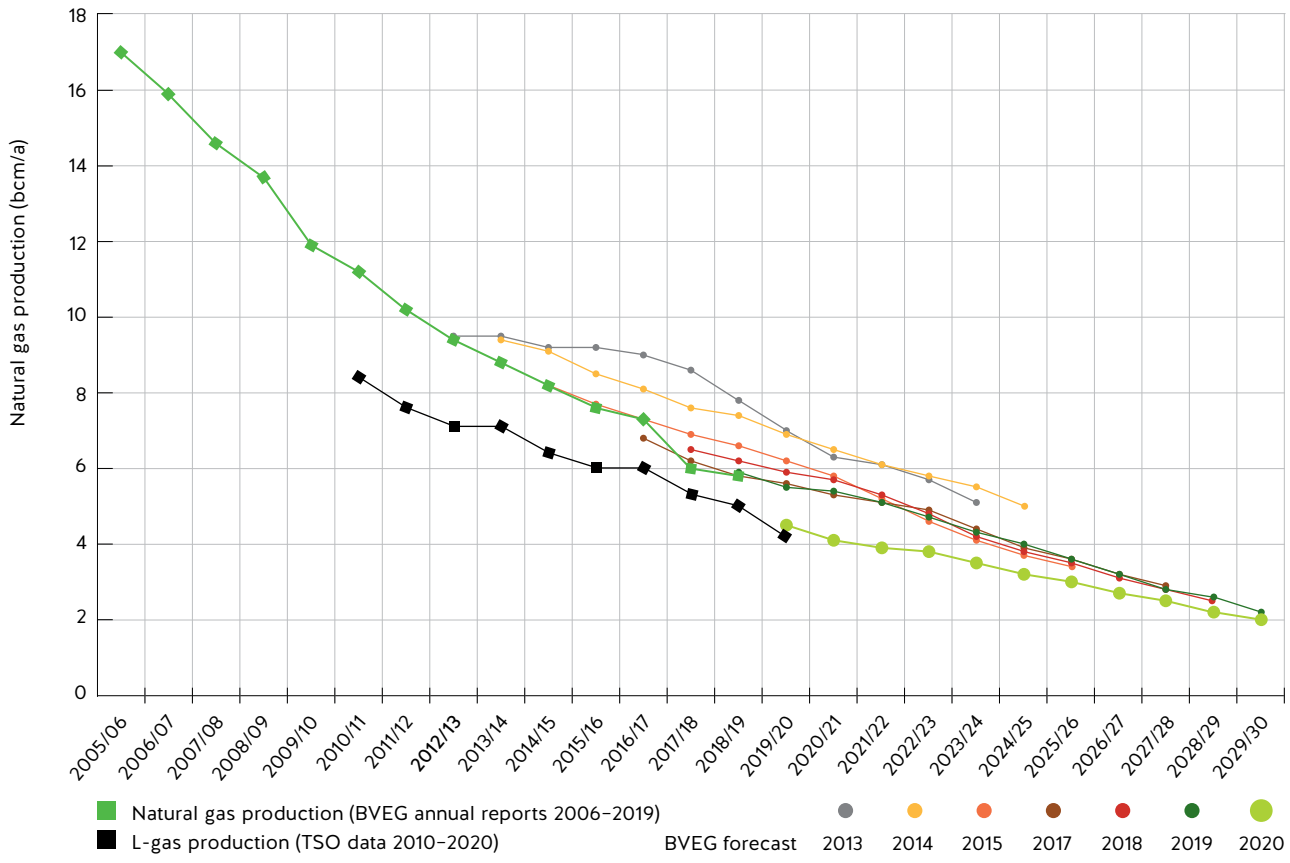
The temperature adjustment is carried out with the help of the degree day figures of the relevant years as well as the degree day figure of the long-term average. Information on the degree day figures in accordance with VDI Guideline 3807 is used for this. The daily degree day figures indicate here the difference between the daily mean temperatures and a defined average room temperature of 20.0 °C. The degree daily figure of the coldest year since 1991 is used to estimate the L-gas consumption in a cold year.

Based on the analysis of the 2019/2020 gas year (cf. Chapter 4.5.2) the transmission system operators do not see any need to adjust the assumed trends in demand.

Domestic production

Figure 7 shows the historical and forecast development of German natural gas production in the period from 2005/2006 to 2029/2030.

Figure 7: Natural gas production in the Elbe-Weser and Weser-Ems supply regions



Source: Transmission system operators on the basis of BVEG 2006–2019, BVEG 2020

The production data for the years from 2006 (corresponds to the 2005/2006 gas year) to 2019 (2018/2019 gas year) is based on the figures published by the BVEG for the two most important German production regions Elbe-Weser and Weser-Ems [BVEG 2019]. For the period from 2020 onwards, the values are based on the BVEG's projections of regional natural gas production from 1 October 2020.

BVEG's current production projection of 1 October 2020 shows the separate development of L-gas production for the first time. In the previous year, the sum of H-gas and L-gas was shown by BVEG and the share of L-gas was forecasted by the transmission system operators using a safety margin.

Therefore, and on the basis of the production figures of the previous years, the transmission system operators believe it to be appropriate to adjusted the safety margin for the German production, so that, taking a safety buffer of 10% into account up to 2023, 90% of the BVEG forecast (instead of the previous 72%) is taken into consideration as the L-gas share of the German production in the quantity balance. Subsequently, the safety buffer is gradually increased to 20% and then to 30% at the end of the forecast period.

Imports from the Netherlands

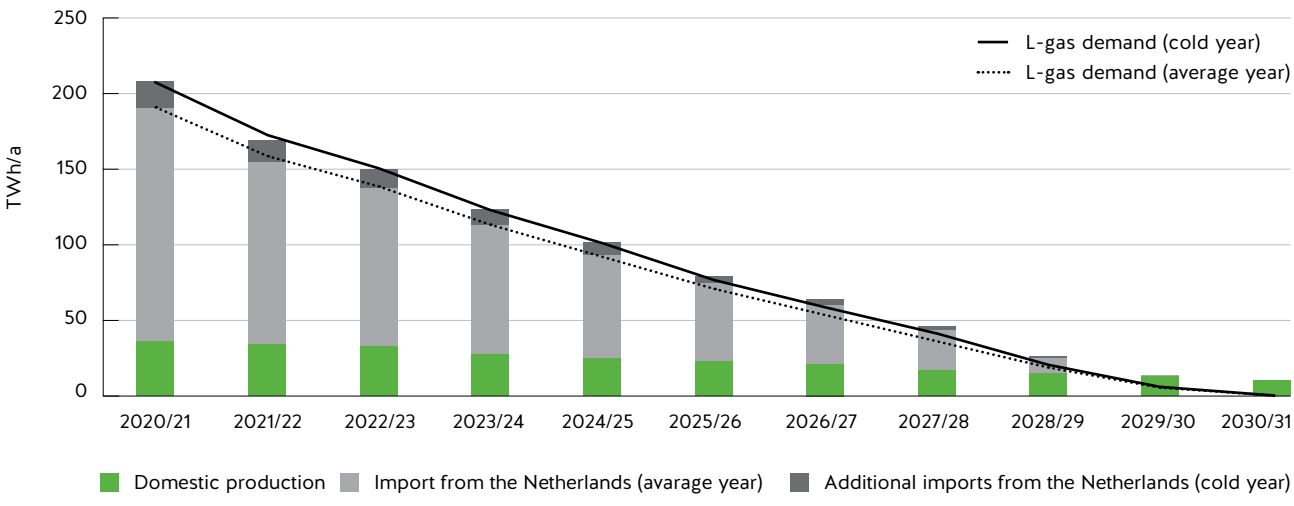
It was established in the course of the analysis of the 2019/2020 gas year that the realised imports were close to the assumptions in the Gas Network Development Plan 2020–2030, adjusted by the temperature effect. The transmission system operators have therefore decided in consultation with GTS not to change the import assumptions of the Gas Network Development Plan 2020–2030 for the German quantity balance.

Germany-wide L-gas quantity balance

The results of the Germany-wide L-gas quantity balance are presented in Figure 8 and Table 11. The updated demand assumptions of the current forecast for domestic production and the updated assumptions for imports from the Netherlands have been compared here. The objective is to present more transparently the changes in the quantity balance that result from the updated production and demand trends.

From the 2028/2029 gas year onwards, the effect of bringing forward the Salzgitter conversion area with around 310,000 appliances to the 2028–2030 years will reduce the demand for volume. As a result, there will be virtually no more L-gas market after 2030.

Figure 8: Germany-wide L-gas quantity balance



Source: Transmission system operators

Table 11: Germany-wide L-gas quantity balance, cold year and average year

Gas year	L-gas demand Cold year	L-gas demand Average year	Domestic production	NL imports Cold year (total)	NL imports Cold year (of which Oude Statenzijl)	NL imports Average year (total)	NL imports Average year (of which Oude Statenzijl)
	TWh/a						
2020/2021	207.4	190.9	36.3	171.7	45.2	154.4	40.0
2021/2022	172.3	158.6	33.9	135.1	38.6	121.1	34.3
2022/2023	150.6	138.6	33.0	116.9	37.5	104.7	33.7
2023/2024	123.0	113.3	27.4	96.1	35.3	85.8	31.9
2024/2025	101.2	93.2	25.0	76.9	30.8	68.5	27.8
2025/2026	76.6	70.5	23.1	55.9	15.8	51.4	15.3
2026/2027	58.7	54.0	21.2	42.8	8.6	39.4	8.2
2027/2028	41.4	38.1	16.8	29.7	7.7	27.3	7.4
2028/2029	20.7	19.1	15.2	11.1	7.7	10.2	7.4
2029/2030	6.1	5.6	13.7	0.3	0.0	0.3	0.0
2030/2031	0.4	0.3	10.0	0.3	0.0	0.3	0.0

Source: Transmission system operators

4.7 Number of annual appliance modifications

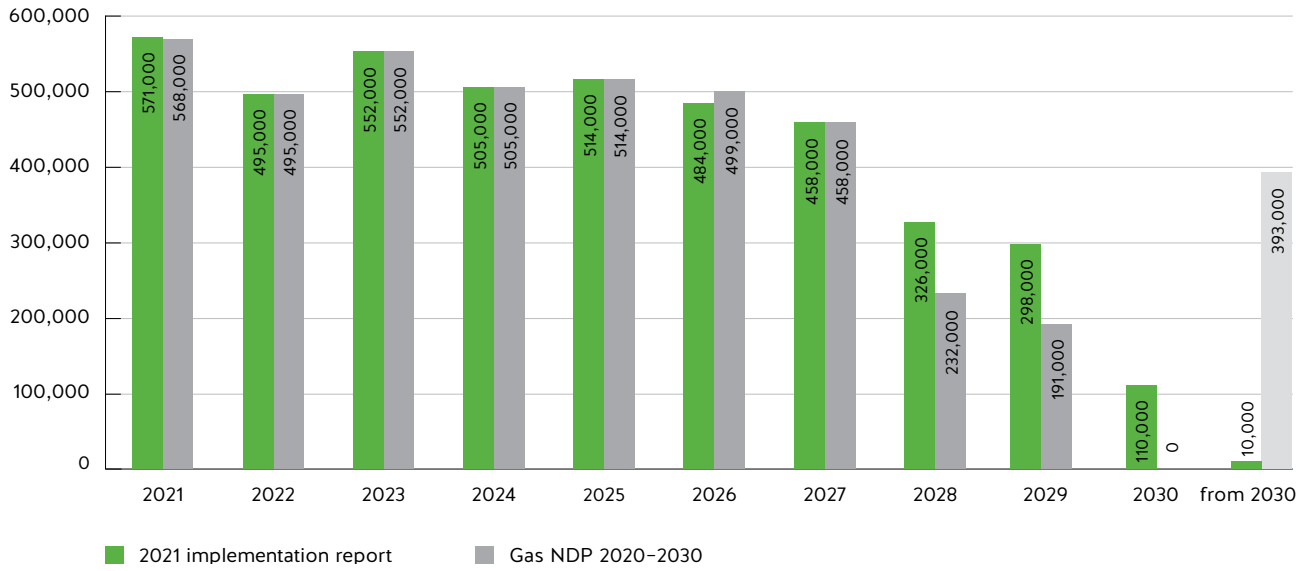
2021 is already the seventh year in which appliances have been modified in the course of the market area conversion. The number of appliances to be converted each year has increased continually since the L-to-H-gas conversion started in order to enable resources to be expanded and personnel to be trained to carry out the appliance modifications. The maximum number of appliances to be converted on schedule will be achieved in 2021. In the course of the detailed planning by the distribution system operators, there were no significant changes in the conversion plan in comparison with the Gas Network Development Plan 2020–2030 up to 2027.

For 2028–2030, the number of appliances to be converted increases because of the conversions from the years after 2030 that will be brought forward. As a result, a decline in the number of appliances that is in line with the market will be achieved after 2027 and idle phases for conversion service providers will be avoided.

The concepts for implementing the market area conversion in the affected areas are almost fully co-ordinated with the distribution system operators and network customers up to 2025.

The plans for the conversion period from 2026 onwards will be further advanced and finalised on an ongoing basis. Figure 9 presents a comparison of the number of appliances to be modified with the Gas Network Development Plan 2020–2030.

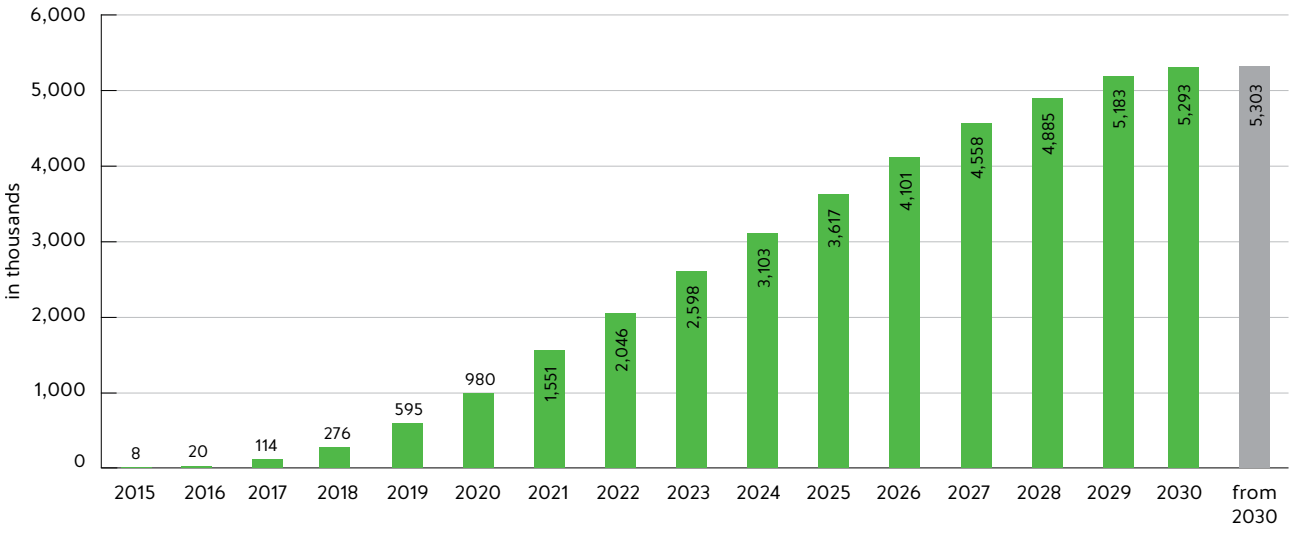
Figure 9: Number of consumer appliances to be modified per year in the specified conversion areas



Source: Transmission system operatorsr

Figure 10 additionally presents the cumulative number of appliances to be modified for the period of the market area conversion.

Figure 10: Cumulative number of consumer appliances to be modified from 2015 to 2030



Source: Transmission system operators

4.8 Conversion areas

4.8.1 Definition of the conversion areas

The conversion of network areas to a supply with H-gas is highly complex in organisational terms and associated with significant costs both in relation to the necessary modification of the consumer appliances to the altered gas quality and in relation to ensuring the transmission of the H-gas. The areas have been selected very carefully and also with a great deal of attention paid to the security of supply across all network levels. It has been and continues to be possible to achieve this only thanks to the close co-operation with the distribution system operators. The concepts of the conversion areas that have been described have been finalised together with the distribution system operators affected and agreed as binding in conversion schedules.

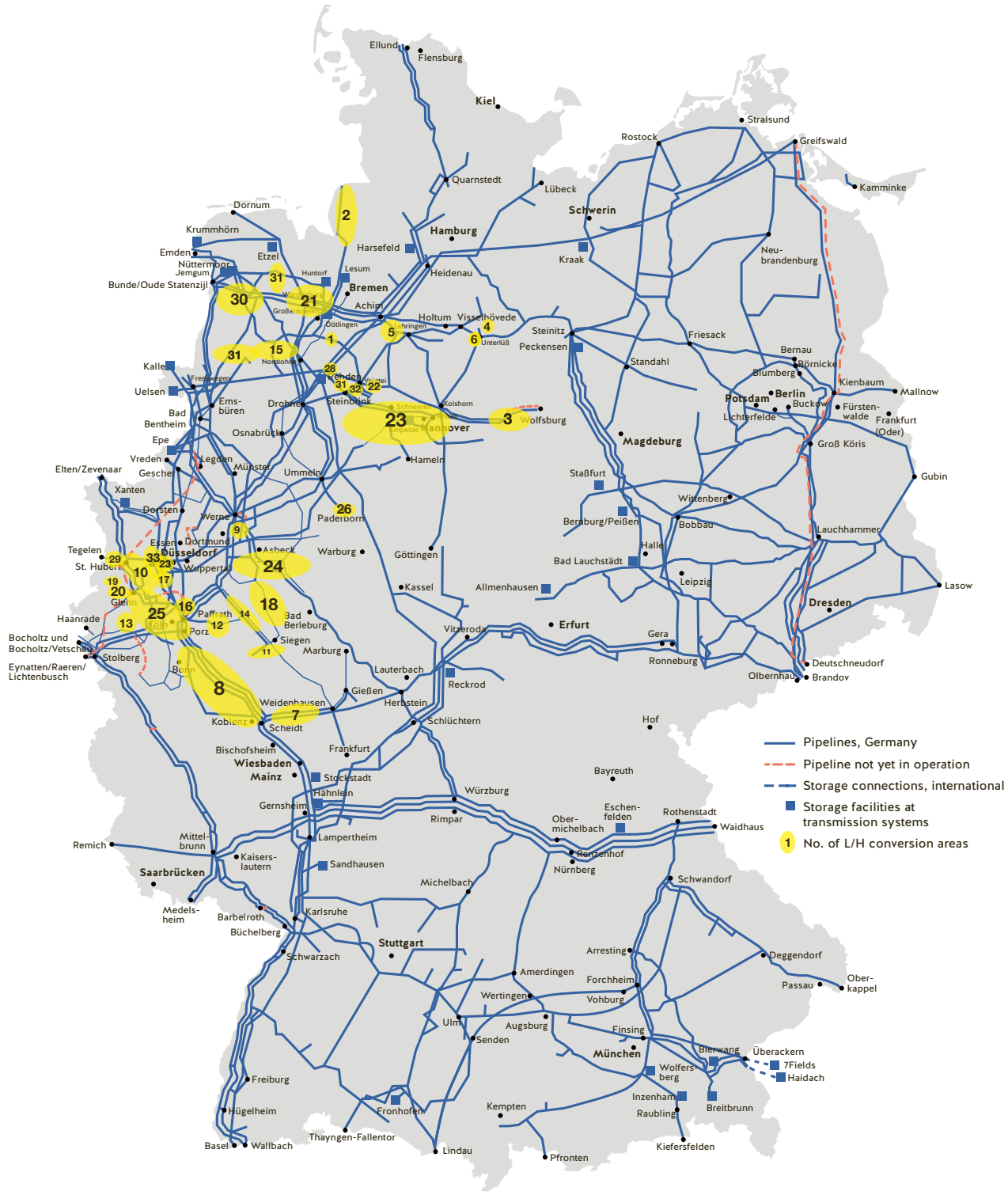
A list of all directly and indirectly connected distribution system operators and their allocation to the conversion areas can be found in the NDP gas database. Furthermore, dependencies of various conversion areas in terms of the conversion sequence if detailed plans are already available are described in the NDP gas database.

The L-to-H-gas conversion plans are drawn up in a continual process that is subject to constant revisions until they are finalised in a contract. The reporting date of 1 November 2020 was selected for this implementation report on the Gas Network Development Plan 2020–2030. Changes that may have emerged in the meantime do not form part of the balances and evaluations shown above. These are described in Chapter 4.8.4.

4.8.2 Overview of the conversion areas

Figure 11 below shows the conversion areas for the years up to 2025. The size of the forms presented in yellow symbolises the capacity demand for the area to be converted.

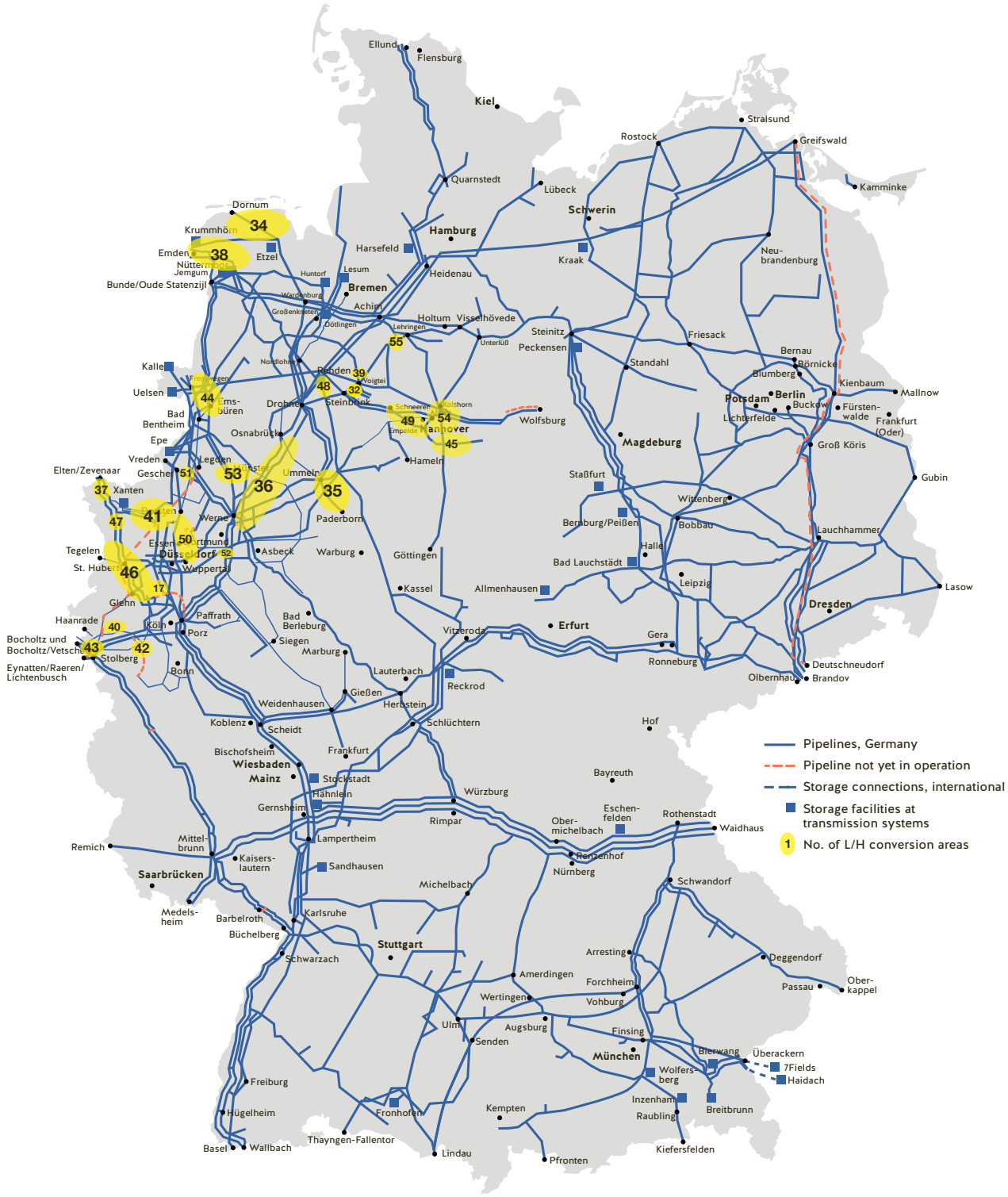
Figure 11: Conversion areas up to 2025



Source: Transmission system operators, reporting date: 1 March 2021

Figure 12 below shows the conversion areas for the years from 2026 to 2030.

Figure 12: Conversion areas 2026 to 2030



Source: Transmission system operators, reporting date: 1 March 2021

Table 12 below provides an overview of all conversion areas up to 2030. A detailed list of the conversion areas with network interconnection and network connection points can additionally be found in the NDP gas database. The indicative conversion dates each refer to the calendar year that is specified.

Table 12: Overview of the L-gas conversion areas

No.	L-to-H-gas conversion area	Transmission system operator	Conversion date Gas NDP 2020–2030
1	EWE Zone part II	GTG	2021
2	Bremen Nord/Osterholz Scharmbeck/Bremerhaven/Cuxhaven	GUD	
3	Hannover Ost/Wolfsburg	GUD	
4	Unterlüß – Gockenholz	GUD	
5	Verden	GUD	
6	Munster Gockenholz area	Nowega	
7	Mittelhessen	OGE	
8	Mittelrhein	OGE	
9	Oberaden	OGE	
10	Rheinland	OGE	
11	Westerwald/Sieg	OGE	
12	Aggertalleitung	Thyssengas	
13	Bergheim 1	Thyssengas	
14	Oberbergisches Land	Thyssengas	
10	Rheinland	Thyssengas	
15	EWE Zone part III	GTG	2022
16	Bergisches Land	OGE	
17	Düsseldorf	OGE	
8	Mittelrhein	OGE	
14	Oberbergisches Land	OGE	
18	Südwestfalen	OGE	
19	Viersen – Meerbusch	OGE	
16	Bergisches Land	Thyssengas	
17	Düsseldorf	Thyssengas	
20	Mönchengladbach	Thyssengas	
14	Oberbergisches Land	Thyssengas	
19	Viersen – Meerbusch	Thyssengas	
21	EWE Zone part IV	GTG	2023
22	Voigtei area	Nowega	
23	Drohne – Ahlten	OGE	
24	Hagen – Iserlohn – Ergste	OGE	
25	Köln – Bergisch Gladbach	OGE	
8	Mittelrhein	OGE	
26	Paderborn	OGE	
19	Viersen – Meerbusch	OGE	
25	Köln – Bergisch Gladbach	Thyssengas	
19	Viersen – Meerbusch	Thyssengas	

No.	L-to-H-gas conversion area	Transmission system operator	Conversion date Gas NDP 2020–2030
27	EWE Zone part V	GTG	2024
28	Rehden – Bassum	Nowega	
16	Bergisches Land	OGE	
23	Drohne – Ahlten	OGE	
29	Kaldenkirchen	OGE	
25	Köln – Dormagen	OGE	
26	Paderborn	OGE	
25	Köln – Dormagen	Thyssengas	
30	EWE Zone part VI	GTG	2025
31	Lemförde (Drohne – Ahlten)	Nowega	
32	Petershagen (Drohne – Ahlten)	Nowega	
23	Drohne – Ahlten	OGE	
33	Düsseldorf – Neuss	OGE	
25	Köln – Dormagen	OGE	
31	Lemförde	OGE	
32	Petershagen	OGE	
33	Düsseldorf – Neuss	Thyssengas	
25	Köln – Dormagen	Thyssengas	
34	EWE Zone part VII	GTG	2026
35	Bielefeld/Paderborn	GUD	
17	Düsseldorf	OGE	
36	Werne – Ummeln – Drohne	OGE	
17	Düsseldorf	Thyssengas	
37	Emmerich	Thyssengas	
38	EWE Zone part VIII	GTG	2027
39	Zone Westnetz	GTG	
40	Rommerskirchen/Kerpen	OGE	
41	Sonsbeck – Dorsten	OGE	
36	Werne – Ummeln – Drohne	OGE	
42	Hürth/Brühl/Bergheim 2	Thyssengas	
40	Rommerskirchen/Blatzheim	Thyssengas	
41	Sonsbeck – Oberhausen	Thyssengas	
43	Weisweiler/Düren	Thyssengas	
44	Emsland II	Nowega	2028
45	Salzgitter I	Nowega	
46	Krefeld – Langenfeld	OGE	
36	Werne – Ummeln – Drohne	OGE	
47	Hamb/Kapellen/Aldekerk	Thyssengas	
37	Kalkar	Thyssengas	
46	Krefeld – Langenfeld	Thyssengas	

No.	L-to-H-gas conversion area	Transmission system operator	Conversion date Gas NDP 2020–2030
48	Rehden-Lengerich area	Nowega	2029
32	Petershagen Messlinger Straße	Nowega	
49	Salzgitter II	Nowega	
50	Dorsten – Leichlingen	OGE	
51	Gescher	OGE	
52	Hagen	OGE	
53	Münsterland	OGE	
41	Sonsbeck – Dorsten	OGE	
36	Werne – Ummeln – Drohne	OGE	
50	Dorsten – Leichlingen	Thyssengas	
54	Salzgitter III	Nowega	2030
55	Voigtei (GUD)	GUD	

Source: Transmission system operators

4.8.3 Changed conversion areas compared with the draft Gas Network Development Plan 2020–2030

Changes in the following conversion areas have resulted in comparison with the draft Gas Network Development Plan 2020–2030:

Table 13: Changed conversion areas compared with the Gas Network Development Plan 2020–2030 (reporting date: 1 November 2020)

No.	Changed L-to-H-gas conversion area	Transmission system operator	Conversion date Implementation Report 2021	Conversion date Gas NDP 2020–2030
45	Salzgitter I	Nowega	2028	After 2030
49	Salzgitter II	Nowega	2029	After 2030
50	Dorsten – Leichlingen	Thyssengas	2029	2029
54	Salzgitter III	Nowega	2030	After 2030
55	Voigtei (GUD)	GUD	2030	After 2030

Source: Transmission system operators

The Salzgitter conversion area envisaged in the previous conversion plan for the remaining L-gas market was divided into three areas in the course of the decline in domestic L-gas production volumes and brought forward to 2028–2030. Bringing these areas forward will play a part in easing the pressure on the L-gas supply in the later years of the common market area conversion.

Once Nowega's Salzgitter area has been fully converted in 2030, the Voigtei area (GUD) can also be converted. This will also be brought forward from 2031 to 2030.

The former Wuppertal conversion area (WUP-01) was integrated in the Dorsten-Leichlingen conversion area (DOL-04) because of the dependencies in terms of the network operating equipment. This does not result in any change to the time of the conversion.

4.8.4 Possible changes in the L-to-H-gas conversion plans

The development of concepts in the course of the L-to-H-gas conversion plans is very advanced up to 2026, with a large part already finalised.

No detailed conversion plans have been developed by the transmission system operators so far for the years from 2027 to 2029. The transmission system operators have held initial discussions on the development and co-ordination of conversion concepts with the distribution system operators concerned. Changes to these conversion years may still be produced as a result.

4.9 Remaining L-gas market after 2030

The remaining L-gas market results from the definitions of the conversion areas up to 2030.

The GUD area “in the production area/upstream” is supplied directly from the surrounding production area. Work has to be started on converting this area before production is no longer able to cover the demand for capacity of the downstream point at L157-Visselhövede. GUD, the producers involved and the relevant distribution system operators are in close contact with each other in this connection.

The Haanrade area constitutes a stand-alone downstream network of the Dutch transmission system. The conversion of this area depends on the GTS conversion concept. As no distribution systems are supplied through this stand-alone network, no significant impacts for the resource planning for the appliance modifications result from the conversion concept.

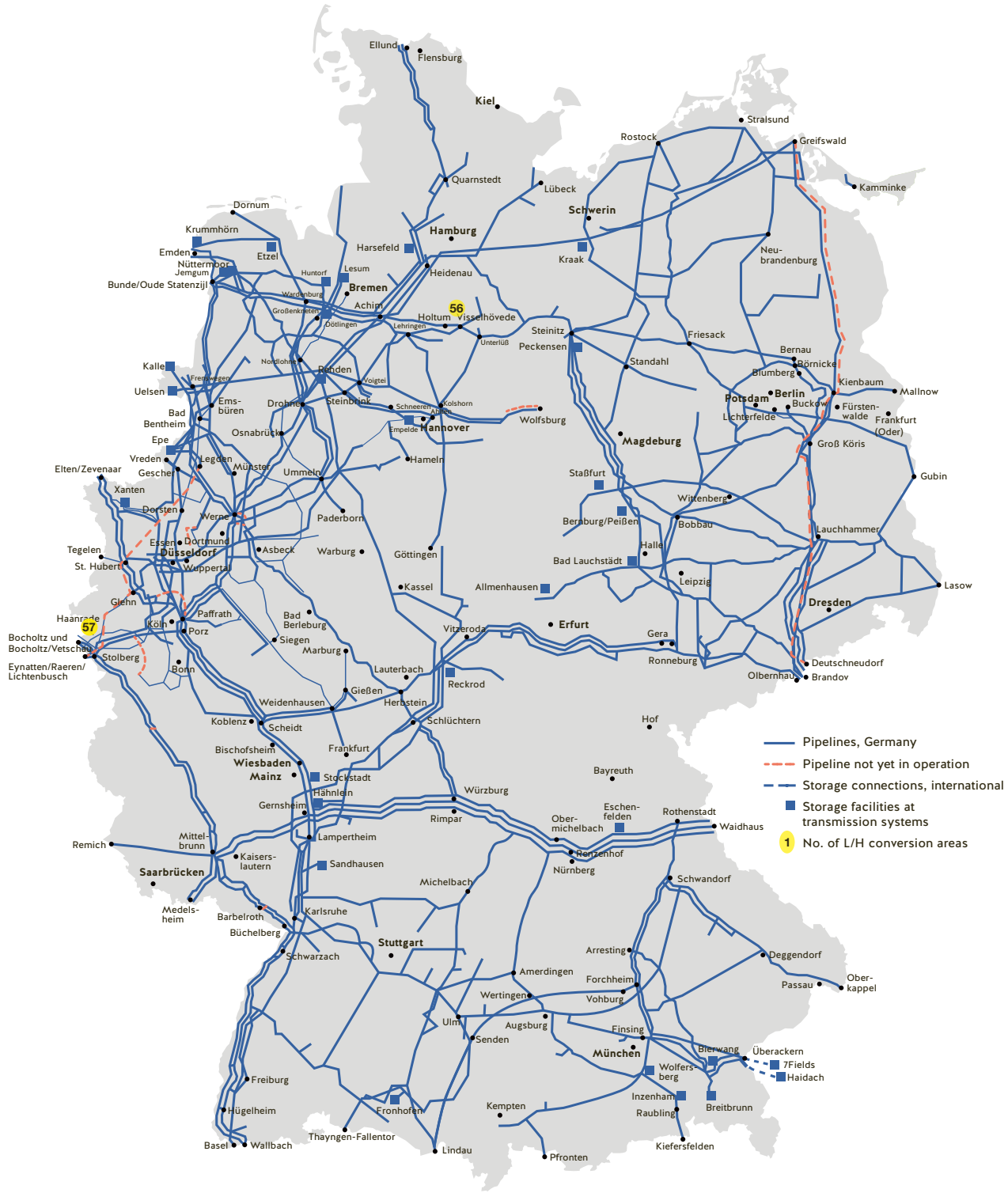
Table 14: Remaining L-gas market after 2030

No.	Changed L-to-H-gas conversion area	Transmission system operator	Conversion date Gas NDP 2020–2030
56	In the production area/upstream	GUD	After 2030
57	Haanrade	Thyssengas	

Source: Transmission system operators

The remaining L-gas market after 2030 is presented in Figure 13.

Figure 13: Remaining L-gas market after 2030



Source: Transmission system operators, reporting date: 1 March 2021

4.10 Ability to derive the German L-gas production

Based on the current plans, the L-gas market in Germany will develop into a supply island around the remaining German reserves by 2030. A development of the remaining market of this kind requires in turn that sufficient flexibility can be provided by integrating storage and conversion capacity in order to ensure two premises:

- The security of supply of the customers supplied with L-gas must continue to be guaranteed.
- For technical and economic reasons, continuous delivery of the L-gas supply should be possible.

The maintenance of the L-gas market and thus the ability to market the remaining domestic production volumes is both in the economic interests of the producers and in the general economic interest. It must be ensured, however, that no inappropriate, additional or unjustifiable costs are charged to all shippers for maintaining the L-gas market. This would lead to incorrect economic incentives on the one hand and, on the other, eliminate the macroeconomic benefits of the remaining production.

The delivery of the remaining German production must be largely blended with the H-gas flow after the Salzgitter area has been fully converted in 2030.

The ability of the H-gas network to accept the L-gas production while complying with the minimum thresholds of the calorific value and the Wobbe Index number has to be investigated. The German transmission system operators will prepare an outlook for the ability to blend the remaining L-gas in the Gas Network Development Plan 2022–2032. To this end, the production forecasts available from the German gas producers will be compared with the expected flows. Special focus will be placed here on the major production facilities in Lehringen, Doetlingen and Voigtei.

Based on current findings and taking into consideration the updated BVEG forecast from 2030 onwards, the remaining L-gas production can be injected at appropriate entry points in the future throughout the whole year and blended with the H-gas.

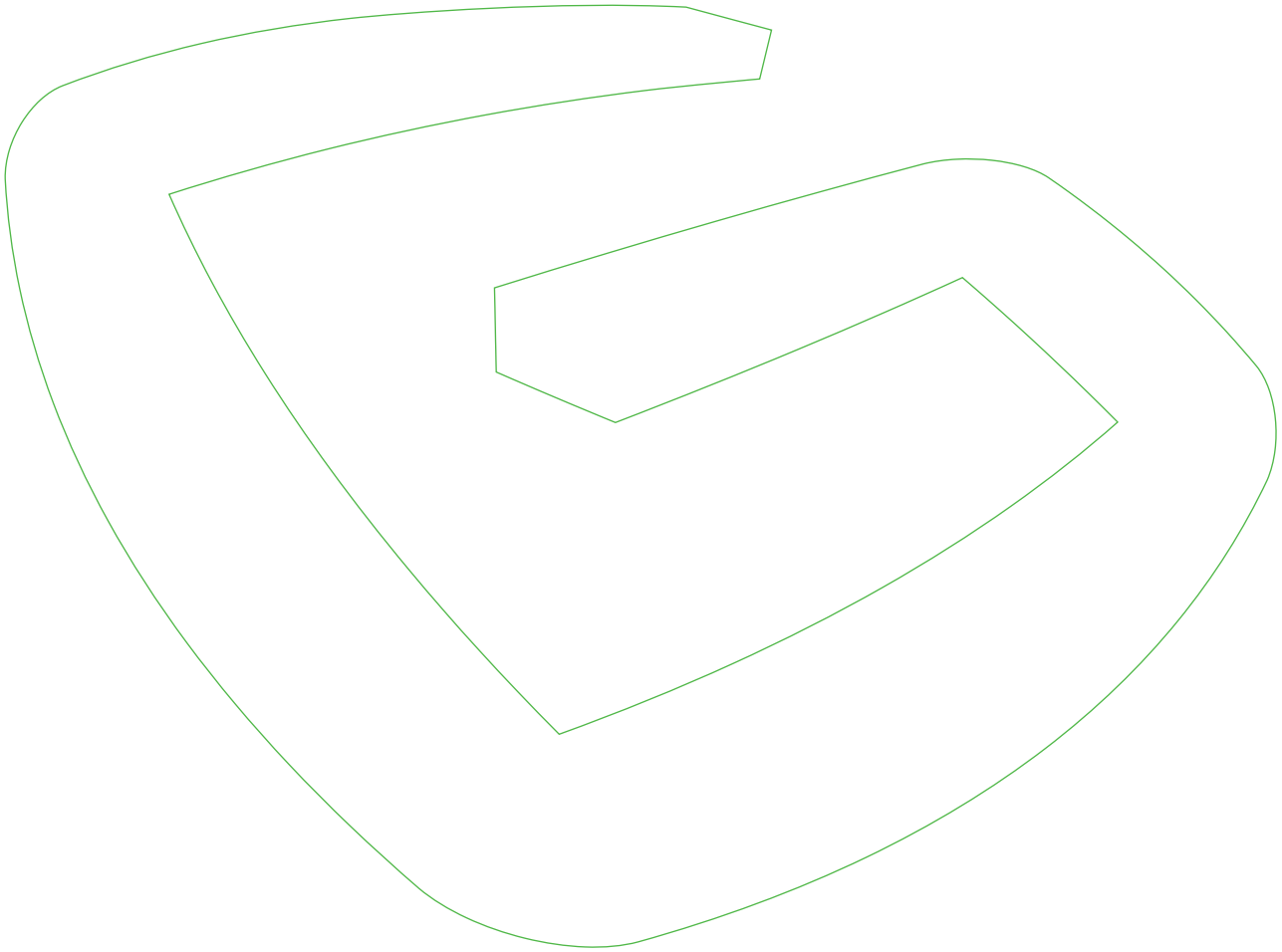
4.11 Summary of the L-to-H-gas conversion

The transmission system operators have looked at the following points in this chapter:

- Determination and presentation of the L-gas capacity and quantity balance in due consideration of the local factors up to 2030;
- Consideration of the number of gas appliances to be modified from L-gas to H-gas per year;
- Examination of the technical measures that are required to maintain the security of supply and that can promptly compensate for the decline in L-gas;
- Creation of a complete overview of the L-gas conversion areas that is specific to each year;
- Changes to the L-to-H-gas conversion plans because of delays caused by Covid-19;
- Review of the concept for the remaining L-gas market;
- Ability to derive the German L-gas production;
- Consideration of the available detailed plans of the distribution system operators.

A list of all network operators affected by the conversion as well as an allocation of the relevant conversion year are published in the NPD gas database.

Appendices



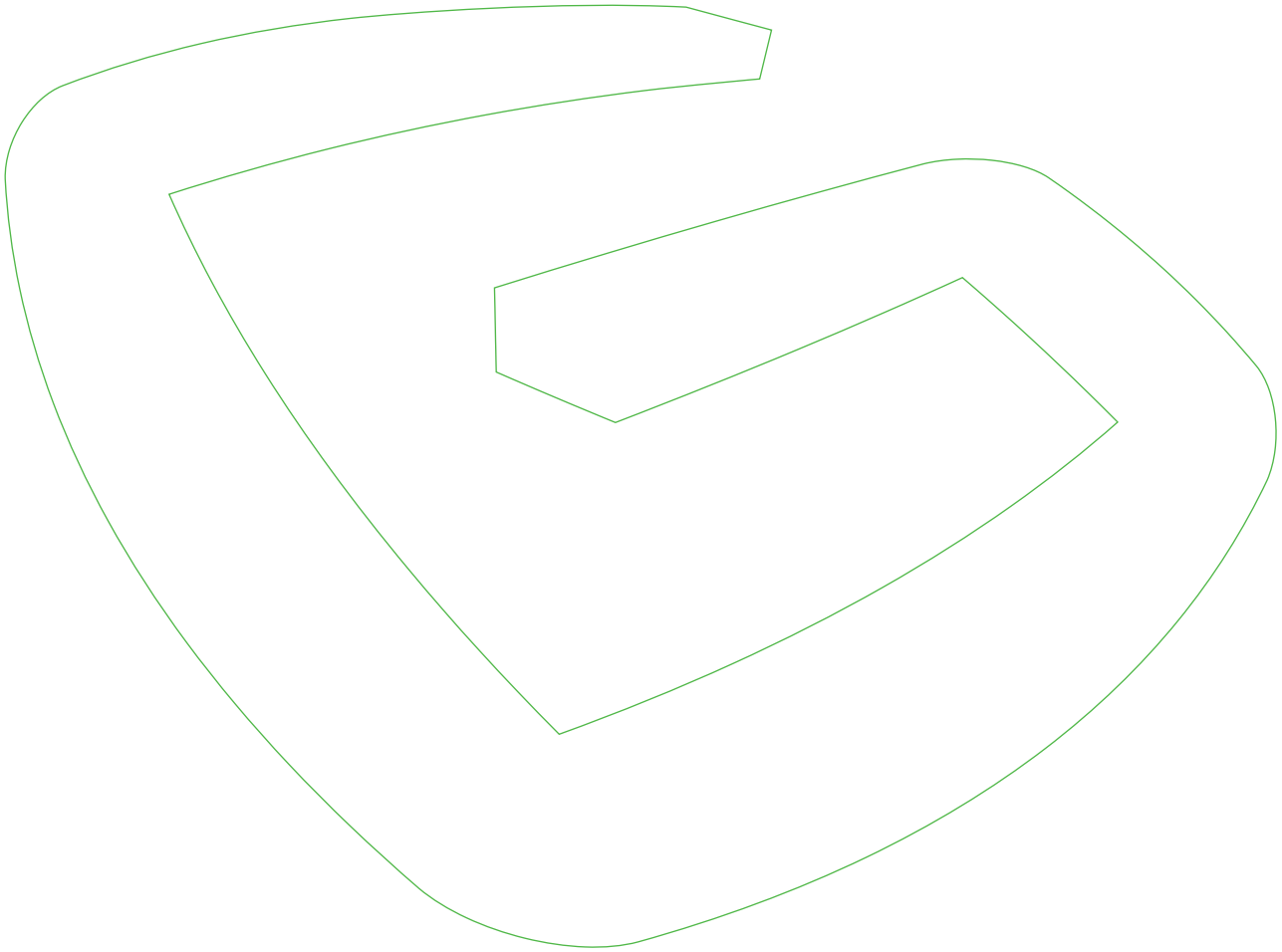
Appendices

The transmission system operators have updated the database for the 2021 implementation report and provide this for the public at http://www.nep-gas-datenbank.de.

The database contains the following information for the cycle of the 2021 implementation report (name of the cycle in the NDP gas database: “2020 – IR on the NDP”):

- Network expansion measures
- L-to-H-gas conversion

Glossary



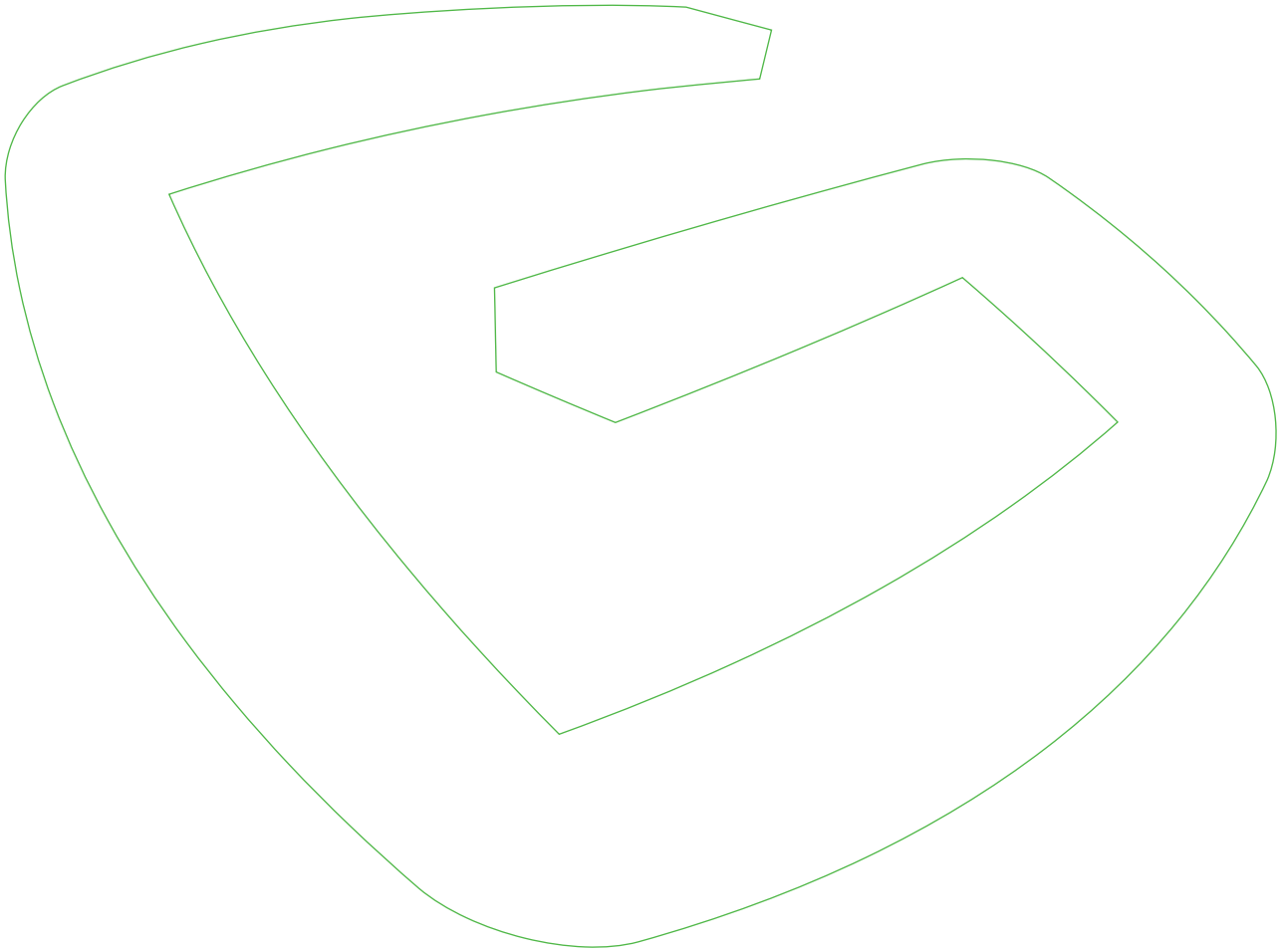
Transmission system operators

bayernets	bayernets GmbH
Ferngas	Ferngas Netzgesellschaft mbH
Fluxys	Fluxys TENP GmbH
Fluxys D	Fluxys Deutschland GmbH
GASCADE	GASCADE Gastransport GmbH
GRTD	GRTgaz Deutschland GmbH
GTG Nord	Gastransport Nord GmbH
GUD	Gasunie Deutschland Transport Services GmbH
LBTG	Lubmin-Brandov Gastransport GmbH
NGT	NEL Gastransport GmbH
Nowega	Nowega GmbH
OGE	Open Grid Europe GmbH
OGT	OPAL Gastransport GmbH & Co. KG
ONTRAS	ONTRAS Gastransport GmbH
terranets	terranets bw GmbH
Thyssengas	Thyssengas GmbH

Other abbreviations

BNetzA	Bundesnetzagentur für Elektrizität, Gas, Telekommunikation, Post und Eisenbahnen – German Federal Network Agency for Electricity, Gas, Telecommunication, Post and Railways
BVEG	Bundesverband Erdgas, Erdöl und Geoenergie e. V. – German Federal Association of Natural gas, Petroleum and Geoenergy
CS	Compressor station
DSO	Distribution system operator
DVGW	Deutscher Verein des Gas- und Wasserfaches e.V. – German Technical and Scientific Association for Gas and Water
EnWG	Energiewirtschaftsgesetz – Energy Industry Act
EUGAL	Europäische Gas-Anbindungsleitung – European gas pipeline link
GasNZV	Verordnung über den Zugang zu Gasversorgungsnetzen/Gasnetzzugangsverordnung – German Gas Network Access Regulation
GASPOOL	GASPOOL Balancing Services GmbH
GPCM	Gas pressure control and measuring station
GTS	Gasunie Transport Services B.V.
GWh	Gigawatt hour
H-gas	Natural gas with a high calorific value
IR	Implementation report
L-gas	Natural gas with a low calorific value
LNG	Liquefied natural gas
m^3	Cubic metre Unless otherwise specified, a volume at normal conditions is to be understood by this.
MEGAL	Mittel-Europäische Gasleitung(sgesellschaft) – Central European gas pipeline (company)
MIDAL	Mitteldeutsche Anbindungsleitung – Central German connecting pipeline
MWh	Megawatt hour
NCG	NetConnect Germany GmbH & Co. KG
NDP	Gas network development plan
NEL	Nordeuropäische Erdgas-Leitung – Northern Europe Natural Gas Pipeline
NETG	Nordrheinische Erdgastransportgesellschaft (gas shipper)
OPAL	Ostsee-Pipeline-Anbindungsleitung – Baltic Sea pipeline link
SEL	Süddeutsche Erdgasleitung – Southern German Gas Pipeline
TENP	Trans Europa Naturgas Pipeline
TSO	(Gas) transmission system operator
TWh	Terawatt hour

Bibliography



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