2022 Coordinated Network Development Plan

for the Gas Transmission System Infrastructure in Austria

for the period from 2023 – 2032

Cover page photo: Role of gas in the future energy system
Photo courtesy: Gas Connect Austria

Document History

Edition	Date	Changes
2	17.04.2023	Amendment according to comments of E-Control Austria of 31.03.2023
2	20.03.2023	Amendment in accordance with E-Control Austria's request of 02.03.2023
2	20.02.2023	Edition for submission for approval to E-Control Austria
1	09.01.2022	Edition for the consultation by the market area manager

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1 Introduction

In accordance with legislation in force since 29 June 2022, the market area manager is obliged to prepare a Coordinated Network Development Plan (CNDP) at least every two years pursuant to section 14 (1) (7) in conjunction with section 63 of the Austrian Natural Gas Act (Gaswirtschaftsgesetz, GWG 2011). The CNDP is to be prepared in line with the aims of section 63 (4) GWG 2011.

Since the assumption of the duties of the market area manager (MAM) on 01 June 2017, following the nomination by the transmission system operators (TSO) Gas Connect Austria GmbH (GCA) and Trans Austria Gasleitung GmbH (TAG GmbH) and the ensuing approval by the authority E-Control Austria (ECA), AGGM Austrian Gas Grid Management AG (AGGM) is within this role responsible for establishing the CNDP in collaboration with Gas Connect Austria and TAG GmbH and their company-specific network development planning.

The coordinated network development plan refers to the Austrian transmission system in the market area East. Since there are no transmission systems in the market areas Tyrol and Vorarlberg, these market areas are not part of the coordinated network development plan.

1.1 Objectives of the Coordinated Network Development Plan

The particular objectives of the coordinated network development plan are:

- Meeting the demand for capacities to supply consumers while considering emergency scenarios,
- Contributing to the realization of the goals of the Paris Climate Agreement and to take measures to achieve climate neutrality for Austria by 2040, relating in particular to the planning of natural gas pipeline systems,
- Ensuring a high degree of availability of capacity (security of supply of the infrastructure),
- Covering transport needs and Complying with the obligation to meet the infrastructure standard according to Article 6 Regulation (EU) No 994/2010
- Integrating the energy sector, while taking into account the high value of gaseous energy carriers which are linking different energy carriers and sectors in the market area.

In the preparation of the coordinated network development plan, technical and economic expediency, the interests of all market participants and consistency with the community-wide network development plan and the long-term planning shall be taken into consideration.

1.2 Approach

In accordance with Regulation (EU) No 2017/459, potential clients can submit their capacity requirements to the transmission system operators in a consistent and structured manner in the course of the process according to the Network Code on Capacity Allocation Mechanisms in transmission systems (NC CAM). Based on that process of 2021, the last submitted incremental capacity demands are the basis for the 2022 Coordinated Network Development Plan (see also Chapter 5.2). As a result, the MAM established the capacity scenario together with the TSOs and coordinated it with E-Control Austria on 14 October 2022.

As a consequence of the Russian attack on sovereign territories of Ukraine on 24 February 2022 and the uncertainties in Austrian gas supply that are associated with the events, MVGM and the TSOs have additionally decided to develop a capacity scenario with diversified supply routes (see chapter 5.2).

Based on this capacity scenario, the TSOs have developed projects in order to meet the submitted demands. Each TSO submitted their individual network contribution to the Austrian network development planning on 29 September 2022 to the MAM. Several meetings between the MAM and the TSOs took place from 04 April 2022 to 29 November 2022 in order to discuss and coordinate the interfaces and the coherence between the projects and the capacity scenario. The submitted projects of the TSOs have been formally harmonized and were added to the Appendix.

The first edition of the 2022 Coordinated Network Development Plan was established by the MAM in coordination with the TSOs. The consultation period of the coordinated network development plan by the MAM (2022 CNDP edition 1) took place from 09 January 2023 to 30 January 2022. The consultation documents were published on the AGGM homepage.

The 2022 CNDP edition 1 will be presented to the market participants on Austrian Gas Infrastructure Day (AGID) on 19 January 2023.

The 2022 Coordinated Network Development Plan edition 2 will be submitted to the regulatory authority E-Control Austria for approval on 20 February 2023.

2 Setting for the gas industry

This chapter gives an overview of the current political developments in Austria and the European Union and describes goals for the future of energy infrastructure and the gas industry. In particular, this chapter aims to show the economic importance of the gas industry and its infrastructure in the context of decarbonization and climate change. The reader is provided with a comprehensive overview of the current gas supply and gas infrastructure in Austria.

2.1 Transmission system operators in the market area East

Website: www.taggmbh.at

Total length of transmission grid:
- 3 pipelines with 380 km each
- 1,140 km in total

Total compressor power:
- 5 compressor stations
- Approx. 421 MW ISO

Physical entry points:
- Baumgarten TAG GmbH (Slovakia)
- Arnoldstein (Italy)

Neighboring transmission system operators:
- Baumgarten TAG: eustream a.s.,
- Tarvisio/Arnoldstein: Snam Rete Gas S.p.A.

Total energy transported (gas):
See ENTSOG Transparency Platform

Physical exit points:
- Arnoldstein (Italy)
- Distribution Area

Non-physical exit points
- Baumgarten (Slovakia)

(Status 02.07.2022)

TAG GmbH is a company governed by Austrian law. In its capacity as a TSO, TAG GmbH is responsible for both transit and supply of the Austrian market and for network development. Snam S.p.A. (84.47%) and Gas Connect Austria GmbH (15.53%) are the owners of TAG GmbH. The TAG pipeline system has a total length of approx. 1140 km and reaches from the Austrian-Slovakian border until the Austrian-Italian border.

The TAG GmbH system is attached via various connections to the system of Gas Connect Austria in Baumgarten. This essentially enables the freely allocable quality of the transmission capacities at the Austrian entry/exit points as well as a high grade of flexibility between the two TSO at the gas station Baumgarten. The TAG GmbH system is also connected to the SOL System in Weitendorf, which enables gas transport towards Slovenia and further to Croatia. The Austrian market is supplied via ten physical exit points.

The system can be physically operated in both direct and reverse flow.

Website: www.gasconnect.at

Total length of transmission grid:

- 561.6 km

Total compressor power:

- 146 MW

Total energy transported (gas):

See ENTSOG Transparency Platform

Physical entry points:

- Baumgarten GCA (Slovakia)
- Baumgarten WAG (Slovakia)
- Überackern ABG (Germany)
- Überackern SUDAL (Germany)
- Speicherpunkt 7Fields
- Oberkappel (Germany)
- Speicherpunkt MAB/WAG
- Distribution Area

Non-physical (virtual) entry points

- Mosonmagyaróvár (Hungary)
- Murfeld (Slovenia)

Petrzalka (Slovakia)

Neighboring transmission system operators:

- Baumgarten GCA/WAG: eustream a.s.
- Oberkappel: Open Grid Europe GmbH, GRTgaz Germany GmbH
- Überackern ABG: bayernets GmbH, Open Grid Europe GmbH
- Überackern SUDAL: bayernets GmbH
- Petrzalka: eustream a.s.
- Mosonmagyaróvár: FGSZ Ltd
- Murfeld: Plinovodi d.o.o

Physical exit points:

- Mosonmagyaróvár (Hungary)
- Überackern ABG (Germany)
- Überackern SUDAL (Germany)
- Murfeld (Slovenia)
- Petrzalka (Slovakia)
- Storagepoint 7Fields
- Baumgarten WAG (Slovakia)
- Baumgarten GCA (TAG)
- Oberkappel (Germany)
- Storage point MAB/WAG
- Distribution Area

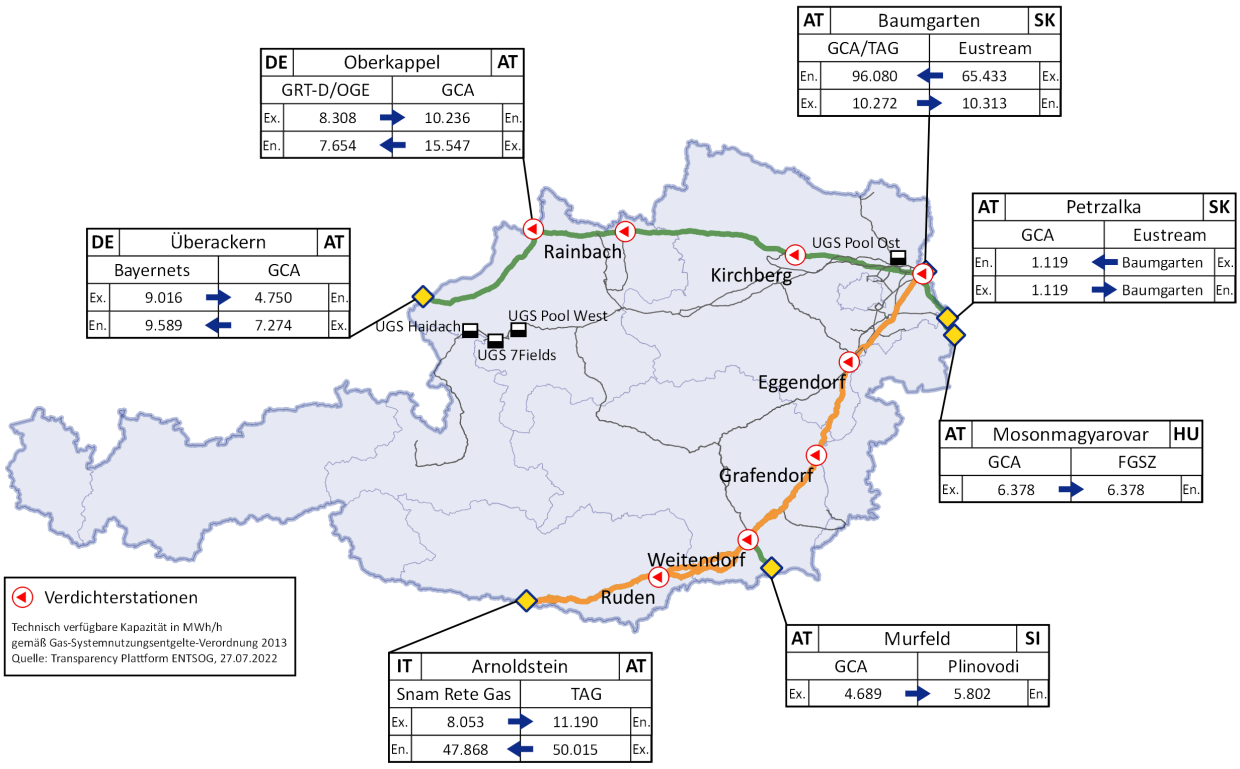
Gas Connect Austria is a transmission system operator and distribution system operator based in Vienna. It has a staff of approx. 280 employees across six locations in Vienna, Lower Austria and Upper Austria. Centered on the distribution node at Baumgarten, Gas Connect Austria operates a modern and efficient high-pressure gas grid with connections to Germany, Slovakia, Slovenia and Hungary, and to storage and production facilities. The 900-kilometre-long pipeline system comprises five compressor stations, more than 40 metering and transfer stations and more than 100 transfer metering points.

2.2 Importance of gas in Austria

2.2.1 Present gas transmission system infrastructure and technical capacities

Number of transmission system operators	2
Total length of transmission grids:	approx. 1,700 km
Total compressor power:	566 MW
Virtual trading point:	CEGH (www.cegh.at)

Figure 1: **Technical capacities at relevant interconnection points in the market area East in MWh/h**



Source: ENTSOG Transparency Platform, 02 October 2022

2.2.2 Gas Storage Infrastructure and Gas Production in Austria

Another important asset of Austria is the excellent connection of its large domestic storage capacities to the virtual trading point (VTP). Table 1 shows the characteristics (working gas volume, injection and withdrawal rates and connection) of the gas storage facilities in Austria.

The storage capacity in Austria of approx. 8.5 billion Nm³ (approx. 95 TWh) is the sixth largest domestic storage capacity in Europe (see Figure 2). This amount corresponds to about 1.5 times of the power demand (approx. 63 TWh) and to the total gas demand (approx. 99 TWh) of 2019 in Austria.

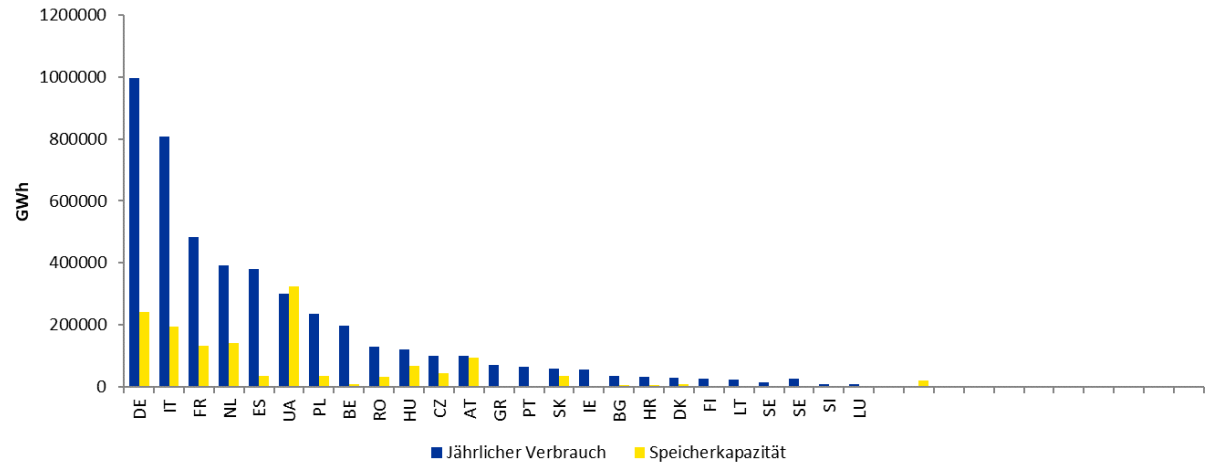
Table 1: Gas storage characteristics Austria

Gas Storage Facility	Working Gas Volume [GWh]	Injection Rate [GW]	Withdrawal Rate [GW]	Connection
Astora (UGS Haidach)	18,610	8	9	Transmission system DE*
GSA LLC (UGS Haidach)	0	0	0	Transmission system DE *
OMV Gas Storage (UGS Pool East)	25,280	9	13	Distribution system
RAG ES (UGS Pool West)	34,180	12	13	Distribution system Transmission system AT** & DE*
Uniper (UGS 7Fields)	17,500	6	9	Distribution system Transmission system AT** & DE*
Total	95,570	35	44	

*) Direct connection to the German transmission system via the storage connection points USP Haidach and Haiming 3 as well as Haiming 2-7F and Haiming 2-RAGES
**) Direct connection to Penta West at Überackern to the Austrian transmission system via the storage connection point Überackern 7Fields.

Source: https://agsi.gie.eu, rounded and downloaded 15 November 2022

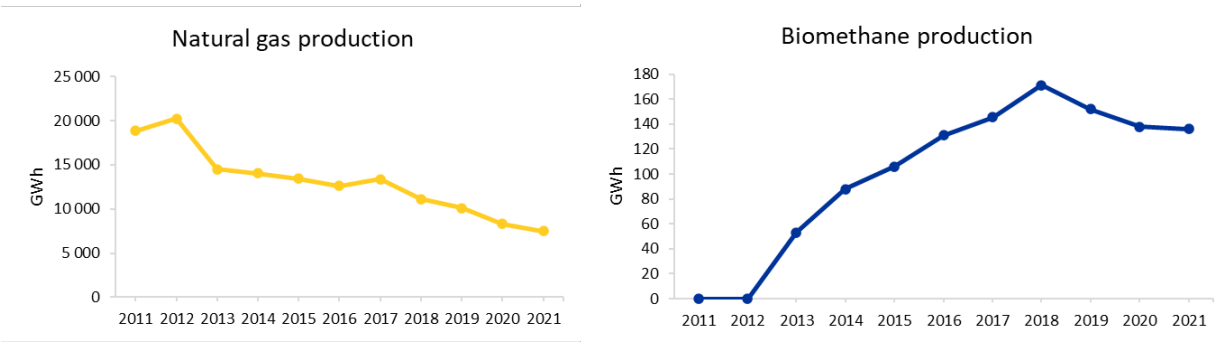
Figure 2: Comparison of storage capacity and domestic consumption in Europe, 2020



Source: Eurostat (downloaded 12 July 2022)

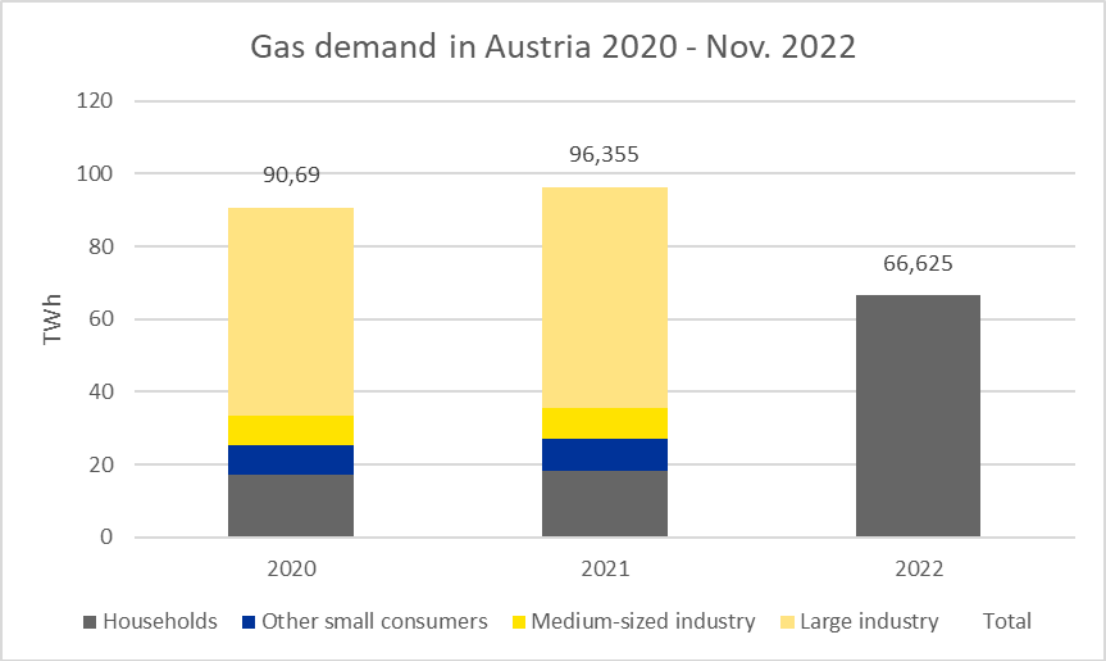
In Austria, natural gas production from fields in Lower Austria, Upper Austria and Salzburg achieved approx. 7,500 GWh in 2021 which contributed to about 8% of the domestic demand. The production of biomethane in Austria originates from 14 biogas plants which are connected to the gas net. The production amounted to approx. 140 GWh in 2021 which contributed to about 0.15% of the domestic demand (Figure 3).

Figure 3: Natural gas and biomethane production in Austria, 2021



Source: E-Control Austria, operational statistics (downloaded 19 August 2022)

Figure 4: Gas demand in Austria 2020-2022



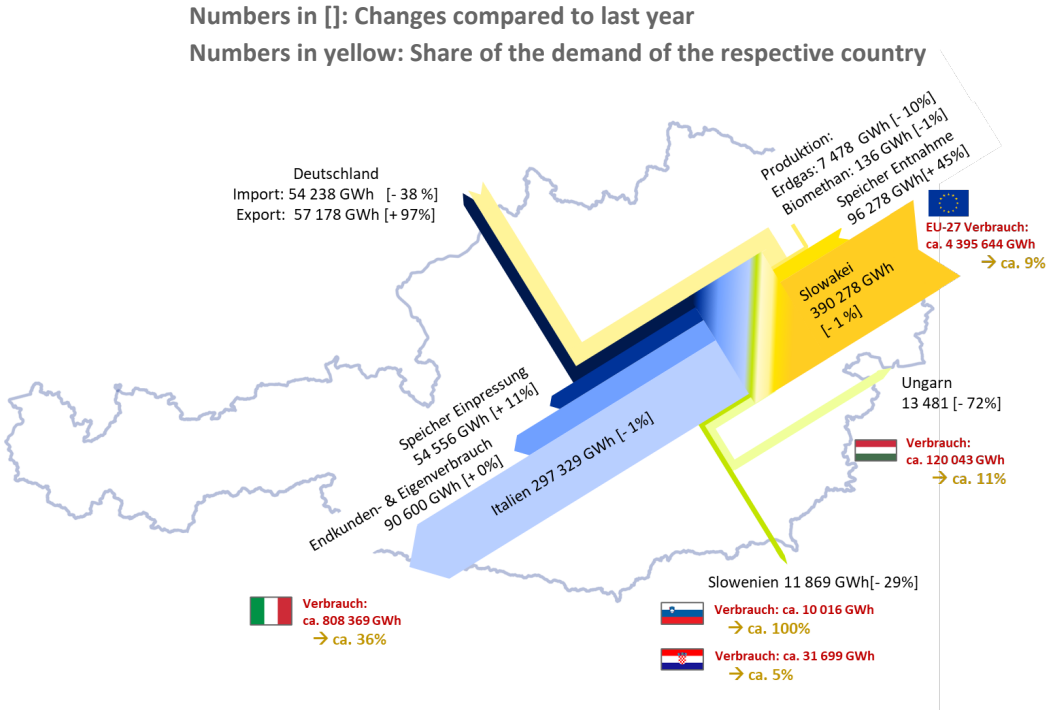
Source: AGGM (downloaded 10 November 2022). Distribution for 2022 not yet available, values for 2022 are until incl. 01 November 2022

Gas transportation in Austria

Due to its specific geographic location, Austria is considered a transit country for gas. illustrates that about three quarters of the total supply are determined for export. Because of the relatively low domestic production (approx. 2% of total supply or approx. 11% of domestic consumption), Austria is highly dependent on foreign imports.

Figure 5 illustrates the schematic physical gas flow of 2021. It can be seen that about 90% of the imports are from the direction of Slovakia. The remaining 10% is imported from Germany. By far the largest share of exports are done towards Italy. There are also exports to Hungary, Germany and Slovenia. In 2021, imports from Slovakia decreased by 1%, exports to Germany almost doubled compared to 2020. In addition, exports in 2021 to Slovenia and Hungary decreased significantly compared to 2020. Withdrawals from gas storage facilities increased compared to the previous year, as did injections.

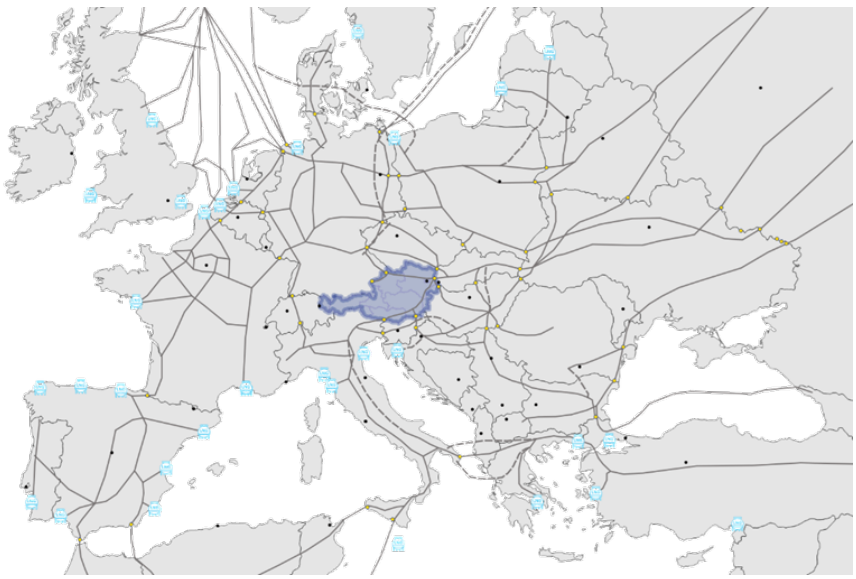
Figure 5: Schematic physical gas flow, 2021



Source: E-Control Austria, Eurostat

2.2.3 Ukraine crisis: Changed framework conditions and implications

Figure 6: Pipeline network in Austrian surroundings



Source: AGGM 2022

Due to the acts of war in Ukraine, the framework for the energy industry in Europe has changed significantly. On 08 March 2022, the European Commission published an "outline of a plan to make Europe independent of Russian fossil fuels before 2030, starting with gas." It notes that EU

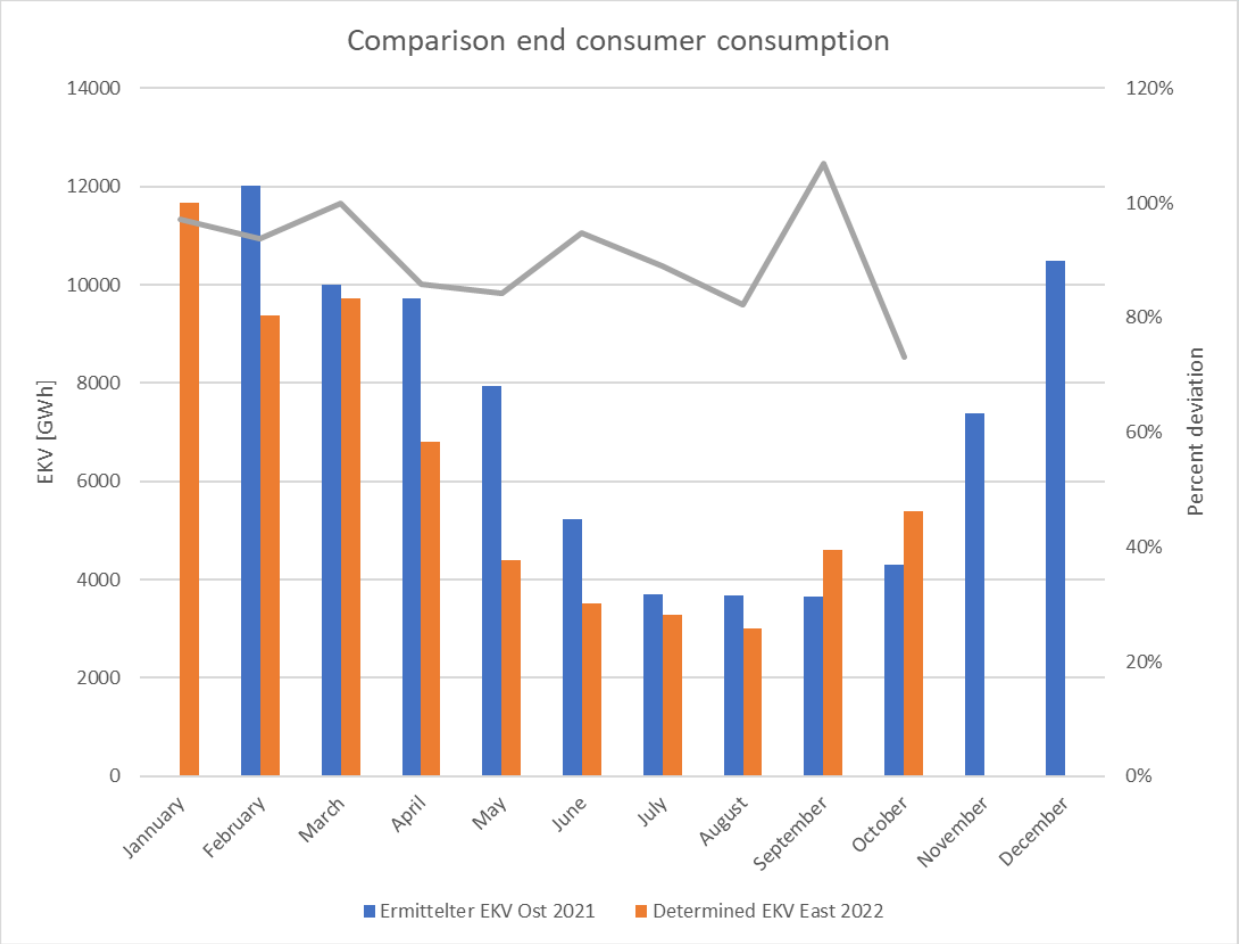
gas imports from Russia in 2021 (pipelines and LNG combined) totaled 155 billion cubic meters (bcm) and holds out the prospect of reducing this amount by two-thirds (101.5 bcm) by the end of 2022. To achieve this goal, the Commission proposes following measures:

1. Increasing imports of liquefied natural gas (LNG) by 50 bcm
2. Raising pipeline gas imports by 10 bcm
3. Increasing biomethane production by 3.5 bcm
4. EU-wide energy saving to reduce gas demand by 14 bcm
5. Solar energy on rooftops to reduce gas demand by 2.5 bcm
6. Heat pumps to reduce gas demand by 1.5 bcm
7. Reduction of gas demand in the power sector by 20 bcm through the use of wind and solar power

A comparison of the years 2021 and 2022 (2022 is included until the editorial deadline up to 01 November 2022) shows, that the proposed measures are, at least in part, already being implemented.

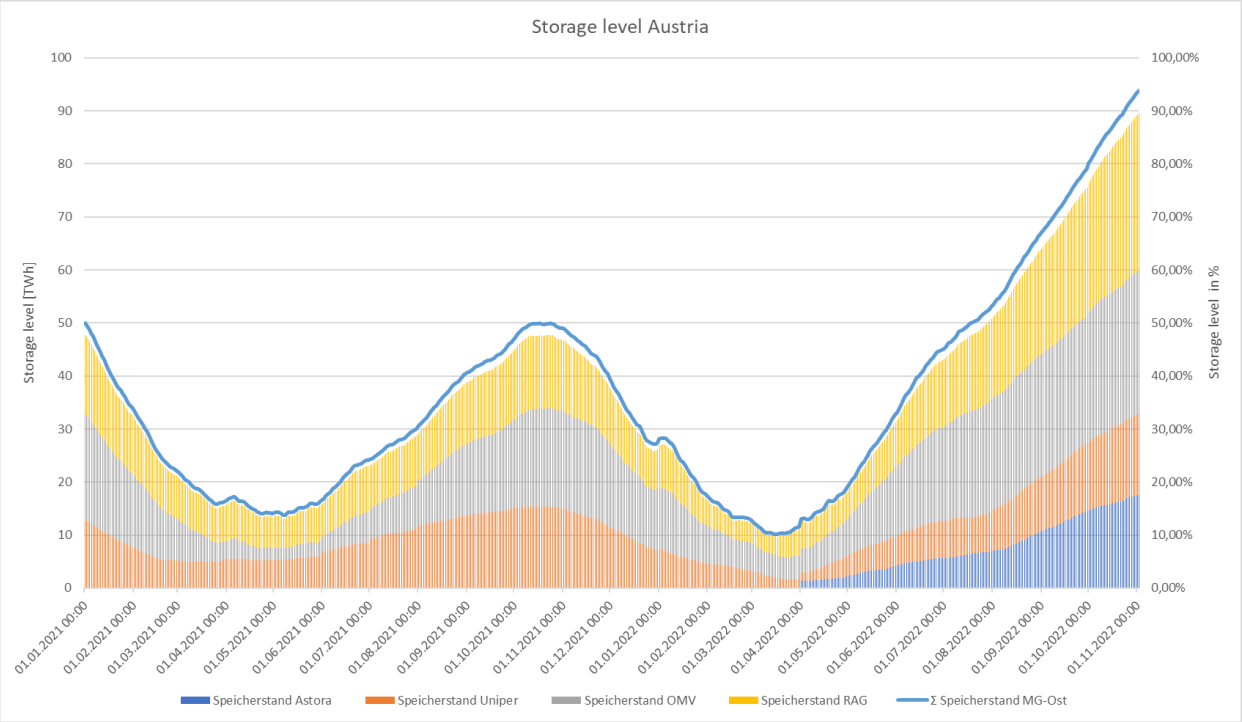
As displayed in Figure 7, end-user consumption (EKV) has fallen by as much as 20% in some months compared to the previous year. The only exception here was a comparatively cold September.

Figure 7: **Comparison of end-user consumption in Austria in 2021 and 2022. Bar chart shows the absolute demand, gray line shows the relative deviation**



Source: AGGM platform, downloaded 10 November 2022

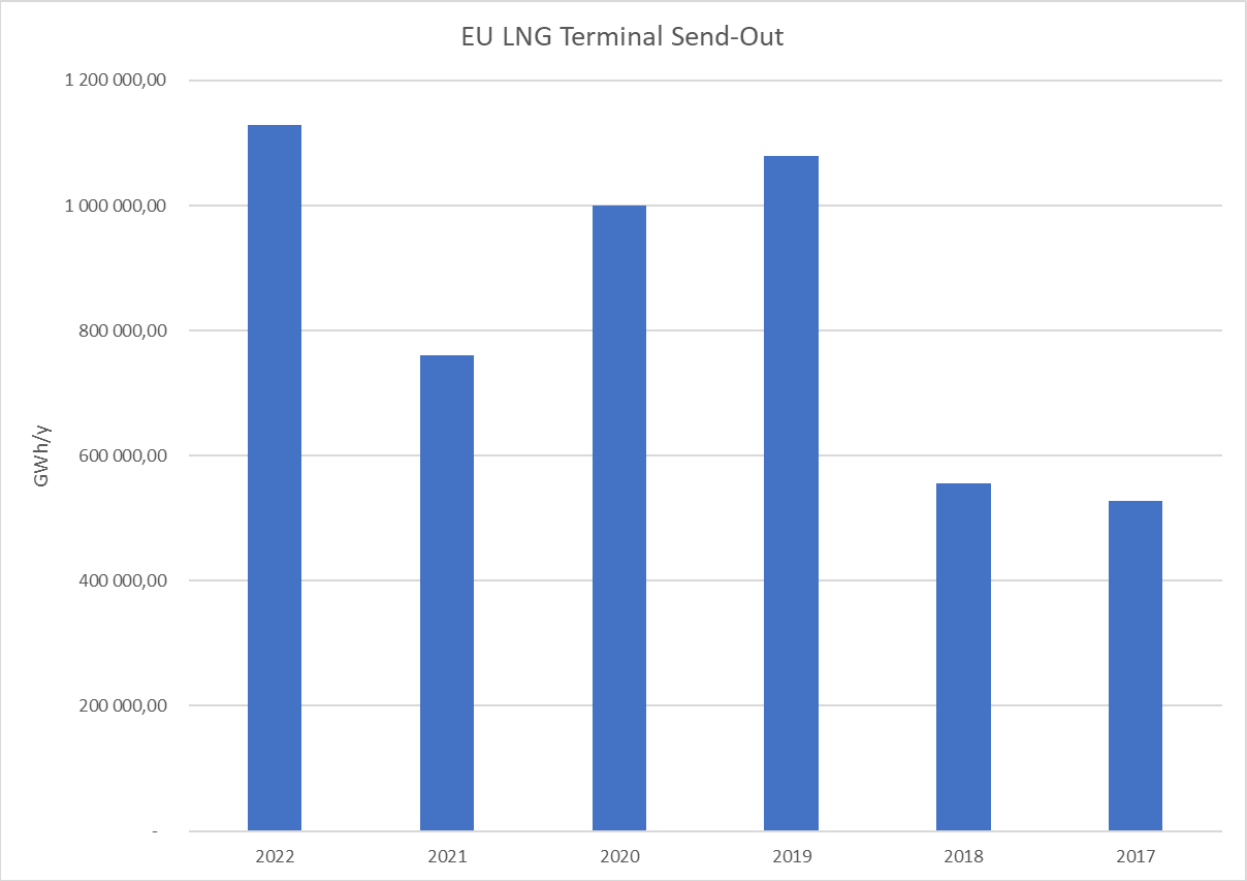
Figure 8: Storage levels in Austria in time lapse 2021-2022, absolute (bars) and relative (line).



Source: AGGM, downloaded 10 November 2022

Even the volume of gas stored for the winter shows a strong change on the gas market. Both in Austria and on the EU level, a storage level of 95% is reached in mid-November.

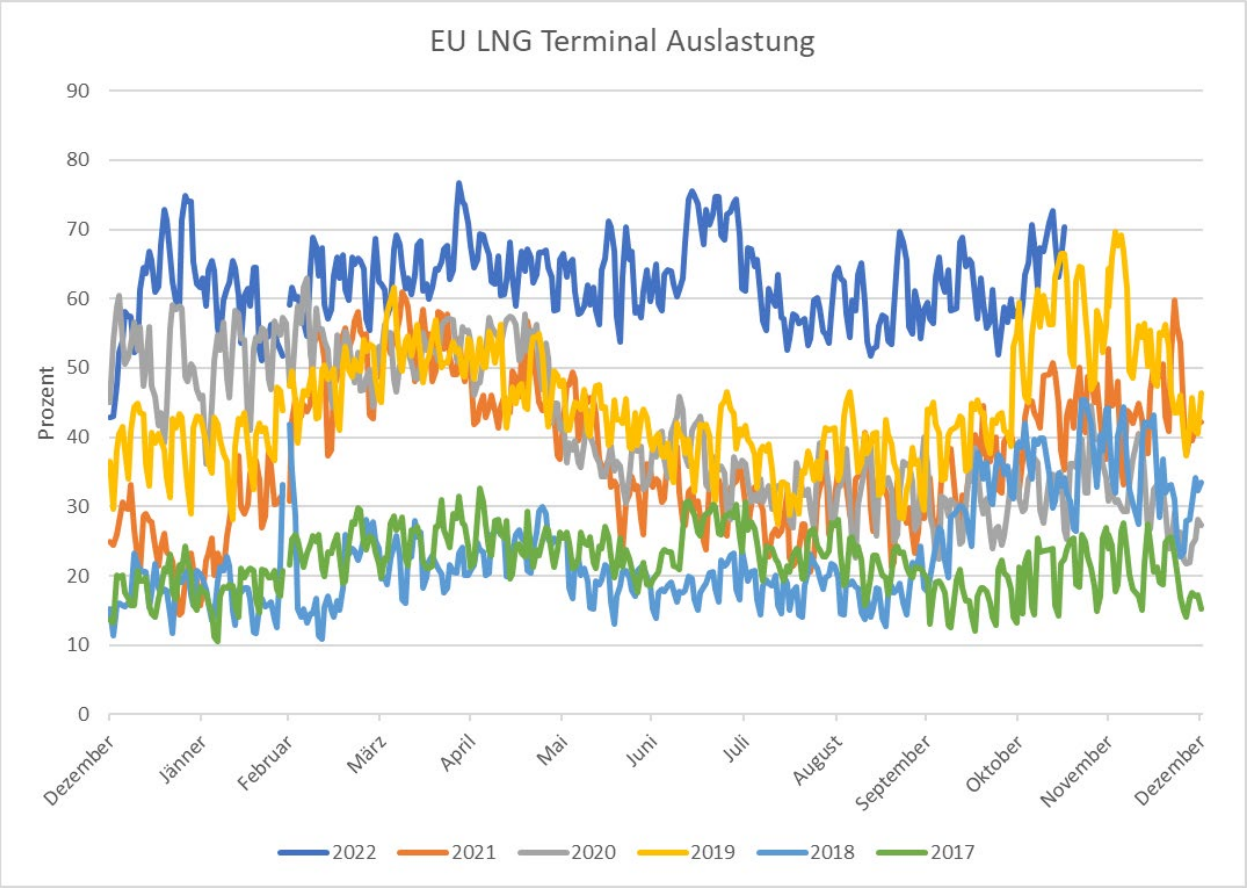
Figure 9: Annual EU LNG send-out rate in GWh/y.



Source: AlSI, downloaded on 15 November 2022

Another measure is to increase LNG imports in the EU to 50 bcm. Whether this measure will be fully achieved is difficult to predict, but rather unlikely. Figure 9 and Figure 10 both show that significant increases will be achieved. In particular Figure 31 shows that LNG terminal utilization in 2022 did not display a characteristic summer low, which is clearly visible in the other years.

Figure 10: EU LNG terminal utilization

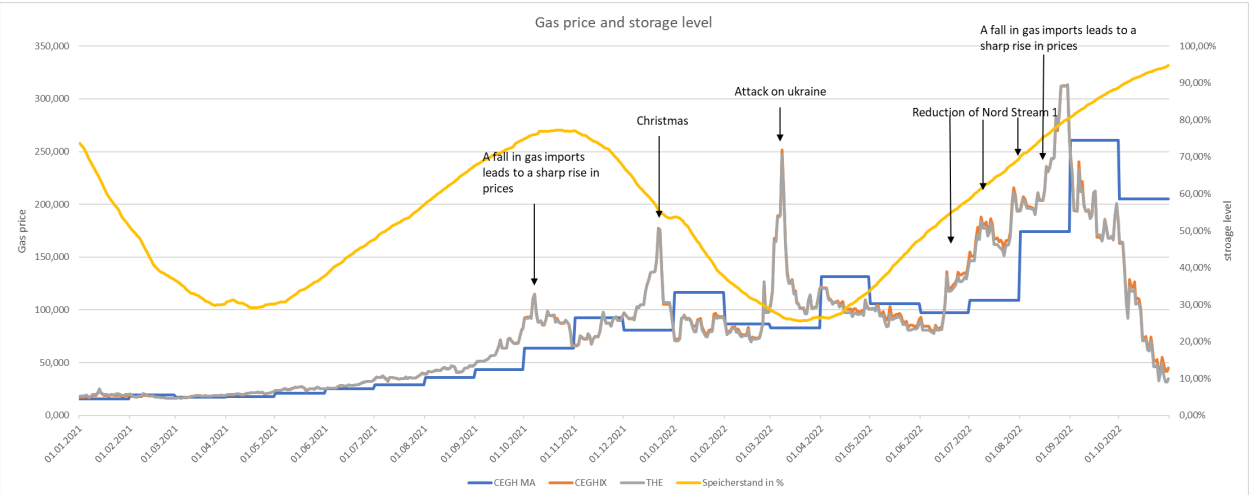


Source: AISI, downloaded on 15 November 2022

Gas imports from Russia predominate

For historical and geographical reasons, Austria imports most of its gas demand from Russia. Until now, Russia has been a reliable contractual partner. In the medium term, the now changed conditions for the energy industry require as a response a greater diversification of gas sources of supply and the replacement of Russian natural gas. Figure 11 shows the effects that selected events have had on the gas market.

Figure 11: EU storage level and development of gas price 2021 - 2022.



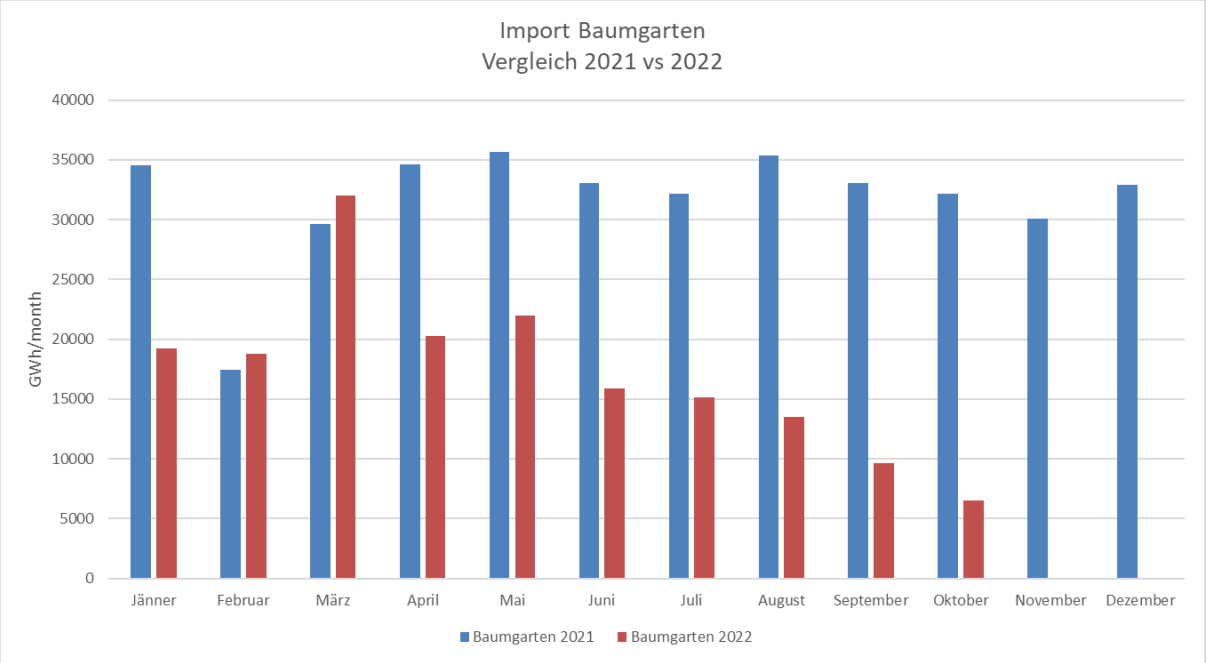
Source: AGGM

Unsurprisingly, Figure 11 shows that increased acquisition of storage volumes with a simultaneous reduction of gas volumes imported from Russia have led to a sharp increase in the gas price.

Taking this into account, a stronger differentiation of import routes into Austria with regard to security of supply must be implemented as soon as possible.

However, before concrete measures can be derived, more data and a more in-depth interpretation of the changing environment is required. In the following, changes at Austria's most important entry/exit points are examined.

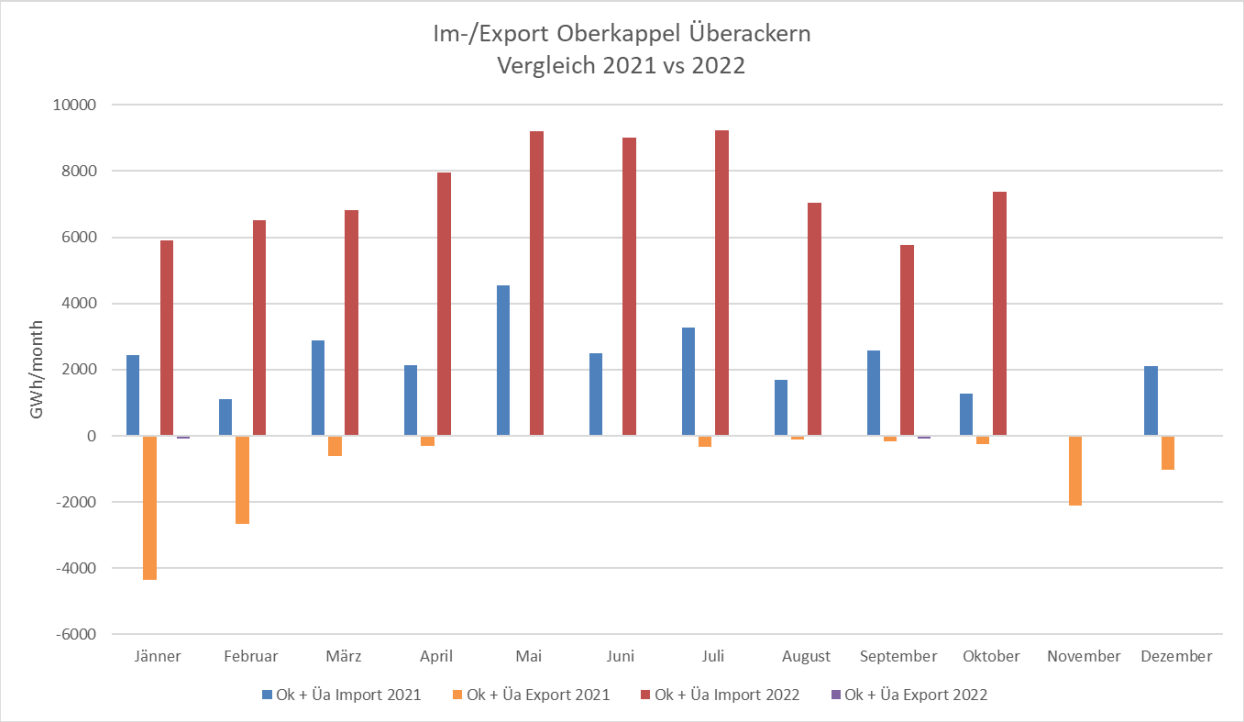
Figure 12: Physical flow Baumgarten 2021 to November 2022.



Source: AGGM platform, downloaded 10 November 2022

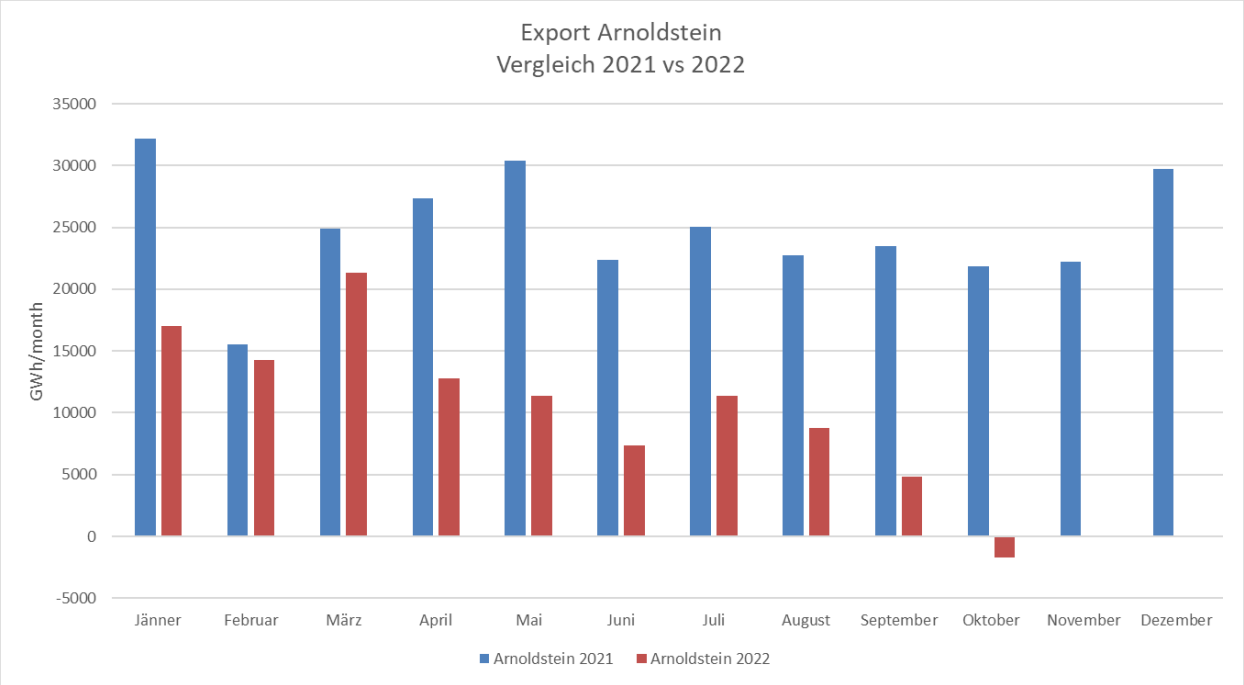
Figure 12 shows a significant reduction in physical import volumes through the Baumgarten cross-border coupling point, especially after March 2022. A comparison with Figure 13 shows that a change occurred between 2021 and 2022. Import flows from Germany to Austria were significantly increased, while exports almost came to a standstill in 2022.

Figure 13: Physical flow of imports and exports Oberkappel and Überackern 2021 to November 2022



Source: AGGM platform, downloaded 10 November 2022

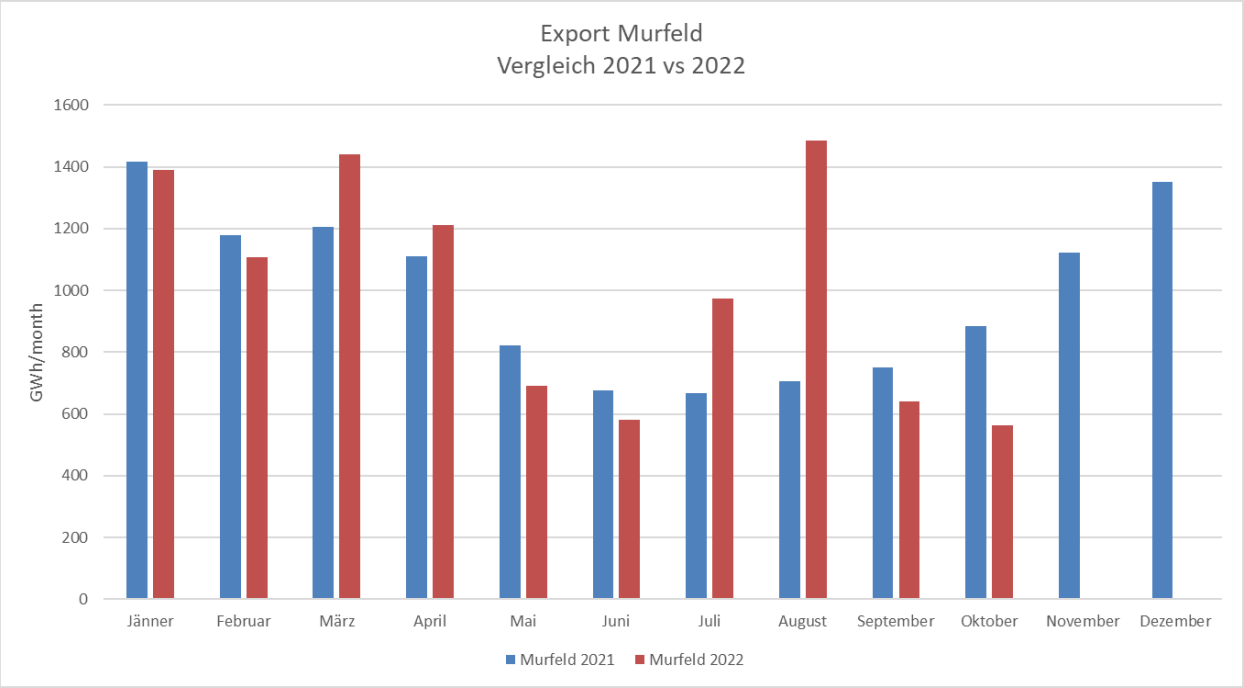
Figure 14: Physical flow Arnoldstein 2021 to November 2022.



Source: AGGM platform, downloaded 10 November 2022

The impact of the changed supply situation for Europe can also be seen at the Arnoldstein cross-border coupling point. It can be assumed that Italy is increasingly covering its demand through LNG and the TAP. In October, there was a physical import flow from Italy to Austria for the first time.

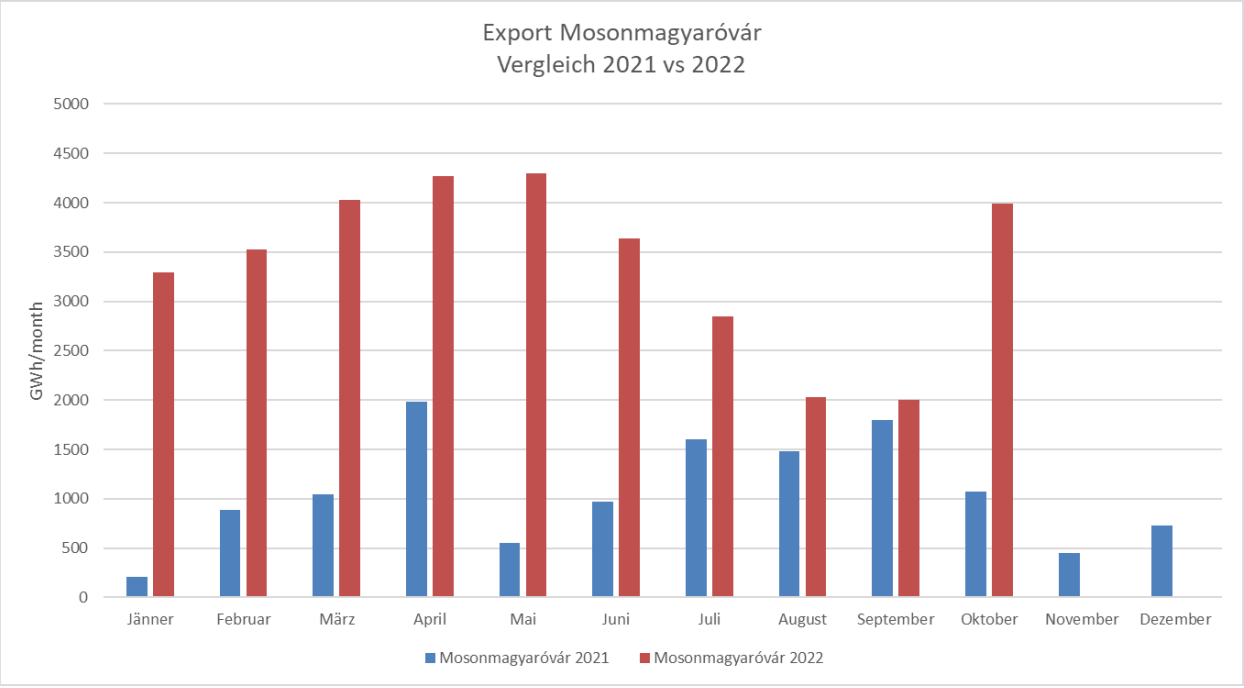
Figure 15: Physical flow Murfeld 2021 to November 2022.



Source: AGGM platform, downloaded 10 November 2022

The Murfeld cross-border coupling point is the only one in the market area East where flows have not changed significantly.

Figure 16: Physical flow Mosonmagyaróvár 2021 to November 2022.



Source: AGGM platform, downloaded 10 November 2022

Exports to Hungary via the Mosonmagyaróvár cross-border coupling point have increased significantly.

New supply sources for Austria

Currently, Austria's gas infrastructure is primarily oriented towards transporting gas from east to west. In order to be able to exploit new supply sources, especially from Central and Eastern Europe, transport capacities to and within Austria must be created accordingly. This requires not only the adaptation of existing pipelines, but also the construction of new gas infrastructure in Austria and neighboring countries.

Financing of necessary pipeline constructions

The existing instrument for market-driven infrastructure expansion (according to EU Regulation 2017/459 establishing a network code on mechanisms for capacity allocation in transmission systems - Network Code CAM) will not provide solutions in the current political situation: Traders no longer make long-term bookings and persist in take-or-pay contracts. This is where the public sector must step in and finance and commission the implementation of strategic infrastructure projects that are not supported by the market.

The required capacity at LNG terminals and the foreign transmission networks (from the import points/production sites to Austria) must be negotiated at the political level in a binding manner. Capacity supply (Kapazitätsbereitstellung) must also take into account the needs of neighboring countries. The import route via Oberkappel and Überackern (Upper Austria), for example, also contributes to meeting the gas demand of Hungary, Slovakia, Slovenia and Italy.

Long-term use of existing and new gas infrastructure

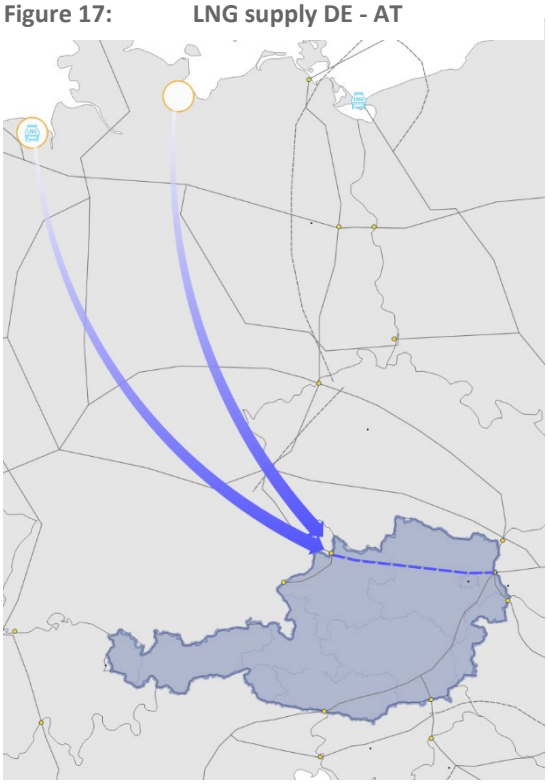
In any case, an important decision factor in infrastructure expansion is the subsequent use of infrastructure for decarbonized and climate-neutral gases. By all means, new gas transport pipelines are to be built "H2-ready", i.e. suitable for the transport of pure hydrogen.

2.3 Possible import routes

2.3.1 Route: Germany - Austria

Natural gas from Norway or LNG from the north German and Dutch ports represents an important import source for Austria and Europe. In order to be able to supply this gas to Austria, both the transport capacities through Germany and those within Austria from Oberkappel/Überackern to Baumgarten must be increased. This would require an expansion of the West-Austria-Gasleitung (WAG pipeline).

Figure 17: LNG supply DE - AT



Within Germany, there is a capacity bottleneck in the direction from north to south, especially if the usual supply from Germany changes (currently mainly via Waidhaus and Greifswald). If gas supplies from Russia are severely curtailed or eliminated altogether, expansion measures in the domestic German network are urgently needed. However, any German infrastructure expansions must not be limited to German demand, but cross-border capacities must also be secured.

Within Austria, completion of the WAG loop incl. modification of the compressor stations along the WAG incl. Baumgarten is required.

The implementation of the Austrian measures starts in the project GCA 2022/01 WAG Teil - Loop and will be explained in more detail there.

A major advantage of this option is that the West Austria Gasleitung (WAG) could be split into two separate pipelines in the future and one pipeline could be operated with natural gas and one with hydrogen. The hydrogen pipeline can be used for a transport from Ukraine via Austria to Germany as well as transport hydrogen from the north of Germany to Austria and further east.

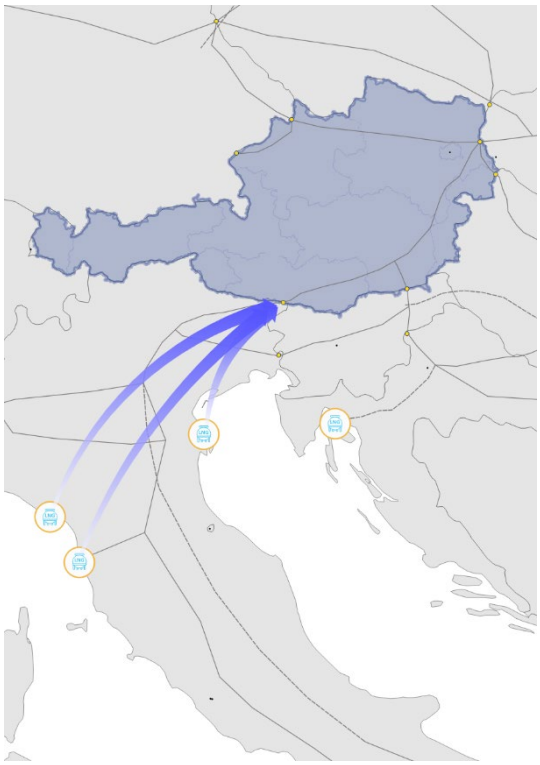
2.3.2 Route: Italy - Austria

Italy has also announced its intention to reduce its dependence on imports from Russian natural gas production. In the future, Italy could make greater use of sources from North Africa and Azerbaijan as well as LNG imports. A pipeline connection with Spain through the Mediterranean Sea is also under discussion.

Already now, Austria has the option of procuring gas via the three LNG terminals in Italy (still further expanded) and transporting it to Arnoldstein via the Italian pipeline network.

In Italy, a capacity of 720,000 Nm³/h is marketed in competition between Passo Gries (IT->CH) and Arnoldstein. From Arnoldstein towards Baumgarten, a capacity of 1,000,000 Nm³/h FZK is available.

Figure 18: LNG supply IT - AT



2.3.3 Route: LNG Terminal Krk Croatia – Slovenia – Austria

The LNG terminal in Krk has a capacity of approx. 2.5 billion Nm³/a and is fully booked until 2027 according to the capacity booking platform of LNG Croatia LLC. Nevertheless, this LNG terminal offers an import option for Austria, especially if the capacity of the terminal is expanded.

In 2020, the grid operators of Croatia, Slovenia and Austria have worked out three options to increase the capacity from Croatia towards Murfeld (Austria). The option of 250,000 Nm³/h offers an import possibility of approx. 17 TWh/a.

In Austria, Gas Connect Austria will have to, depending on the expansion stage, loop the SOL over its entire length, and build a compressor station in the Murfeld area. Trans Austria Gasleitung has to make adaptations at the compressor station Weitendorf and Eggendorf. For further information see GCA-2020/02, GCA-2020/03 GCA-2020/04, GCA-2015/08 and TAG 2016/01.

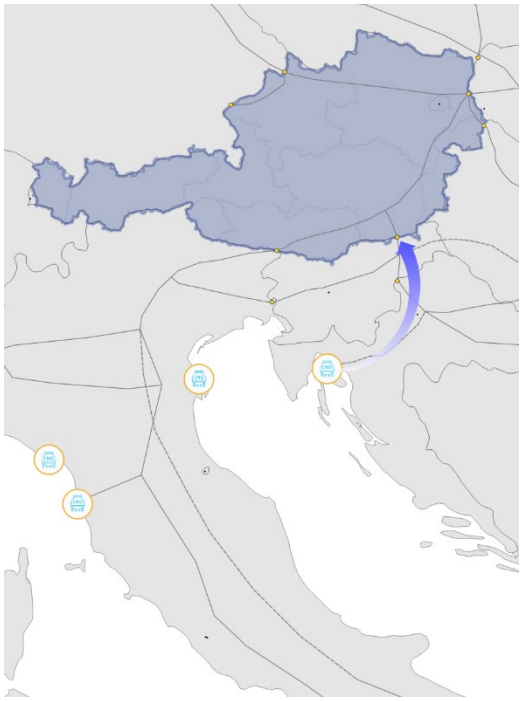


Figure 19: LNG supply KR - SL - AT

Conversion to hydrogen have would to be considered in a longer term, since there is no continuous parallel pipeline network.

2.4 Infrastructure standard

The infrastructure standard has been calculated in accordance with Regulation (EU) 2017/1938, in force since 01 November 2017. The Regulation concerns measures to safeguard the security of gas supply and repeals Regulation (EU) No. 994/2010, *(Security of Supply, SoS VO)*.

In cooperation with the transmission system operators, AGGM has calculated the infrastructure standard for the market area East.

The result of the N-1 formula for the market area East is 172 %. This result reflects security of supply only in terms of infrastructure.

Table 2: **Calculation of the infrastructure standard according to regulation (EU) No 2017/1938**

Facility	Techn. capacity [million Nm³/d]	Definition & Explanation
Baumgarten (GCA, WAG, TAG)	140.34	Exit Slovakia
Oberkappel	21.95	Minimum from Exit NCG and WAG cap. OK -> BM
Überackern	0	integrated into Oberkappel
Arnoldstein	17.29	Exit Italy
Freilassing & Laa/ Thaya	0.87	available technical capacity
EPm	**180.45**	**Technical capacity of entry points**
Production OMV	1.99	booked standard capacity
Production RAG	0.36	booked standard capacity
Biomethane production	0.06	booked standard capacity
Pm	**2.41**	**Max. technical domestic production**
Gas Storage OMV	23.39	at a working gas volume of 30%
Gas Storage RAG	14.20	at a working gas volume of 30%
7Fields transmission pipeline	0	only interruptible capacity
7Fields distribution area	6.49	at a working gas volume of 30%
Haidach distribution area	0	not connected in Austria
Sm	**44.07**	**Max. technical storage withdrawal capacity**
LNGm	**0**	**Max. technical LNG capacity**
Im	**140.34**	**Techn. capacity of the largest single infrastructure**
Dmax	**50.31**	**Max. daily gas demand** Baseline scenario max. from the next 10 years
N - 1	**172%**	

Source: AGGM; 2022

It should be noted that the calculated infrastructure standard is not a meaningful measure of a country's security of supply, because

- Only infrastructure is considered. There is no consideration of whether gas supply sources are actually available at the potential import points and whether they are being used.
- Import infrastructure in the market area East is also being used for transit through the MA East, and this capacity is not available for supply to the MA East. See also Figure 12 through Figure 16.
- The infrastructure standard is a static parameter. An assessment of security of supply must also consider whether the storage facilities that are named as entry points can be refilled.

This means that even if the infrastructure standard is high, it may be necessary to create additional capacity. Specifically for the MG East, this means that additional capacities, in particular from Germany and Slovenia, are required.

3 Hydrogen in Austria

3.1 Hydrogen demand and supply

3.1.1 Climate neutrality from 2040

For the declared goal of the federal government to achieve climate neutrality in Austria already in 2040, the Austrian gas infrastructure offers an optimal basis, enabling import of cost-efficient climate-neutral gases and to advance the national production. The hydrogen strategy for Austria builds on using already existing gas infrastructure for a pipeline-based transport of hydrogen by means of a conversion into hydrogen pipelines. Currently, the pipeline systems in Austria are already suitable for the transport of admixed hydrogen. According to ÖVGW guideline GB 210, a share of 10% hydrogen in the Austrian gas distribution network is already permitted on principle.

For the launch of the hydrogen market, the distribution network is of particular importance. The first clusters that are linking production and consumption, e.g. the H2 Collector East, will play a key role in getting the national hydrogen market up and running. This is because the main consumers of hydrogen in Austria, the industrial companies, are connected to the distribution grid. An early commitment of the government to hydrogen and rapidly scaling-up the infrastructure will result in planning and investment security for the industry in Austria, which is a production-heavy and CO2-emitting location.

3.1.2 Project: H2-Readiness

Taking into consideration the goal of climate neutrality until 2040, AGGM, the Austrian distribution system and transmission system operators have launched the Project H2-Readiness in the fall of 2020. Within the framework of this project, a roadmap for a dedicated hydrogen network is compiled to prepare the transformation to hydrogen transport in the existing gas network. Step by step, a hydrogen and a methane network are to be established in parallel, and an optimal usage of the existing methane network is to be ensured by rededicating it to a hydrogen network. Among other things, the hydrogen demand survey in Austrian industry which was conducted in spring 2022 will serve as the basis for the planning and the creation of a sales model.

For the survey, a questionnaire with three categories of gas demand was sent out to industrial customers:

- Methane (natural gas, biomethane, synthetic methane),
- Hydrogen (actual demand), or
- Hydrogen or methane (optional demand).

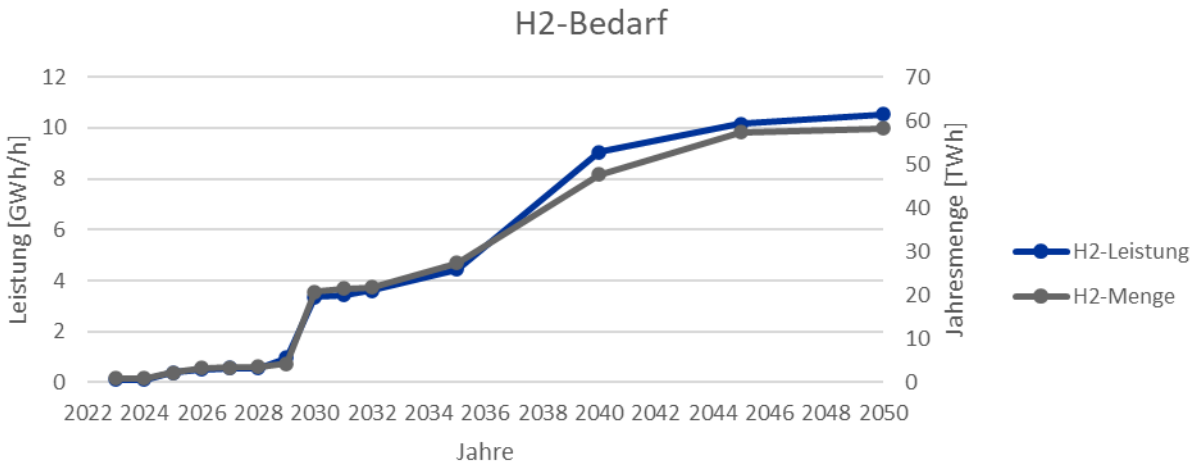
The survey was for the years spanning 2023 to 2050.

The result of the survey shows a clear interest of the companies in hydrogen and an accompanying decrease in the demand for methane.

In the years from 2023 to 2040, methane demand in the surveyed companies decreases by approx. 55%. Taking into account the goal of climate neutrality to be achieved in 2040, it should be noted here, that biomethane or synthetic methane will still continue to play an essential role in meeting demand in industry.

The first major hydrogen demands in Austria have already been reported for the year 2025 with an annual quantity of 2.3 TWh. There are significant increases in 2030 with a reported demand of approx. 21 TWh. A production of this hydrogen quantity corresponds to an electrolysis capacity of approx. 3.5 GW_{el}, with a utilization of 7500 full load hours and an efficiency of 80%. By 2040, hydrogen demand more than doubles compared to 2030 to approx. 47 TWh and a required connected load of about 9 GW. Until 2050, a further increase to 58 TWh hydrogen is visible in the demand survey, with the difference between 2040 and 2050 not referring to new consumers, but to an increase in demand in the companies that have already been purchasing hydrogen.

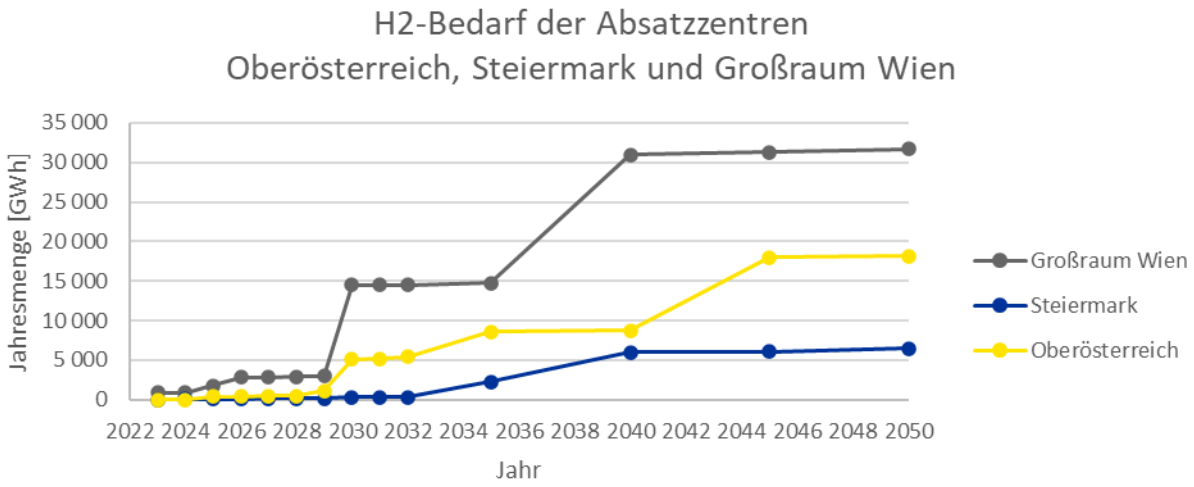
Figure 20: **Reported annual quantities and power of actual hydrogen demand (optional demand not considered) in the surveyed companies.**



Source: AGGM

On the federal state level, results were confirmed by industrial focal points such as Styria, Upper Austria and the Vienna metropolitan area. The surveyed hydrogen demand in Styria is only about 280 GWh in 2030, but this demand increases strongly to 6 TWh by 2040. For Upper Austria, significantly higher demands were reported, already around 5 TWh from 2030 and 8.8 TWh from 2040. In the third industrial focal point, the Vienna metropolitan area, about 14.5 TWh were reported for 2030 and approx. 31 TWh for 2040.

Figure 21: **Reported annual quantities and power of actual hydrogen demand (optional demand not considered) in the industrial focal points Upper Austria, Styria and the Vienna metropolitan area**



Source: AGGM

On the basis of the surveyed data, 3 hydrogen demand scenarios were created:

Demand scenarios:

- Minimal hydrogen demand (only actual reported hydrogen demands are considered)
- Medium hydrogen demand (optional reported hydrogen demands are considered)
- Maximal hydrogen demand (the demand of large customers who have not yet reported demands in the survey is assumed as 100% from 2040 onwards)

Subsequently, hydraulic calculations are to be used to show how sales can or could be covered in the future. For this purpose, the respective sales scenarios have been combined with 3 different sourcing scenarios.

Sourcing scenarios

- Import (supply via Baumgarten, Arnoldstein, Oberkappel/Überackern and Murfeld)
- Storage (supply via gas storage facilities that will be converted in the future) or
- De-centralized hydrogen production (supply via hydrogen production plants in Austria)

The results of the Hydrogen Roadmap are described in detail in LTiP 2022. Particularly relevant for transmission planning is that the sourcing scenario that assumes predominant import of hydrogen requires feed-in capacities of 3300 MW by 2030 and 9000 MW by 2040 from the transmission line to the distribution grid.

Beyond that, an analysis of the existing Austrian gas network has shown that existing pipelines are basically suitable for transporting hydrogen. It may nevertheless be necessary to make occasional adaptations to ensure that natural gas pipelines can be converted to hydrogen pipelines.

3.1.3 Where does hydrogen come from?

The national hydrogen strategy and other European countries consider green hydrogen to be an important building block for the goal of climate neutrality. Due to its geographical location and the already existing infrastructure, Austria has the potential to take on a hub function in hydrogen transport, as it already does in natural gas transport, and to maintain its role as a transit country. Furthermore, Austria has optimal possibilities to obtain hydrogen or to distribute it via its transit routes due to its very well-developed pipeline network and the border transfer points Arnoldstein, Baumgarten, Murfeld as well as Oberkappel and Überackern. Currently, different sources[1] for hydrogen import to Austria are under discussion. In the North/Baltic Sea, the production of offshore wind power and hydrogen is being promoted, which could represent a supply option via Germany. In the East, the production of onshore wind power and hydrogen in Ukraine and Romania, respectively, is being investigated, which represents a possible supply route via Slovakia to Baumgarten. From the south, hydrogen from solar power or onshore wind power production from Tunisia could be brought to the Austrian market area via Italy.

Due to limitations in available areas as well as limited potentials of wind, solar and water energy, the EU will still be dependent on imports of hydrogen to cover the demand. Therefore, it will be necessary for Austria to purchase hydrogen from the global market. Currently, there are some projects for the production of hydrogen outside the EU (e.g. in Australia "HySupply" or in Africa "Potential Atlas Green Hydrogen"), but these are still in the concept or planning phase.

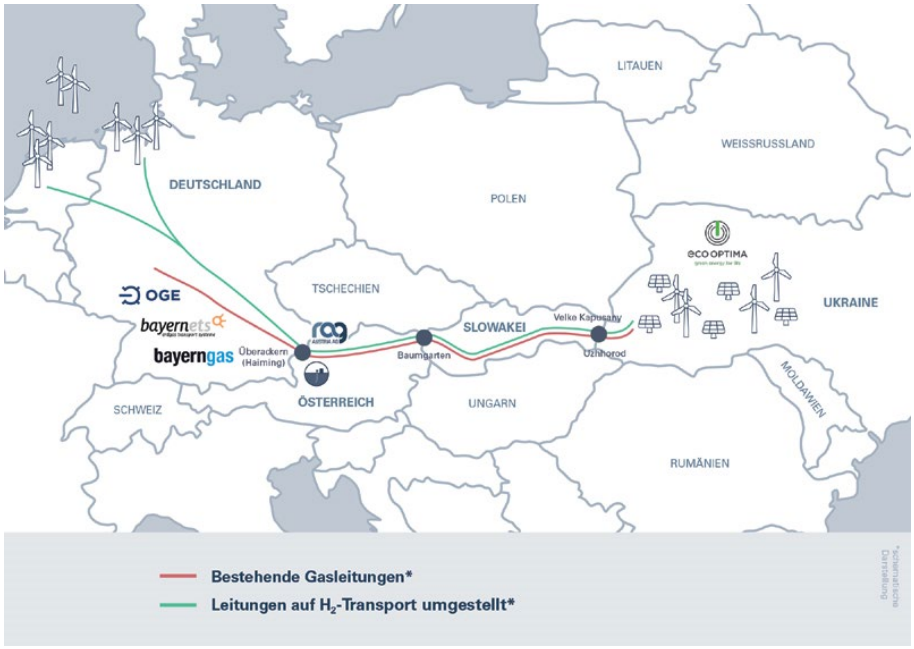
3.1.3.1 H2EU+ Store

A project planned and initiated by RAG AG for the production, storage and transport of green hydrogen is the H2EU+Store. Ukrainian partners are to produce green hydrogen in Ukraine using solar and wind energy, which is to be transported to Austria via long-distance pipelines through Slovakia and the Baumgarten transfer station. By expanding storage volumes in Austria, hydrogen can then be stored or transported further to Germany or Central Europe.[2]

[1] see EHB: Analysing future demand, supply, and transport of hydrogen, June 2021

[2] www.h2euplusstore.com

Figure 22: H2EU+Store project chart



Source: www.h2euplusstore.com

3.2 Hydrogen plans of transmission system operators

3.2.1 WAG Loop as a connective link

Recent results from the European Hydrogen Backbone (EHB) initiative and the World Energy Council (WEC) import study indicate, that GCA will be able to provide the necessary infrastructure to transport significant quantities of hydrogen at the Überackern and Oberkappel border interconnection points by 2030. A project for potential hydrogen transport in the future (HYD-N-757) has already been included in the European network development plan TYNDP 2022.

The expansion of WAG and Penta West into two fully closed pipeline strings offers full flexibility for the transport of pure hydrogen and methane. Assuming demand and interregional production of hydrogen, the amount of hydrogen transported can be tripled. The bidirectional WAG Loop provides a hydrogen pipeline that can deliver green energy to industrial sites in Austria, but also to Germany. Furthermore, the WAG Loop has the potential to secure Austria's status as an industrial location, to maintain its already established hub function or to expand it with hydrogen. A rapid establishment of a hydrogen network would allow Austria to become a central European transport and trade hub and to exploit its geographical role in an economically sensible way. Gas Connect Austria is working together with neighboring network operators to obtain (hydrogen) PCI project status for the WAG LOOP full expansion project.

3.2.2 SOL H2 Project

Another potential future source of hydrogen is the LNG import terminal.

Coordinated with the Slovenian transmission system operator Plinovodi, the Croatian transmission system operator Plinacro and GCA, there was a timely submission as PCI candidate, which on the Austrian side bears the name SOL H2 (ENTSOG code HYD-N-1354).

It should be emphasized that this coordinated submission at the European level, in the perspective eligibility of projects under the amended TEN-E Regulation.

In any case, transmission system operators along the route to Austria are ready to jointly pursue the vision of hydrogen and to coordinate potential infrastructure in a timely manner in order to create a further import possibility for the Austrian market area.

3.2.3 TAG – South-North Corridor

TAG will enable the hydrogen import from 2030 onwards. Due to its central location at the intersection of the current European gas and future hydrogen transit corridors from south to north and from west to east, TAG GmbH's transmission system will play an essential role in the future supply of Austria and Europe with climate-neutral gases.

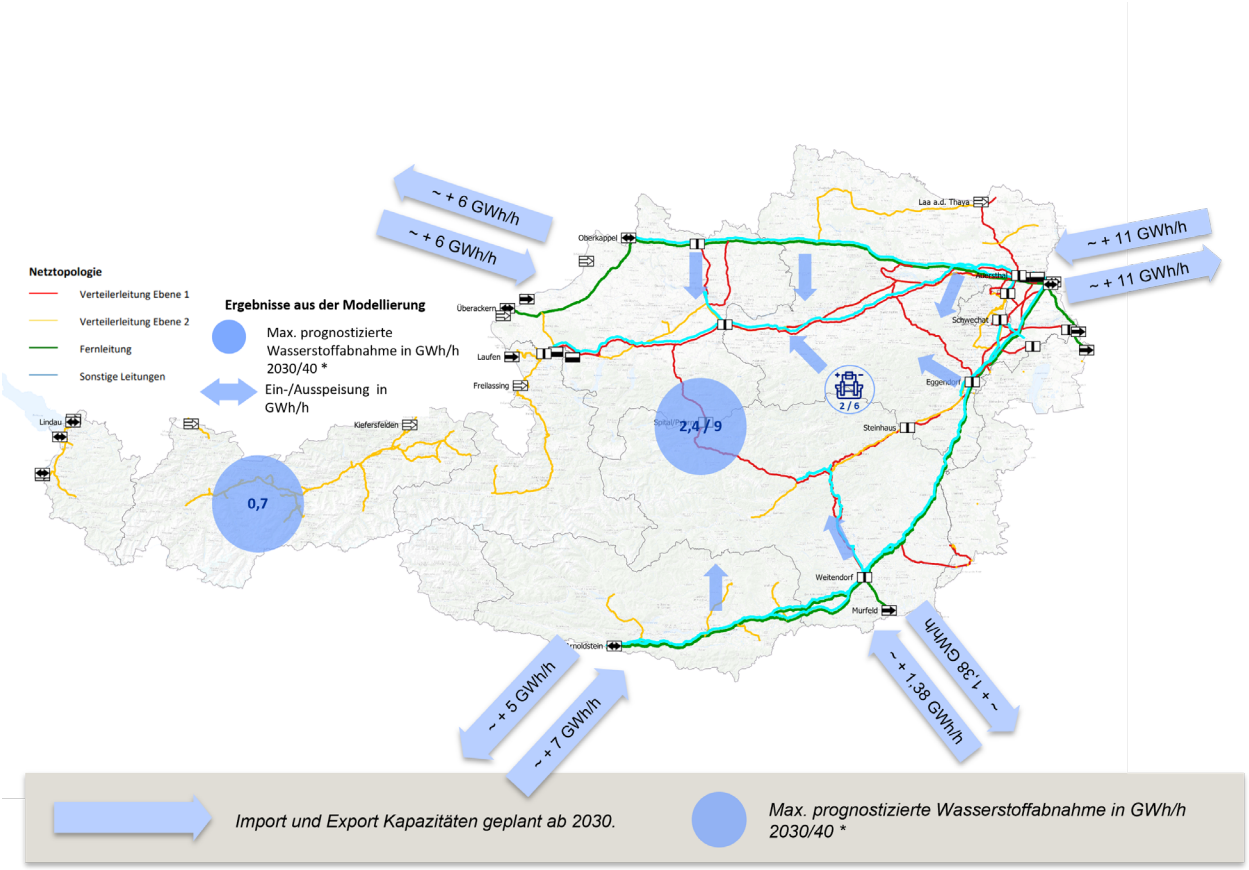
The corresponding project "H2 Readiness of the TAG Pipeline System" (HYD-N-986), which proposes a cost-efficient conversion of existing gas infrastructure for the potential transport of hydrogen from the year 2030 onwards, is included in the European network development plan TYNDP 2022, has been submitted as PCI candidate and demonstrates TAG GmbH's readiness for a future based on sustainable energy. In a first phase, the project comprises a complete repurposing of one out of three pipelines of the TAG pipeline system and all relevant facilities that are required for a bidirectional transport of up to 100% hydrogen, between the respective interconnection points at the Italian-Austrian and the Austro-Slovakian border.

The bidirectional flow of hydrogen via the TAG pipeline system has the potential to connect the future hydrogen markets of Italy, Austria, Germany and Central/Eastern Europe, which is why the corresponding TAG project is also part of the European Hydrogen Backbone and European Clean Hydrogen Alliance initiatives.

3.3 Capacity scenario H2

If the projects presented in chapter 3.2 are implemented, the indicative hydrogen capacities shown in Figure 23 can be reported. On the WAG, an indicative capacity of 6 GW hydrogen can be transported. On the TAG of about 7 GW Entry, 5 GW Exit and on the SOL min. 1.38 GW. This results in an entry/exit capacity of 6 GW in Oberkappel/Überackern, an entry/exit capacity of 5 GW in Arnoldstein and an entry/exit capacity of 11 GW in Baumgarten.

Figure 23: H2 Capacity scenario



* Wenn kein Zweiter Wert dann gibt es keine Veränderung zwischen 2030 und 2040

Source: AGGM, GCA, TAG

Figure 23 also shows the total hydrogen capacities required for Austrian end consumers. The required hydrogen capacities are the result of the Hydrogen Roadmap (see Chapter 3.1.2).

Based on the hydrogen survey and the demands to be covered in Austria, hydraulic calculations are reported here. Table 3: Required capacities for supply in Austria shows the required capacities of the Junction of TAG and WAG for the years 2030 and 2040.

Table 3: Required capacities for supply in Austria

GWh/h / Junction	2030	2040	2050
Junction - TAG	2.5	6 to 8	6 to 9
Junction - WAG	1	2 to 5	3 to 6

3.4 What is needed - Conclusion

3.4.1 Creating a regulatory framework

Currently, the European legal framework for the internal gas market is being revised and adapted to the regulations for a hydrogen market. Regarding regulations for the unbundling of hydrogen networks, it is essential to find solutions that offer the possibility of operating H2 and natural gas networks together, thus creating cost-reducing synergies. There is a need to quickly create regulations concerning the promotion of investments related to hydrogen and to issue regulations for the conversion of natural gas networks to hydrogen networks. In order to minimize risks related to investments in hydrogen infrastructure, it is necessary to create binding regulations related to tariffing and cost recognition. In order to enable the import of hydrogen and to ensure the scaling-up of the hydrogen market, appropriate framework conditions must be created quickly.

3.4.2 Project list

The following Table 4: Planning Projects for additional hydrogen capacities shows planned projects of the Austrian transmission system operators for the realization of the European Hydrogen Backbone and for the supply of Austria. These plans include a capacity expansion for the hydrogen transport from south to north as well es from east to west.

Table 4: Planning Projects for additional hydrogen capacities

Project sponsor	Project number	Project name	Implementation time frame [years]	Planned completion [date]
GCA	2022/02	Hydrogen project WAG	4.5	
GCA	2022/03	Hydrogen project Penta	4.5	
GCA	2022/04	Hydrogen project SOL	3.5	
TAG	2022/01	H2 Readiness of the TAG Pipeline System	4.5	

Source: Gas Connect Austria, TAG GmbH; 2022

4 Planning framework for the Coordinated Network Development Plan 2022

This chapter characterizes the framework and underlying conditions for network development planning in Austria and Europe. The aim is to provide an insight into current developments and into future regional projects in Europe, especially in neighboring regions. In conclusion, potential consequences for the Austrian gas transmission system will be presented.

4.1 Considered Network Development Plans

The following section ensures the necessary coherence with the Gas Regional Investment Plans according to Regulation (EC) No. 715/2009 Article 12 Section 1, the Ten Year Network Development Plan according to Regulation (EC) No. 715/2009 Article 8 Section 3 and the Long-Term integrated Planning (LTiP). To enable a comprehensive examination of the framework conditions, planning measures and strategic goals, a short insight into the 2022 network development plan for power of the APG transmission network is provided in addition to the plans in the gas sector. Due to sector coupling measures and plans between the gas and electricity infrastructure, for example electrolyzers for hydrogen production, an integrated examination of both sectors is becoming increasingly important.

4.1.1 Ten Year Network Development Plan 2022

Biannually, the European Network of Transmission System Operators for Gas (ENTSOG) prepares the non-binding, community-wide Ten Year Network Development Plan (TYNDP) with a planning horizon of min. ten years. The TYNDP provides a picture of the European gas infrastructure and, in particular, comprises detailed information on various development scenarios, market integration and security of supply. In 2018, the TYNDP was created in cooperation with the Network of Transmission System Operators Electricity (ENTSO-E) for the first time.

One of the objectives of the TYNDP is, to provide modelling of an integrated gas network in order to be able to identify future potential investment gaps in a timely manner, particularly with respect to cross-border capacities. Pursuant to Regulation (EC) No 715/2009, the Agency for the Cooperation of Energy Regulators (ACER) reviews the national Ten Year network development plans to assess their consistency with the TYNDP and, in the case of inconsistencies, recommends amendments to the national Ten Year network development plans as appropriate.

Projects in the TYNDP are categorized into following categories. In addition to that, the PCI-status according to the current PCI-List is assigned to the corresponding project.

- Projects with final investment decision (“FID“)
- Projects without final investment decision
  - with advanced status (“Advanced“)
  - with less advanced status (“Less-Advanced“)

TYNDP 2022 builds on findings and lessons learned from TYNDP 2020 and addresses future challenges through new modeling capabilities with respect to evaluating a hybrid gas system in which methane and hydrogen can coexist as energy carriers.

The published hydrogen and energy system integration strategies of the European Union are taken into account by including hybrid infrastructure and future projects. The hydrogen market including all possible clusters, cross-border and interconnected hydrogen infrastructure or even admixture with natural gas will be considered coherently for the first time on this level of detail within the TYNDP of 2022.

Table 5: TYNDP 2022 projects with a focus on Austria shows Austrian projects that are part of the TYNDP 2022. For further details see also the project table of TYNDP 2022 or the "TYNDP2022 List of Projects" for an overall listing of TYNDP 2022 projects.

Table 5: TYNDP 2022 projects with a focus on Austria

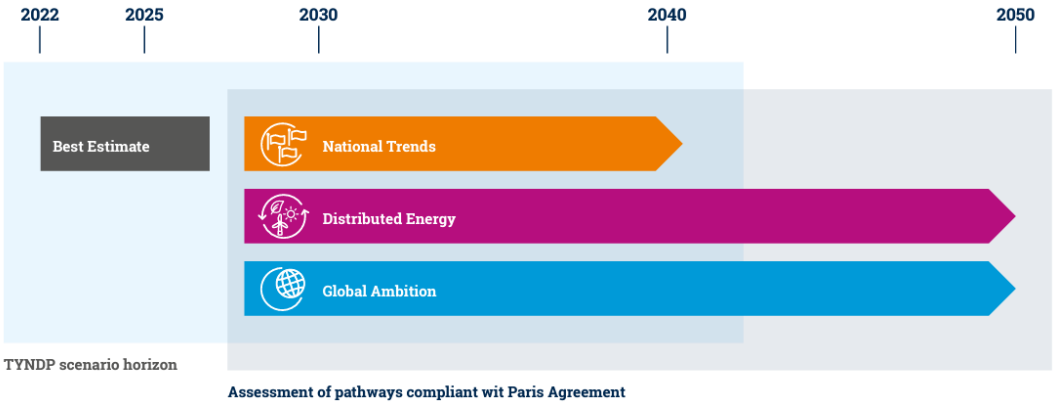
TYNDP project nr.	Project name	Status in TYNDP 2022	Suitable for rising H2 amounts	Projects in CNDP 2022	5th PCI List
TRA-N-954	TAG Reverse Flow	Less-Advanced	Yes	TAG 2016/01	No
TRA-N-766	Entry Murfeld	Less-Advanced	Yes	GCA 2015/08	No
TRA-N-389	Upgrade of Murfeld/Ceršak interconnection	Less-Advanced	Yes		No
TRA-N-600	Czech-Austrian Interconnection (AT)	Less-Advanced	Yes	GCA 2015/01a	No
TRA-N-1059	Czech-Austrian Interconnection (CZ)	Less-Advanced	Yes	GCA 2015/01a	No
OTH-N-604	P2G4A.	Less-Advanced			No
HYD-N-757	H2 Backbone WAG + Penta West	Less Advanced		GCA 2022/02 GCA 2022/03	No
HYD-N-986	H2 Readiness of the TAG pipeline system	Less Advanced		TAG 2022/01	No

Source: ENTSOG, TYNDP 2022 – Annex A & TYNDP 2022 List of Projects

4.1.1.1 Scenarios for the Ten Year Network Development Plan 2022

For the first time, in TYNDP 2018, ENTSO-G developed together with ENTSO-E joint scenarios for a future low-carbon energy system, based on an integrated approach that views electricity production and consumption together with gas demand and supply and considers the scenarios' accordance with EU climate goals and raw material prices. These different scenarios show possible future European energy developments, so-called "storylines" for the European gas and power systems until 2050. The best estimate scenario for 2022 is based on the input of the transmission system operators and reflects all current national and European regulations. Following three storylines, which have been developed together by the ENTSOs and the stakeholders based on different methodologies, and which also represent different economic and social frameworks, are being anticipated for 2030 and 2040/2050.

Figure 24: Scenario framework for the 2022 TYNDP



Source: TYNDP 2022

- **National Trends (NT)**
  - Bottom-up approach based on input data of the TSO and DSO according to the 2030 national climate and energy plans of the member states
  - In conformity with the European climate and energy framework 2030
    - Reduction of greenhouse gas emissions by min. 40% compared to 1990
    - min. 32% energy from renewable sources
    - increase of energy efficiency by min. 32,5%
  - In conformity with the EU long-term goal for 2050
    - Reduction of 80% – 95% of greenhouse gas emissions compared to 1990
- **Global Ambition (GA)**
  - Top-Down approach by ENTSO-E and ENTSO-G according to the political vision of the European commission
  - In conformity with the 1,5 °C goal of the Paris Climate Agreement
  - Reduction of greenhouse gas emissions of min. 55% until 2030 and net-zero greenhouse gas emissions by 2050
  - In conformity with the European climate and energy framework 2030
  - Focus on centralized energy production
  - Cost reduction through large-scale production of renewable technologies

- Imports continue to play a role

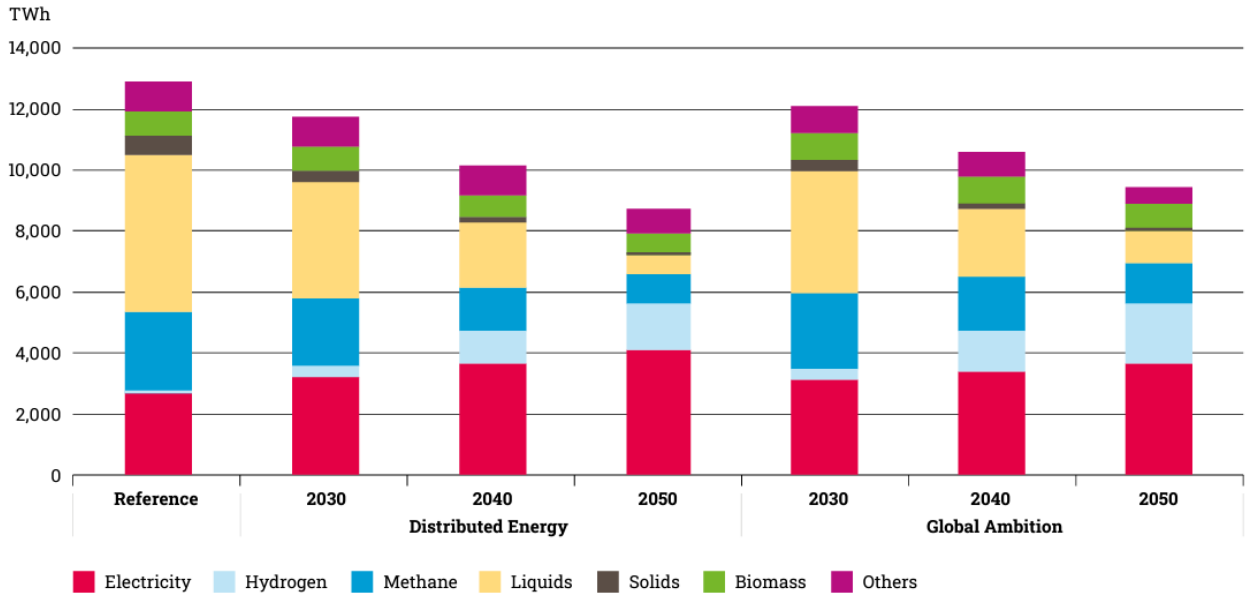
- **Distributed Energy (DE)**
  - Top-Down approach by ENTSO-E and ENTSO-G according to the political vision of the European commission
  - In conformity with the 1,5 °C goal of the Paris Climate Agreement
  - Reduction of greenhouse gas emissions of min. 55% until 2030 and net-zero greenhouse gas emissions by 2050
  - In conformity with the European climate and energy framework 2030
  - Focus is on society's willingness to set energy autonomy based on available domestic renewable energy sources and to adopt changes in lifestyle, and a strong decentralized drive towards decarbonization
  - Focus on the end-consumer as a “prosumer“, who actively participates in the energy market
  - “Small-scale“ applications and circular economy

4.1.1.2 Energy demand according to TYNDP 2002 scenarios

The basis for the assessment of energy demand is the assumption that energy efficiency in the EU can be significantly improved and that a reduction in energy demand is possible by 2050. Important are furthermore:

- The direct use of electricity from renewable energy sources and an adjustment of the demand
- Variable renewable energies are more productive because they can produce renewable hydrogen whenever the electricity demand is lower than the available renewable capacities
- The need for additional renewables and decarbonization capacities is lower due to the integration of hydrogen in the gas grid and short-term battery solutions
- The storage capacity of the gas grid provides flexibility to the power grid

Figure 25: Energy demand for different energy sources in EU27



Source: TYNDP 2022

In the "Distributed Energy" scenario, electricity accounts for 52% of the final energy demand in 2050, and gaseous hydrogen (including non-energy use) for 17%. In the "Global Ambition" scenario, these shares reach 43% and 21% in 2050. The final energy consumption (including electricity losses and excluding non-energy use) of "Distributed Energy" and "Global Ambition" is 7,812 TWh and 8,412 TWh, in 2050 in the European member states.

4.1.1.3 The role of gaseous energy carriers in TYNDP 2022

The basic premise for the role of gaseous energy sources in the TYNDP 2022 is that a well-integrated system can deliver efficient decarbonization solutions and that European gas generation and electricity generation will be carbon neutral by 2050.

The European hydrogen market is an opportunity for the EU to participate in a global clean energy market and import carbon-free energy.

- The integration of electricity, methane, and hydrogen infrastructures offers a wide range of options to meet short-term and seasonal flexibility needs in a net-zero energy system.
- The development of hydrogen and synthetic fuels through electrolysis will further support expansion of wind and solar power. This makes hydrogen a key player in the overall system.
    - Hydrogen can open up the full potential of renewable electricity resources and will contribute to greater energy autonomy in Europe.
    - The European hydrogen market is an opportunity for the EU to take part in a global clean energy market and to import carbon-free energy.

Another potential considered in TYNDP 2022 is Europe's role in the production of renewable methane (e.g. biomethane) and hydrogen.

An analysis of supply potentials for methane and hydrogen shows that the EU needs to use all of its renewable energy sources in either of the scenarios in order to support decarbonization efficiency and limit the dependence on imports. Thus, for reasons of cost and energy efficiency, both methane and hydrogen will be in use alongside each other, to varying degrees and with different developments.

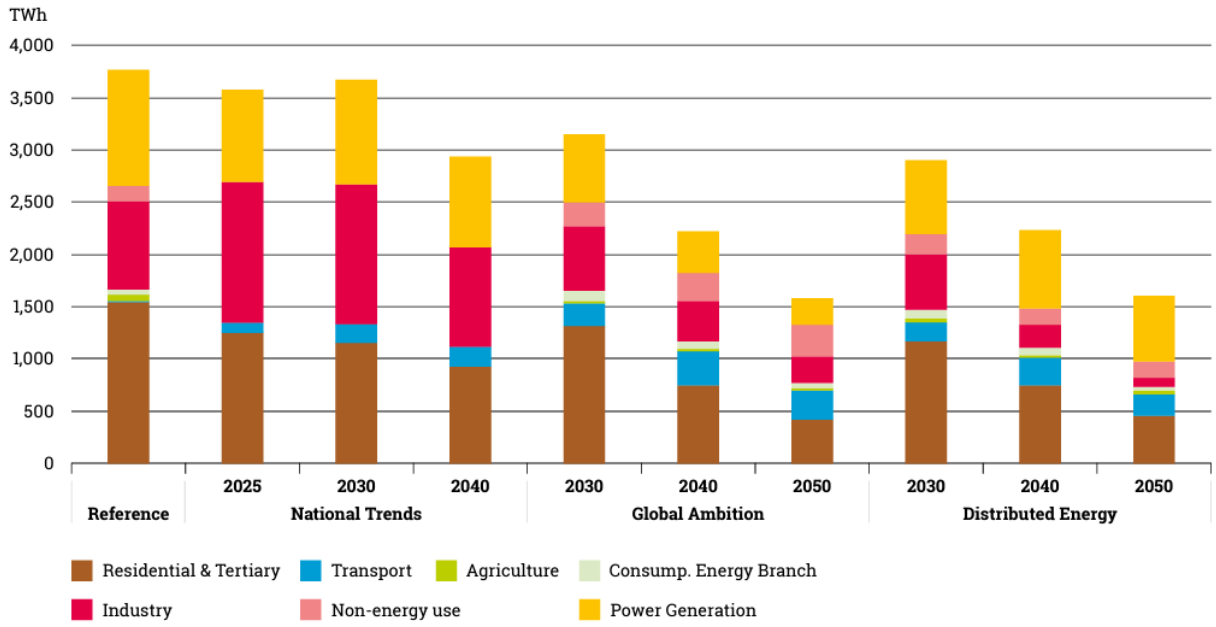
In the top-down scenarios DE and GA (Distributed Energy and Global Ambition), the framework for gaseous energy carriers is fixed. If instead the bottom-up approach of the National Trends Scenario is considered, the assumptions for methane and hydrogen are not yet so clear. Current national policies in many countries do not always include a long-term vision beyond 2030 and neither consider shifting gas demand from methane to hydrogen nor significant CCU/S capacities.

As electrification increases, the seasonality of gas demand remains significant because the shift in heating demand toward electrification is compensated by the increasing volatility of electricity demand.

Methane

In the results of the TYNDP Scenario Report of April 2022, national development plans display in their gas demand which plans are related to methane as an energy carrier. Methane used as a gaseous energy carrier continues to play a major role, with very limited demand development until 2030. However, after 2030, methane demand decreases with the implementation of some member states' national strategies intending to meet domestic hydrogen demand.

Figure 26: Methane demand across sectors in EU27

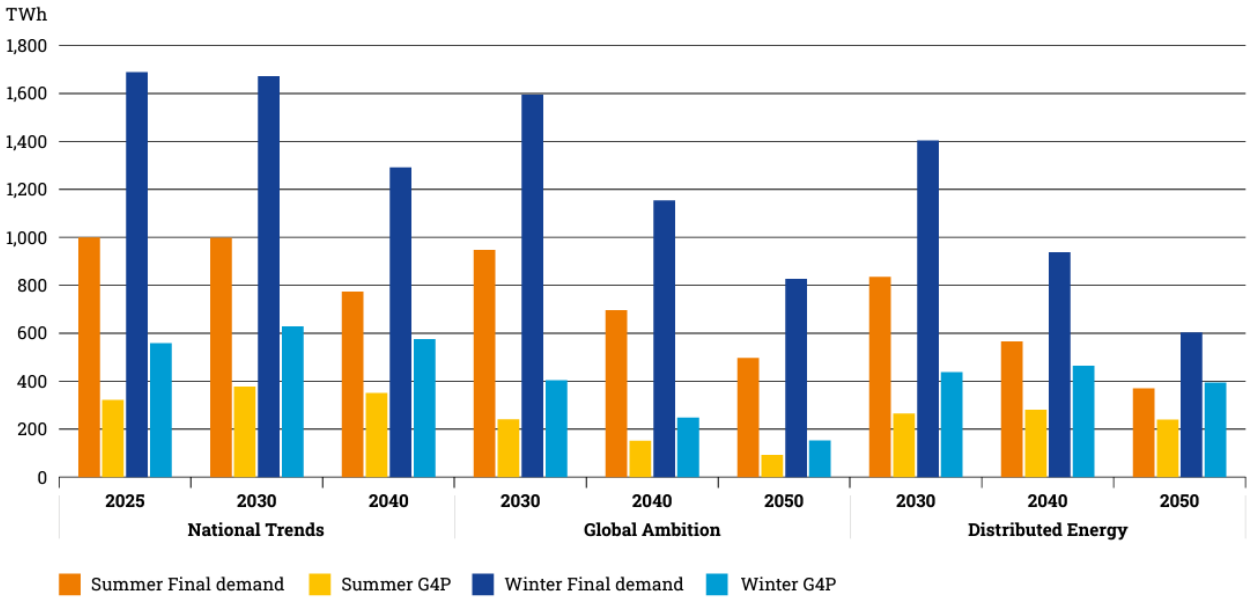


Source: TYNDP 2022

The final development of methane demand varies from region to region. Due to the high dependence on coal and the conversion from coal to methane, methane demand for heating purposes tends to increase in Central and Eastern Europe, while other regions aim more towards electrification.

As shown in Figure 26, methane demand decreases with the development of hydrogen after 2030. Still, methane is needed in all scenarios to meet the EU's energy demand until 2050. The demand for methane decreases through a decrease in final demand, including demand for non-energy use as well as for hydrogen production (974 TWh in Distributed Energy 2050 and 1,328 TWh in Global Ambition 2050).

Figure 27: Methane demand by season in EU27



Source: TYNDP 2022

Hydrogen

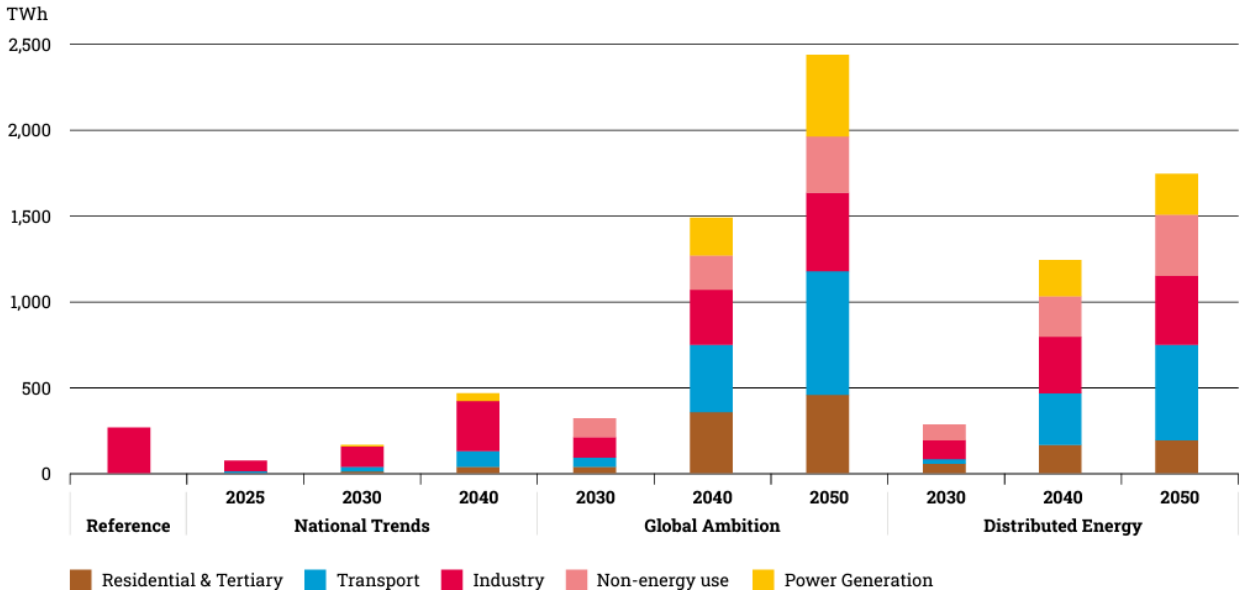
In all scenarios, hydrogen demand develops from 2030 onwards and hydrogen becomes the most important gaseous energy carrier in 2050. Today, hydrogen is mainly used as a raw material in industry. However, as the demand for clean, gaseous energy increases, most prominently in the context of CO21- and EU climate and energy targets, hydrogen will be used mainly for its energy content by 2040 - quantified in TWh - and its use as a raw material will become less significant over time.

On the EU level, hydrogen demand develops slowly at first due to the different national targets and increases steadily from 2030 onwards.

In the GA and DE scenarios, significant amounts of hydrogen are required to meet COP 21 goals and EU climate and energy policy targets and to achieve CO2 neutrality by 2050. In both the Distributed Energy and the Global Ambition scenario, domestic production and import of renewable hydrogen are required, but the scenarios have different transition pathways:

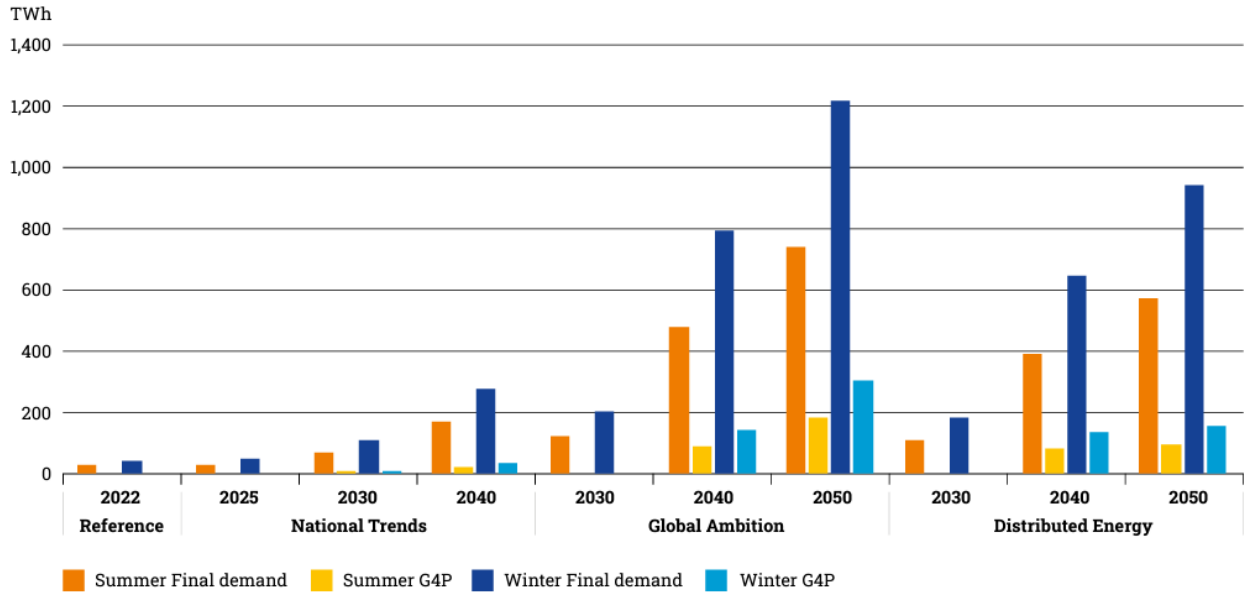
- Distributed Energy: A development in hydrogen demand is foreseen in relation to the development of production capacities in the EU (1,744 TWh in 2050).
- Global Ambition: Access to an international clean hydrogen market as part of a transition to a global supply of energy is foreseen to support a faster development of hydrogen demand (749 TW of imports of renewable hydrogen in 2050).

Figure 28: Hydrogen demand across sectors in EU27



Source: TYNDP 2022

Figure 29: Hydrogen demand by season in EU27



Source: TYNDP 2022

4.1.2 Gas Regional Investment Plan

The regional gas investment plans (GRIP - Gas Resource and Infrastructure Plan) must be prepared and published every two years by the respective transmission system operators in accordance with Directive (EU) 2009/74 Art. 7 and Regulation (EU) 715/2009. GRIPs are built on the data sets from TYNDPs and, in contrast to TYNDP, have a narrower planning framework of 10 years. The aim of these regional plans is to present an integrated and regional overview of future dynamic developments in the gas market by taking an integrated and regional perspective of supply scenarios, market integration, security of supply (SoS) as well as hydraulic analyses.

The current CEE (Central Eastern Europe) GRIP was published in 2021 and is still based on TYNDP 2020 projects and frameworks. As in the previous plans, six regional (partly overlapping) investment plans were prepared and published in the fifth version:

- GRIP North-West
- **GRIP Central Eastern Europe CEE** (with Austrian participation, TAG GmbH & Gas Connect Austria)
- GRIP Baltic Energy Market Interconnection Plan (BEMIP)
- **GRIP Southern Corridor SC** (with Austrian participation, TAG GmbH & Gas Connect Austria)
- GRIP South-North Corridor
- GRIP South

Since GRIPs are based on the same data as TYNDPs, Austrian projects from table 5 are also part of the GRIPs CCE and SC. In total, 109 gas infrastructure projects are included in GRIP 2021 and 12 of them have a relation to Austria. Included are also cross-border transports between:

1) Austria –> Hungary
2) Austria <–> Slovenia
3) Austria <–> Germany
4) Austria <–> Czechia
5) Austria <–> Italy

Source: ENTSOG, CEE GRIP 2021 Main Report

GRIP CCE 2021 also refers to hydrogen and Austria's hydrogen strategies. The national hydrogen strategy as well as visions of GCA and TAG and the importance of the European Hydrogen Backbone (EHB) are discussed briefly.

4.1.3 PCI projects concerning Austria

PCI are mainly cross-border, key infrastructure projects (gas, electricity, oil, smartgrid, CO_2), within the European Union aimed at making affordable, secure and sustainable energy available to all citizens in line with the Paris climate targets. According to Regulation (EU) 347/2013 (so called "TEN-E" regulation), the list is created and published as a delegated regulation by the European Commission biannually. The current (fifth) PCI list[3] was published on 19 November and includes 98 projects: 67 projects for power transmission and storage, 20 gas projects (which had already been included in the fourth PCI list), six CO2-network projects und five projects for smart grids.

One change between the fourth and fifth PCI lists (besides the reduced number of projects from 149 to 67) is reflected in the evolving policy priorities related to achieving EU carbon neutrality targets and the transition to clean energy. Neither new gas infrastructure projects or now new oil projects are included. This clearly shifts the focus of member state infrastructures towards the EU's decarbonization goals.

However, gas projects are not entirely removed from the 5th PCI list. The number of PCI projects in the gas sector was reduced from 32 projects in the fourth list to 20 in the fifth. These projects are necessary to ensure supply security for all member states. New gas infrastructure projects are not supported by the current proposal of the European Commission. On the one hand, this underlines the robustness of the existing EU gas network, on the other, it also shows the determination of the EU to phase out support for fossil fuel infrastructure.

The selected projects benefit from accelerated approval and implementation processes (up to 3 years and 6 months) and potential access to European Union funding.

These projects were selected according to the following criteria:

- Significant impact on at least two EU countries
- Improvement of market integration or integration of national energy grids
- Boost in competition by enabling alternative transit routes
- Increase in security of supply (SoS)
- Contribution to the EU's climate and energy goals through integration of renewable energy

In the cluster definitions of the 5th PCI list, Austria is assigned to the third priority corridor electricity "Priority Corridor North-South Electricity Interconnections in Central Eastern and South Europe ("NSI East Electricity")" listed under sub-item 3.1 and 3.28:

[3] Annex to the 4th PCI list: https://ec.europa.eu/energy/sites/ener/files/c_2019_7772_1_annex.pdf

Table 6: Corridor Austria – Germany in the 5th PCI list

Number	Definition
3.1	Cluster Austria — Germany, including the following PCIs:
	3.1.1 Interconnection between St. Peter (AT) and Isar (DE)
	3.1.2 Internal line between St. Peter and Tauern (AT)
	3.1.4 Internal line between Westtirol and Zell-Ziller (AT)
3.28	Internal line within Austria between Lienz and Obersielach

Source: European Comission, Annex to the 5th PCI list, November 2021

In contrast to the 4th PCI list, the 5th PCI list no longer makes a reference between Austria and a gas priority corridor. Austria is no longer listed in project number 6.24 or in project number 6.26 (including the project "GCA 2015/08: Entry/Exit Murfeld (AT)" and "Upgrade of Murfeld/Ceršak interconnection (AT-SI)").

4.1.4 2021 Long-term integrated planning 2022

Along with its role as market area manager and the associated task of creating the CNDP, AGGM prepares a long-term integrated planning (LTiP) for the gas distribution network infrastructure in Austria.

The overall objective of long-term integrated planning is to ensure the necessary transport capacities in the distribution area, thereby supplying end consumers as well as assuring transport needs of conventional and renewable gas of storage facilities and producers.

For the first time, not only end-user methane demand but also future hydrogen demand was determined and is presented in the sales scenarios up to 2050.

End-user demand is analyzed based on 3 sales scenarios, assuming three different development options for the conversion from methane to hydrogen.

Each of the three demand scenarios is described in terms of the maximum possible hourly flow rate on the one hand and expected annual demand (with a winter with approx. 3000 heating degree days) on the other. The maximum possible hourly flow rate is used as the design basis for distribution network infrastructure. This means that infrastructure must be designed in such way that it can safely transport the maximum possible hourly flow rate at any given time.

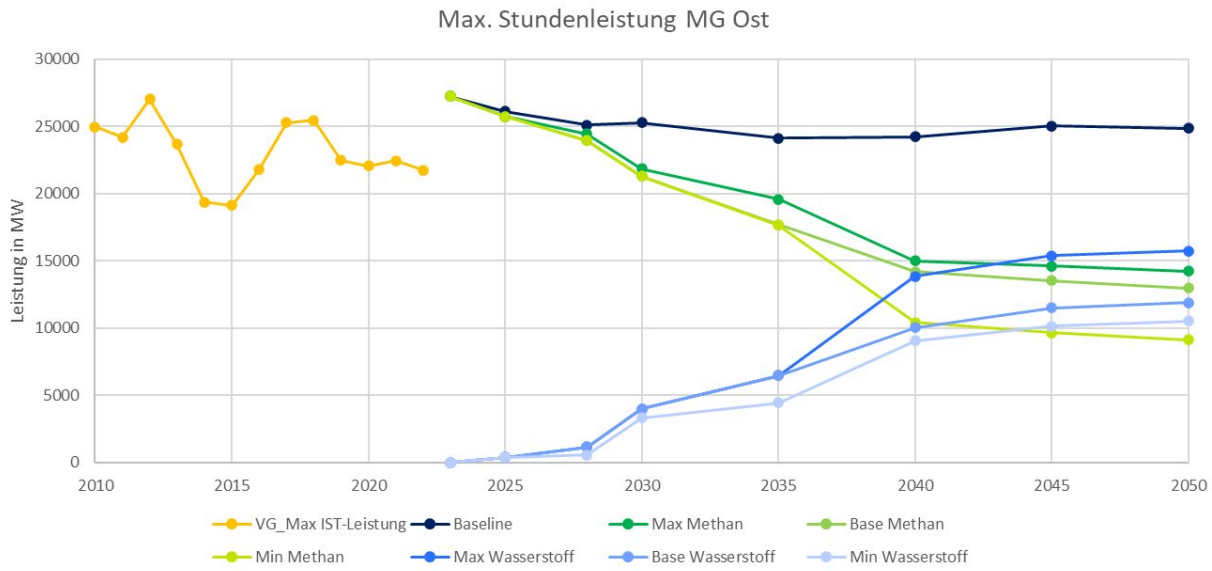
Peak demand in the Eastern distribution area was measured at 27 GW in February 2012. This high demand was due both to a prolonged cold spell and to high levels of electricity generation. Demand was at a similarly high level in January 2017 and in February 2018. The demand scenarios considered in the LTiP 2022 are based on this historical peak demand value recorded in February 2012.

The actual flow rates and the future maximum possible flow rate in in Figure 31 are based on different methodological considerations. The actual flow rate shown in the diagram reflects the

historical simultaneous gas demand measured in the distribution area East (VG_MAX). The future maximum possible hourly flow rates reflect the maximum expected simultaneous demand, comprising the total maximum expected flow rates for each distribution area (NB_MAX). This assumes a 90% reduction by 2040 for SLP customers and a 30% reduction by 2040 for LPZ customers with a smaller than 50 MW connected load. At the same time, feedback from the hydrogen demand survey on the transition of large customers (customers with a connected load greater than 50 MW) and gas-fired power plants from natural gas, oil or coal to hydrogen was taken into account accordingly.

The NB_MAX value for maximum possible hourly flow rate is used in hydraulic calculations for grid design across the entire distribution network.

Figure 31: Demand scenarios, maximum hourly demand, market area East



Source: AGGM, 2022 LTiP

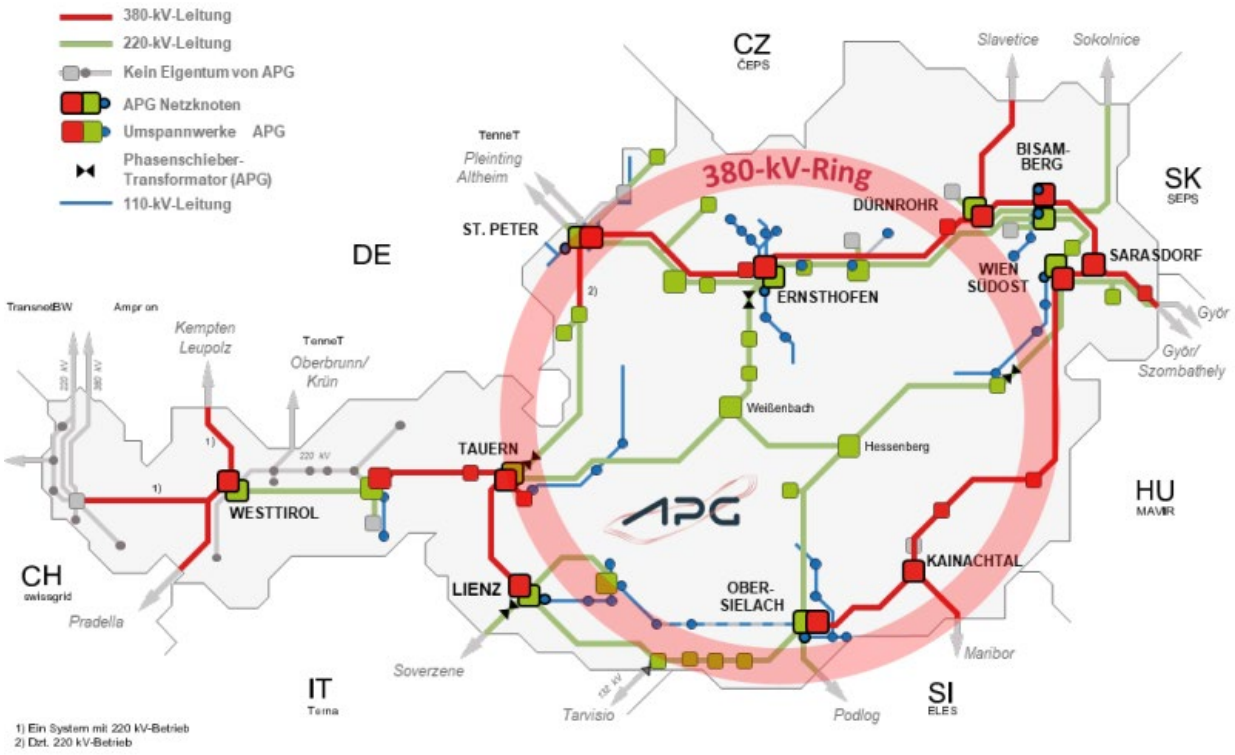
In order to meet the increasing hydrogen demand in the distribution area, there are new hydrogen capacity requirements of the distribution area towards the transmission lines, which are shown in Table 3.

4.1.5 2021 Network development plan for the transmission grid of Austrian Power Grid AG (APG)

Similar to the Coordinated Network Development Plan for the gas transmission system infrastructure in Austria, the Electricity Industry and Organization Act 2010 (§37 ElWOG 2010) demands the preparation of a Network Development Plan (NEP) for the transmission grid. Since the ElWOG amendment of 2021, the transmission grid operator has to submit a network development plan to the regulatory authority every two years with a planning framework of ten years. In this plan, supply and demand forecasts are to be presented based on the current situation.

The publication of the NDP informs all market participants about planned network expansions (expansion investments). For a targeted development of the transmission grid, the realization of the projects in the NEP as well as a general increase of grid capacities represents an important support in achieving the Austrian climate and energy targets. In this context, one of the central topics in the NEP 2021 was the grid integration of renewable energy sources (RES), its effects and a possible framework for action for the existing grid. Ensuring an efficient transmission grid infrastructure and security of supply is based on the projects and targets defined in the NEP.

Figure 32: Transmission grid in Austria



Source: APG 2021

The status quo of the Austrian power grid serves as the basis for promoting Austria as an attractive business location. To this end, APG will invest 2.9 billion EUR in the expansion, conversion and modernization of the grid infrastructure over the next 10 years.

In the NDP, not only national interests are presented and brought into focus, but also the European and international framework is considered. The EU Green Deal (no net greenhouse gas emissions with a focus on 2050) and the Clean Energy Package (legislative package of the European Union for the provision of clean energy for all Europeans) were only one part of the legal and strategic foundations that defined of measures and milestones in the Network Development Plan 2021:

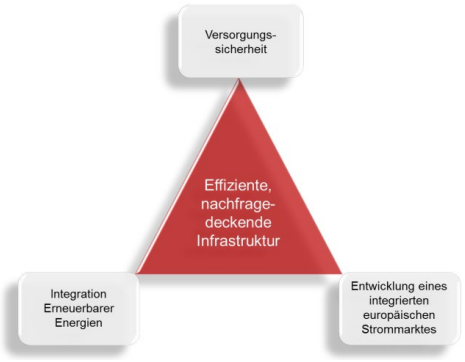


Figure 33: EU targets for transmission grids (Source: APG 2021)

- Transformation of all sectors with respect to the climate, especially the energy system and infrastructure
- Comprehensive new legal framework through the Expansion of Renewables Act (EAG)
- Goal of 100% supply (on-balance nationally) with green electricity
- Creation of an integrated grid infrastructure plan
- Integration of energy systems through sector couplings

The expansion of renewable energy sources is one of the central points of the NDP due to their non-permanent availability (e.g. wind power in different weather conditions). Both an expansion to promote the share of RES in the end-user mix as well as assuring grid functionality during this process are central to the plan. Historically, it can be noted that the dynamics of RES expansion are very progressive (expansion of wind power in the EU from 41 GW in 2005 to 205 GW in 2019). Due to this shift in sources for generating electricity, from fossils at present to renewables, and due to the change in focus of the industry to electricity-based processes and increased e-mobility, the NEP 2021 assumes that expansion dynamics will continue to increase and become even more progressive.

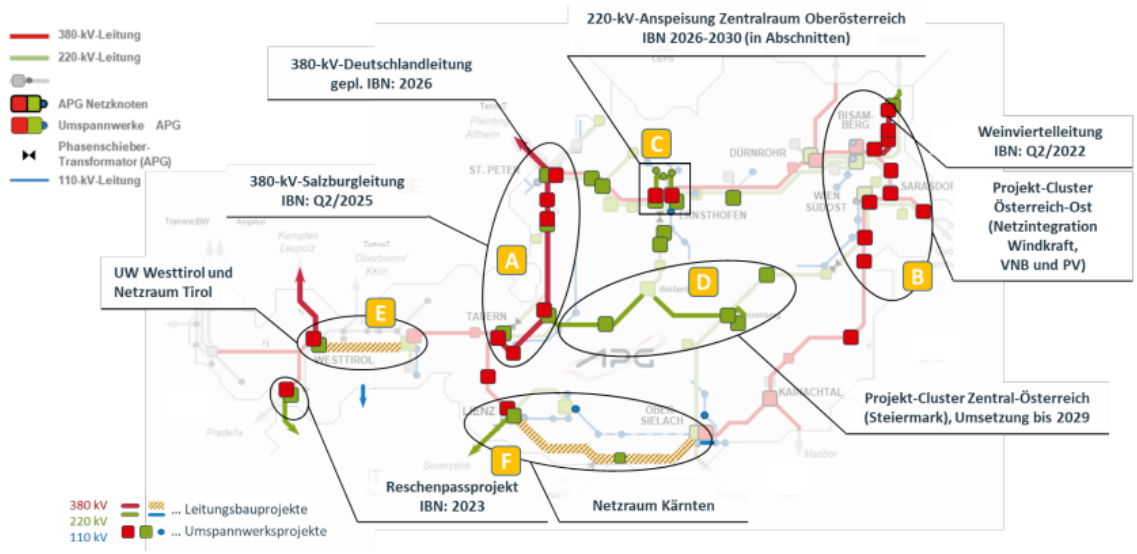
The NDP 2021 for the APG control area states once again that it is necessary to massively accelerate the expansion of renewable energy sources in order to achieve climate protection goals. This is stipulated in the Austrian government program and regulated in the Expansion of Renewables Act (EAG). A massive further expansion of an additional 19 GW of RE generation capacity is to be achieved in Austria by 2030.

The "TOP grid expansion projects in the NEP 2021 of APG" are derived from TYNDP 2021 and comprise expansion projects in the transmission grid. In particular, NEP 2021 includes the connection of the 380 kV ring with the Salzburg line and an expansion in the south of Austria as well as efficient east -> west transport axes and an expansion in the west of Austria.

In summary, the NDP 2021 of APG lists following priorities:

- New power lines in the transmission grid of at least approx. 240 km
- Conversion of approx. 110 km of existing lines to higher voltage levels
- General renewal of lines in the amount of about 290 km
- 20 new transformer stations ("green field" TS) by 2030 in order to strengthen connections to the distribution grids, as well as expansions of existing transformer stations
- Implementation of around 50 transformers with a total capacity of approx. 18,000 MVA, which will be required for coupling grid levels
- Extensive measures and age-related general overhauls as well as upgrades of switching systems as operating investments.

Figure 34: Top grid expansion projects in NEP 2021



Source: APG 2021

If the listed expansion measures are not implemented or not implemented in the required scope, APG anticipates following long-term disadvantages:

- Further increase and use of cost-intensive bottleneck management incl. resulting costs for grid customers
- Feed-in reductions of RE and power plants in case of lacking grid capacities and bottlenecks as well as power restrictions on the transfer points to the distribution grids (or future refusal of new grid connections)
- Impact on transregional electricity transports
- Threats to grid and system security as well as security of supply
- Far-reaching negative effects for Austria as a business location

4.1.6 Hydrogen Backbone

Since its inception in 2020, the European Hydrogen Backbone (EHB) initiative has been laying foundations through the publication of the European Hydrogen Backbone map and the associated target vision of a European-wide hydrogen network and market. The central pillar of the EHB is the map with a vision of the network, that is being planned to be both technically and economically realistic. The importance of hydrogen for climate neutrality is widely recognized, as is the need for hydrogen transport in pipelines in the future European energy system.

With the publication of the European Commission's gas legislative package in December 2021, the need for an H2 network was once again highlighted and confirmed. The promotion of market competition, security of supply and security of demand all require a corresponding network.

The transition to clean energy was once more catapulted into focus by the Ukraine crisis. This stance was firmly anchored by the European Commission's REPowerEU project. In the project, ending Europe's dependence on fossil fuels from Russia was determined to take place by 2030 at the latest. The measures in the RePowerEU project are manifold, but also include the creation of a legal framework for measures in 'Fit for 55' including 5.6 million tons of renewable hydrogen and a further 15 million tons of produced hydrogen envisaged there, which stretches beyond the goals of the EU hydrogen strategy.

The current EHB version shows the possible integration of five pan-European hydrogen supply and import corridors by 2030 (~28,000 km pipeline network). The hydrogen infrastructure can then be developed into a European-wide network of almost 53,000 km (+47% to 2030) by 2040, mostly based on re-dedicated natural gas infrastructure. Total investments for the whole package of measures are estimated at 80-143 billion euros by 2040. The corridors shown in the map are:

1. South Europe corridor: Supply and connection from Tunisia and Algeria via Italy to central Europe.

2. Portugal-Spain-France (to Germany): Transport and export of green hydrogen produced on the Iberian Peninsula into the countries; in the longer term, hydrogen import from Morocco is possible

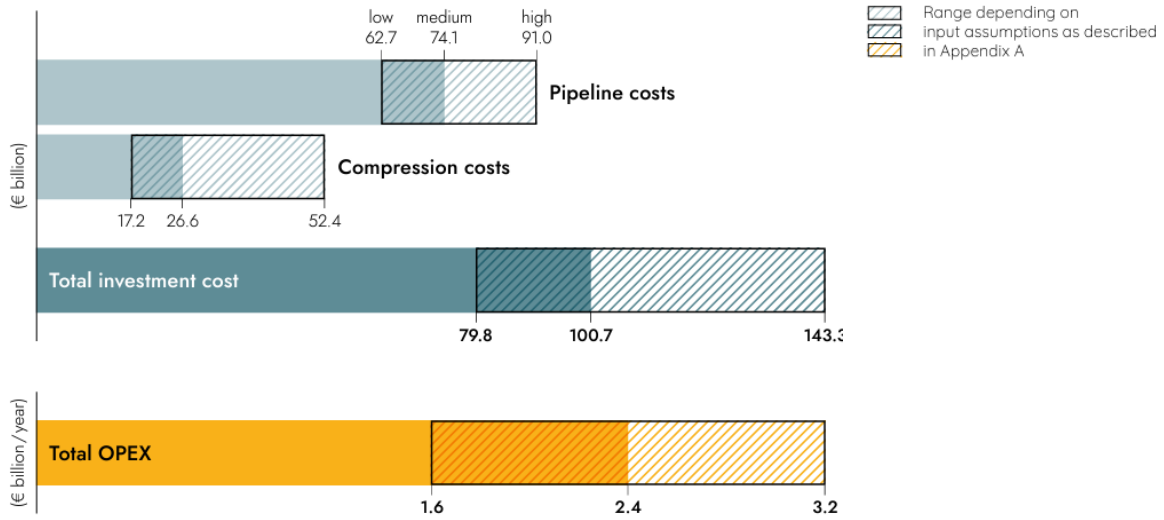
3. North Sea corridor: Interconnected corridor based on planned offshore wind, large integrated hydrogen projects and ship imports of hydrogen derivatives (Netherlands, Belgium, Germany and France)

4. Supply corridor of Nordic and Baltic countries - Europe: Potential for green hydrogen supply based on onshore and offshore wind (Baltic countries and Poland)

5. East and southeast Europe corridor: Great potential for hydrogen production and supplying hydrogen consumers in central Europe; uncertainty about the development of future natural gas flows (Romania, Greece and Ukraine, among others)

Transporting hydrogen over 1,000 km along the proposed onshore corridors would cost an average of €0.11-0.21 per kg of hydrogen, making EHB the most cost-effective option for long-distance hydrogen transport.

Figure 35: Estimated investment and operational costs of EHB (2040)



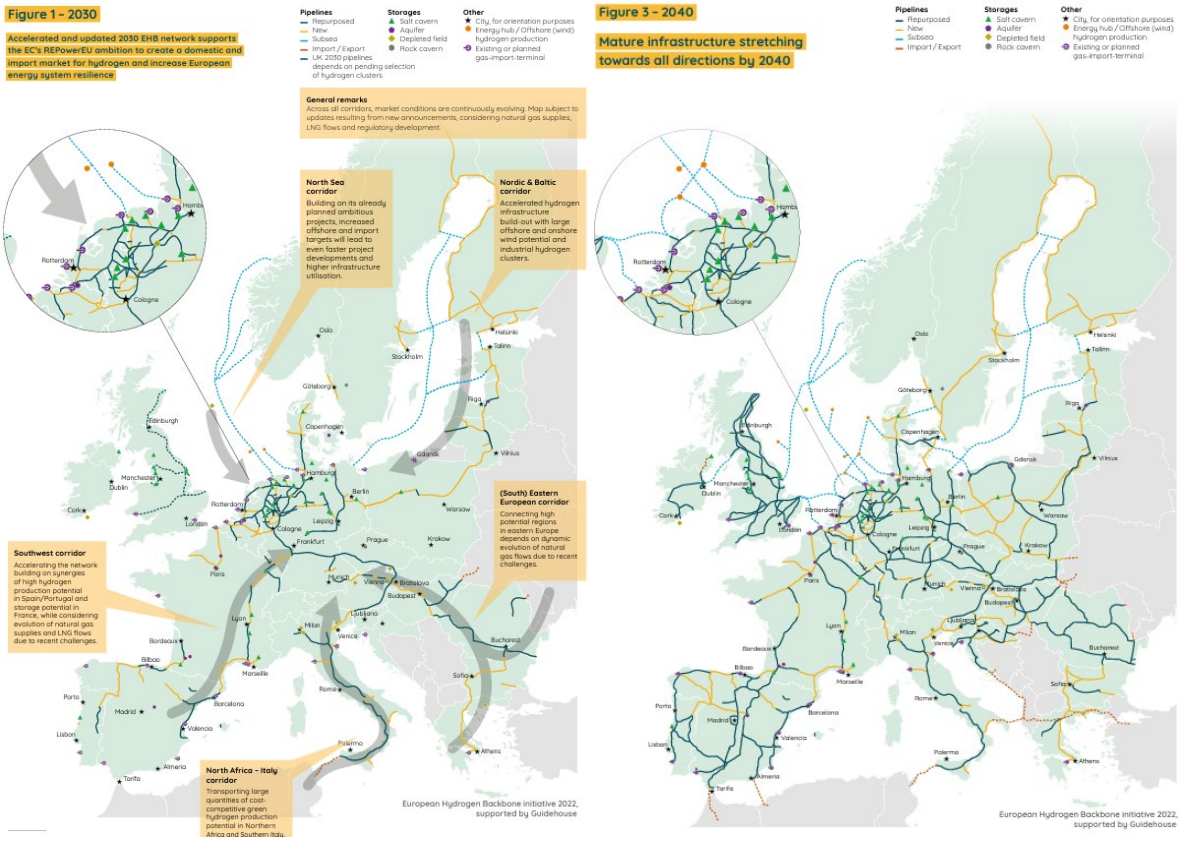
Source: European Hydrogen Backbone

The European Hydrogen Backbone offers the opportunity to accelerate decarbonization in the energy sector by efficiently integrating significant amounts of additional renewable and low-carbon energy and connecting regions with high supply potential to centers of demand.

EHB recommends the following infrastructure requirements and policy objectives for implementation:

1. Establish a more integrated hydrogen, natural gas and electricity infrastructure planning on the EU and member state level.
2. Promote efficient measures to facilitate the rapid deployment of dedicated hydrogen infrastructure by encouraging the re-dedication of existing natural gas infrastructure.
3. Simplifying and shortening planning and approval procedures for renewable energy and hydrogen projects.
4. Unlocking funding to accelerate the deployment of hydrogen infrastructure by leveraging funding mechanisms such as the Connecting Europe Facility (CEF), Important Projects of Common European Interest (IPCEI) and Horizon Europe funds.
5. Promoting international cooperation and creating energy and hydrogen partnerships within and outside Europe.

Figure 36: European Hydrogen Backbone development 2030 – 2040



Source: European Hydrogen Backbone

The two transmission system operators in Austria, Gas Connect Austria and TAG, assume that hydrogen will flow through/into Austria in the future, too. The political framework demands that 100% of electricity should be covered by renewable energy sources by 2030 and requires climate neutrality by 2040, which is increasingly putting hydrogen into focus.

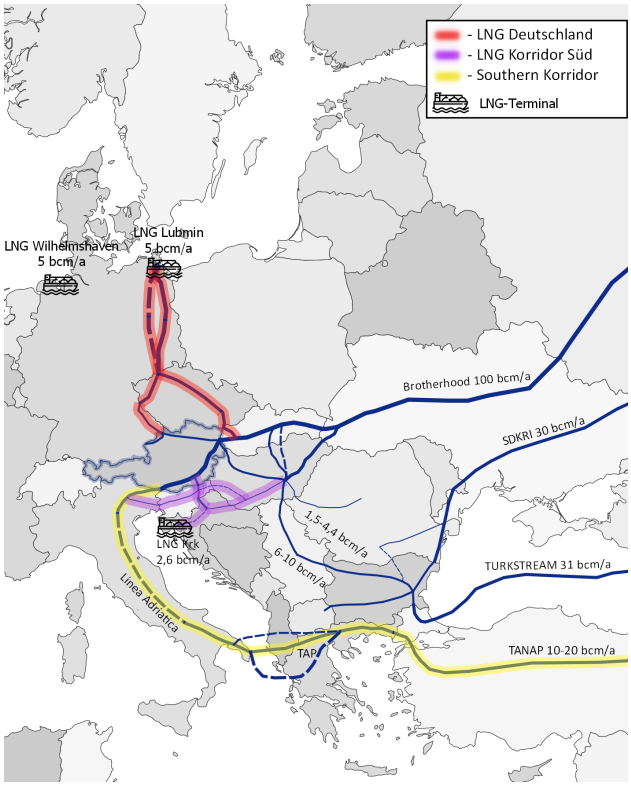
However, the most important driver for a possible hydrogen infrastructure in Austria, besides supplying domestic customers, would be the transit function for the East-West corridor (Ukraine - Slovakia - Austria - Germany) and for the North-South corridor (North Africa - Italy - Austria - Germany). A WAG loop and the conversion of one of the three TAG pipelines to hydrogen would be the first steps for this transit function. This would allow the Austrian network to serve two corridors for the transport of green hydrogen: Ukrainian green hydrogen from Slovakia via Austria and North African green hydrogen from Italy via Austria.

Figure 37: Austria in EHB

4.2 Regional network development of European gas infrastructure and its implications for Austrian gas infrastructure

This chapter provides a compact insight into European network development planning with a focus on projects relevant for Austrian gas infrastructure. Potential and future transportation and supply routes to and around Austria have already been described in the preceding chapters. Therefore, the most recent network development plans of the neighboring countries Germany, Hungary and Slovenia are summarized here in this context. The most recent available network development plans of the neighboring countries Germany, Italy, Bulgaria, Croatia, Czechia and Slovakia have been reduced to key facts and translated from the respective language they were published in if necessary. In order to view the developments in the European gas network in an integrated manner, this section incorporates as many cross-border projects from the Ten Year Network Development Plans as possible. Furthermore, the national and European legal frameworks are also discussed here.

Figure 38: Supply routes in Austrian surroundings



Source: AGGM

Since new constructions and expansion within the supply net are relevant even in the European context, most of the "major" projects can be found also in the 2022 ENTSOG TYNDP. A simplified gas infrastructure network is shown in Figure 38.

Bulgaria TYNDP 2022-2031

Priority activities in the TYNDP of Bulgartransgaz for the period 2022 - 2031 are set on rehabilitation, modernization and expansion of the existing infrastructure for gas transmission, interregional connections and expansion of storage capacity. Hydrogen projects are planned for the construction of new hydrogen infrastructure and the evaluation of upgrades of existing infrastructure. Projects in Bulgaria's TYNDP 2022 aim to develop the country as a regional gas distribution center and to gradually contribute to the decarbonization of the country's energy and economic sectors.

Bulgartransgaz EAD pursues a consistent and targeted policy which is aimed at improving connectivity with neighboring countries by establishing new interconnection points and by maximizing capacity at the existing points. Current and planned gas infrastructure offer opportunities to diversify natural gas supplies both to Bulgaria and to neighboring countries and to southeastern Europe.

Natural gas consumption in Bulgaria in 2021 was 35,430 GWh, which represents an increase of 13.06% compared to consumption in 2020 (31,337 GWh). The share of natural gas imports in Bulgaria was 99.4% in 2021. The remaining 0.6% of consumption were covered by local production. Imports come predominantly from Russia, with an increase in the percentage of Russian natural gas in total imports from 2020 to 2021 (76.1% of total imports from Russia in 2020; 88.5% of Russian imported gas in 2021).

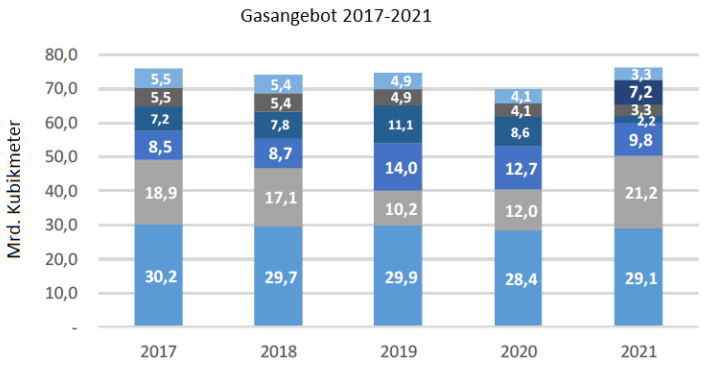
In the 2022 TYNDP of Bulgartransgaz, the focus was still on the period 2021 and the aggressive war by Russia on Ukraine or the related energy crisis were not yet considered by the Bulgarian plan.

Italy TYNDP 2022 - 2031

Italian natural gas demand in 2021 amounted to 76.6 billion m³ (789 TWh at 10.58 kWh/m3), which represents an increase of 5.2 billion m³ (+7.2%) compared to the previous year. The civil sector increased by 2.6 billion m³ (+9.3%), from 27.6 to 30.2 billion m³, divided into two categories, residential and tertiary. In the thermoelectric and cogeneration of heat and electricity with natural gas, there was an increase in consumption of approx. 1.7 billion m³ (+5.8%), due to recovering electricity demand. The demand for gas for direct industrial use has recovered, with a consumption of 10.8 bcm in 2021, an increase of about 1 bcm (+9.7%).

In 2021, 4% of the gas demand was covered by domestic production and the remaining 96% by imports. Imports via pipelines amounting to 62.9 bcm, representing 86.5% of total imports, increased by 9.4 bcm in comparison to 2020. In particular, imports from Northern Europe (Holland and Norway) decreased to 2.2 bcm (-75%) and from Libya (3.2 bcm, -28%), while imports from Algeria increased (21.2 bcm, +76%). The inflow from Russia in 2021 was slightly higher than in the previous year (+29.1 bcm, +2%).

Figure 39: Gas imports from 2017 to 2021



Source: IT scenario description 2022, SNAM & Terna

A constant element is the significant contribution to diversification of supply through the import routes from the south (Mazara) and the maximization of the TAP route. LNG also plays an important role in meeting demand and flexibility: Flows reaching the Italian network through regasification plants vary between 5 bcm and 25 bcm depending on the considered supply scenario.

Table 7: Gas demand in 2030 and 2040

bcm /year	2030	2040
National production	3	1
Biomethane	1-5	7-10
Import from the North (incl. Tarvisio and Griespass)	Up to 20	Up to 12
Import from the South (Mazara del Vallo, Gela und TAP)	37-44	28-39
LNG	5-25	Up to 20

Source: IT scenario description 2022, SNAM & Terna

In recent years there has been a fluctuation of import flows from the North, depending on prices and market conditions. The different Italian scenarios confirm the role of Passo Gries and Tarvisio as interconnectors between European markets, given the current uncertainty about the supply situation in Europe, especially in regards to the previous main supplier and the increasing availability of alternative sources of supply.

The increase of hydrogen demand in Italy must be accompanied by a development of hydrogen production and supply. The development of an import strand also represents an opportunity for the potential export of hydrogen to meet demand in other European countries. This is the role envisioned in the European Hydrogen Backbone for the supply corridor from North Africa across the Mediterranean and through Italy. The infrastructure along this route already exists for natural gas and can be converted to hydrogen. (see Figure 36)

Croatia TYNDP 2021 – 2030

The gas grid in Croatia is to be expanded significantly with two major projects. One of these two is the Ionian-Adriatic Pipeline, which is expected to increase the maximum transport capacity of the network until 2030. This will create a connection between Croatia, Montenegro, Albania, Bosnia and Herzegovina and a connection to the Trans Adriatic Pipeline. The IAP project has a length of 511 km and is expected to handle a capacity of 5 bcm/a in the mentioned countries.

Associated with the envisaged increase of the infrastructure standard is also the LNG Krk corridor. Originally, the LNG Krk project aimed at assuring security of supply in central- and southeastern Europe by connecting alternative gas sources for a source- and route diversification with existing liquid gas hubs in central Europe. The complementary projects associated with the construction of the LNG terminal in Krk were grouped together as cluster 6.5 in the first PCI list of the European Commission. In the last version of the PCI list (Fifth PCI list from 19 November 2022) however, gas projects have been significantly reduced and even cluster 6.5 and its associated subprojects have been removed from the list.

It would in any case be appropriate and suitable to connect the LNG Terminal Krk via Croatia and Slovenia to Austria and thereby to an additional source, the liquid gas hub CEGH. In this manner, the European Union goal of strengthening the European internal energy market would be implemented in an efficient way.

The Croatian TYNDP 2021 still lists the following PCI projects and clusters that are related to Austria:

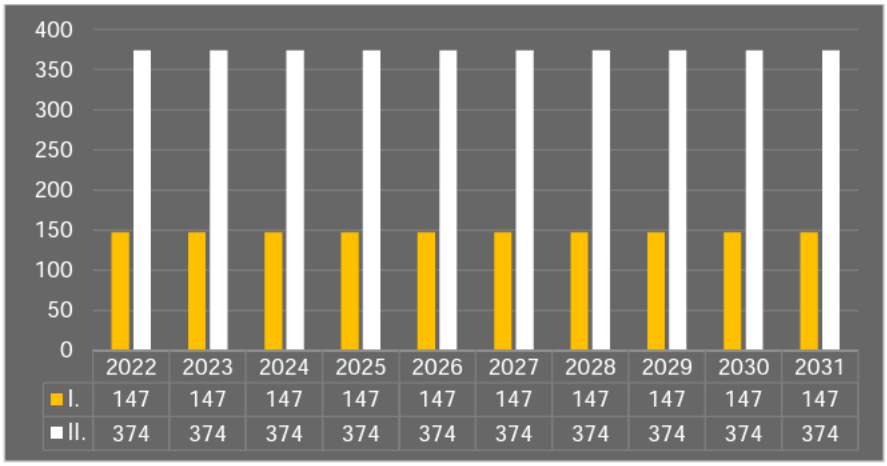
- Project Group Croatia - Slovenia - Austria - PCI no. 6.26.
  - Interconnector Croatia - Slovenia (Lučko - Zabok - Rogatec; PCI No. 6.26.1).
- Compressor stations 2 and 3 of the Croatian gas transmission system - PCI no. 6.26.3.

In the TYNDP 2021-2030 of Plinacro, only the period until 2021 was considered. The Ukrainian-Russian confrontation and the accompanying energy crisis was not yet part of the Croatian plan.

Slovakia TYNDP 2022 - 2031

The projected consumption of natural gas in Slovakia is slightly increasing or stable, depending on the extent to which natural gas is used as a substitute for coal.

Figure 40: Consumption prognosis in Slovakia for the upcoming 10 years (I: Average daily consumption | II: max. daily consumption in GWh/d)



Source: eustream 2022

References to the Austrian gas market can be found in the Slovak TYNDP 2022 in the HUSKAT project, for which the market interest was assessed in 2019. The HUSKAT connection was terminated due to a negative result of the economic feasibility study in tender round IV, in which no transmission capacity could be allocated due to the economic and legal uncertainties related to the Black Sea gas project. Gas market participants nevertheless confirmed their interest during a non-binding market analysis. In late January/February 2020, eustream and FGSZ launched a public consultation on the amended project design with the aim of offering firm capacity to the market in both directions amounting to 5,724,340 KWh/h (15°C). In 2021, there were no indications for additional capacity.

However, it is assumed that future additional capacity needs of HUSK as part of the North-South corridor will be positively influenced by the start of gas production in the Black Sea area, the gas interconnector between Serbia and Hungary, the LNG terminal on Krk and its connection via the HUSK project to the LNG terminal in Świnoujście (Poland). Therefore, in its current state, the project is in a preparatory phase, reconciling several related and planned processes. Among them

are an increase in fixed transmission capacity at the Veľké Zlievce interconnection point or an increasing return flow of natural gas to Ukraine.

In the TYNDP 2022-2031 of eustream, no reference has yet been made to the Ukrainian-Russian confrontation and the accompanying energy crisis.

Slovenia TYNDP 2022-2031

Slovenia's location in relation to natural gas flows in Europe is favorable, as it is in close proximity to transport routes from northeastern Europe (from Russia through Slovakia and Austria to Italy and Croatia) and on the border with Italy, where transport routes from the Mediterranean and northern Europe converge. The Slovenian network is located close to existing and newly planned LNG terminals in the Adriatic Sea and natural gas storage facilities in neighboring networks.

The supply of natural gas to the Slovenian market is fully dependent on imports from Russia and through individual nodes of the European gas market.

Table 8: Capacity of transmission system on relevant points in Slovenia

Relevant point	Technical capacity GWh/d	Contractually booked total capacity GWh/d	Max. daily use of techn. capacity % (08.2020)	Avg. monthly use of techn. capacity % (08.2020)	Max. monthly use of techn. capacity % (08.2020)
Ceršak - Entry	139.216	44.717	55	32.9	50.3
Rogatec - Entry	7.731	1.049			
Rogatec - Exit	68.289	5.956	78.7	28.4	77.8
Šempeter - Entry	28.534	1.693			
Šempeter - Exit	25.940	0.000	39.6	0.3	1.3
Exit from Slowenien	81.252	53.818	60.5	32.5	49.1

Source: Plinovodi 2022

According Slovenia’s 2020 energy balance, the final energy consumption in 2020 is 58 TWh, which is 3.6% more than in previous years. This value is also forecast to remain unchanged until 2031.

Cross-border transmission capacities and bookings of the Slovenian gas transmission network are embedded in the European and global international environment and will continue to enable a connection with Austria at the border crossing point Ceršak.

Table 9: Existing and potential cross-border trade and transmission from / towards Austria

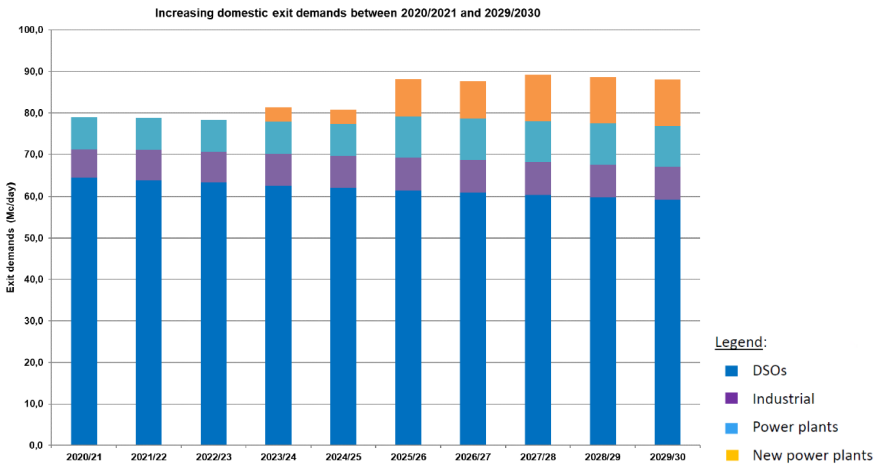
Direction	Existing supply	Planned supply
Austria -> Croatia	Yes	Yes
Croatia -> Austria	Yes, interruptible upstream transmission capacity	Yes + Expansion, if pipeline connections with projects in Croatia are realized
Austria -> Italy	Yes	Yes + Expansion
Italy -> Austria	Yes, interruptible upstream transmission capacity	Yes, interruptible upstream transmission capacity
Austria -> Hungary	No	Yes if connection line between Slovenia and Hungary is realized
Hungary -> Austria	No	Yes, interruptible upstream transmission capacity + Yes - if connection line between Slovenia and Hungary is realized

Source: Plinovodi 2022

Hungary TYNDP 2021

In the Hungarian 2021TYNDP, domestic gas demand is assumed to remain constant at approx. 80 m³/day until 2025. From 2025 onwards, gas demand will increase due to the commissioning of new power plants.

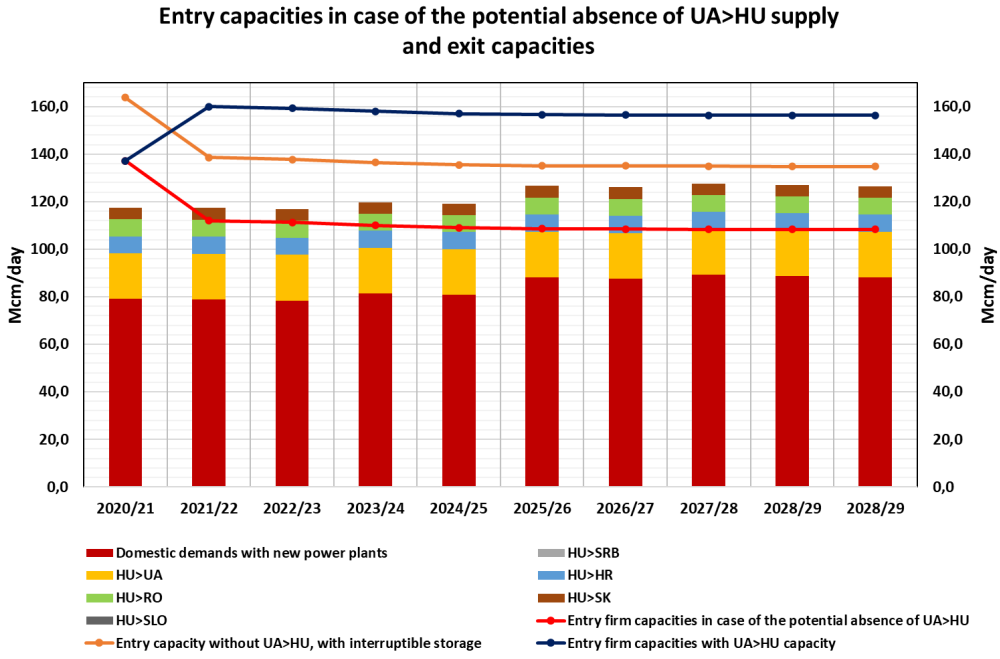
Figure 41: Demand of domestic exit points



Source: FGSZ 2021

In the scenario with the highest gas demand, interruptible injection capacities can ensure domestic demand supply even in the event of a potential failure of the Ukraine-Hungary interconnection.

Figure 42: Hungarian entry- and exit-capacities



Source: FGSZ 2021]

There is a project with a relation to Austria in the Hungarian TYNDP 2021: the HU > AT connection, which, however, is not yet approved and requires further analysis. The project ensures transmission from Hungary to Austria with 2 slightly modified variants (0.9 bcm/y or 100,000 m³/h or 1.1 bcm/y or 120,000 m³/h). FGSZ Ltd and Gas Connect Austria started a new investigation to see if market participants will register non-binding capacity demands and if the project requires a new technical solution.

In the TYNDP 2021-2030 of FGSZ Ltd, no reference has yet been made to the Ukrainian-Russian confrontation and the related energy crisis, as the currently published network development plan was published in December 2021.

Germany NDP 2022-2032

The changing political and geopolitical framework has also had a major impact on the TSOs' 2022-2032 network development plan for the gas pipeline network in Germany. Partial or complete reversal of load flows, increased integration of new sources of supply for Liquified Natural Gas (LNG) and associated required infrastructures or the perspective increase of green gases driven by climate targets and the associated reduction of natural gas as well as the acceleration of the development of a hydrogen market are only some of the determined measures in the NDP 2022-2032 in Germany. Therefore, this year's Gas NEP is not a normal network development plan, as it includes two parts:

1) an interim status with basic variants that do not yet reflect the final and new framework conditions on the gas market
    a. but include additional LNG supply security variants

   b. and include a hydrogen variant (Based on memoranda of understanding with 250 lead project partners, a transport demand of 165 TWh will arise.)
2) an LNG security of supply variant (LNGplus) with several approaches

How and to what extent LNG and LNG plants are considered in the base variant and the LNG variant depends on the respective scenario framework. In the baseline variant, the required exchange potential is derived from employments at existing northwestern European LNG facilities in the Netherlands and Belgium. In order to develop a scenario that is as comprehensive as possible, it is necessary to apply an exchange capacity of 66% of the total capacity. Based on the total capacity of the planned LNG plants in Germany of 35.5 GW, this results in an exchange capacity of 23.4 GW.

In the LNG variant, this factor is considered in even more detail. The objective is to determine to which extent Russian natural gas imports can be substituted by German LNG plants and the associated network expansion measures. The scenario framework of the Gas NDP 2022-2032 has specified the following variants here:

1) LNG variant 1: LNG injection capacity: 61.5 GWh/h -> Stade: 21.7 GWh/h; Brunsbüttel: 13.8 GWh/h; Wilhelmshaven: 26 GWh/h.
2) 2nd LNG variant 2: LNG injection capacity 49.8 GWh/h -> Rostock: 10.0 GWh/h; Brunsbüttel: 13.8 GWh/h; Wilhelmshaven: 26 GWh/h
3) LNG variant 2.1: LNG feed-in capacity 61.5 GWh/h -> Rostock: 21.7 GWh/h; Brunsbüttel: 13.8 GWh/h; Wilhelmshaven: 26 GWh/h

In order to create the possibility for market participants to substitute Russian gas with LNG, the LNG variants assume LNG plant capacities of up to 48 GWh/h. This is to make the planned competing injection capacity identical to the volumes of Russian gas. Another assumption is that LNG plants are not planned in close proximity to transmission pipelines. This presupposes that a connection from the plant to the nearest transport infrastructure is necessary. GASCADE is planning to apply for Important Projects of Common European Interest (IPCEI) funding for the construction of a new hydrogen pipeline from the port of Rostock to Glasewitz. Other connecting pipelines to the LNG plants are also being planned or implemented already.

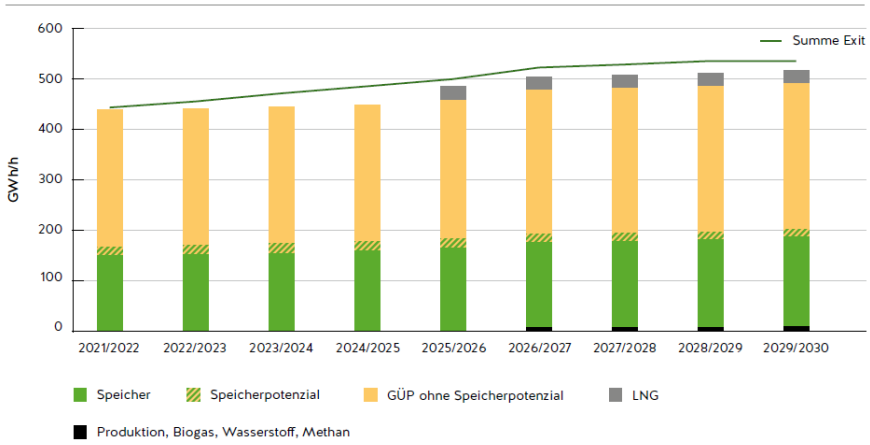
One of the first measures which can be implemented through short-term decisions in implementation and through an accelerated approval process is the "Tie-In LNG Rostock" project (implementation by Q4 2023). This would enable an addition of approximately 7 GWh/h to the German long-distance gas pipeline network already from Q4 2023, approximately 19 GWh/h from Q1 2024, and up to 21.7 GWh/h from Q4 2023.

The framework conditions for both L-gas (low calorific gas) and H-gas (high calorific gas) will change in the next few years and measures will be taken accordingly in the German NDP. Due to the increasing risks in natural gas production in the Netherlands, production of L-gas in the Groningen area will be discontinued as early as the start of the 2022/23 gas year. Part of the

Groningen field will subsequently remain active as a capacity reserve with minimal production. In the 2021/2022 gas year, Groningen was still producing a volume of 4.6 bcm.

Due to the reduction of natural gas imports from Russia, short term focus in Germany has shifted towards LNG plants. Political objectives are pushing the construction of LNG plants accordingly. The capacity requirement in H-gas increases from 443 GWh/h to 535 GWh/h in the reviewed period from 2021/2022 to 2032/2033. The main reasons for this are the L-H gas switch, new power plants and an increased demand in the Netherlands which is assumed for security of supply reasons. H-gas volumes increase from 439 GWh/h to 517 GWh/h in the review period from 2021/2022 to 2032/2033. The main reasons for this are increased offered capacities at storage facilities, increased feed-in at the Greifswald and Lubmin II border crossing points to supply the Netherlands, new LNG plants, and the feed-in of synthetic methane.

Figure 43: **Capacitative H-gas-balance all over Germany in the basis variant**



Source: FNB Gas 2022

In total, offered capacity at the border crossing points increases from 286 GWh/h to 327 GWh/h in the considered period. These capacities also include LNG plants and storage potential. In the considered period, H-gas demand increases by about 92 GWh/h from 443 GWh/h in the gas year 2021/2022 to 535 GWh/h in the gas year 2032/2033. Of this, about 59 GWh/h in the gas year 2032/2033 is accounted for by the additional H-gas demand due to conversion. In comparison to the Gas Network Development Plan 2020-2030, methane demand has increased further.

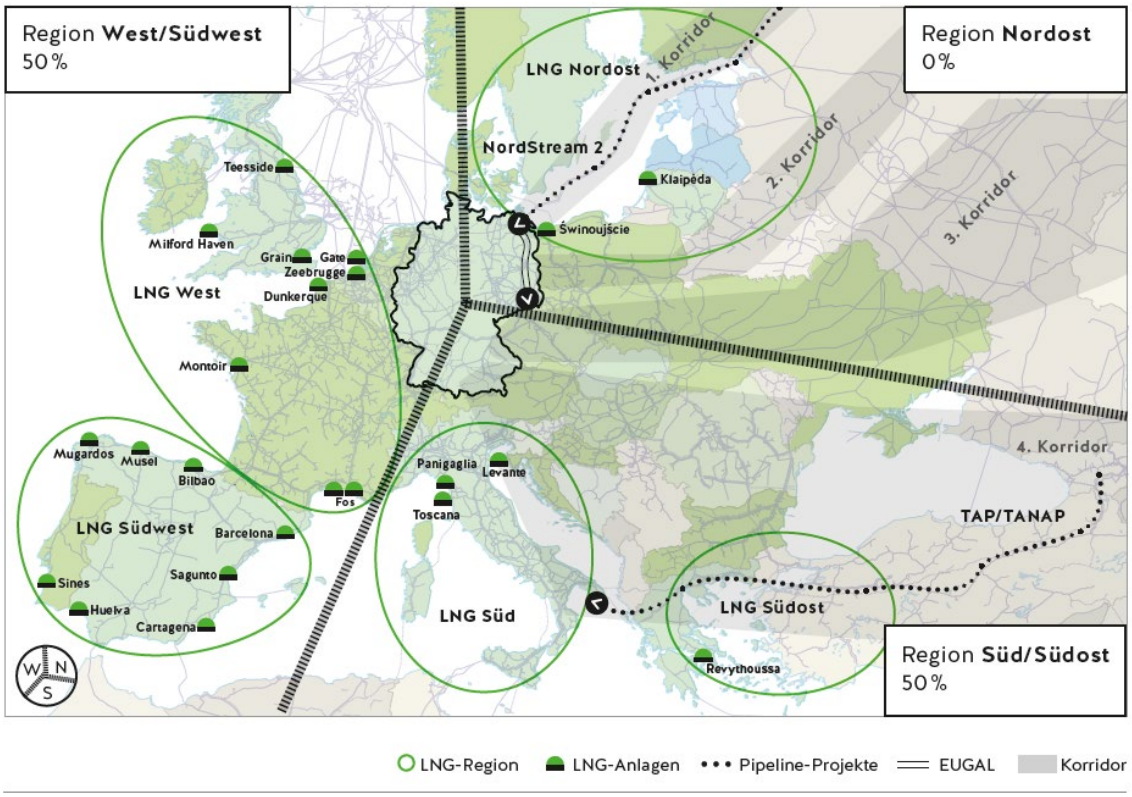
Figure 44: H-gas demand in the 2029/2030 gas year of distribution network operators, industry

Gaswirtschaftsjahr 2029/2030	NEP Gas 2022-2032	NEP Gas 2020-2030	Differenz
	GWh/h		
Verteilernetzbetreiber*	292	287	5
Industrie	23	17	6
Kraftwerke	52	39	13
Summe	**367**	**343**	**24**

* Summe aus dem H-Gas-Bedarf der Verteilernetzbetreiber und der L-H-Gas-Umstellung

Source: FNB Gas 2022

Figure 45: Covering the additional European demand until 2032



Source: FNB Gas 2022

In NEP 2022-2032, capacities from the northeast region were set to 0 % due to the reduction of Nord Stream. Accordingly, and in line with to the scenario framework, 50 % of the capacities are assumed for the west/southwest region and the south/southeast region.

The table in Figure 46 shows interconnection points between the German and Austrian natural gas grids and the respective regions, criteria and an explanation. In general, it can be said that an increase of the feed-in capacity is possible at the three IP. The criteria in the table are as follows:

a. Information from network development plans
b. Information from the TYNDP 2020
c. Capacity requirements at the border crossing point

Figure 46: Considered interconnection points in the H-gas source distribution of the base variant; focus on Austria

Grenzübergangspunkt	Land	Region	Kriterium	Erläuterung
Überackern	Österreich	Süd-/ Südost-europa	a, b, c	Mögliche Erhöhung der Einspeiseleistung auf Basis der im Koordinierten Netzentwicklungsplan Gas (KNEP 2021) zugewiesenen Kapazitäten. Daher wird der Grenzübergangspunkt in der Quellenverteilung angesetzt.
Überackern 2	Österreich	Süd-/ Südost-europa	a, b, c	Mögliche Erhöhung der Einspeiseleistung auf Basis der im Koordinierten Netzentwicklungsplan Gas (KNEP 2021) zugewiesenen Kapazitäten. Daher wird der Grenzübergangspunkt in der Quellenverteilung angesetzt.
Oberkappel	Österreich	Süd-/ Südost-europa	a, d	Mögliche Erhöhung der Einspeiseleistungen durch zusätzliche Leitungsbauprojekte des TYNDP. Daher wird der Grenzübergangspunkt in der Quellenverteilung angesetzt.

Source: TSOs Gas 2022

Figure 47: Additional capacities at interconnection points based on the H-gas source distribution; focus on Austria

Grenzübergangspunkt	Fernleitungs-netzbetreiber	Einspeisung/ Ausspeisung	Kapazitätsart	Zusätzliche Leistung 2027/2028 [GWh/h]	Zusätzliche Leistung 2032/2033 [GWh/h]
Oberkappel	OGE, GRTD	Einspeisung	unterbrechbar	3,1	2,1
Überackern	bayernets	Einspeisung	fDZK	1,9	1,9

Source: TSOs Gas 2022

The assumptions and developments described above are based mostly on the baseline scenario. However, LNG security of supply variants were co-developed in the German NEP. In the LNG security of supply variants 1 and 2.1, TSOs reduced feed-in capacities of the border crossing points by 48 GWh/h. This corresponds to approx. half of the total Russian feed-ins intended for the German market. In security of supply variant 2, the feed-in capacity is reduced by 36.3 GWh/h.

Excluding Nord Stream 2 and taking into account the development of the LNG plants in Germany, LNG security of supply variants forecast a feed-in capacity of 429 GWh/h and a withdrawal capacity of 470 GWh/h. Accordingly, an additional demand of about 41 GWh/h has to be considered in the H-gas source distribution, which has to be covered by additional injection capacities at the border crossing points. In general, additional capacity requirements predicted by the modeling results must be reflected in network expansion measures.

Results can be seen in Table 10. In LNG security of supply variant 1, LNG plants in Brunsbüttel, Stade and Wilhelmshaven are connected and a large portion of measures corresponds to those of the baseline variant. In LNG security of supply variant 2, LNG facilities in Brunsbüttel, Rostock and Wilhelmshaven are connected and there are lower investment costs. LNG security of supply variant 2.1 includes the LNG plants in Brunsbüttel, Rostock and Wilhelmshaven and increases LNG plant capacity in Rostock from 10.0 GW to 21.7 GW compared to variant 2.

Table 10: Results of the LNG security of supply variants

LNG security of supply variants	Variant 1 until end of 2032	Variant 2 until end of 2032	Variant 2.1 until end of 2032
Pipeline [km]	961	961	961
Compressor station [MW]	251	221	221
Investment [billion Euro]	4.6	4.4	4.4
- Network expansion measures from NDP GAS 2020 (without LNG)	1.9	1.9	1.9
- LNG-measures	2.4	2.1	2.1
- Further new net expansion measures from NDP Gas 2022	0.4	0.4	0.4

Source: TSOs Gas 2022

In addition, TSOs also have a hydrogen variant in the gas network development plan for 2022-2032. This is based on the lack of legal and regulatory framework conditions for the hydrogen network development plan. Furthermore, there is also a lack of legislation that would integrate hydrogen network planning with gas network development planning in one process, optimizing the overall system. As a result, binding commitments cannot be made for a hydrogen network. Nevertheless, the TSOs have attempted to create a framework in the NDP in order to develop a committed integrated network planning for gas and hydrogen.

The determined hydrogen network of the hydrogen modeling is based on needs reported in memoranda of understanding. It is also oriented on the results of the network development plan Gas 2020-2030 and the pipeline reports of the transmission system operators and (potential) hydrogen network operators as well as on existing parallel pipeline systems in the transmission system.

In general, it can be said for Germany that transmission system operators are actively working to diversify the gas supply in order to reduce dependence on Russian gas. In addition to conversions and expansions, options envisage first and foremost a modified use of the existing gas network adapted to the new framework conditions. Until a decision is made on the implementation of the options, it is hardly possible to make reliable statements on cost-reducing conversions of existing pipelines and plants from methane transport to hydrogen transport.

4.2.1 Findings and conclusions

The analysis of the available network development plans shows that, compared to 2021, the plans in central Europe (Germany, Italy and Austria) are putting a growing focus on decarbonization of the gas network, diversification measures and on the independence from Russian gas. Biomethane and hydrogen as energy carriers, general energy efficiency, increasing European security of supply and raising the infrastructure standard, as well as the development of sustainable projects are included in all European network development plans that were analyzed.

Particularly hydrogen is considered in Germany and Austria. Germany has set an additional strong focus on LNG and stands out with first pilot projects in its current network development plan. The injection of biomethane is also frequently part of the projections.

In contrast to central European network development plans, hydrogen- and decarbonization projects are currently not implemented according to the eastern European plans, but they are planned in a forward-looking manner. Hungary for instance plans to connect its natural gas grid to the “European Hydrogen Backbone” between 2025 and 2030. Even Slovenia is following this approach through an adaptation of the Integrated National Energy and Climate Plan.

It is important that the entire European natural gas net participates in these developments. In the years to come, coordination among the network operators regarding the application of hydrogen or other green gases will be necessary to guarantee gas flow also in the future, and diversification measures must be taken in accordance with each other.

The need for and expansion of the network with the purpose of improving security of supply appears to be higher in eastern Europe in comparison with central Europe. NC-CAM processes conducted in the East in past years have however been concluded mostly without seeing a relevant interest on the market. This does point to a deceleration of network expansion.

The elimination of the Nord Stream corridor and the confrontations between Ukraine and Russia have shown that great dependence on one energy source and supplier is also associated with risks in the long term. Since the second half of 2021, energy prices in the EU and worldwide have risen sharply. Fuel prices have continued to rise as a result of the internationally tense situation, which has also led to concerns about the security of energy supply in the EU.

Therefore, diversification of energy carriers, general energy efficiency, cooperation within the EU and/or internationally as well as efforts for decarbonization have moved further into focus. In the considered network development plans of neighboring countries, these current topics have not always been included, since the plans were mostly published before the beginning of the confrontations of Russia and Ukraine and the resulting energy crisis. In the German and Austrian (C)NDPs, independence from Russian gas has been included as a major factor in the design process. In the upcoming NDP publications of the other countries, these central factors will certainly be included as well.

From the collected findings, clear conclusions for national and cross-border energy supply can be drawn for Austria, too. Both a diversification of energy carriers as well as an expansion of potential sources are essential for Austria. The completion of new biogas plants and hydrogen production within the national borders are steps towards these goals. As already mentioned on multiple occasions in this Coordinated Network Development Plan for the planning period 2023 to 2032 (including in the projects of GCA and TAG), the expansion and/or conversion of important long-distance pipelines leading to and through Austria is of great international importance.

Both the gradual expansion and the conversion of the West-Austrian gas pipeline and the Trans-Austrian gas pipeline are essential steps that are necessary to further reduce dependencies in energy supply. This can advance the vision of a future hydrogen infrastructure and also represent a significant step towards diversification. Rapidly stimulating the emergence of a hydrogen market also has EU-wide relevance for energy supply.

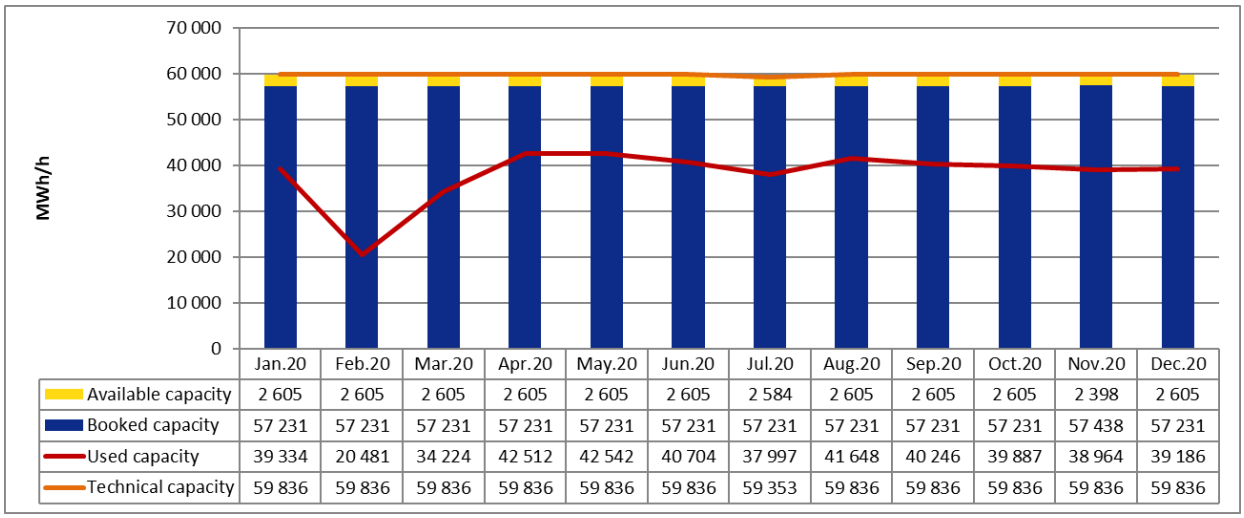
5 Capacity Demand

5.1 Capacity booking and capacity usage – 2022 status report

Figure 48 to Figure 59 show technically marketable capacity, available capacity, booked capacity and used capacity for each point and direction from 1 January 2021 to 31 December 2021.

Fluctuations of technically marketable capacity are attributable to maintenance work which restricts capacity. The current maintenance work schedules of the transmission system operators are available from the Gas Connect Austria website[4] and on the TAG GmbH website[5].

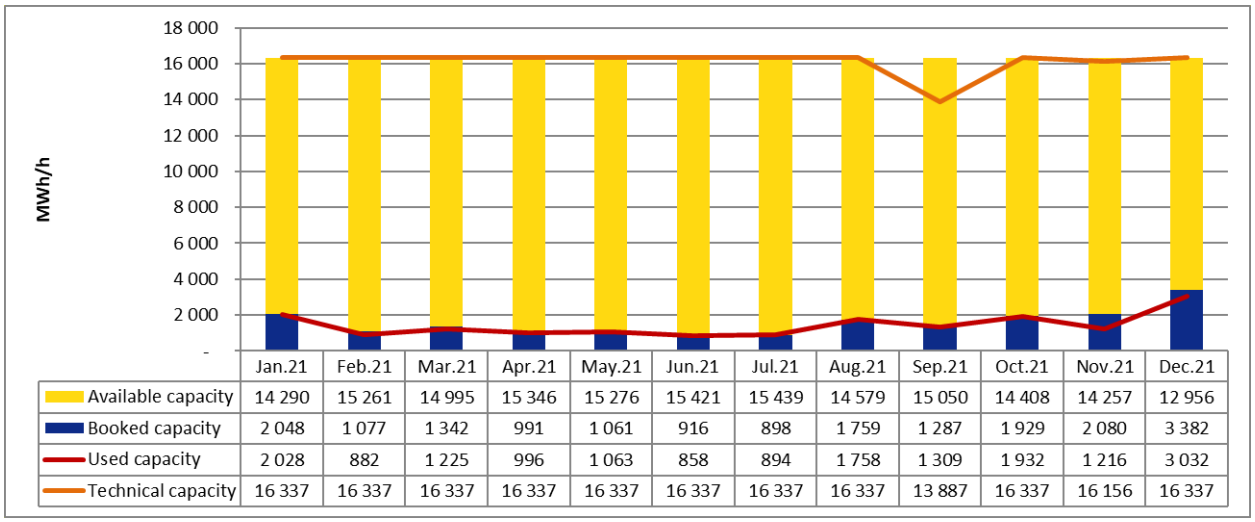
Figure 48: TAG GmbH - Entry Baumgarten TAG



	Jan.20	Feb.20	Mar.20	Apr.20	May.20	Jun.20	Jul.20	Aug.20	Sep.20	Oct.20	Nov.20	Dec.20
Available capacity	2 605	2 605	2 605	2 605	2 605	2 605	2 584	2 605	2 605	2 605	2 398	2 605
Booked capacity	57 231	57 231	57 231	57 231	57 231	57 231	57 231	57 231	57 231	57 231	57 438	57 231
Used capacity	39 334	20 481	34 224	42 512	42 542	40 704	37 997	41 648	40 246	39 887	38 964	39 186
Technical capacity	59 836	59 836	59 836	59 836	59 836	59 836	59 353	59 836	59 836	59 836	59 836	59 836

Source: AGGM platform (based on TAG GmbH submitted data)

Figure 49: Gas Connect Austria - Entry Baumgarten GCA



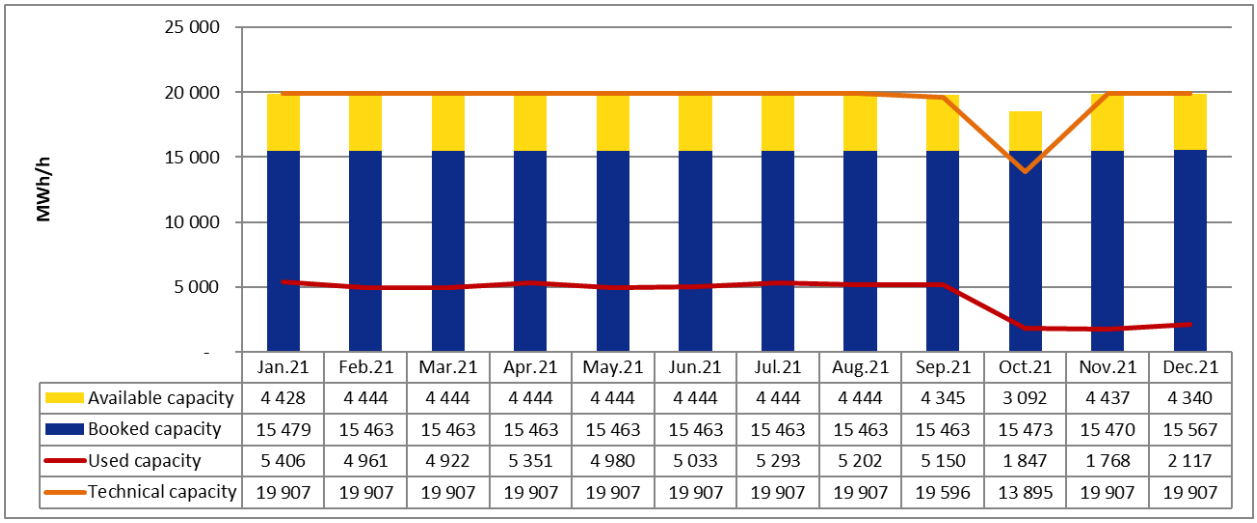
	Jan.21	Feb.21	Mar.21	Apr.21	May.21	Jun.21	Jul.21	Aug.21	Sep.21	Oct.21	Nov.21	Dec.21
Available capacity	14 290	15 261	14 995	15 346	15 276	15 421	15 439	14 579	15 050	14 408	14 257	12 956
Booked capacity	2 048	1 077	1 342	991	1 061	916	898	1 759	1 287	1 929	2 080	3 382
Used capacity	2 028	882	1 225	996	1 063	858	894	1 758	1 309	1 932	1 216	3 032
Technical capacity	16 337	16 337	16 337	16 337	16 337	16 337	16 337	16 337	13 887	16 337	16 156	16 337

Source: AGGM platform

[4] https://www.gasconnect.at/en/network-information/network-development/maintenance/ (retrieved on 24.08.2021)

[5] https://www.taggmbh.at/en/for-system-users/maintenance-works/ (retrieved on 24.08.2021)

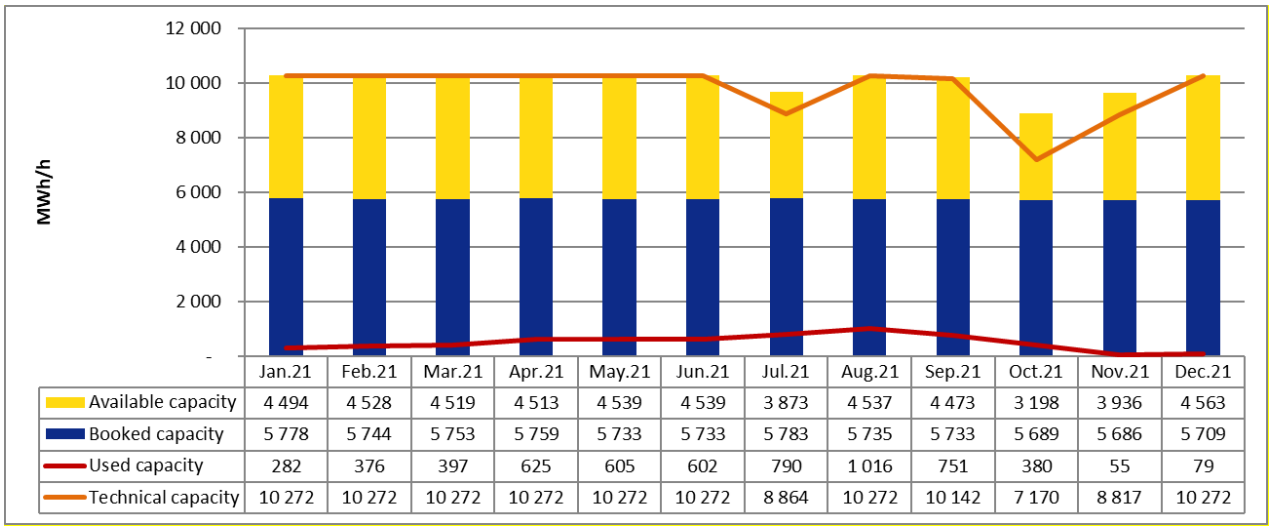
Figure 50: Gas Connect Austria - Entry Baumgarten WAG



	Jan.21	Feb.21	Mar.21	Apr.21	May.21	Jun.21	Jul.21	Aug.21	Sep.21	Oct.21	Nov.21	Dec.21
Available capacity	4 428	4 444	4 444	4 444	4 444	4 444	4 444	4 444	4 345	3 092	4 437	4 340
Booked capacity	15 479	15 463	15 463	15 463	15 463	15 463	15 463	15 463	15 463	15 473	15 470	15 567
Used capacity	5 406	4 961	4 922	5 351	4 980	5 033	5 293	5 202	5 150	1 847	1 768	2 117
Technical capacity	19 907	19 907	19 907	19 907	19 907	19 907	19 907	19 907	19 596	13 895	19 907	19 907

Source: AGGM platform

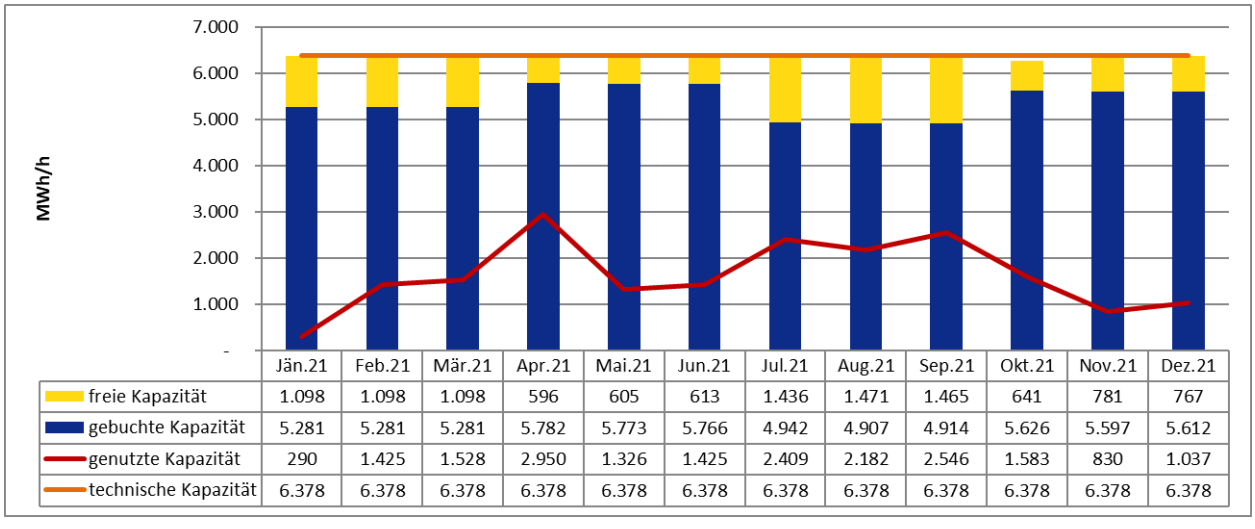
Figure 51: Gas Connect Austria – Exit Baumgarten WAG



	Jan.21	Feb.21	Mar.21	Apr.21	May.21	Jun.21	Jul.21	Aug.21	Sep.21	Oct.21	Nov.21	Dec.21
Available capacity	4 494	4 528	4 519	4 513	4 539	4 539	3 873	4 537	4 473	3 198	3 936	4 563
Booked capacity	5 778	5 744	5 753	5 759	5 733	5 733	5 783	5 735	5 733	5 689	5 686	5 709
Used capacity	282	376	397	625	605	602	790	1 016	751	380	55	79
Technical capacity	10 272	10 272	10 272	10 272	10 272	10 272	8 864	10 272	10 142	7 170	8 817	10 272

Source: AGGM platform

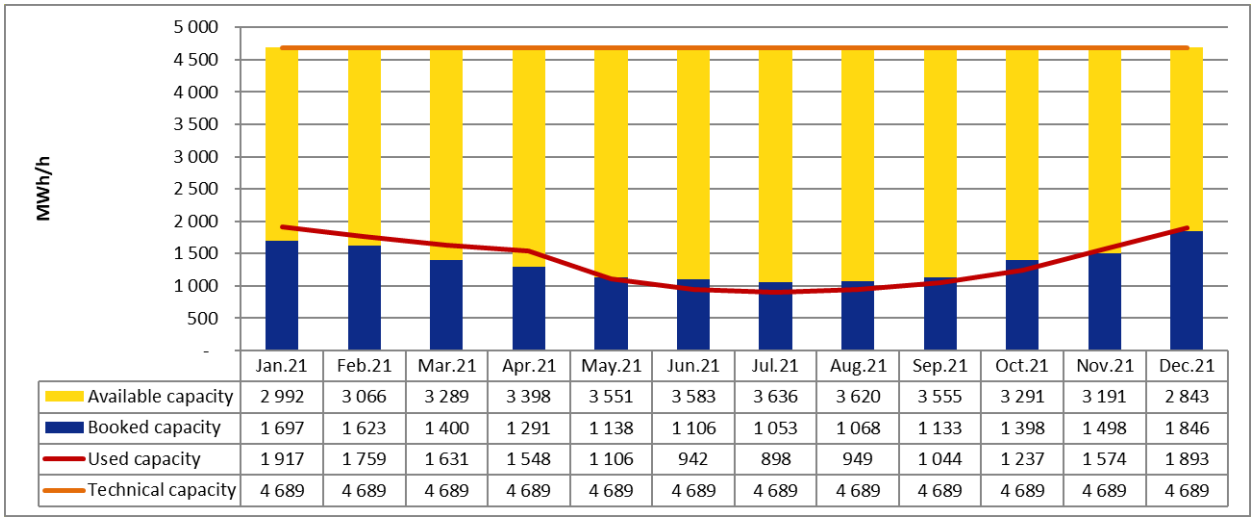
Figure 52: Gas Connect Austria – Exit Mosonmagyaróvár



	Jän.21	Feb.21	Mär.21	Apr.21	Mai.21	Jun.21	Jul.21	Aug.21	Sep.21	Okt.21	Nov.21	Dez.21
freie Kapazität	1.098	1.098	1.098	596	605	613	1.436	1.471	1.465	641	781	767
gebuchte Kapazität	5.281	5.281	5.281	5.782	5.773	5.766	4.942	4.907	4.914	5.626	5.597	5.612
genutzte Kapazität	290	1.425	1.528	2.950	1.326	1.425	2.409	2.182	2.546	1.583	830	1.037
technische Kapazität	6.378	6.378	6.378	6.378	6.378	6.378	6.378	6.378	6.378	6.378	6.378	6.378

Source: AGGM platform

Figure 53: Gas Connect Austria – Exit Murfeld

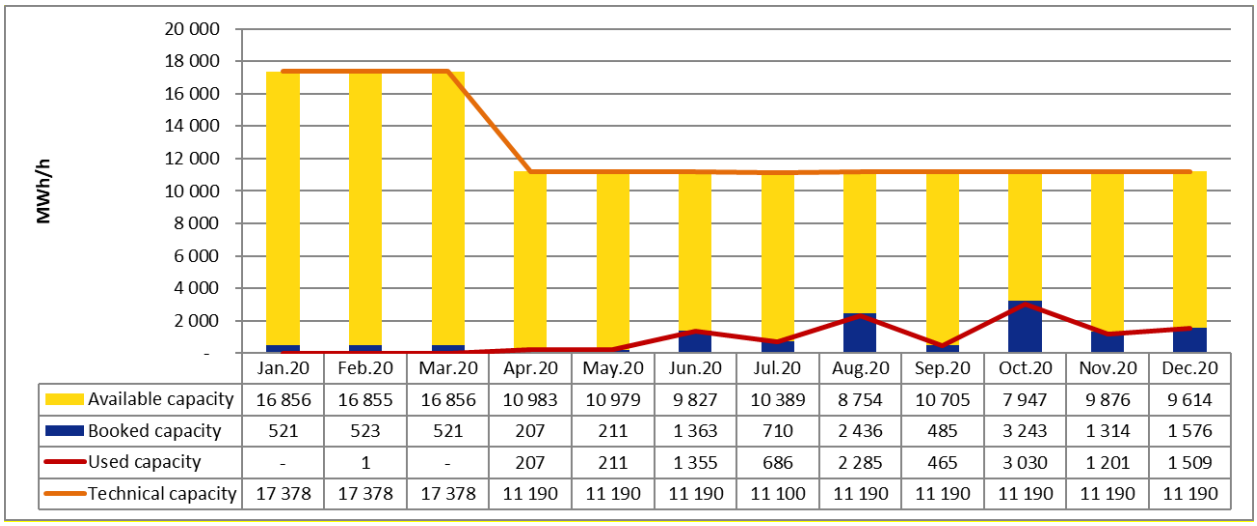


	Jan.21	Feb.21	Mar.21	Apr.21	May.21	Jun.21	Jul.21	Aug.21	Sep.21	Oct.21	Nov.21	Dec.21
Available capacity	2 992	3 066	3 289	3 398	3 551	3 583	3 636	3 620	3 555	3 291	3 191	2 843
Booked capacity	1 697	1 623	1 400	1 291	1 138	1 106	1 053	1 068	1 133	1 398	1 498	1 846
Used capacity	1 917	1 759	1 631	1 548	1 106	942	898	949	1 044	1 237	1 574	1 893
Technical capacity	4 689	4 689	4 689	4 689	4 689	4 689	4 689	4 689	4 689	4 689	4 689	4 689

Source: AGGM platform

Since April 2021 TAG GmbH markets the quality FZK instead of DZK at the entry point Arnoldstein.

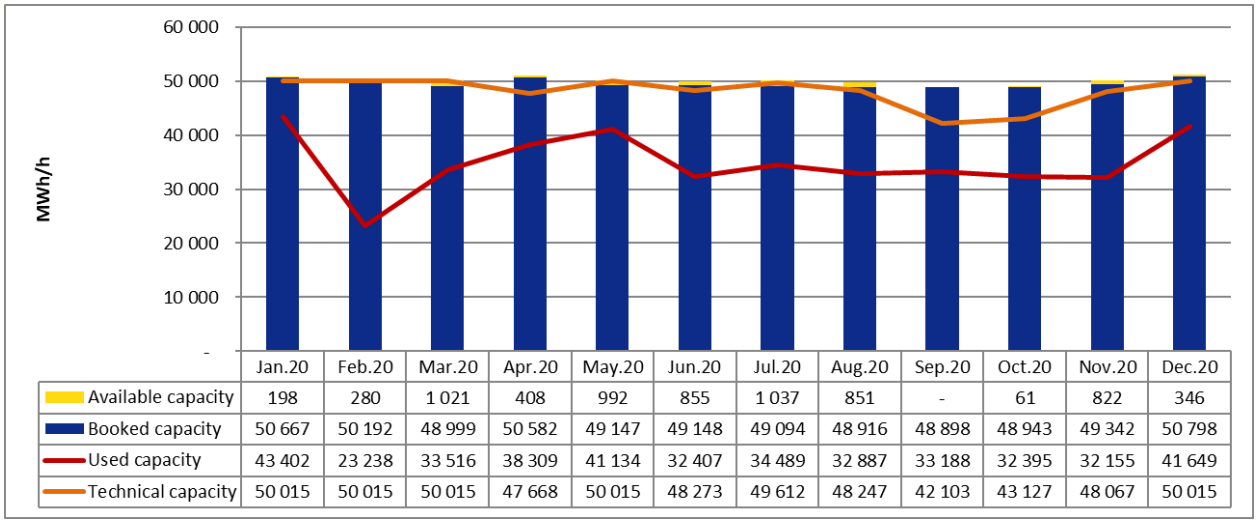
Figure 54: TAG GmbH – Entry Arnoldstein



	Jan.20	Feb.20	Mar.20	Apr.20	May.20	Jun.20	Jul.20	Aug.20	Sep.20	Oct.20	Nov.20	Dec.20
Available capacity	16 856	16 855	16 856	10 983	10 979	9 827	10 389	8 754	10 705	7 947	9 876	9 614
Booked capacity	521	523	521	207	211	1 363	710	2 436	485	3 243	1 314	1 576
Used capacity	-	1	-	207	211	1 355	686	2 285	465	3 030	1 201	1 509
Technical capacity	17 378	17 378	17 378	11 190	11 190	11 190	11 100	11 190	11 190	11 190	11 190	11 190

Source: AGGM platform (based on TAG GmbH submitted data)

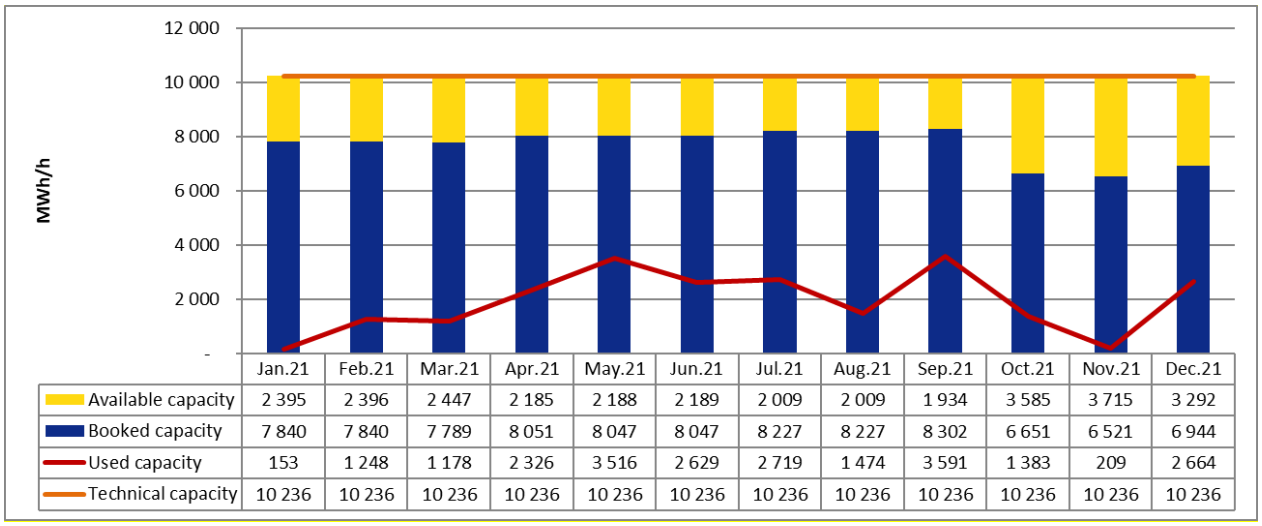
Figure 55: TAG GmbH – Exit Arnoldstein



	Jan.20	Feb.20	Mar.20	Apr.20	May.20	Jun.20	Jul.20	Aug.20	Sep.20	Oct.20	Nov.20	Dec.20
Available capacity	198	280	1 021	408	992	855	1 037	851	-	61	822	346
Booked capacity	50 667	50 192	48 999	50 582	49 147	49 148	49 094	48 916	48 898	48 943	49 342	50 798
Used capacity	43 402	23 238	33 516	38 309	41 134	32 407	34 489	32 887	33 188	32 395	32 155	41 649
Technical capacity	50 015	50 015	50 015	47 668	50 015	48 273	49 612	48 247	42 103	43 127	48 067	50 015

Source: AGGM platform (based on TAG GmbH submitted data)

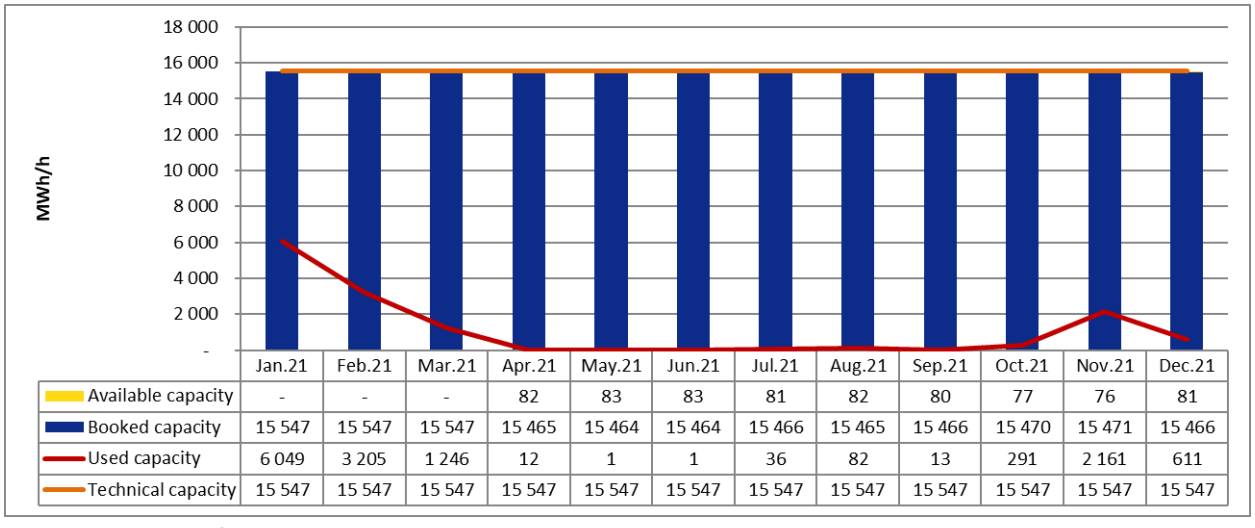
Figure 56: Gas Connect Austria – Entry Oberkappel



	Jan.21	Feb.21	Mar.21	Apr.21	May.21	Jun.21	Jul.21	Aug.21	Sep.21	Oct.21	Nov.21	Dec.21
Available capacity	2 395	2 396	2 447	2 185	2 188	2 189	2 009	2 009	1 934	3 585	3 715	3 292
Booked capacity	7 840	7 840	7 789	8 051	8 047	8 047	8 227	8 227	8 302	6 651	6 521	6 944
Used capacity	153	1 248	1 178	2 326	3 516	2 629	2 719	1 474	3 591	1 383	209	2 664
Technical capacity	10 236	10 236	10 236	10 236	10 236	10 236	10 236	10 236	10 236	10 236	10 236	10 236

Source: AGGM platform

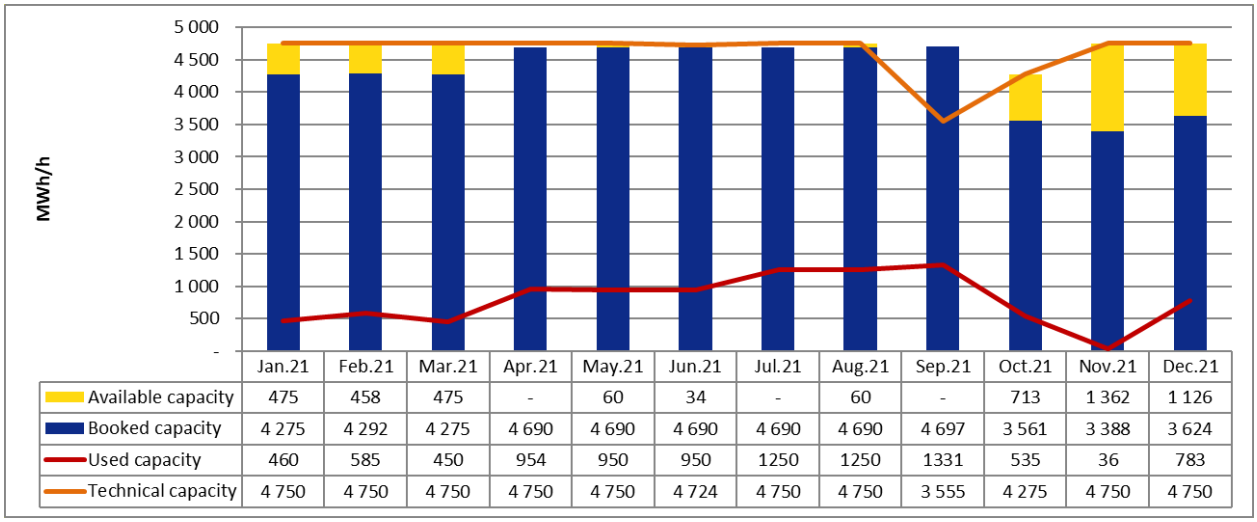
Figure 57: Gas Connect Austria – Exit Oberkappel



	Jan.21	Feb.21	Mar.21	Apr.21	May.21	Jun.21	Jul.21	Aug.21	Sep.21	Oct.21	Nov.21	Dec.21
Available capacity	-	-	-	82	83	83	81	82	80	77	76	81
Booked capacity	15 547	15 547	15 547	15 465	15 464	15 464	15 466	15 465	15 466	15 470	15 471	15 466
Used capacity	6 049	3 205	1 246	12	1	1	36	82	13	291	2 161	611
Technical capacity	15 547	15 547	15 547	15 547	15 547	15 547	15 547	15 547	15 547	15 547	15 547	15 547

Source: AGGM platform

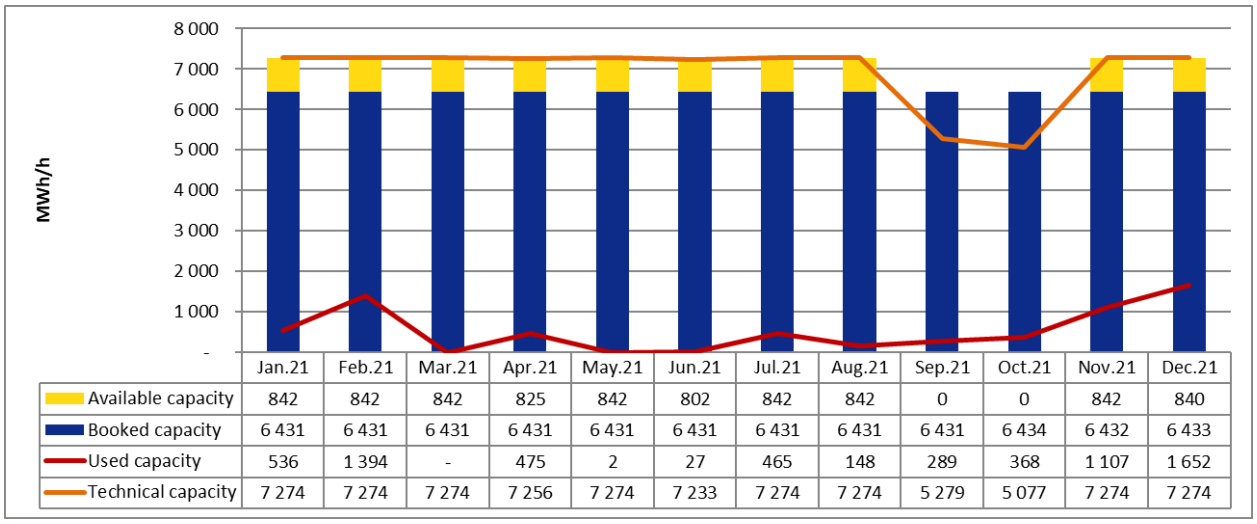
Figure 58: Gas Connect Austria – Entry Überackern ABG/SUDAL



	Jan.21	Feb.21	Mar.21	Apr.21	May.21	Jun.21	Jul.21	Aug.21	Sep.21	Oct.21	Nov.21	Dec.21
Available capacity	475	458	475	-	60	34	-	60	-	713	1 362	1 126
Booked capacity	4 275	4 292	4 275	4 690	4 690	4 690	4 690	4 690	4 697	3 561	3 388	3 624
Used capacity	460	585	450	954	950	950	1250	1250	1331	535	36	783
Technical capacity	4 750	4 750	4 750	4 750	4 750	4 724	4 750	4 750	3 555	4 275	4 750	4 750

Source: AGGM platform

Figure 59: Gas Connect Austria – Exit Überackern ABG/SUDAL



	Jan.21	Feb.21	Mar.21	Apr.21	May.21	Jun.21	Jul.21	Aug.21	Sep.21	Oct.21	Nov.21	Dec.21
Available capacity	842	842	842	825	842	802	842	842	0	0	842	840
Booked capacity	6 431	6 431	6 431	6 431	6 431	6 431	6 431	6 431	6 431	6 434	6 432	6 433
Used capacity	536	1 394	-	475	2	27	465	148	289	368	1 107	1 652
Technical capacity	7 274	7 274	7 274	7 256	7 274	7 233	7 274	7 274	5 279	5 077	7 274	7 274

Source: AGGM platform

5.2 Capacity scenario for the 2022 CNDP

5.2.1 Submitted capacity demands and resulting capacity scenario

During the reconcilement of the CNDP process with the NC CAM process, it was concluded in coordination with E-Control Austria that the last capacity demands from the NC CAM process are taken as a basis for the current CNDP in order to keep consistency. Only demands from the distribution system side, strategic projects of the transmissions system operators and requirements of the regulation authority are included additionally. Beyond that, even capacity demands from current PCI Projects are considered.

The market area manager in cooperation with the transmission system operators have aggregated the submitted demands and created the resulting capacity scenario for the 2022 CNDP. The capacity scenario is illustrated in Figure 60.

Due to the war in Ukraine and the resulting plans of the European Commission to strongly reduce EU gas imports in the short term and to cease importing gas in the medium term, the economic framework conditions for gas have changed fundamentally. The market area manager, AGGM, and the transmission system operators, GCA and TAG, have therefore decided to adapt this year's planning process and to increase their focus on projects that are necessary for future security of supply.

Furthermore, it must be clear that not only pipelines will be needed, but also sources will have to be developed.

The capacity demand is divided into two categories:

- Capacity demands for security of supply within and outside of Austria, established in H2 Ready, are shown in green in Figure 60.
- Bundled capacity demands provided by upstream network operators are shown in gray in Figure 60.

In addition, in the 2022 capacity scenario:

depicts sources that need to be developed in order to reach independence from Russian gas. The capacity scenario takes into account that both methane and hydrogen can flow from these sources.

MAM and TSOs emphasize that creating additional capacity at border transfer points alone will not be enough to ensure security of supply. Both capacities and quantities must be booked by market participants at the respective sources.

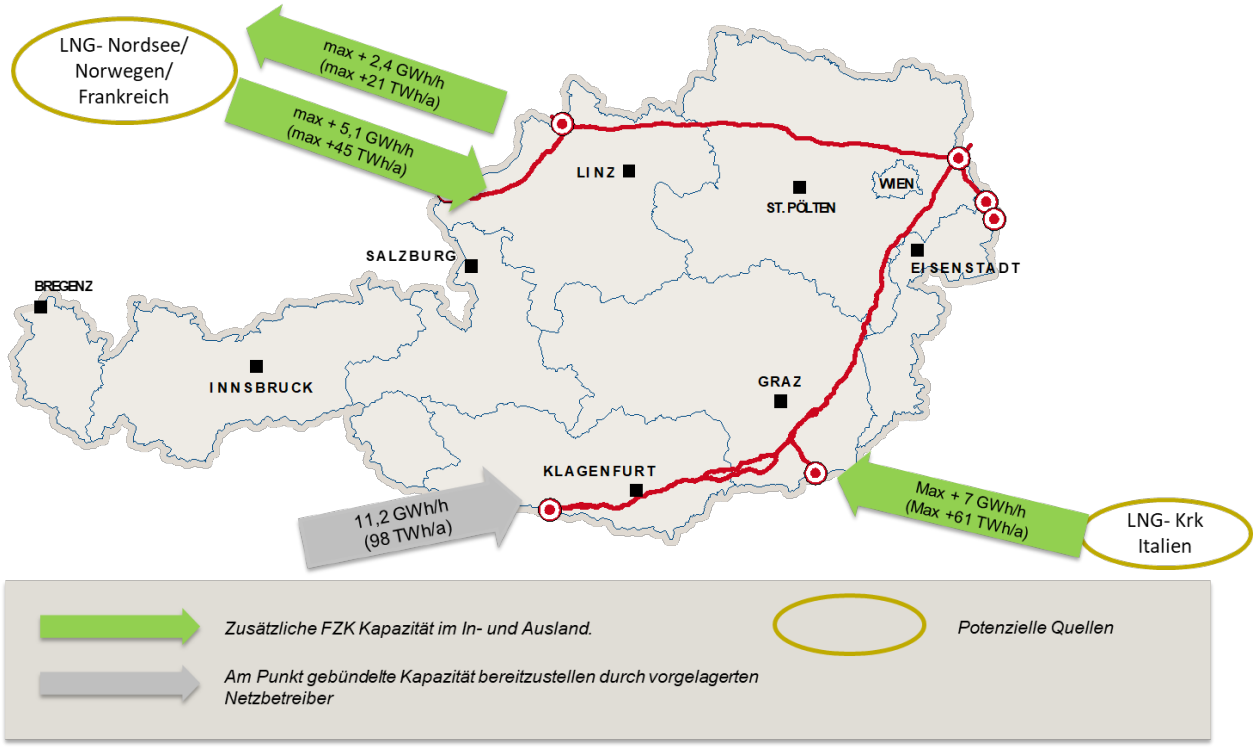
The capacity scenario has been presented to E-Control Austria on 13 October 2022 and was thereafter approved by E-Control Austria.

Table 11: Capacity demands of the 2022 capacity scenario

Interconnection Point	Direction	Capacity [GWh/h]	Origin of the demand	Admission [year]
Oberkappel/Überackern	Entry Exit	5.1 2.4	Security of supply (TYNDP: HYD-N-757)	2022
Murfeld	Entry	6.94	Security of supply	2017

Source: Gas Connect Austria, TAG GmbH, AGGM; 2022

Figure 60: Capacity scenario

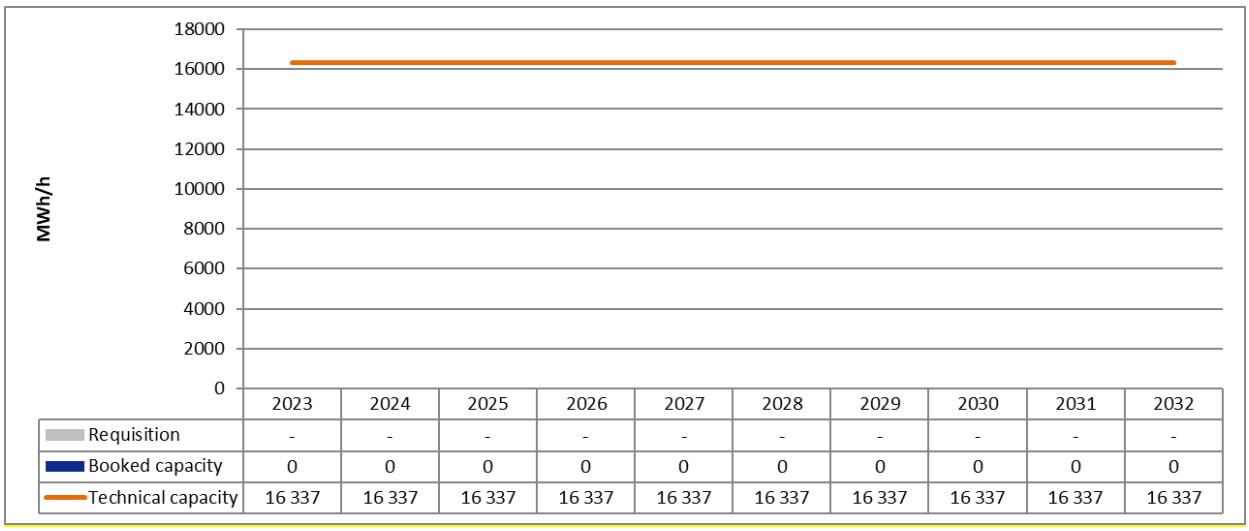


Source: AGGM, Gas Connect Austria, TAG GmbH; 2022

5.2.2 Booked capacities and capacity demand by entry/exit point from 2023 to 2032

The following figures illustrate the capacities booked at each entry/exit point and the capacity demand from the capacity scenario of the 2022 CNDP covering the years 2023 to 2032.

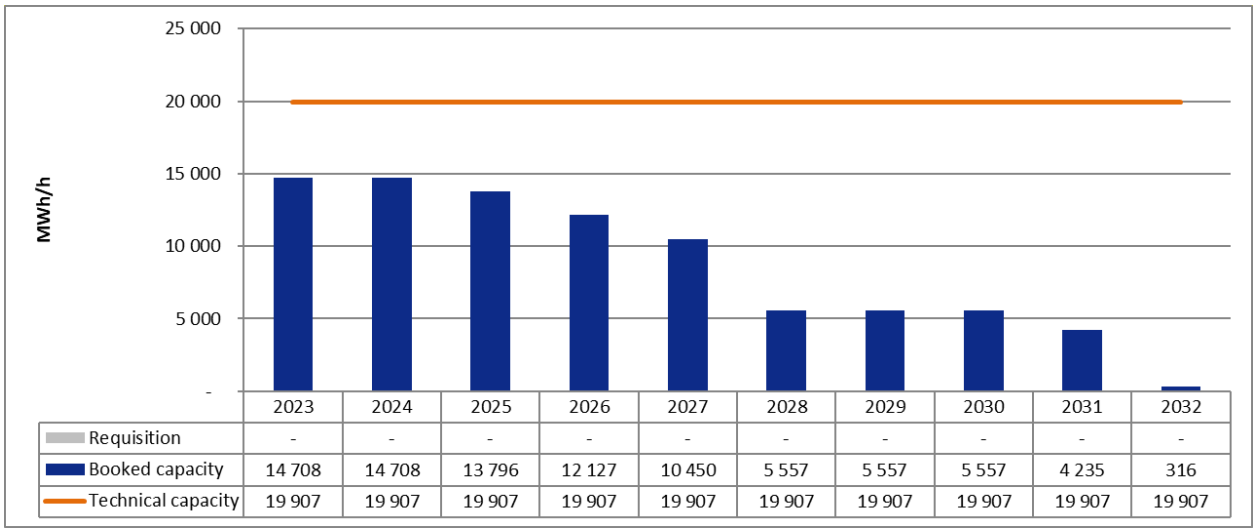
Figure 61: Entry Baumgarten GCA, capacities booked and capacity demand 2023-2032



	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	0	0	0	0	0	0	0	0	0	0
Technical capacity	16 337	16 337	16 337	16 337	16 337	16 337	16 337	16 337	16 337	16 337

Source: AGGM platform, capacity demand; 2022

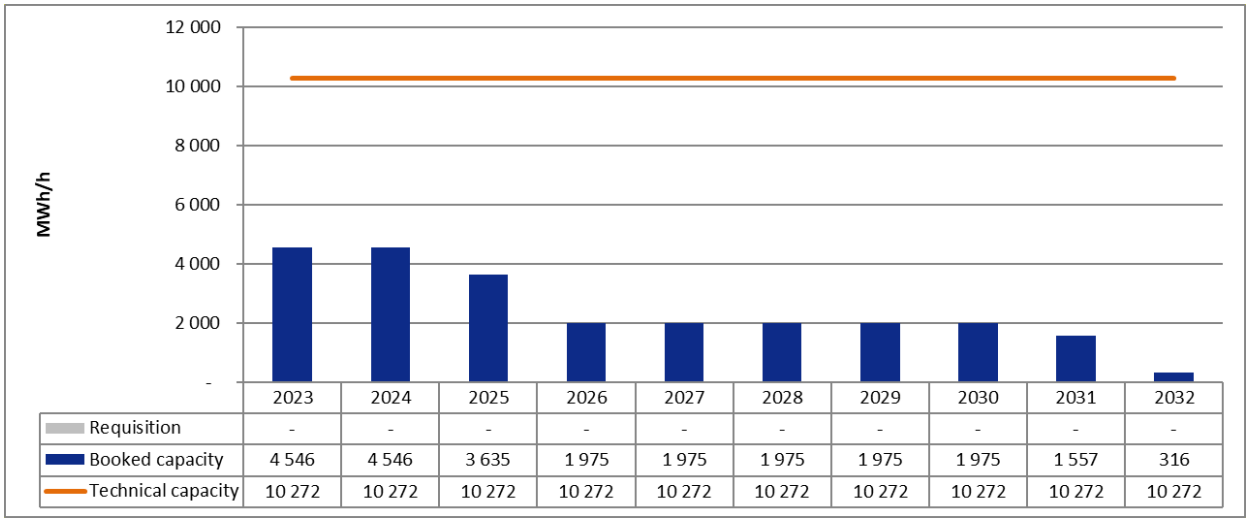
Figure 62: Entry Baumgarten WAG, capacities booked and capacity demand 2023-2032



	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	14 708	14 708	13 796	12 127	10 450	5 557	5 557	5 557	4 235	316
Technical capacity	19 907	19 907	19 907	19 907	19 907	19 907	19 907	19 907	19 907	19 907

Source: AGGM platform, capacity demand; 2022

Figure 63: Exit Baumgarten WAG, capacities booked and capacity demand 2023-2032

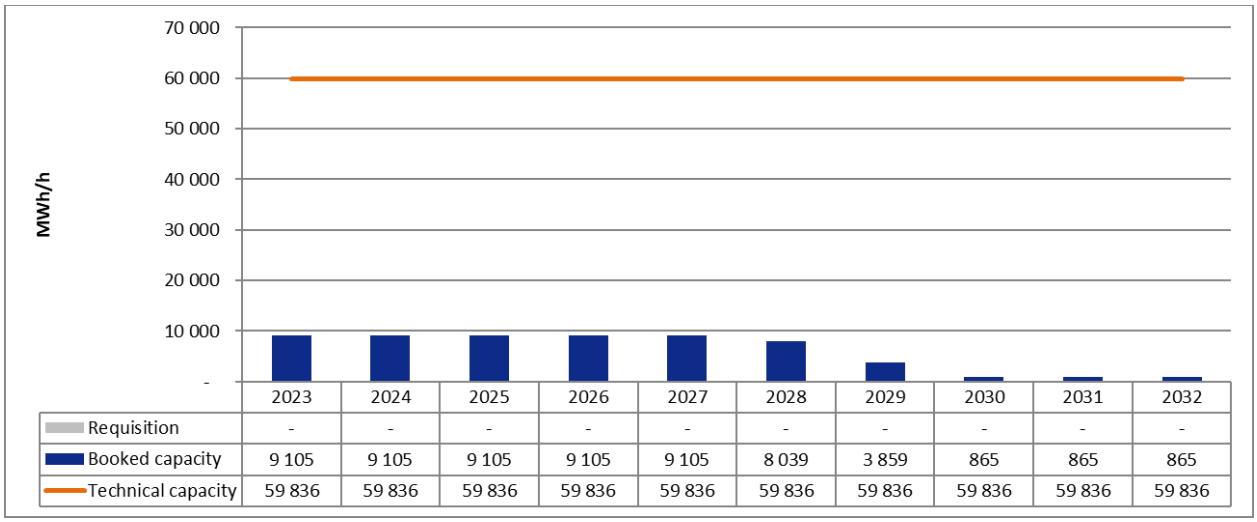


	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	4 546	4 546	3 635	1 975	1 975	1 975	1 975	1 975	1 557	316
Technical capacity	10 272	10 272	10 272	10 272	10 272	10 272	10 272	10 272	10 272	10 272

Source: AGGM platform, capacity demand; 2022

Due to the expiry of several long-term contracts, the available free capacity will increase significantly from 2023 onwards, see Figure 64.

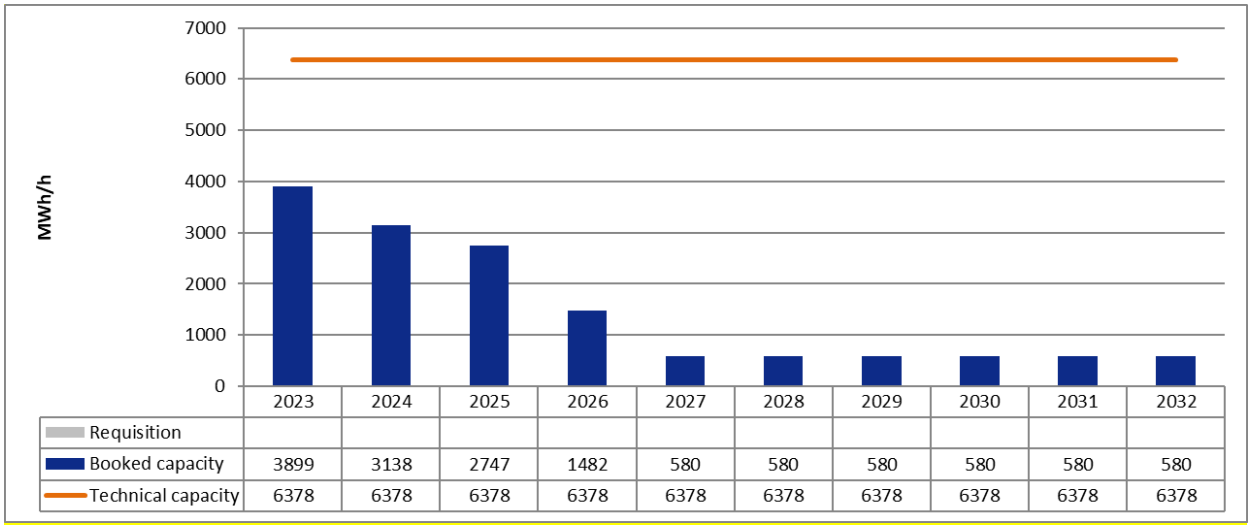
Figure 64: Entry Baumgarten TAG, capacities booked and capacity demand 2023-2032



	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	9 105	9 105	9 105	9 105	9 105	8 039	3 859	865	865	865
Technical capacity	59 836	59 836	59 836	59 836	59 836	59 836	59 836	59 836	59 836	59 836

Source: AGGM platform (based on TAG GmbH submitted data), capacity demand; 2022

Figure 65: Exit Mosonmagyaróvár, capacities booked and capacity demand 2023-2032

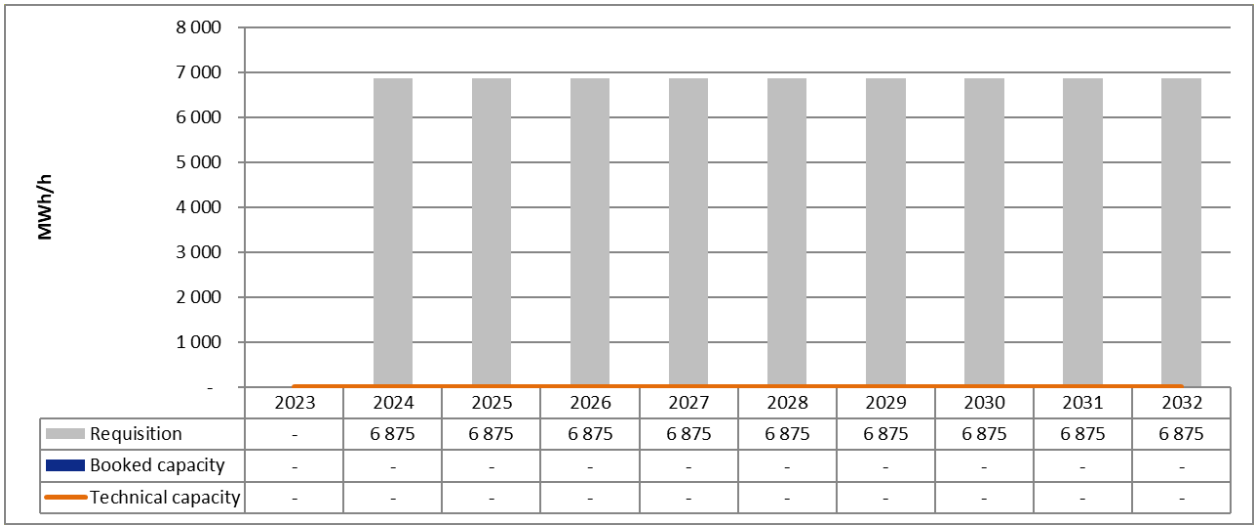


	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Requisition										
Booked capacity	3899	3138	2747	1482	580	580	580	580	580	580
Technical capacity	6378	6378	6378	6378	6378	6378	6378	6378	6378	6378

Source: AGGM platform, capacity demand; 2022

The demand reported at the Murfeld entry and exit point was recorded by the transmission system operators Gas Connect Austria and Plinovodi in the market demand assessment according to NC CAM procedure. The aim is to provide entry capacity in the amount of 6,875 MWh/h. See also Figure 66 and Figure 67.

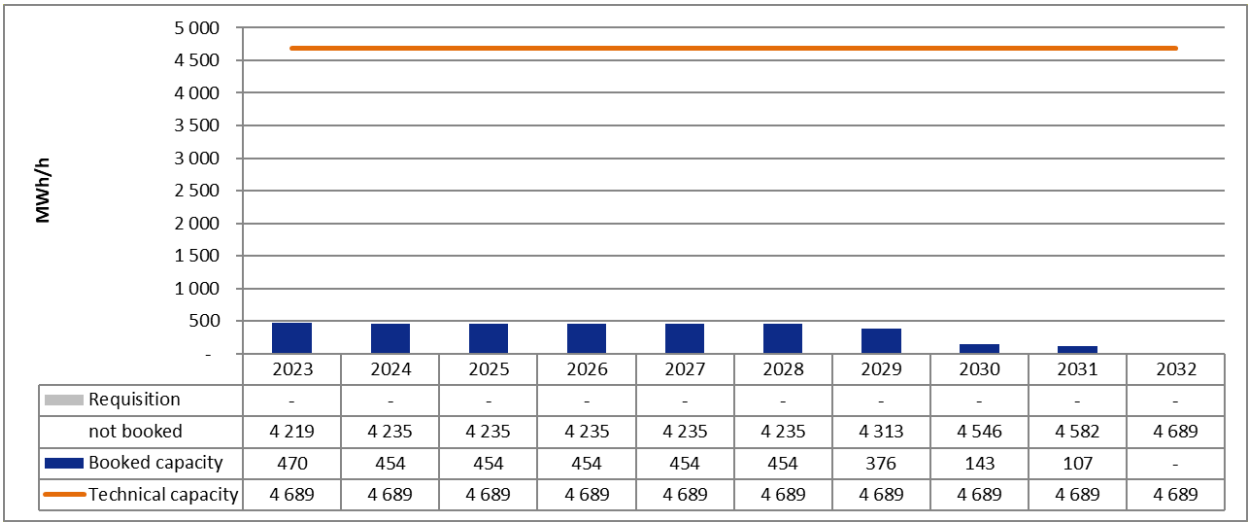
Figure 66: Entry Murfeld, capacities booked and capacity demand 2023-2032



	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Requisition	-	6 875	6 875	6 875	6 875	6 875	6 875	6 875	6 875	6 875
Booked capacity	-	-	-	-	-	-	-	-	-	-
Technical capacity	-	-	-	-	-	-	-	-	-	-

Source: AGGM platform, capacity demand; 2022

Figure 67: Exit Murfeld, capacities booked and capacity demand 2023-2032

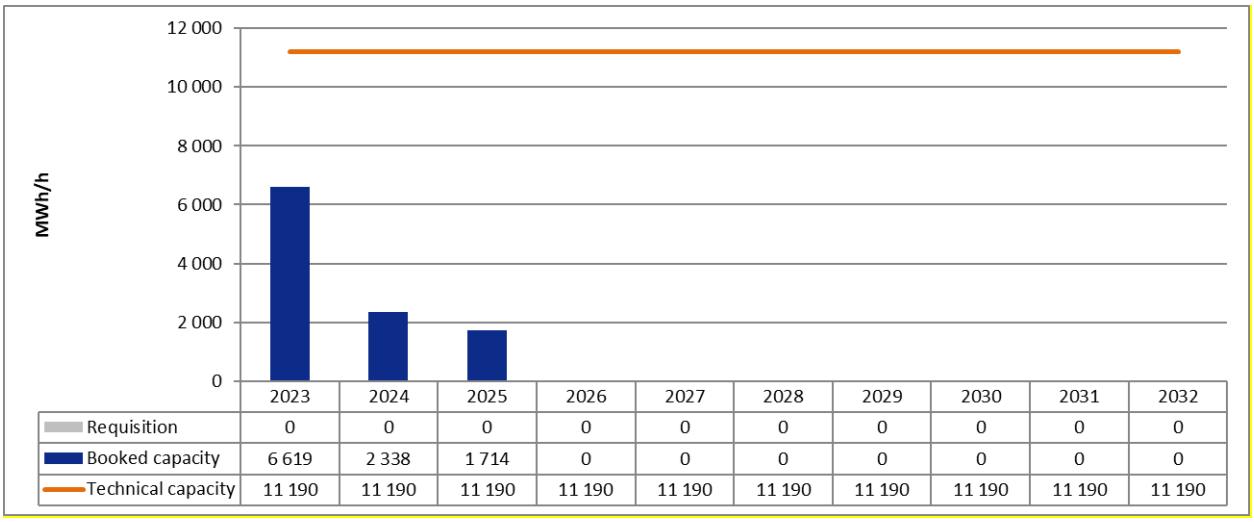


	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Requisition	-	-	-	-	-	-	-	-	-	-
not booked	4 219	4 235	4 235	4 235	4 235	4 235	4 313	4 546	4 582	4 689
Booked capacity	470	454	454	454	454	454	376	143	107	-
Technical capacity	4 689	4 689	4 689	4 689	4 689	4 689	4 689	4 689	4 689	4 689

Source: AGGM platform, capacity demand; 2022

Figure 68 shows that both the technical capacity and the capacity booked at the Arnoldstein entry point remain stable during the forecast period of 2023 to 2032.

Figure 68: Entry Arnoldstein, capacities booked and capacity demand 2023-2032

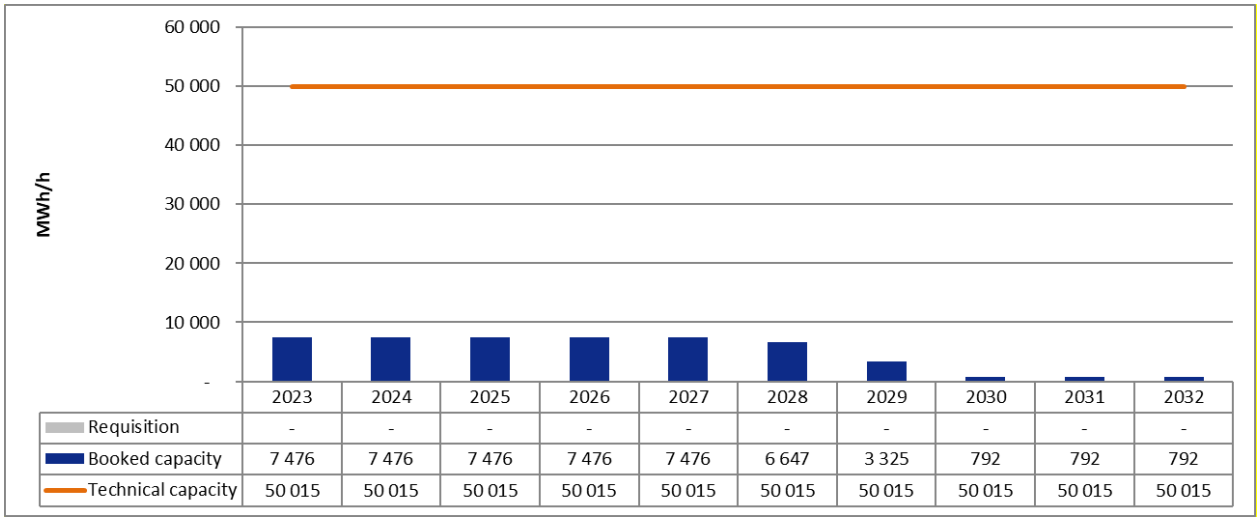


	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Requisition	0	0	0	0	0	0	0	0	0	0
Booked capacity	6 619	2 338	1 714	0	0	0	0	0	0	0
Technical capacity	11 190	11 190	11 190	11 190	11 190	11 190	11 190	11 190	11 190	11 190

Source: AGGM platform (based on TAG GmbH transmitted data), capacity demand; 2022

Similar to the Baumgarten entry point, free capacity will increase significantly from 2023 onwards due to the expiry of long-term contracts spanning several years.

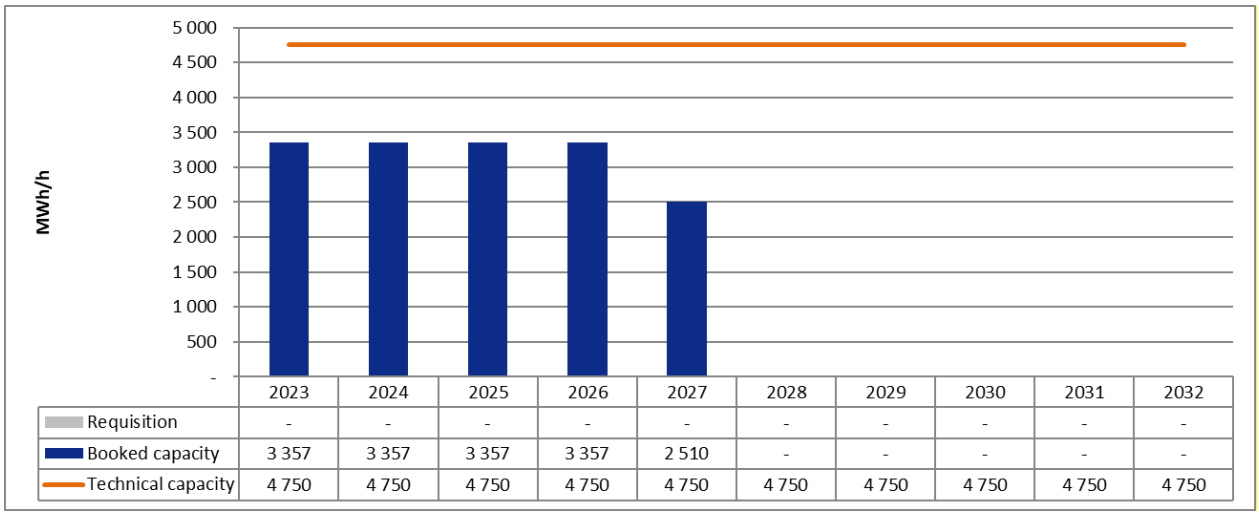
Figure 69: Exit Arnoldstein, capacities booked and capacity demand 2023-2032



	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	7 476	7 476	7 476	7 476	7 476	6 647	3 325	792	792	792
Technical capacity	50 015	50 015	50 015	50 015	50 015	50 015	50 015	50 015	50 015	50 015

Source: AGGM platform (based on TAG GmbH submitted data), capacity demand; 2022

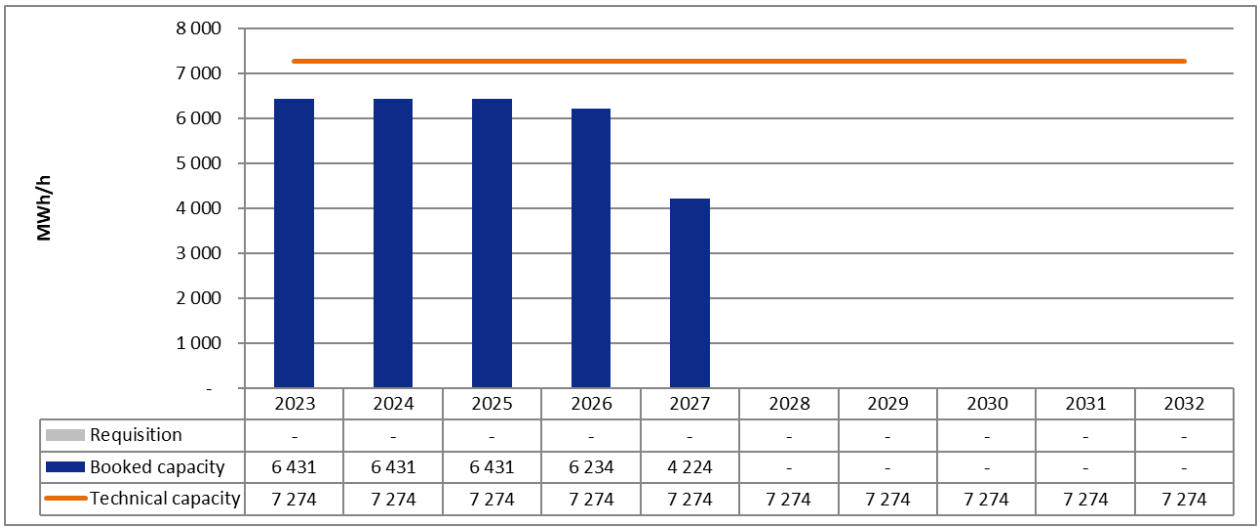
Figure 70: Entry Überackern ABG and SUDAL, capacities booked and capacity demand 2023-2032



	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	3 357	3 357	3 357	3 357	2 510	-	-	-	-	-
Technical capacity	4 750	4 750	4 750	4 750	4 750	4 750	4 750	4 750	4 750	4 750

Source: AGGM platform, capacity demand; 2022

Figure 71: Exit Überackern ABG and SUDAL, capacities booked and capacity demand 2023-2032

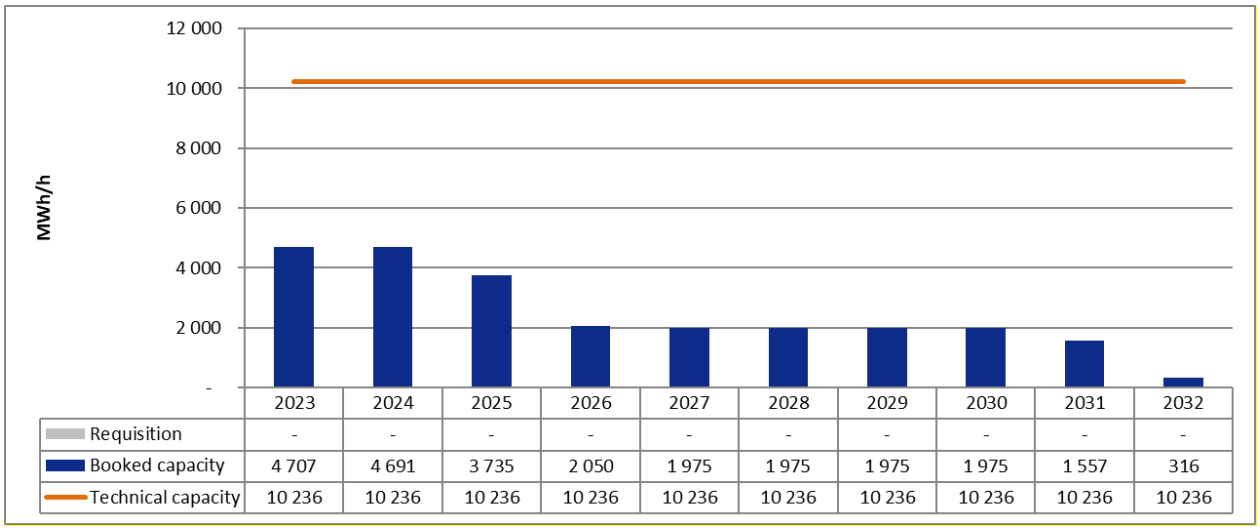


	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	6 431	6 431	6 431	6 234	4 224	-	-	-	-	-
Technical capacity	7 274	7 274	7 274	7 274	7 274	7 274	7 274	7 274	7 274	7 274

Source: AGGM platform, capacity demand; 2022

No additional demand was reported at the Oberkappel entry and exit point in the 2022 CNDP. See also Figure 72 and Figure 73.

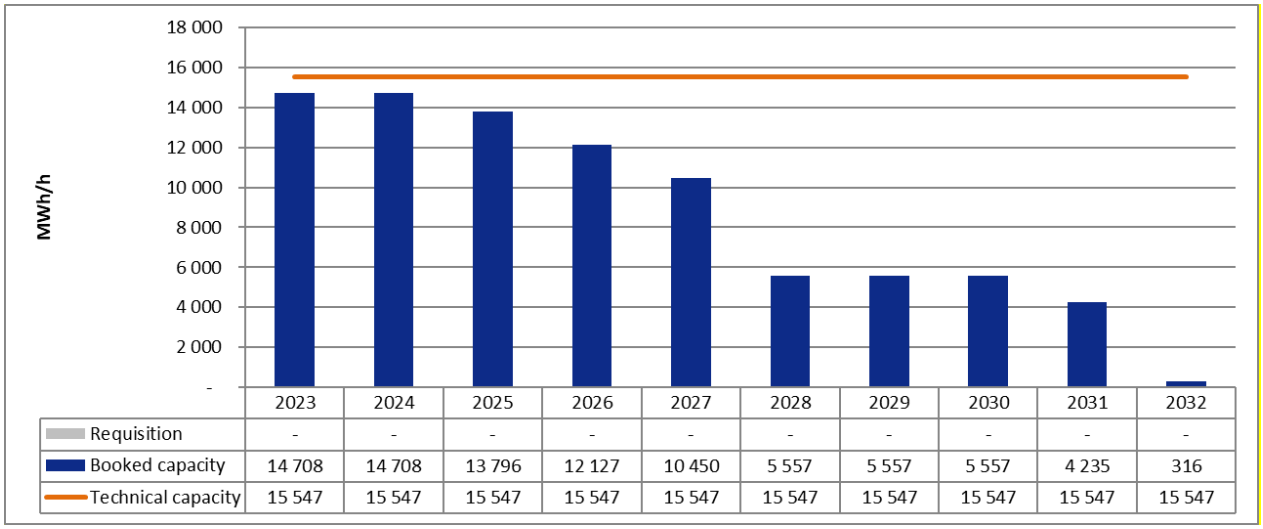
Figure 72: Entry Oberkappel, capacities booked and capacity demand 2023-2032



	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	4 707	4 691	3 735	2 050	1 975	1 975	1 975	1 975	1 557	316
Technical capacity	10 236	10 236	10 236	10 236	10 236	10 236	10 236	10 236	10 236	10 236

Source: AGGM platform, capacity demand; 2022

Figure 73: Exit Oberkappel, capacities booked and capacity demand 2023-2032



	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	14 708	14 708	13 796	12 127	10 450	5 557	5 557	5 557	4 235	316
Technical capacity	15 547	15 547	15 547	15 547	15 547	15 547	15 547	15 547	15 547	15 547

Source: AGGM platform, capacity demand; 2022

5.2.3 Capacity expansions with corresponding projects

During the planning phase the transmission system operators developed suitable projects in order to meet the capacity demands of the capacity scenario. Table 10: Results of the LNG security of supply variants Table 12 shows the assigned capacity demand per respective project.

Table 12: Capacity demand requests and corresponding projects to meet the demands

Demand	Project-sponsor	Project-number	Project name	Implementation time frame [year]	Planned completion [date]
Entry Oberkappel/Überackern + 5,1 GWh/h					
	GCA	2022/01	WAG Loop	4.5	
	GCA	2022/05	WAG Voll-Loop		
Exit Oberkappel/Überackern + 2,4 GWh/h					
	GCA	2022/01	WAG Loop	4.5	
	GCA	2022/05	WAG Voll-Loop		
Entry Murfeld + 6,94 GWh/h					
	GCA	2015/08	Entry Murfeld	4.5	
	Alternatives according to offer level				
	GCA	2020/02	Entry Murfeld - 160	4.5	
	GCA	2020/03	Entry Murfeld - 284	4.5	
	GCA	2020/04	Entry Murfeld - 119	4.5	
	additionally				
	TAG	2016/01	TAG Reverse Flow Weitendorf / Eggendorf	4.5	

Source: AGGM, Gas Connect Austria; TAG GmbH, 2022

6 Activities of the transmission system operators (Network development plans of the transmission system operators)

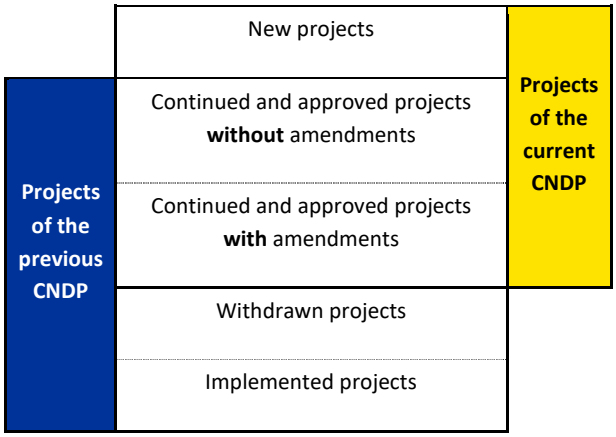
6.1 Classification of projects

The projects in the KNEP are structured according to project categories and project types.

6.1.1 Project categories

The projects of the CNDP are divided into 5 project categories which reflects the procedure of approval.

Figure 74: Projectcategories [Source: AGGM]



New Projects

New projects are projects that are submitted for approval in the current CNDP for the first time.

Continued and approved projects without amendments

This category comprises projects that have been submitted and approved in previous CNDPs and are continued without any substantial modifications.

Continued and approved projects without amendments

Pursuant to section 64 (1) Natural Gas Act 2011, approval is granted based on proof to be submitted by the TSO showing that the investments in the plan are necessary for technical reasons, adequate and economically efficient. In the event of substantial changes to this proof and the underlying data, the project modifications have to be submitted by the TSOs, and the project has to be re-evaluated pursuant to section 64 Natural Gas Act 2011 by E-Control as a matter of principle.

Withdrawn projects

This category comprises projects that have been put into operation by the submission deadline for the current CNDP.

Implemented projects

This category comprises projects that have been put into operation by the submission deadline for the current CNDP.

6.1.2 Project types

Furthermore, the projects in the CNDP are distinguished according to their scope of realization (e.g. creating of additional capacities, replacement of existing infrastructure, etc.) into following project types.

Planning projects for additional capacities

Planning projects are projects in an early planning stage aiming to create additional capacities, which have been influenced by related precursory projects with regard to technical design and economic optimization or for which marketing modalities have not yet been finalized.

Projects of additional capacities

Projects creating additional capacities are projects in an advanced planning stage (e.g. detailed planning has been completed, approval procedures have been started, a feasibility study has been carried out). They can be sub-divided into the following groups:

a. **Projects that require an economic test** pursuant to Article 22 in conjunction with Article 24 of Regulation (EU) 2017/459:
   These are projects with costs are entirely or partially assigned to one or several handover point(s) (IP). These projects should only be implemented if the economic test pursuant to Article 22 in conjunction with Article 24 CAM NC has a positive result.

b. **Complementary projects:**
   These are projects that must be realized in order for a project listed under item a. to entirely fulfil its functions. Such projects can only be implemented if the corresponding project listed under item a. has received a positive result on the economic test pursuant to Article 22 in conjunction with Article 24 CAM NC. Once approved, these projects should be implemented when the related precursory project or the corresponding project fulfils the conditions for being implemented.

c. **Projects that do not require an economic test:**
   These are projects that neither fit item a. nor item b. and are not replacement investment projects either but which are still capacity-relevant with regard to their intended function and purpose (e.g. increasing the flexibility of access to the virtual trading point, fostering freely allocable capacities with regard to security of supply and transit (increase in the redundancy of freely allocable capacity etc.).

Projects for additional hydrogen capacities

Additional H2 capacity projects are projects that have reached an advanced project status (e.g., detailed design completed, permitting process initiated, or feasibility study conducted). These are divided into:

a. **Projects for the laying of new hydrogen pipelines**
   These are projects that are capacity-relevant from the perspective of the intended function and project, and where the laying of new pipeline strings is planned.
b. **Conversion to H2 pipeline:**
   These are projects that are capacity-relevant from the perspective of the intended function and project, and where the conversion of pipeline strings is planned.

Replacement investment projects

Even replacement investments that concern existing infrastructure pursuant to section 63 (3) item 1 Natural Gas Act 2011 and that safeguard secure, reliable and effective operations of the system will be included in the CNDP.

6.2 CNDP 2022 Projects

The 2022 CNDP includes the projects listed in Table 13 to Table 19.

In Table 13 and Table 17 list those projects that will be continued unchanged from the 2021 CNDP. These projects have already been approved by E-Control Austria and will be continued by the project promoters in accordance with the implementation plan.

Table 14 and Table 18 list those projects that were approved by E-Control Austria in an earlier KNEP but were modified based on new findings or changed needs.

Table 15 and Table 19 list the new projects or planning projects created in the KNEP 2022. These projects are submitted to E-Control Austria for approval.

The project sheets summarizing the most important project data are attached to Annex 1. They are ordered by project type and project number.

Information on possible impacts on transmission capacities during the implementation of the projects can be found under the following links:

- AGGM: https://www.aggm.at/netzinformation/instandhaltungskoordination
- Gas Connect Austria: https://www.gasconnect.at/netzinformationen/netzentwicklung/wartungsarbeiten/
- TAG GmbH: https://www.taggmbh.at/fuer-netzbenutzer/wartungsarbeiten/

6.2.1 Projects for additional capacities

The following projects have been analyzed and developed in close coordination between the Austrian transmission system operators and/or the respective neighboring TSO.

These projects including the technical measures are presented in Appendix 1.

Table 13: Projects for additional capacities – Continued and approved projects without amendments

Project sponsor	Project number	Project name	Implementation time frame [years]	Planned completion [date]
GCA	2015/08	Entry Murfeld	4,5	
GCA	2020/02	Entry Murfeld - 160	4,5	
GCA	2020/03	Entry Murfeld - 284	4,5	
GCA	2020/04	Entry Murfeld - 119	4,5	
TAG	2016/01	TAG Reverse Flow Weitendorf / Eggendorf	4,5	

Source: Gas Connect Austria, TAG GmbH; 2022

Table 14: Projects for additional capacities – Continued and approved projects with amendments

Project sponsor	Project number	Project name	Implementation time frame [years]	Planned completion [date]

Source: Gas Connect Austria, TAG GmbH; 2022

Table 15: Projects for additional capacities – New Projects

Project sponsor	Project number	Project name	Implementation time frame [years]	Planned completion [date]
GCA	2022/01	WAG Loop	4,5	
GCA	2022/05	WAG Voll-Loop (Planingproject)	4,5	

Source: Gas Connect Austria, TAG GmbH; 2022

Table 16: Planning Projects for additional hydrogen capacities – New Projects

Project sponsor	Project number	Project name	Implementation time frame [years]	Planned completion [date]
GCA	2022/02	Planningproject: Wasserstoffprojekt WAG	4,5	
GCA	2022/03	Planningproject: Wasserstoffprojekt Penta	4,5	
GCA	2022/04	Planningproject: Wasserstoffprojekt SOL	3,5.	
TAG	2022/01	Planningproject: H2 Readiness of the TAG Pipeline System	4,5.	

Source: Gas Connect Austria, TAG GmbH; 2022

6.2.2 Replacement investment projects

An overview of the individual replacement investment projects can be found in Table 17, Table 18 and Table 19. More information on these projects including the technical measures is presented in project data sheets at the end of this document.

Table 17: Replacement investment projects – Continued and approved projects without amendments

Project sponsor	Project number	Project name	Implementation time frame [years]	Planned completion [date]
GCA	2016/E1	110 kV Freileitung, UW Oberweiden, UW BMG redundante Anspeisung		Q4 2026
GCA	2019/E6	UW Baumgarten Netzqualität		Q3 2021/Q4 2026
GCA	2021/E2	VS Neustift Erneuerung Maschienensteuerung		Q1 2023
GCA	2021/E3	Erneuerung RMA Armaturen Abschnitt 3 (Bad Leonfelden)		Q4 2025
GCA	2021/E4	Erneuerung Stationsteuerung VS Kirchberg		Q4 2026
GCA	2021/E5	MS Überackern/SS Mauerkirchen Erneuerung Isolierkupplung (IK)		Q1 2023
GCA	2021/E6	Erneuerung Stationsteuerung MS Überackern		Q4 2024
GCA	2021/E10	VS Kirchberg Erneuerung Maschienensteuerung		Q4 2026
TAG	2016/R12	SCS Replacement CS Baumgarten-Grafendorf-Ruden		Q4 2026
TAG	2019/R09	DLE 1.5 + 72 hole PT module BC500 in CS Baumgarten		Q4 2022
TAG	2020/R05	New Flanges – Measurement Optimization MS Arnoldstein		Q2 2023
TAG	2021/R01	Exchange of Insulation Joints Ludmannsdorf & Arnoldstein		Q4/2023
TAG	2021/R03	Substitution MKVI CS Eggendorf		Q4/2024
TAG	2021/R04	Substitution MKVI CS Weitendorf		Q4/2023

Source: Gas Connect Austria, TAG GmbH; 2022

Table 18: Replacement investment projects – Continued and approved projects with amendments

Project sponsor	Project number	Project name	Implementation time frame [years]	Planned completion [date]
TAG	2020/R01	DLE 1.5 hole PT module BC600 in CS-Baumgarten		Q4 2023
TAG	2020/R06	Optimization TUCOs CS-Ruden		Q4 2025
TAG	2021/R06-A	Upgrade of safety and control loops CS Baumgarten		Q4 2024

Source: Gas Connect Austria, TAG GmbH; 2022

Table 19: Replacement investment projects – New projects

Project sponsor	Project number	Project name	Implementation time frame [years]	Planned completion [date]
GCA	2022/E1	VS WAG Baumgarten Erneuerung Stationssteuerung		Q2 2025
GCA	2022/E2	HAG+BOP11/12/13 Feldgerätetausch		Q4 2025
GCA	2022/E3	VS Kichberg Erneuerung Stationssteuerung/NISG		Q4 2023
GCA	2022/E4	WAG Baumgarten Erneuerung Maschienensteuerung		Q4 2025
GCA	2022/E5	Baumgarten HAG/WAG Umbau Analysenhäuser		Q4 2025
GCA	2022/E6	VS OGG Baumgarten Erneuerung Maschienensteuerung		Q2 2026
GCA	2022/E7	VS OGG + MS 5 Baumgarten Erneuerung Stations-steuerung		Q4 2025
TAG	2022/R01	Exchange of Combustor WC100		Q4 2023
TAG	2022/R02	Exchange of Fuel Metering Valves GC500		Q4 2024
TAG	2022/R03	Pipeline Integrity Section 1/2/3 Phase 1		Q4 2023
TAG	2022/R04	Pigging 2024		Q4 2024
TAG	2022/R05	Automation Reverse Flow MS-A		Q4 2023
TAG	2022/R06	Installation of RC Snubbers at ELCO Transformers CS-B/E/G		Q4 2024

Source: Gas Connect Austria, TAG GmbH; 2022

6.3 Projects and activities of Gas Connect Austria

Gas Connect Austria markets transport capacities and services transparently and offers uniform conditions to all customers. With an annual sold transport capacity of 143 billion cubic meters, the company contributes significantly to the secure supply of natural gas in Austria and Europe. The natural gas is transported to the Austrian provinces but also to Germany, France, Slovenia, Croatia and Hungary.

Projects as building blocks. To this end, Gas Connect Austria carries out detailed planning for those technical measures that will make our supply possible in the future. In this context, the planning of projects as a specific part of network development planning is subject to the procedure of Chapter 5 of Commission Regulation (EU) 2017/459 establishing a Network Code on Capacity Allocation Mechanisms in transmission systems (NC CAM).

Coordinated. Gas Connect Austria's projects are an integral part of the coordinated network development plan. Concepts for the short- and medium-term development of new sources to increase security of supply and related projects have been developed in close coordination with the Austrian transmission system operator Trans Austria Gasleitung GmbH (TAG) and neighboring transmission system operators.

Energy & climate targets. In line with the European Union's climate and energy policies, Austria is pursuing the goal of reducing greenhouse gas emissions. Gas Connect Austria is developing forward-looking projects related to the development of a hydrogen infrastructure with a view to connecting potential H2 sources and sinks.

6.3.1 Gas Connect Austria - Innovation through change

From market-based planning to security of supply. Since 2012, Gas Connect Austria has planned its infrastructure taking into account the utilization of the infrastructure and notified non-binding requirements. Under these framework conditions, projects were submitted and the additional capacities from the approved projects were supplied to the market in binding auctions. The resulting binding bookings were the basis for the economic evaluation and the economic presentability of additional capacities to be created.

Changed gas flows - new framework conditions. Due to the tense geopolitical situation, in March 2022 the EU heads of state and government decided in the European Council to end Europe's dependence on Russian energy imports as soon as possible. As a result, the requirements for national and European network development planning by transmission system operators have changed. As a result, increasing national supply security has become a stronger focus of project planning in the short to medium term. In the short term, Gas Connect Austria opened the possibility to strengthen the security of supply of Tyrol by means of expansion of TRUD!Y[6]. At the

[6] Siehe hierzu TRUD!Y: Gas Connect

same time, it is necessary to re-equip and plan the already existing infrastructure together with new capacities for the transport of green hydrogen in the long term.

In addition, for some months now, persistently changed gas flows, from west to east and from the south, respectively, have occurred. The changed demands on the gas grid manifest themselves in a sustainable way in corresponding capacity bookings, which show a significant increase at the German import points Oberkappel and Überackern.

Who WAGs Wins. The booking behavior of the customers shows that the gas market also functions under the changed framework conditions but cannot answer the open questions of a sustainable orientation. Gas Connect Austria sees itself in the responsibility to develop projects, which have on the one hand the potential to increase the national security of supply and on the other hand to advance the vision of a hydrogen infrastructure in the long term. In order to enable diversification quickly and to support the ramp-up of a hydrogen market, it is important to create a workable regulatory framework. Forms of financing for the necessary projects must be found to replace the initial lack of market demand and thus reduce the risk for transmission system operators. A determined approach together with courage for implementation offer the chance to maintain and further expand Austria as an industrial location and the important hub function of the Austrian gas market even under the changed framework conditions.

6.3.2 Network development for direct connection of the gas markets of Austria and the Czech Republic

Based on the approval of the project proposal for new capacities to be created at the interconnection point between Austria and the Czech Republic, the auctions for the two offer thresholds (2,115.00 MWh/h per year and in the amount of 7,533.25 MWh/h per year) took place on July 4, 2022.

The auctions for additional capacity at the interconnection point between Austria and the Czech Republic have ended without results.

The project GCA-2015/01a, which is the basis of the above-mentioned offer threshold in the amount of 7,533.25 MWh/h per year, is withdrawn due to the negative economic test according to CAM NC Article 22(3).

Project GCA-2020/01, which reflects the new supply threshold of 2,115.00 MWh/h per year listed above, is withdrawn due to the negative economic viability test pursuant to CAM NC Article 22(3).

6.3.3 Grid development of the Austro-Hungarian interconnection point

Based on the result of the analysis of the market demand, which Gas Connect Austria and FGSZ carried out[7] jointly and in accordance with Article 26 of the NC CAM in September and October

[7] Cf. report on the market demand analysis between the Austrian Market Area East and the Hungarian entry-exit system, published in English on the Gas Connect Austria website at https://www.gasconnect.at/fileadmin/Fachabteilungen/ST/NEP/2019-10-21-MDAR-HU-AT.pdf. As part of the analysis of market demand, network users also indicatively requested additional exit capacity of around 4,271.12 MWh/h per year for

2019, the offer thresholds at the Mosonmagyaróvár entry point, of 954.67 MWh/h per year and of 1,145.61 MWh/h per year were put up for auction on 04 July 2022.

The auctions for additional capacity at the Mosonmagyaróvár entry point ended without results.

The project GCA 2021/01, on which these bid thresholds are based, is withdrawn due to the negative economic test according to CAM NC Article 22(3). The "planning project" GCA-2015/04, as it was an alternative project to GCA 2021/01, is accordingly also withdrawn.

6.3.4 Grid development of the Austrian-Slovenian interconnection point

With the RepowerEU initiative of the European Commission, the Austria-Slovenia border point Murfeld is of particular importance.

The current booking behavior already shows significant interest in a physical reverse flow at the Murfeld entry point, manifested by bookings at the virtual entry point of up to 2,750 MWh/h on an interruptible basis. In the short to medium term, this route has the potential to bring additional methane from Italy to the Austrian market area. Rapid diversification of sources and development of new routes would make a decisive contribution to increasing security of supply for Austria.

In addition, the expansion of LNG Terminal KrK to 6bcma provides a potential additional source of LNG gas that can accompany the transition to green hydrogen and alternative energy in the medium to long term.

The expansion of the LNG Terminal KRK, as well as the expansion of the Croatian transmission network towards Slovenia has been placed on the list of RepowerEU projects by the European Commission. These projects are classified as necessary to achieve the stated goals of European security of supply, diversification of routes and sources to achieve independence from Russian gas supplies by 2027.

GCA infrastructure projects that create capacity for additional methane in the medium term will be built 100% hydrogen-capable. Thus, they are not only in line with RepowerEU targets, but also support the achievement of climate targets and the establishment of a European Hydrogen Backbone (EHB).

GCA is already in coordination with the Slovenian transmission system operator to advance the already elaborated projects and to work on efficient ways to meet the European mandate from the RepowerEU initiative.

The projects GCA-2020/02, GCA-2020/03 GCA-2020/04 and GCA-2015/08 for the production of firm, freely allocable capacity in the amount of max. 6,937.80 MWh/h at the entry point

the gas years 2020 to 2029. A technical analysis carried out by Gas Connect Austria showed that such an expansion threshold can be commercially commissioned for the gas year 2025 at the earliest. However, as of the end date of the market demand analysis on October 21, 2019, sufficient free inventory capacity was shown to cover the indicative demand from the gas year 2024 onwards, Gas Connect Austria and FGSZ decided not to initiate a project for new capacity to be created in the flow direction from Austria to Hungary.

Murfeld/Cersak is already in the approval portfolio of the network development planning of Gas Connect Austria. The technical measures planning was updated for the planning horizon of the present network development plan and summarized in the project data sheet in the appendix.

Gas Connect Austria is working together with the grid operators concerned (Slovenia and Croatia) to obtain the status of a (hydrogen) PCI project for the Entry Murfeld project. The coordinated submission of the project (ENTSOG code HYD-N-1354 for the Austrian part) was submitted to ENTSOG in due time and is managed as planning project GCA-2022/04.

6.3.5 Network development of the Austrian-German interconnection points

The current booking situation at the Austrian-German interconnection points Oberkappel and Überackern shows a reversal of the gas flow from the West to the East. Since April 2022, demand for entry capacity at the Oberkappel and Überackern points has been rising sharply. The booked capacity at these points is currently around 13 GWh/h - mainly due to the additional supply of interruptible capacities - and thus around 3 GWh/h above the technical capacity limit of the West-Austria-Gasleitung (WAG). These capacities are also predominantly utilized to the full extent, taking advantage of all technical redundancies and an increased upstream pressure in the upstream German pipeline system.

The changes in gas flows and the Austrian market area's need for additional capacity from LNG sources to ensure security of supply and pave the way towards independence from Russian gas supplies makes it necessary to expand capacity at the above points. In the short term, Gas Connect Austria opened the possibility to strengthen the security of supply of Tyrol by means of expansion of TRUD!Y[8].

The expansion of WAG not only contributes to source and route diversification in the medium term. The "WAG Loop" is already part of the European Hydrogen Backbone and with 150 GWh/d from 2030 onwards able to provide significant amounts of hydrogen for Austria and the neighboring markets.

The project GCA-2022/01, describes the first expansion stage, which creates additional import capacities, based on hydraulic calculations, in the amount of max. 3.2 GWh/h at the border points between the Austrian and German market areas. The technical planning of measures was presented for the planning horizon of the present network development plan and summarized in the project data sheet in the appendix.

With the second expansion stage (planning project GCA-2022/05, the WAG will be completely looped and will create additional import capacities based on hydraulic calculations in the amount of max. approx. 5.1 GWh/h at the border points described. Furthermore, there will also be an expansion of export capacities in the amount of max. 2.4 GWh/h in case of a full loop. The full loop is also a prerequisite for the hydrogen planning projects GCA-2022/02 and GCA-2022/03.

[8] see TRUD!Y: Gas Connect

Gas Connect Austria is working together with neighboring network operators to obtain (hydrogen) PCI project status for the WAG LOOP full expansion project.

6.3.6 Grid development of the Austrian-Slovakian interconnection point

The long-term booking behavior of network users and the lack of indicative demand for new capacity to be created at the Baumgarten entry and exit point prove that Gas Connect Austria offers sufficient existing capacity on the market.

6.3.7 Network development of the interconnection point with the Austrian distribution area

At the entry and exit point of the transmission system (FN) of Gas Connect Austria to the Austrian distribution area (VG), no capacity requirements were registered in the survey period of the present network development plan.

With regard to a future hydrogen demand in Austria, we refer to the potentials of the EHB[9].

[9] Europäischer Wasserstoff-Backbone (EHB) wächst: Gas Connect

6.4 Network Development Plan Trans Austria Gasleitung GmbH

Centrally laid in the middle of the continental Europe on the intersection of the South-North and West-East current gas and future hydrogen international transit corridors, Austria and its virtual trading point play due to their geographical situation a crucial role in the supply of natural gas of the European Union and more particularly of the Central-East European (CEE) region.

Due to its central location, Trans Austria Gasleitung GmbH („TAG GmbH“) constitutes a vital transportation artery between the CEE region and German and Italian markets. In constant exchange with the other national adjacent TSO Gas Connect Austria GmbH (“GCA”), TAG GmbH makes a considerable contribution to the Austrian security of supply (historically 5-10% of the gas demand covered, about 1 Bcm[10]/year) and to the international security of supply (historically 40% of the Italian gas demand covered, about 28-30 Bcm/year and 55% of the Slovenian and Croatian gas demand covered, about 1.0-2.0 Bcm/year).

The planning and the execution of investment projects achieve basically a triple target, which lies at the core of the responsibilities of TAG GmbH as TSO:

- maintain through re-investments the existing transportation infrastructure of the TAG system reliable, efficient and optimized, in order to guarantee the hitherto existing transportation demand
- respond adequately to the addressed market demand on additional transportation capacity, by mean of the pinned NDP methodology „survey on capacity demand / determination of the capacity need / definition and analysis of capacity scenario / project planning“ and
- ensure full flexibility of gas transport between transmission, storage and distribution systems

The network development plan (NDP) of TAG GmbH delivers essentially an overview of the continuous planning activity and progress of the company towards the different actors of the gas and energy sectors, stakeholders, policy makers and consumers.

The listing of the main investments articulated between potential investments for capacity extension respectively re-investment materializes each of the realization for covering the demand and the infrastructural perpetuation of the TAG system. TAG GmbH introduces also in the NDP the positioning of the activity of the TSOs in the broader context of the further development of the European gas market, the current situation on Security of Supply, some innovation, and the technology aspects as well as its current and potential commercial activity.

The NDP of TAG GmbH is integral part of the coordinated network development plan (“CNDP”) and was established in an integrative way in closed cooperation with AGGM as Market Area Manager, GCA, and the neighbor TSOs. The other possible interactions with the Austrian distribution system have been also integrated closely in a holistic consideration under the involvement of AGGM as distribution area manager (DAM).

[10] Bcm: normal Billion cubic meter (0°C)

6.4.1 TAG GmbH, Mission and Vision

TAG GmbH has used the past years to prepare itself for the upcoming challenges of the current decade. The company projects its business and industrial role towards the decarbonized future, supporting strongly the energy transition, the decarbonization, and the European green deal in the turbulent context of COVID, its human impact and, its economic uncertainty.

The company mission has been newly elaborated end of 2019, fitting more appropriately with the evolution of the TAG GmbH business in the scope of the energy transition and decarbonization European objectives.

Energy connects people. We provide the energy for your ideas and the advanced gases transport of tomorrow.

TAG GmbH also renewed its motto in 2019, re-positioning its vision and its approach to the mid- and long-term challenges of the energy sector, always considered in a broader sense, and the positioning of the role as a Transmission System Operators along the energy value chain in the next decade.

Our vision is to connect markets by providing sustainable energy for a lighter future.

The energy transition started at the beginning of the 21st century and is driven by the climate change, putting the fossil fuel-based sectors (industry, mobility) under pressure to decarbonate their businesses.

Appropriate measures can be found at both European and national level of the member states, such as national communication on the phase-out of coal, CO_2 allowances' volume interventions or favorable policy for the massive penetration of renewable energy sources, mainly based on the development of wind and solar power production till now.

This trend has been accelerated by the start of the war in Ukraine at the beginning of 2022 highlighting:

- The strong energetical dependency of the EU on natural gas as energy carrier
- The vision of the EU to pace the energy transition 2020-50 in order to release itself from the strong natural gas dependency toward a carbon-neutral society

As direct consequence, the different energy demand scenarios base strongly on a gradual up to accelerated replacement of the fossil energy carriers, within the next 30 years. The future can be analyzed along an energy trilemma framework:

- **Gas, as a storable energy source, is the backbone of security of supply:** Natural gas still represents a significant amount of the primary energy demand of Europe. Gas, through its high storability, enables the seasonal flexibility of the EU with a consumption factor winter / summer of about 1.75. Gases, and in particular the current penetration of carbon-neutral biogas and the deployment of hydrogen, are integrative part of the energy transition, as the

current viable technological progresses of other energy vectors do not provide concrete answer to this energy-volume storability scale from today's point of view.

- **The affordability of the energy-transition**: Particularly put under pressure since the second half of 2021 and the start of the war in Ukraine beginning of 2022, requiring potentially a state-driven intervention, an adaptation of the market mechanisms and an anticipation of the transformation of the energy systems, transport systems included.
- **The sustainable gases:** Government policy measures are already critical for determining the role of gas in the dual challenges of reducing GHG emissions and improving urban air quality and for supporting the introduction of low carbon gas technologies. The future of the gas and its place in the EU society is currently projected as a green, sustainable, and carbon-free one, relying on biogas, synthetic gas and hydrogen.

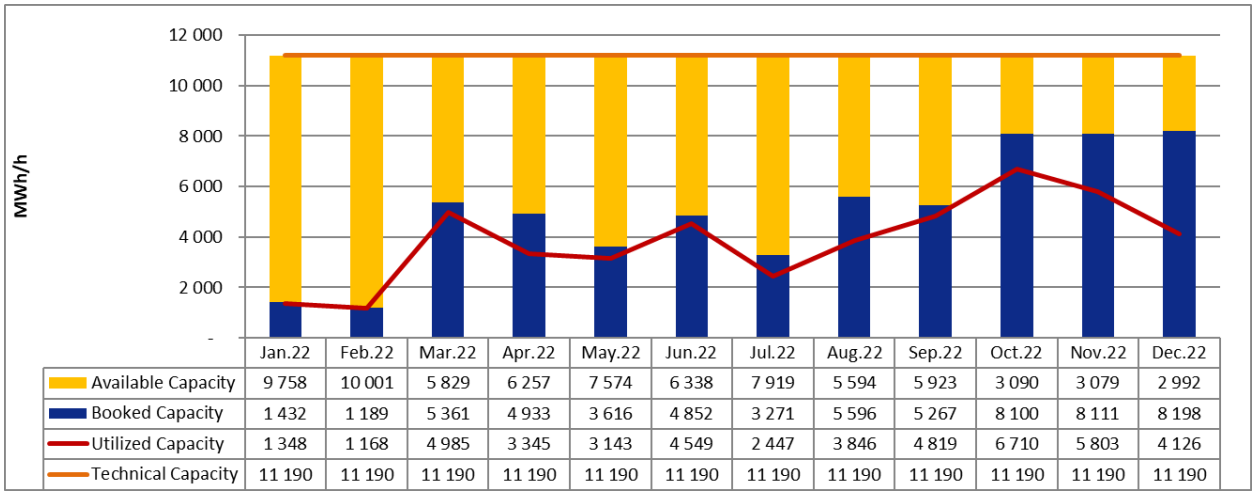
TAG GmbH re-positions its strategy in the view of the big energetic challenges for the next 30-year period up to 2050, paving the way for the adaptation and transformation of the TSO system through the energy transition, facing the end of the multiannual long-term contract security toward a long-term sustainability, driven by differentiated businesses and the deployment of green gases, anchoring its business sustainability.

6.4.2 Security of supply

The Security of Supply in natural gas is at the core of the responsibilities of the European Union and the member states, striving for keeping it at the highest level possible, also under a potential reduction up to the full disruption of the Russian gas imports. Different measures have been already completed, like the safeguarding of the filling-in level of gas storages at a high level before the winter season (89.61% in the EU, 80.95% in Austria; 05.10.2022); others are outstanding through e.g. the proposal by the EC of a COUNCIL REGULATION on coordinated demand reduction measures for gas (20.07.2022) aiming at reducing the winter gas consumption by 15% in comparison to the past five years.

The security of supply and the related capacity access to its system have been always one of the core responsibilities of TAG GmbH, beside the system operation stability and integrity. 2022 is characterized by a regular increase of the capacity bookings and capacity usage at the Entry point Arnoldstein from Italy towards Austria, following the flow reduction of the gas delivery from the North-Eastern Entry point Baumgarten.

Figure 75: Capacity Arnoldstein Entry



	Jan.22	Feb.22	Mar.22	Apr.22	May.22	Jun.22	Jul.22	Aug.22	Sep.22	Oct.22	Nov.22	Dec.22
Available Capacity	9 758	10 001	5 829	6 257	7 574	6 338	7 919	5 594	5 923	3 090	3 079	2 992
Booked Capacity	1 432	1 189	5 361	4 933	3 616	4 852	3 271	5 596	5 267	8 100	8 111	8 198
Utilized Capacity	1 348	1 168	4 985	3 345	3 143	4 549	2 447	3 846	4 819	6 710	5 803	4 126
Technical Capacity	11 190	11 190	11 190	11 190	11 190	11 190	11 190	11 190	11 190	11 190	11 190	11 190

Source: TAG GmbH 2022

TAG GmbH has already developed the physical and commercial reverse flow possibility during the last 10 years, lastly offering to the market 11,190 MWh/h full FZK capacity in Entry Arnoldstein (8.76 Bcm/year capacity[11]) starting from April 2021. Further assessment of reverse flow possibility in 2022 confirmed again the already identified planning, mostly already included into the past CNDP exercise, of two projects linked to potential further enhancements of the reverse flow situation in the South to North direction:

- The "TAG 2016/01 TAG Reverse Flow Weitendorf/Eggendorf" project, also complementary to the "Entry Murfeld" projects of Gas Connect Austria, aiming at increasing the physical flow and marketed capacity possibility up to 17,904 MWh/h in Entry Arnoldstein (14.01 Bcm/year capacity[12]) automating at the same time the operation mode needed in the CS station CS Weitendorf (Styria) and CS Eggendorf (Lower Austria).
- The new "TAG 2022/R05 Automation Reverse Flow MS-Arnoldstein" project aiming at automating the station process for an automatic on/off of the reverse flow at the cross-border metering station Arnoldstein in Entry Austria from the South, improving the availability and operability of the physical reverse flow mode.

Potential further upsides in the reverse flow from the South to the North are in steady assessment in coordination with the neighboring TSOs and countries, in order to make available the maximum gas transport capacity possible for the system users now and in the future in adequacy with the market and SoS needs.

[11] Potential maintenance reduction factor not considered here.

[12] Potential maintenance reduction factor not considered here.

6.4.3 Renewal and future of the transportation system: innovation and technology, decarbonization, energy efficiency, H2

The renewal of the TAG system and the maintenance activity are in the core of the main responsibilities of TAG GmbH, in order to ensure the technical, operational and commercial integrity of the operation of the TAG system, in the higher-ranked target of the security of supply and the avoidance of transport curtailments. In the course of the development of major re-investment projects and programs, TAG GmbH dedicates a significant focus on innovation and technology, with the goal to generate socio-economic benefits for the society, which refer for example to the

- emission reductions
- the optimization of the OPEX
- the diminution of unplanned transportation interruptions
- the increase of the operational reliability

Backed by initial steps comprising latest EU commission guidelines, a national hydrogen strategy by the Austrian government issued in June 2022, as well as strong collaboration with various gas/hydrogen associations and neighboring TSOs, TAG GmbH positions itself for a transition into the era of sustainable gases and hydrogen. Among others, initiatives such as technical impact assessments of grid compatibility for H_2 blended gases as well as potentiality of retrofitting and repurposing of infrastructure for transportation of blended and/or pure hydrogen on a 20–30-year horizon are being considered.

Decarbonization and energy efficiency in the gas transportation

- Efficiency – TAG GmbH is further developing optimization tools, that could support the management and operation of its compressors, depending on the fuel quantities, the variable costs and the CO2 effects.

- Make green also the sourcing – TAG GmbH is striving for an increase of the certified renewable proportion of its power sourcing from year to year within the next 5 years, subject to support from the relevant authorities. A mirroring initiative to the remining gas-driven compressors through the procurement of green gas Guarantee of Origins for the compression fuel gas is in development, nevertheless subject to the development of a liquid national or international green gas GoO market.

- Other decentralized contribution – On a long-term perspective, TAG GmbH assesses other decentralized possibilities to reduce its energy consumption, improving its environmental impact and energy efficiency. Equipping the roof of the buildings in the compressor stations with photovoltaic systems to feed TAG's facilities shows promising efficiency increase.

Another field of enhancement is the facility illumination; the one currently in place shall be replaced in next time. Dismantling of ceiling spotlights and installation of wall LED luminaires

must also be considered in the compressor halls. A lighting concept will be drawn up (where lighting is required or where system components can be used, field distribution, cable routes, etc.). Motivated by energy-saving measures, parts of the lighting can be controlled via motion detectors in order to reduce the energy consumption for lightening.

Innovation and technology

- Strong digitalization – TAG GmbH supports the cost efficiency and productivity improvement activities of the business identifying the best tools to support modelling, simulations and reporting performed on operational and process data. This philosophy is currently being deployed in all company departments, concerning particularly commercial, financial, operational and dispatching activities of the TSO.

- Actuators and Valves replacement – TAG GmbH reviewed its technical standard for actuators in April 2019 redefining its re-investment strategy also for this material, together with the subsequent valve system, based on a pro-active approach with a high degree of automatization, digitalization and integration into the station control based on the latest innovation and technological state of the art.

Towards the Hydrogen Society

- General framework - In complement to the general contribution given in the CNPD 2022, TAG GmbH participates actively or indirectly, as part of the TSOs community and as promoter of the renewable gas grid, in common collaboration with the gas associations (GIE, ENTSOG, FGW, ÖVGW) as well as in strong collaboration with the neighboring TSOs.

The revision of the TEN-E[13] guideline by the EU commission has paved the way for fulfilling the "European need in modern, clean, secure, future-proof and smart energy infrastructure for delivering the Green Deal." The proposal for a recast of the gas package has been communicated by the EC end of 2021, anchoring the European strategy for hydrogen and sustainable gases. The Austrian government released its national hydrogen strategy in June 2022.

- Infrastructure transformation - TAG GmbH initiates on the mid-term technical impact assessments of the compatibility of its grid with different H_2 tolerance. A 10% content H_2-threshold should be reachable at the TSO level with only small investments, as also normatively anchored by the ÖVGW in the G B210 norm.

Furthermore, under its contribution into the European Hydrogen Backbone (EHB) association and European Clean Hydrogen Alliance, TAG GmbH positions stronger its future in making the usage of its pipelines for hydrogen transportation real, in strong collaboration with all European gas

[13] Reg (EU) 2022/869, 30 May 2022, on guidelines for trans-European energy infrastructure

TSOs along the predefined corridor for Central Europe, the Hydrogen interconnections in Central Eastern and South Eastern Europe (HI East).

- Market development - In parallel to the technical evaluations, market estimations from supply to demand potential in a European cross-border dimension and on the long-term horizon are daily business for TAG GmbH, in strong cooperation with all other European TSOs and the ENTSOs in this regard and its contribution to the Gas Coordination Group, the European Ten-Year Development Plan, the Regional CEE and SC Groups and to the Winter and Summer Supply Outlook. The integration of the hydrogen and other sustainable gases (biogas, synthetic methane) on the long run as energy carriers supportive to the energy transition is an increasing and integrated part of the TSOs evolutive role.

- Hydrogen feeding - The gas TSOs consider themselves as a natural potential investor and market participant in the deployment of conversion solutions for feeding hydrogen into the grids on large scale, perpetuating their linking role between the sourcing, the storing, and the distribution of sustainable gases. A lot is still to do, beginning with the definition of an appropriate legal and regulatory framework at the European and Austrian level, promoting the necessary R&D and innovative investment climate necessary to trigger the technological deployment, the definition of the market access rules, etc. TAG GmbH currently conducts analysis on the potentiality of retrofitting and repurposing its system for the purpose of the transportation of blended and/or pure hydrogen on a 20–30-year horizon.

6.4.4 Other potential sustainable new businesses

Sustainable Gases for Mobility

- Future sustainable gases in HDV mobility sector - Mobility based on all sustainable gases as fueling potentiality - hydrogen, bio and synthetic gaseous or liquified gases - bears promising development in the next decades for transportation vehicles, heavy duty vehicle first.

As potential new business, operation of fuel tanks with a diversity of gaseous fuel possibility could be further explored.

District Heating

- Diversified usage for heat - Since 2012, TAG GmbH has been operating a Waste Heat Recovery Unit for power generation from waste heat generated by the gas compressors used for the gas transport. An adaptation or diversified use for bringing produced heat directly to regional municipalities could be the next step to be made in compressor stations to be identified, increasing the social welfare, the efficiency and diversifying the delivery portfolio for heat usage and recycling.

6.4.5 Further development of the TAG Pipeline System

FZK upgraded capacity and security of supply baseline: the project fulfills the obligation from the decision V KNEP G 01/15 dated October 27, 2015, issued by ECA for the KNEP 2016-2025. Together with the GCA 2015/10 and TAG 2016/02 projects, the project will create new and non-

competing freely allocable capacity at the Arnoldstein and Murfeld entry points. The project is also complementary with the GCA 2015/08, GCA 2020/02, GCA 2020/03 and GCA 2020/04 projects.

Capacities at the Arnoldstein and Murfeld entry point: The project provides for the possibility of automated flow reversal at CS Weitendorf and CS Eggendorf to allow the transport of the existing entry capacity at Arnoldstein and the planned new capacity at Murfeld towards Baumgarten while fulfilling all contractual obligations at the domestic exit points.

The project "TAG 2016/01 TAG Reverse Flow Weitendorf/Eggendorf" provides for the modifications of the pipelines and the station controls in CS Weitendorf and CS Eggendorf and enables the physical transport of at least 17,904,000 kWh/h (1,600,000 Nm³/h, 0°C). This amount consists of at least 11,190,000 kWh/h (1,000,000 Nm³/h, 0°C) at the Arnoldstein entry point and 6,714,000 kWh/h (600,000 Nm³/h, 0°C) at the Murfeld entry point. The project will also enable the physical operation from the Murfeld entry point in the direction of Italy via the SOL and TAG systems, which is unlikely from today's point of view.

Coordination with neighboring TSOs: Coordination at the operational level has largely taken place between TAG GmbH and GCA since 2016. The coordination process for the detailed project planning was continued by TAG GmbH and GCA, based on the additional technical capacities identified in the capacity scenario.

Capacity allocation concepts: As the additional interconnection capacity does not affect the amount of capacity at the relevant points of the TAG system, no capacity allocation is performed by TAG GmbH.

European integration is done: This project officially became part of TYNDP 2017 (TRA-N-954) on 28/04/2017, was continued in TYNDP 2018 and TYNDP 2020, and is scheduled for TYNDP 2022. Through the TAG 2016/01 project, together with the TAG 2016/02 and GCA 2016/E2, and GCA 2020/02, GCA 2020/03, GCA 2020/04 projects, the project aims to increase local supply security through diversification of supply routes and sources and therefore increased access from Italy. The project supports the North-South-East corridor by providing further physical transport options in reverse flow in the South-North and South-East directions and is therefore of interest for the Austrian market area.

Approval already in the NEP 2017-2026, monitoring and amendments: In the NEP 2017 - 2026, the TAG 2016/01 project has already been approved. For rescheduling and procurement reasons, TAG 2016/01 was approved again as a planning project in the KNEP 2020 and continued in the subsequent KNEPs. The project is currently in the planning phase; its eventual implementation depends on a positive market test of the complementary projects of Gas Connect Austria GCA 2020/02, GCA 2020/03, GCA 2020/04 in Entry Murfeld.

Information for KNEP23-24: The TAG2022/R03 project will be submitted in KNEP22. The regular pigging and intensive measurement campaigns carried out by TAG in accordance with the maintenance requirements provide important information on the condition of the TAG pipelines. Based on this information and after an internal analysis, investment projects will be defined to

ensure the integrity of TAG pipelines by carrying out necessary repairs (for example, deformations, corrosion spots, insulation defects, etc.). The follow-on phase of the TAG2022/R03 project will begin in 2024 and build on Phase 1. The corresponding replacement investment project will be submitted in KNEP23-24.

7 Appraisal of the market participants comments from the consultation of the market area manager

On 19.01.2023 the Coordinated Network Development Plan 2022 was published to the market participants during the Austrian Gas Infrastructure Day (AGID). The report was published on the AGGM website on 09.01.2023 and all market participants were informed of the consultation by e-mail. This took place in the period from 09.01.2023 to 30.01.2023.

The transmission system operators and the market area manager would like to thank the market participants for the comments received.

Ten comments were submitted on the Coordinated Network Development Plan 2022. These are attached to Annex 2.

7.1 Statement of Bayerisches Staatsministerium für Wirtschaft, Landesentwicklung und Energie, Bayernets GmbH, Borlealis Arolinz Melamine, Central European Gas Hub, OMV Exploration & Production, Flughafen Wien, Österreichische Vereinigung für das Gas- und Wasserfach, RHI Magnesita, Verbund sowie Wien Energie

The TSOs and AGGM would like to thank the Bavarian State Ministry of Economic Affairs, Regional Development and Energy, Bayernets GmbH, Borlealis Arolinz Melamine, Central European Gas Hub, OMV Exploration & Production, Vienna Airport, Österreichische Vereinigung für das Gas- und Wasserfach, RHI Magnesita, Verbund and Wien Energie for their comments.

Basically, the TSOs see themselves strengthened by the comments in their offer for the short- and medium-term security of supply as well as the long-term perspective of the connection to a future European hydrogen network and will continue on this path.

At the same time, however, the comments clearly address some identified hurdles.

The TSOs support the call for the establishment of cross-border hydrogen transport and welcome the desire for a continuous dialogue on its development.

Therefore, it is essential to create a coordinated, European approach and appropriate (especially financial and regulatory) framework conditions to realize the implementation of the projects.

7.2 Überackern compressor station

With reference to the statement on the subject of the Überackern compressor station, a correction is necessary. In the KNEP 2022, due to an editorial error, the construction of a compressor station in Überackern is outlined on page 21. In fact, neither in the project data sheets nor in the confidential supplement for the regulatory authority is the construction of a compressor station in Überackern planned. Only modifications to the existing compressor stations along the WAG are necessary depending on the projects (security of supply projects and/ or hydrogen projects).

GCA supports the idea to let existing and emerging pressure sources, i.e. higher feed-in pressures from upstream grids as well as new/expanded compressor stations, have an effect on the border crossing points between Germany and Austria (and thus on downstream markets). This would allow more capacity to be represented at these points in the short term in the interests of security of supply.

7.3 Capacity demand survey long-distance pipeline and important import routes

GCA and AGGM basically share the opinion of OMV Energy on the procedure for new capacity to be created according to Chapter V of Regulation (EU) 2017/459 (NC CAM) and have expressed this in the past in the context of statements to, among others, the European legislator.

However, we would like to point out that this year's planning process has been adapted, especially due to the changed framework conditions in the energy industry, and the capacity scenario has not only been based exclusively on the standard capacity demand survey according to NC CAM, but has also taken into account the increase in security of supply.

GCA has called for the creation of exit capacity to Austria in its comments on the supplement to the scenario framework of the German 2022 network development plan. Therefore, not only due to the current market situation and security of supply, but also for reasons of coherence and logic, it is necessary to provide for corresponding entry capacities by means of project planning on the Austrian side.

GCA would like to point out that the second expansion stage (planning project GCA-2022/05) is the prerequisite for the hydrogen planning projects GCA-2022/02 and GCA-2022/03.

The efficiency claimed by OMV Energy is in any case ensured by the fact that both the partial loop project as well as the full loop project would only be realized anyway if the regulatory costs were covered in advance (by whatever mechanism).

In addition to network development planning by means of capacity expansion projects, GCA also regularly investigates possibilities for capacity maximization, for example, by means of allocation requirements.

8 Summary

In the Coordinated Network Development Plan 2022, the announced new capacity requirements were included and corresponding projects were developed by the transmission system operators that are suitable for covering additional capacity requirements. The projects were developed in coherence with the European planning instruments and in coordination between the domestic and foreign transmission system operators. The needs of the distribution area were also taken into account.

Information on the construction of relevant projects to meet the notified capacity needs and adequate security of supply in the planning period 2023 - 2032 (Table 11 and Table 15) was provided by the transmission system operators. The projects were listed, which will be continued on the basis of previous approvals without any amendments (Table 13 and Table 17). In addition, the projects that are continued on the basis of previous approvals with amendments were listed (Table 14 and Table 18).

New projects submitted under the 2022 CNEP are listed in Table 15 and Table 19. An implementation schedule has been prepared for each project, and the planned completion date or implementation duration is provided in the project sheet (Appendix 1).

The 2022 CNEP meets the objectives under Section 63(4): Already with the current network the supply of end customers can be ensured, in the project planning of new projects a high degree of availability of pipeline capacity was taken into account, the coverage of transport requirements was ensured and the infrastructure standard according to Art.5 of Regulation (EU) No. 2017/1938 is achieved.

Gas Connect Austria submits five new projects for the provision of new capacity and a total of 7 new replacement investment projects. Trans Austria Gasleitung GmbH submits one new project for the provision of new capacities and a total of 6 new replacement investment projects.

9 Disclaimer

The Coordinated Network Development Plan 2022 exists in both a German and an English language version; any differences in content are not intended. The binding language version in each case is the German-language version. The English translation is non-binding and serves information purposes only. Any liability of the market area manager and the transmission system operators for any deviations in content or translation errors is excluded.

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TYNDP 2022-2031 Slowenien. s.l. : Plinovodi.

TYNDP 2022-2032 Deutschland NEP. s.l. : FNB.

List of abbreviations

ACER	Agency for the Cooperation of Energy Regulators
AGGM	AGGM Austrian Gas Grid Management AG
AT	Österreich
BG	Bulgarien
CBCA	Cross Border Cost Allocation
CZ	Tschechische Republik
DE	Deutschland
DZK	Dynamisch zuordenbare Kapazität
ECA	Energie-Control Austria
ENTSOG	European Network of Transmission System Operators Gas
FNB	Fernleitungsnetzbetreiber
FZK	Frei zuordenbare Kapazität
GCA	Gas Connect Austria GmbH
GWG	Gaswirtschaftsgesetz
GWh	Gigawattstunden
GRIP	Gas Regional Investment Plan
HR	Kroatien
HU	Ungarn
IP	Interconnection Point
IT	Italien
KNEP	Koordinierter Netzentwicklungsplan
kWh	Kilowattstunden
KWK	Kraft-Wärme-Kopplung
LFP	Langfristige Planung
MAB	March Baumgarten Gasleitung
MGM	Marktgebietsmanager
MW	Megawatt
MWh	Megawattstunden
NC CAM	Network Code Capacity Allocation Mechanism
NCG	Net Connect Germany
Nm^3/h	Normkubikmeter pro Stunde (Temperatur 0°C)
PCI	Project of Common Interest
RO	Rumänien
SI	Slowenien
SK	Slowakei
SOL	Süd Ost Leitung
SoS	Security of Supply
TAG GmbH	Trans Austria Gasleitung
TR	Türkei
TYNDP	Ten Year Network Development Plan
UK	Unterbrechbare Kapazität
VGM	Verteilergebietsmanager
VHP	Virtueller Handelspunkt
VS(CS)	Verdichterstation
WAG	West Austria Gasleitung

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Appendix 1:

Projects for additional capacities

Project owner	Project number	Project name	Duration [years]	Planned completion	Development in comparison to CNDP 2021 *)
GCA	2015/08	Entry Murfeld	4,5		Continuation
GCA	2020/02	Entry Murfeld - 160	4,5		Continuation
GCA	2020/03	Entry Murfeld - 284	4,5		Continuation
GCA	2020/04	Entry Murfeld - 119	4,5		Continuation
GCA	2022/01	WAG Teil-Loop	4,5		New
GCA	2022/05	WAG Voll-Loop	k.A		New
TAG	2016/01	TAG Reverse Flow Weitendorf / Eggendorf	4,5		Continuation
*)	Continuation	Continued approved projects without amendment			
	Amendment	Continued approved projects with amendment			
	New	New Project			

Plannigprojects for additional hydrogen capacities

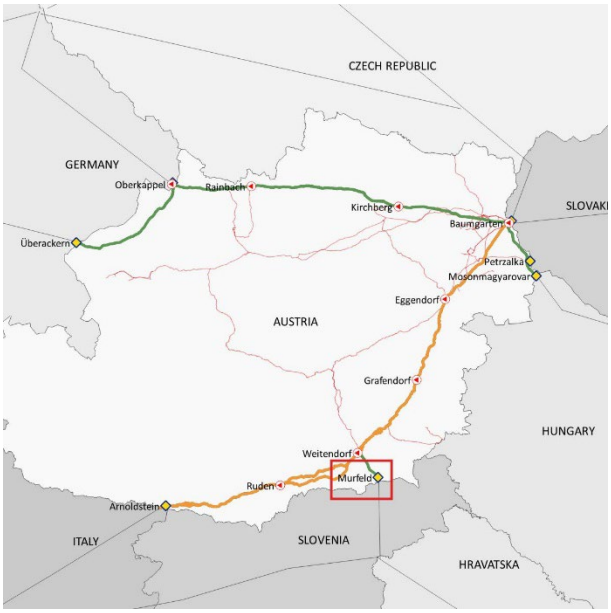
Project owner	Project number	Project name	Duration [years]	Planned completion	Development in comparison to CNDP 2021 *)
GCA	2022/02	Planningproject: H2 Project WAG	4,5		New
GCA	2022/03	Planningproject: H2 Project Penta	4,5		New
GCA	2022/04	Planningproject: H2 Project SOL	3,5		New
TAG	2022/01	Planningproject: H2 Readiness of the TAG pipeline system	4,5		New
*)	Continuation	Continued approved projects without amendment			
	Amendment	Continued approved projects with amendment			
	New	New Project			

Project name:	**GCA 2015/08 Entry Murfeld**		
Project number:	GCA 2015/08		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	4	**Date:**	31.10.2022
Project type:	Project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	4,5 years	**Economic test according to CAM NC:**	Yes
Planned completion:			

Project objective:

The project aims to increase technical capacities on FZK basis at the Murfeld entry/exit point and to create technical capacities on FZK basis at the Murfeld entry point for the first time.

Project description



The following investments are necessary for the project:

- Extension of Weitendorf and Murfeld metering stations: Filter separator, metering routes, regulation, piping
- New Murfeld CS
- Loop of the SOL over entire length
- Loop of the Murfeld – Cersak border crossing pipeline

Project rationale:

The project serves to cover the additional demand registered at the Murfeld entry and exit point. The expansion contributes to source and route diversification, which has also become a focus of attention in connection with REPowerEU.

Please note in particular:

The contents of the technical studies of the project ("confidential supplements") remain unchanged and valid in accordance with the Network Development Plan 2017 of Gas Connect Austria.

Connection to other projects:

This project is in direct connection with the complementary project TAG 2016/01: TAG Reverseflow Weitendorf/Eggendorf.

Technical data:

The project-related analyses were carried out on the basis of the following additional capacities:
Freely allocated capacity (FZK) Murfeld entry point: 620,000 Nm³/h (0°C)

Economic data:
Planned investment cost 153.381.800 € (Cost base 2022) The cost estimate may deviate by +/- 25% due to uncertainties in the first planning phase. The extension threshold for implementing the project is reached as soon as the costs allocated to the virtual point are covered by binding long-term bookings.

Capacity impact:
None

Project phase:
Identify & Assess

TYNDP: TRA-N-766	**PCI status:** No	**CBCA decision:** No

Project modifications:
CNDP 2018: None
CNDP 2019: None
CNDP 2020: None
CNDP 2021: None
CNDP 2022: None

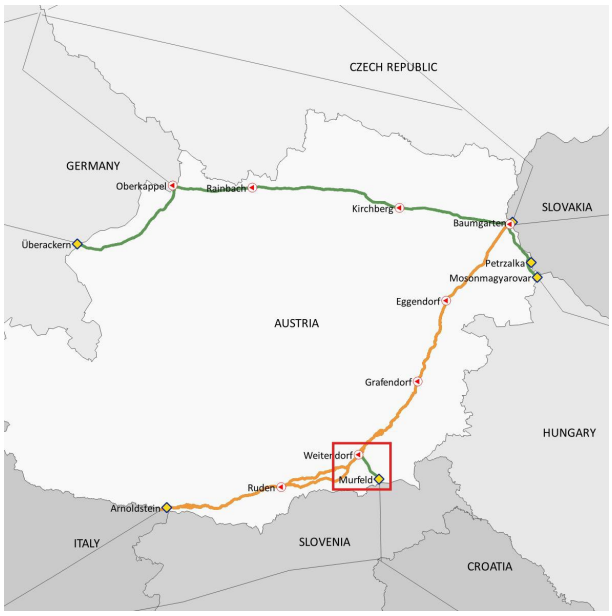
Project status:
CNDP 2015: Approved as a project
CNDP 2016: Withdrawn and replaced by the project GCA 2016/03
CNDP 2017: Approved as a project including amendments
CNDP 2018: Further monitored without amendments
CNDP 2019: Further monitoring without amendments
CNDP 2020: Further monitoring without amendments
CNDP 2021: Further monitoring without amendments
CNDP 2022: Further monitoring without amendments

Project name:	**GCA 2020/02 Entry Murfeld - 160**		
Project number:	GCA 2020/02		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	20	**Date:**	31.10.2022
Project type:	Project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	4,5 years	**Economic test according to CAM NC:**	Yes
Planned completion:			

Project objective:

The project´s goal is to create FZK at the Murfeld entry point.

Project description



The following investments are necessary for the project:

- outcrossing of metering and transfer station Weitendorf
- outcrossing of metering and transfer station Weitendorf
- New compressorstation Murfeld

Project rationale:

The project serves to redimension the GCA 2015/08 Entry Murfeld project due to the booking situation of the LNG terminal in Krk and official requests. The expansion contributes to source and route diversification, which has also become a focus of attention in connection with REPowerEU.

Please note in particular:

-The contents of the technical studies on the project ("confidential attachments") remain unchanged and valid in accordance with the 2020 network development plan from Gas Connect Austria.

Connection to other projects:

The project is directly related to the complementary project TAG 2016/01: TAG Reverseflow Weitendorf / Eggendorf.

Technical data:

The corresponding project-specific analyses were carried out on the basis of the following capacities:

Freely allocable capacity (FZK) Murfeld entry point: 160.000 Nm³/h (0°C)

Economic data:

CNDP 2020: Planned investment cost 29.624.800 € (Cost base 2022). The cost estimate may deviate by +/- 25% due to uncertainties in the implementation phase.

The project will be realized when the costs allocated to the Murfeld point are covered by binding long-term bookings.

Capacity impact:

None

Project phase:

CNDP 2020: Identify & Assess

CNDP 2021: Identify & Assess

CNDP 2022: Identify & Assess

TYNDP: No	**PCI status:** No	**CBCA decision:** No

Project modifications:

CNDP 2021: None

CNDP 2022: None

Project status:

CNDP 2020: New Project

CNDP 2021: Continuation without amendments

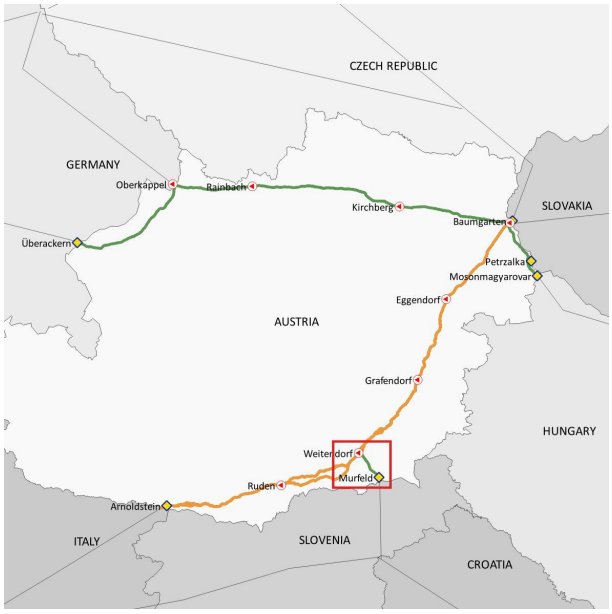
CNDP 2022: Continuation without amendments

Project name:	**GCA 2020/03 Entry Murfeld - 284**		
Project number:	GCA 2020/03		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	2	**Date:**	31.10.2022
Project type:	Project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	4,5 years	**Economic test according to CAM NC:**	Yes
Planned completion:			

Project objective:

The project´s goal is to create FZK at the Murfeld entry point.

Project description



The following investments are necessary for the project:

- outcrossing of metering and transfer station Weitendorf
- outcrossing of metering and transfer station Weitendorf
-New compressorstation Murfeld

Project rationale:

The project serves to redimension the GCA 2015/08 Entry Murfeld project due to the booking situation of the LNG terminal in Krk and official requests. The expansion contributes to source and route diversification, which has also become a focus of attention in connection with REPowerEU.

Please note in particular:

The contents of the technical studies on the project ("confidential attachments") remain unchanged and valid in accordance with the 2020 network development plan from Gas Connect Austria.

Connection to other projects:

The project is directly related to the complementary project TAG 2016/01: TAG Reverseflow Weitendorf / Eggendorf.

Technical data:

The corresponding project-specific analyses were carried out on the basis of the following

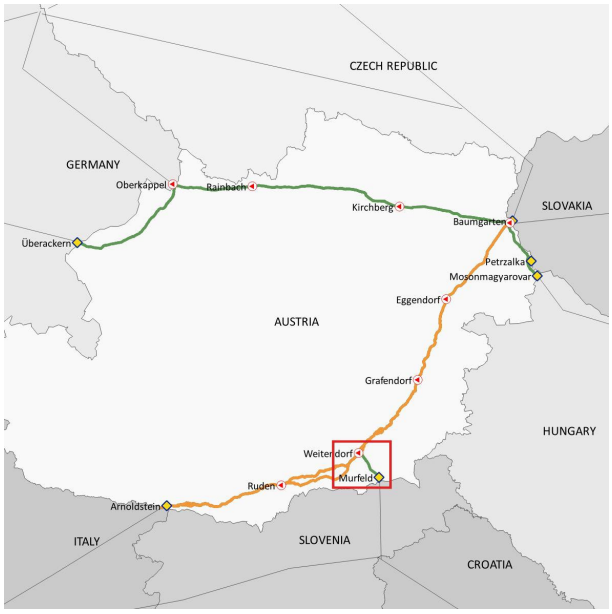
capacities: Freely allocable capacity (FZK) Murfeld entry point: 284.000 Nm³/h (0°C)		
Economic data: CNDP 2020: Planned investment cost 54.868.400 € (Cost base 2022). The cost estimate may deviate by +/- 25% due to uncertainties in the implementation phase. The project will be realized when the costs allocated to the Murfeld point are covered by binding long-term bookings.		
Capacity impact: None		
Project phase: Identify & Assess		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications: CNDP 2021: None CNDP 2022: None		
Project status: CNDP 2020: New Project CNDP 2021: Continuation without amendments CNDP 2022: Continuation without amendments		

Project name:	**GCA 2020/04 Entry Murfeld - 119**		
Project number:	GCA 2020/04		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	2	**Date:**	31.10.2022
Project type:	Project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	4,5 years	**Economic test according to CAM NC:**	Yes
Planned completion:			

Project objective:

The project´s goal is to create FZK at the Murfeld entry point.

Project description



The following investments are necessary for the project:

- outcrossing of metering and transfer station Weitendorf
- outcrossing of metering and transfer station Weitendorf
- New compressorstation Murfeld

Project rationale:

The project serves to redimension the GCA 2015/08 Entry Murfeld project due to the booking situation of the LNG terminal in Krk and official requests. The expansion contributes to source and route diversification, which has also become a focus of attention in connection with REPowerEU.

Please note in particular:

-The contents of the technical studies on the project ("confidential attachments") remain unchanged and valid in accordance with the 2020 network development plan from Gas Connect Austria.

Connection to other projects:

The project is directly related to the complementary project TAG 2016/01: TAG Reverseflow Weitendorf / Eggendorf.

Technical data:

The corresponding project-specific analyses were carried out on the basis of the following capacities:

Freely allocable capacity (FZK) Murfeld entry point: 126.000 Nm³/h (0°C)

Economic data:

CNDP 2020: Planned investment cost 26.381.200 € (Cost base 2022). The cost estimate may deviate by +/- 25% due to uncertainties in the implementation phase.

The project will be realized when the costs allocated to the Murfeld point are covered by binding long-term bookings.

Capacity impact:

None

Project phase:

Identify & Assess

TYNDP: No	**PCI status:** No	**CBCA decision:** No

Project modifications:

CNDP 2021: None

CNDP 2022: None

Project status:

CNDP 2020: New Project

CNDP 2021: Continuation without amendments

CNDP 2022: Continuation without amendments

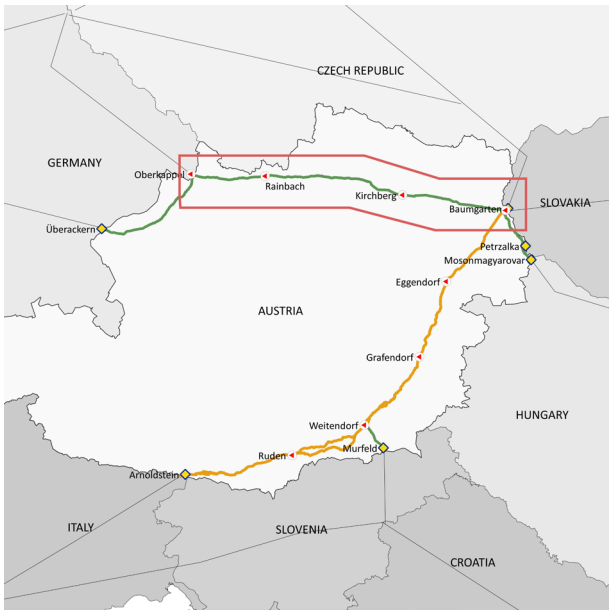
Project name:	**GCA 2022/01 WAG Teil-Loop**		
Project number:	GCA 2022/01		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Planning project for additional capacities	**Project category:**	New project
Implementation time frame:	4,5 years	**Economic test according to CAM NC:**	No
Planned completion:			

Project objective:

The changes in gas flows and the Austrian market area's need for additional capacity from LNG sources to ensure security of supply and pave the way towards independence from Russian gas supplies makes capacity expansion at the above-mentioned points necessary.

The expansion of the WAG not only contributes to source and route diversification in the medium term. The "WAG Loop" will make it possible to provide significant quantities of hydrogen for Austria and neighboring markets from 2030 onwards.

Project description



The following investments are necessary for the project:

- Partial expansion of the WAG Loop (Oberkappel to Bad Leonfelden)
- electric compressor unit in Rainbach.
- Modification in Rainbach and Baumgarten

Project rationale:

The expansion of the WAG not only contributes to source and route diversification in the medium term. The "WAG Loop" is already part of the European Hydrogen Backbone and will be able to provide significant amounts of hydrogen for Austria and neighboring markets from 2030 onwards.

Please note in particular:

Connection to other projects:

None

Technical data:

The corresponding project-specific analyses were carried out on the basis of the following capacities:

Expansion to freely allocable capacity (FZK) at the Oberkappel/Überacken entry points 783,000 Nm³/h (0°C)/ 440,000 Nm³/h (0°C).

Economic data:

CNDP 2022: Planned investment costs € 180,000,000 (cost basis 2022). The cost estimate is understood with an accuracy of +/- 25%, which represents the uncertainty in the initial planning phase. The realization of the project will be achieved if the costs allocated to the Oberkappel/Überackern point are covered economically.

Capacity impact:

None

Project phase:

Identify & Assess

TYNDP: None	**PCI status:** None	**CBCA decision:** None

Project modifications:

Project status:

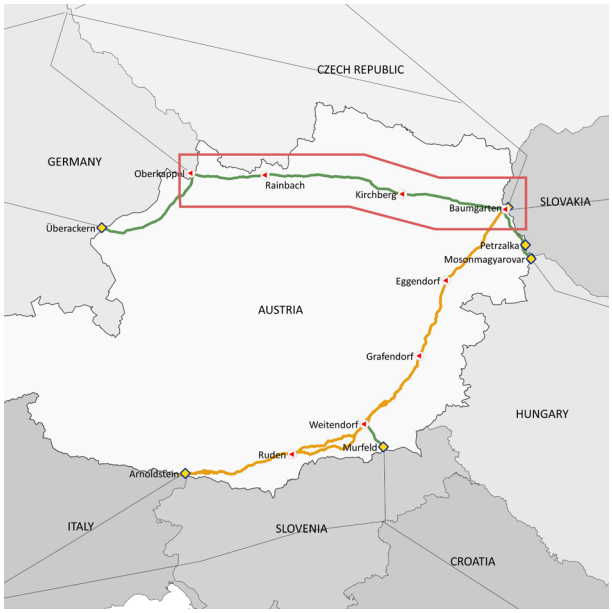
CNDP 2022: Submission for approval

Project name:	**Planningproject: GCA 2022/02 Hydrogen project WAG**		
Project number:	GCA 2022/02		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Planning project for additional capacities	**Project category:**	New project
Implementation time frame:	4,5 years	**Economic test according to CAM NC:**	No
Planned completion:			

Project objective:

The planning project examines the challenges for an appropriate investment project in the construction of a hydrogen infrastructure that will enable significant quantities of hydrogen to be available for Austria and neighboring markets from 2030.

Project description



The planning project serves as the basis for an investment project.
The subjects of study include:

- WAG retrofit requirement
- Conversion requirement Kirchberg compressor station

Project rationale:

By expanding the WAG ("WAG Loop") and converting a pipeline into an H2 pipeline, Austria will be able to provide a significant amount of hydrogen for Austria and neighboring markets from 2030.

Please note in particular:

Connection to other projects:

None

Technical data:

The corresponding project-specific analyses were performed based on the following capacities:

Provision of up to 150 GWh/d from 2030.

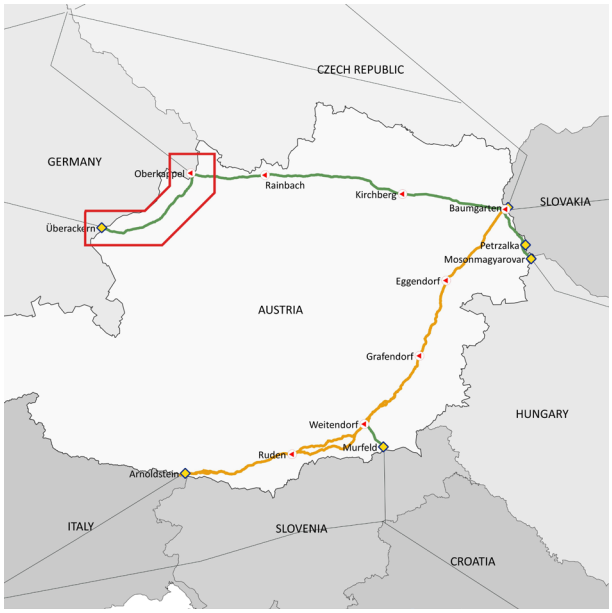
<table>
<tr><td colspan="3">Economic data:
Results from the planning project show in a first cost estimate at the implementation of the corresponding investment project costs in the amount of € 155,000,000 (cost basis 2022). The cost estimate is understood with an accuracy of +/- 25%, which represents the uncertainty in the initial planning phase. The realization of the project will be achieved if the costs allocated to the Oberkappel/Überackern point are covered economically.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
Identify & Assess</td></tr>
<tr><td>TYNDP: HYD-N-757</td><td>PCI status: None</td><td>CBCA decision: None</td></tr>
<tr><td colspan="3">Project modifications:</td></tr>
<tr><td colspan="3">Project status:
CNDP 2022: Submission for approval as a planning project</td></tr>
</table>

Project name:	**Planningproject: GCA 2022/03 Hydrogen project Penta**		
Project number:	GCA 2022/03		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Planning project for additional capacities	**Project category:**	New project
Implementation time frame:	4,5 years	**Economic test according to CAM NC:**	No
Planned completion:			

Project objective:

The planning project examines the challenges for an appropriate investment project for the construction of a hydrogen infrastructure on the Penta West in order to be able to transport hydrogen via the Überackern single-exit points.

Project description



The planning project serves as the basis for an investment project.

The objects of study are:

- Construction of the Penta West H2 Loop
- Hydrogen project WAG (project 2022/02)

Project rationale:

By expanding the WAG ("WAG Loop") and converting a pipeline into an H2 pipeline, Austria will be able to provide a significant amount of hydrogen for Austria and neighboring markets from 2030 onwards.

Please note in particular:

Connection to other projects:

None

Technical data:

The corresponding project-specific analyses were performed based on the following capacities:

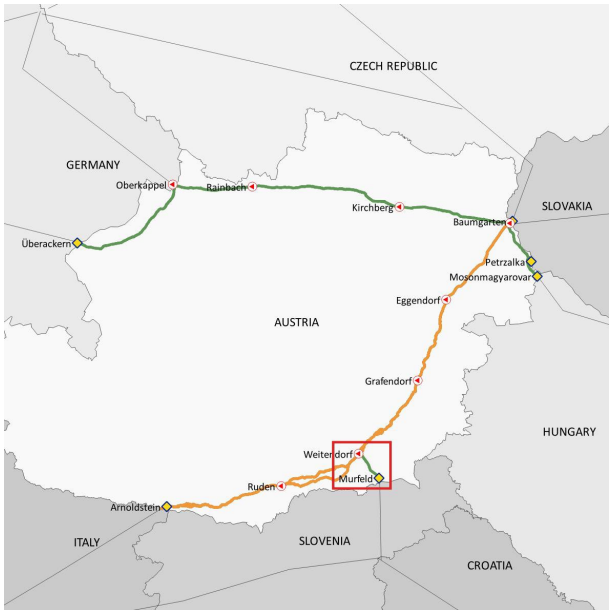
Provision of up to 150 GWh/d from 2030.		
Economic data: Results from the planning project show in a first cost estimate at implementation of the corresponding investment project costs in the amount of € 310,000,000 (cost basis 2022). The cost estimate is understood with an accuracy of +/- 25%, which represents the uncertainty in the initial planning phase. The realization of the project will be achieved if the costs allocated to the Oberkappel/Überackern point are covered economically.		
Capacity impact: None		
Project phase: Identify & Assess		
TYNDP: HYD-N-757	**PCI status:** None	**CBCA decision:** None
Project modifications:		
Project status: CNDP 2022: Submission for approval as planning project		

Project name:	**Planningproject: GCA 2022/04 Wasserstoffprojekt Murfeld**		
Project number:	GCA 2022/04		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	05.10.2022
Project type:	Planning project for additional capacities	**Project category:**	New project
Implementation time frame:	3,5 years	**Economic test according to CAM NC:**	No
Planned completion:			

Project objective:

The planning project investigates the challenges for an appropriate investment project for the establishment of a hydrogen infrastructure which should enable the provision of a significant amount of hydrogen for Austria and the neighboring markets.

Project description



The planning project serves as the basis for an investment project.

The objects of investigation are:

- New measuring station incl. infrastructure and connection to the TAG H2 system (Weitendorf)
- New measuring station incl. infrastructure in Murfeld
- H2 pipeline with length of 23.85 km in DN500 (incl. slide gate groups and pig sluices)
- H2 pipeline with a length of 2.25 km in DN500 (incl. pig trap)

Project rationale:

By expanding the SOL and converting one pipeline into an H2 pipeline, Austria will be able to provide a significant amount of hydrogen for Austria and neighboring markets from 2035.

Please note in particular:

Connection to other projects:

None

Technical data:

The corresponding project-specific analyses were carried out on the basis of the following capacities:

Expansion of the freely allocable capacity (FZK) to the entry point Murfeld to Entry 460,000 Nm³/h (0°C) and to the exit point to Exit 460,000 Nm³/h (0°C).		
Economic data: Results from the planning project show in a first cost estimate at the implementation of the corresponding investment project costs in the amount of € 85,760,000 (cost basis 2022). The cost estimate is understood with an accuracy of +/- 25%, which represents the uncertainty in the initial planning phase. The realization of the project will be achieved if the costs allocated to the point Murfeld are covered economically.		
Capacity impact: None		
Project phase: Identify & Assess		
TYNDP: HYD-N-1354	**PCI status:** no	**CBCA decision:** no
Project modifications:		
Project status: CNDP 2022: Submission for approval as planning project		

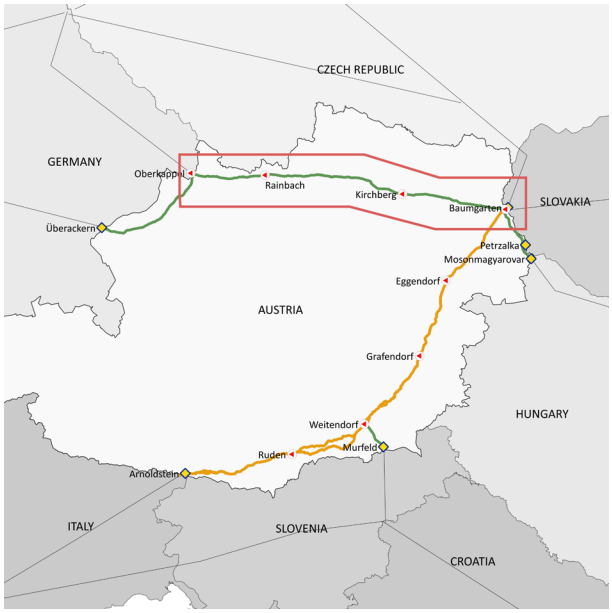
Project name:	**GCA 2022/05 WAG Voll-Loop**		
Project number:	GCA 2022/05		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	05.10.2022
Project type:	Planning project for additional capacities	**Project category:**	New project
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:			

Project objective:

The changes in gas flows and the Austrian market area's need for additional capacity from LNG sources to ensure security of supply and pave the way towards independence from Russian gas supplies makes it necessary to expand capacity at the Oberkappel/Überackern entry points.

The expansion of the WAG not only contributes to source and route diversification in the medium term. The "WAG Loop" will make it possible to provide significant quantities of hydrogen for Austria and neighboring markets from 2030 onwards.

Project description



The following investments are necessary for the project:

- Gap closure from Rainbach to Rapottenstein
- Gap closure from Kirchberg to Sierndorf
- Modification in Rainbach and Baumgarten

Project rationale:

The expansion of the WAG not only contributes to source and route diversification in the medium term. The "WAG Loop" is already part of the European Hydrogen Backbone and will be able to provide significant amounts of hydrogen for Austria and neighboring markets from 2030.

Please note in particular:

Connection to other projects:

no

Technical data:

The corresponding project-specific analyses were carried out on the basis of the following capacities:

Expansion of the freely allocable capacity (FZK) at the Oberkappel/Überacken entry points to Entry 806,000 Nm³/h (0°C) / 582,000 Nm³/h (0°C). For the exit points, the hydraulic calculations result in a total increase of the freely allocable capacity (FZK) to 1,600,000 Nm³/h (0°C), which are not specifically allocated to an exit point, as the focus is placed on the entry capacities.

Economic data:

Planned investment costs € 276,000,000 (cost basis 2022). The cost estimate is understood with an accuracy of +/- 25%, which represents the uncertainty in the initial planning phase. The realization of the project will be achieved if the costs allocated to the Oberkappel/Überackern point are covered economically.

Capacity impact:

None

Project phase:

Identify & Assess

TYNDP: no	**PCI status:** no	**CBCA decision:** no

Project modifications:

Project status:

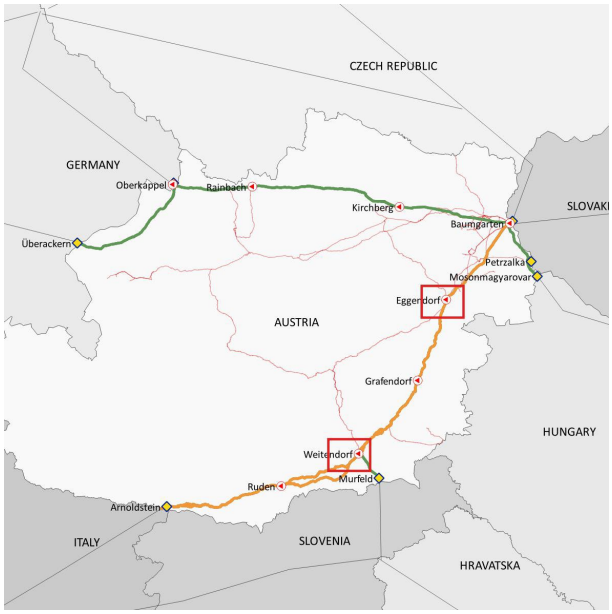
CNDP 2022: Submission for approval as planning project

Project name:	**TAG 2016/01 TAG Reverse Flow Weitendorf/Eggendorf**		
Project number:	TAG 2016/01		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	4	**Date:**	24.10.2022
Project type:	Project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	4,5 years	**Economic test according to CAM NC:**	No
Planned completion:			

Project objective:

The implementation of the project "TAG 2016/01 TAG Reverse Flow Weitendorf/Eggendorf" will allow the transportation of at least 1.6 million Nm³/h (at least 1,000,000 Nm³/h in Arnoldstein entry points and 600,000 Nm³/h in Murfeld entry point) to Baumgarten, with the possibility to utilize CS Weitendorf and CS Eggendorf. The scope of the project includes modifications of the station control system.

Project description



The following activities are planned:

- Creation of a connection from the SOL system to the low-pressure side of the compressor station (approx. 20 metres at DN 240") with corresponding valve and bypass
- Creation of a connection from the high-pressure side to TAG 2 (approx. 20 meters of DN 240") with corresponding valve and bypass in Eggendorf in order to enable reverse flow on two pipelines
- Update of the existing station control system at the Weitendorf CS and the Eggendorf CS.

Project rationale:

Without any compressor station in operation the maximum physical reverse flow in Baumgarten – by continuing to respect contractual obligations at the Austria domestic exit points – is around 1,000,000 Nm³/h. After the implementation of the project it will be possible to use Weitendorf and Eggendorf compressor stations in reverse flow operation.

The project fulfills the obligation imposed in the official decision PA 16870/15 issued by ECA in respect of the 2016-2025 CNDP.

Please note in particular:

Potential impact on availability of transportation capacity during the execution: YES

https://www.taggmbh.at/en/for-system-users/maintenance-works/

https://www.aggm.at/en/network-information/maintenance-coordination

Connection to other projects:

This project is in direct connection with the following corresponding projects:

TAG 2016/02 AZ1 additional entry and connection with BOP 13 (already implemented)

GCA 2015/08 Entry/Exit Murfeld

GCA 2015/10 Entry Arnoldstein

GCA 2020/03

GCA 2020/04

Technical data:

The project will permit flow at the Weitendorf CS to be reversed to allow the existing entry capacity at Arnoldstein and the planned new capacity at Murfeld to be transported towards Baumgarten while also fulfilling all contractual obligations at the domestic exit points. The project also involves a number of minor changes at the TAG CS to permit reverse flow under normal operating conditions with no need for intervention in Baumgarten.

Increase in technical reverse flow capacity in the TAG system: >1.6 million Nm^3/h (0°C) (+0.6 million Nm^3 / h (0 ° C) for freely allocable capacity in Entry Murfeld)

Economic data:

CNDP 2016: Planned investment cost XXX €. (Cost base 2016). The cost estimation has been valuated by the Engineering partner. The cost estimate underlies in this project phase an accuracy of +/- 25%.

CNDP 2017: Planned investment cost XXX € (Cost base 2017) The cost estimate underlies in this project phase an accuracy of +/- 25%.

CNDP 2018: Planned investment cost XXX € (Cost base 2018). The cost estimate underlies in this project phase an accuracy of +/- 25%.

CNDP 2019: Planned investment cost XXX € (Cost base 2019). The cost estimate underlies in this project phase an accuracy of +/- 25%.

CNDP 2020: Planned investment cost XXX € (Cost base 2020). The cost estimate underlies in this project phase an accuracy of +/- 25%.

CNDP 2021: Planned investment cost XXX € (Cost base 2021). The cost estimate underlies in this project phase an accuracy of +/- 25%.

CNDP 2022: Planned investment cost XXX € (Cost base 2022). The cost estimate underlies in this project phase an accuracy of +/- 25%.

Capacity impact:

This project enables together with its corresponding projects following non competing freely allocable capacity (FZK):

Arnoldstein entry point: min. +1.000.000 Nm^3/h (0°C)

Murfeld entry point: +614.388 Nm^3/h (0°C)

Project phase:

CNDP 2016: Planning phase

CNDP 2017: Planning phase

CNDP 2018: Planning phase

CNDP 2019: Planning phase

CNDP 2020: Planning phase

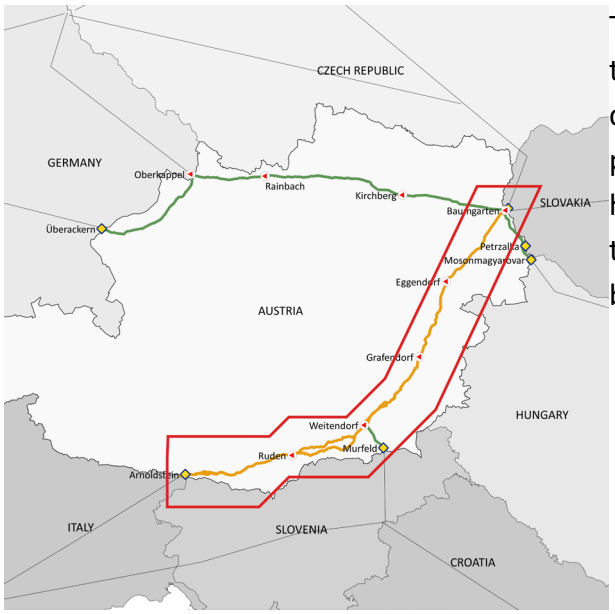
CNDP 2021: Planning phase CNDP 2022: Planning phase		
TYNDP: TRA-N-954	**PCI status:** No	**CBCA decision:** No
Project modifications: CNDP 2022: None		
Project status: CNDP 2016: Approved as a project CNDP 2017: Approved including amendments CNDP 2018: Further monitored without amendments CNDP 2019: Submission for approval including amendments. CNDP 2020: Submission for approval including amendments. CNDP 2021: Further monitored without amendments CNDP 2022: Further monitored without amendments		

Project name:	**Planningproject: TAG 2022/01 H2 Readiness of the TAG Pipeline System**		
Project number:	TAG 2022/01		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	1	**Date:**	17.11.2022
Project type:	Planning project for additional capacities	**Project category:**	New project
Implementation time frame:	4,5 years	**Economic test according to CAM NC:**	No
Planned completion:			

Project objective:

The planning project forms the basis for the corresponding investment project to connect the IT/AT border with the AT/SK border, for the transport of low-cost hydrogen from North Africa to Europe and provides a green and alternative energy carrier from another supply region. The project will be part of a planned network in coordination with neighboring TSOs and will mainly use existing infrastructure.

Project description



The planning project serves as the basis for the investment project, which envisages the conversion of one of the three existing pipelines of the TAG system for 100% hydrogen, with all associated facilities and tapping points between the Italian-Austrian border and the Austrian-Slovakian border.

The system is expected to be operational in 2030 and envisages transporting hydrogen from low-cost production areas in North Africa to the largest clusters of hydrogen demand, using mainly existing infrastructure. The implementation of the investment project serves as an essential part of the European Hydrogen Network, which includes the "Adriatic H2 Corridor", the "South-Eastern H2 Corridor" and the "Eastern H2 Corridor" according to the REPowerEU Plan, as well as Corridors A (North Africa and Southern Europe) and E (Eastern and South-Eastern Europe) according to the European Hydrogen Backbone. Furthermore, the project is part

of the European Clean Hydrogen Alliance.

Project rationale:

The planning project is intended to ensure a rapid implementation of the investment project, which, in contrast to the construction of new infrastructure or other transport options, has a lower environmental impact. The retrofit of the TAG system will contribute to the supply of affordable hydrogen to Europe by unlocking low-cost green hydrogen with enormous potential (given that the cost of production facilities is considered globally, but the main cost advantages are local: high solar radiation, wind and space - as given in North Africa). The network serves the largest hydrogen demand clusters in Central Europe and supports the decarbonization of industries on the way to Germany: it has the potential to become the future backbone of H2 supply and support societies in Europe as well as in North Africa.

Please note in particular:

Potential impact on availability of transportation capacity during the execution: yes

Connection to other projects:

-

Technical data:

Capacities after implementation of the investment project:
IT => AT: 168 GWh/d
AT => SK: 142 GWh/d
SK => AT: 126 GWh/d
AT => IT: 126 GWh/d

Economic data:

KNEP 2022: Based on the current planning project, the planned investment costs for the implementation of the corresponding investment project amount to € XX ml (cost basis 2022). A more precise cost estimate will be carried out in the course of the feasibility study and presented subsequently.

Capacity impact: -

Project phase:

CNDP 2022: Identify & Assess

TYNDP: HYD-N-986	**PCI status:** -	**CBCA decision:** No

Project modifications:

Project status:

CNDP 2022: Submission for approval as planning project

Re-investment projects

Project owner	Project number	Project name	Duration [years]	Planned completion	Development in comparison to CNDP 2021 *)
GCA	2016/E1	110 kV Freileitung, UW Oberweiden, UW BMG redundante Anspeisung		Q4 2026	Continuation
GCA	2019/E6	UW Baumgarten Netzqualität		Q3 2021/Q3 2026	Continuation
GCA	2021/E2	VS Neustift Erneuerung Maschienensteuerung		Q1 2023	Continuation
GCA	2021/E3	Erneuerung RMA Armaturen Abschnitt 3 (Bad Leonfelden)		Q4 2025	Continuation
GCA	2021/E4	Erneuerung Stationsteuerung VS Kirchberg		Q4 2026	Continuation
GCA	2021/E5	MS Überackern/SS Mauerkirchen Erneuerung Isolierkupplung (IK)		Q1 2023	Continuation
GCA	2021/E6	Erneuerung Stationsteuerung MS Überackern		Q4 2024	Continuation
GCA	2021/E10	VS Kirchberg Erneuerung Maschienensteuerung		Q4 2026	Continuation
GCA	2022/E1	VS WAG Baumgarten Erneuerung Stationssteuerung		Q2 2025	New
GCA	2022/E2	HAG+BOP11/12/13 Feldgerätetausch		Q4 2025	New
GCA	2022/E3	VS Kichberg Erneuerung Stationssteuerung/NISG		Q4 2023	New
GCA	2022/E4	VS WAG Baumgarten Erneuerung Maschienensteuerung		Q4 2025	New
GCA	2022/E5	Baumgarten HAG/WAG Umbau Analysenhäuser		Q4 2025	New
GCA	2022/E6	VS OGG Baumgarten Erneuerung Maschienensteuerung		Q2 2026	New
GCA	2022/E7	VS OGG + MS 5 Baumgarten Erneuerung Stationssteuerung		Q4/2025	New
TAG	2016/R12	SCS Replacement, CS Baumgarten-Grafendorf-Ruden		Q4 2026	Continuation
TAG	2019/R09	DLE 1.5 + 72 hole PT module BC500 in CS Baumgarten		Q4 2022	Continuation
TAG	2020/R01	DLE 1.5 hole PT module BC600 in CS-Baumgarten		Q4 2023	Amendment
TAG	2020/R05	New Flanges – Measurement Optimization MS Arnoldstein		Q2 2023	Continuation
TAG	2020/R06	Optimization TUCOs, CS-Ruden		Q4 2025	Amendment
TAG	2021/R01	Exchange of Insulation Joints Ludmannsdorf & Arnoldstein		Q4 2023	Continuation
TAG	2021/R03	Substitution MKVI CS Eggendorf		Q4 2024	Continuation
TAG	2021/R04	Substitution MKVI CS Weitendorf		Q4 2023	Continuation
TAG	2021/R06-A	Upgrade of safety and control loops CS Baumgarten		Q4 2024	Amendment
TAG	2022/R01	Exchange of Combustor WC100		Q4 2023	New
TAG	2022/R02	Exchange of Fuel Metering Valves GC500		Q4 2024	New
TAG	2022/R03	Pipeline Integrity Section 1/2/3 Phase 1		Q4 2023	New
TAG	2022/R04	Pigging 2024		Q4 2024	New
TAG	2022/R05	Automation Reverse Flow MS-A		Q4 2023	New

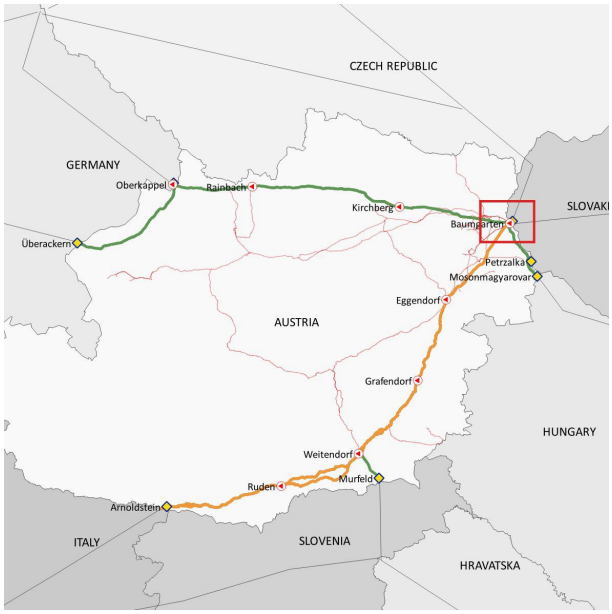
TAG	2022/R06	Installation of RC Snubbers at ELCO Transformers CS-B/E/G	Q4 2024	New
	)	*Continuation* *Continued approved projects without amendment* *Amendment* *Continued approved projects with amendment* *New* *New Projects* *Information* *Submission takes place in CNPD 2023*		

Project name:	**GCA 2016/E1 110 kV Overhead Power Line, UW Oberweiden, redundant feed**		
Project number:	GCA 2016/E1		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	4	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2026		

Project objective:

Maintaining and strengthening supply and contract security through a fully redundant power supply for the Baumgarten station and its e-compressors. Exploitation of potential for CO2 savings and the coupling of the energy sectors.

Project description



- Construction of a substation in the Oberweiden area
- Construction of a 110 kV overhead power line from Untersiebenbrunn to Oberweiden
- Looping of existing underground cables into the new Oberweiden substation by way of system admission to Netz Niederösterreich

Project rationale:

A significant improvement in security of supply to the compressor station, as power will be supplied from the public 110kV grid at two physically separate locations.

Reduction in electrical losses from the underground cables due to the reduced length

In future it will be possible to utilise the entire installed capacity at the Baumgarten substation including upstream cabling systems

Redundant supply of the UW BMG by laying a 110kV underground cable to complete the redundancy

Please note in particular:

-

Connection to other projects:

-

Technical data:

-

Economic data:

CNDP 2018: Planned investment cost XX € (Cost base 2017). The cost estimate may deviate by +/- 25% due to uncertainties in the first planning phase

CNDP 2019: Planned investment costs XXX € (cost basis 2019). The cost estimate is an accuracy of +/- 10%, which represents the uncertainty in the implementation phase.

CNDP 2020: Planned investment costs XXX € (cost basis 2020). The cost estimate is an accuracy of +/- 25%, which represents the uncertainty in the implementation phase.

CNDP 2020: Planned investment costs XXX € (cost basis 2021). The cost estimate is an accuracy of +/- 25%, which represents the uncertainty in the implementation phase.

CNDP 2022: Planned investment costs XXX € (cost basis 2022). The cost estimate is an accuracy of +/- 25%, which represents the uncertainty in the implementation phase.

Capacity impact:

-Increase in FZK redundancy

Project phase:

CNDP 2018: Identify & Assess

CNDP 2019: Execution phase

CNDP 2020: Identify & Assess

CNDP 2021: Identify & Assess

CNDP 2022: Identify & Assess

TYNDP: No	**PCI status:** No	**CBCA decision:** No

Project modifications:

-The categorization (project type) of the project will be changed based on the new guidelines. Extension of the project scope to include the redundant supply of the BMG substation starting from new Oberweiden substation.

Project status:

CNDP 2016: Approved as a project

CNDP 2017: Approved including amendments

CNDP 2018: Further monitored without amendments

CNDP 2019: Further monitoring without amendments

CNDP 2020: Further monitoring without amendments

CNDP 2021: Continuation with amendments

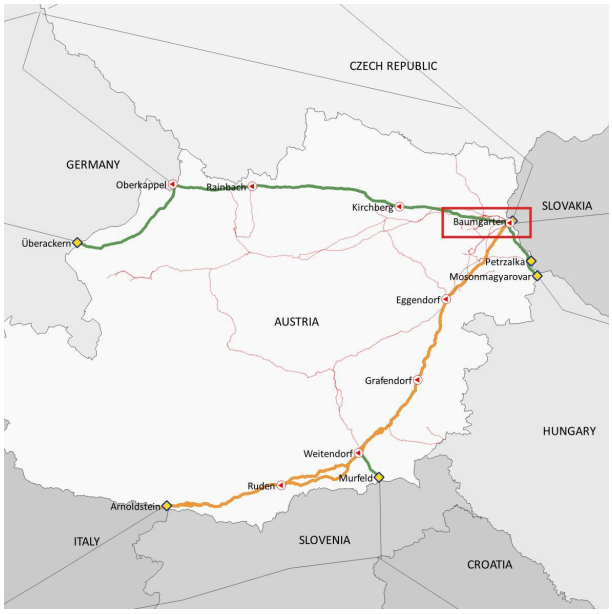
CNDP 2022: Further monitoring without amendments

Project name:	**GCA 2019/E6 UW Baumgarten power quality**		
Project number:	GCA 2019/E6		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	3	**Date:**	31.08.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q3/2026		

Project objective:

The aim of the project is the adaptation of the compensation system to the current needs.

Project description



Areas of VS Baumgarten have been completely or partially equipped with electric compressors in recent years.

The electric compressors are equipped with frequency inverters with power electronics which, depending on the operating point of the compressor, generate different types of network perturbations and harmonics and impair the quality of the network.

In view of the changes in the VS Baumgarten, a new evaluation of the already existing reactive power sources as well as the compensation systems has already been carried out.

Project rationale:

The project is required because the existing compensation plant has to be upgraded due to the recent expansion in Baumgarten.

Please note in particular:

The contents of the technical studies of this project ("confidential attachments") remain unchanged and valid in accordance with the 2019 Network Development Plan of Gas Connect Austria.

Connection to other projects:

No

Technical data:

There is no change in existing technical transport capacities.

Economic data:

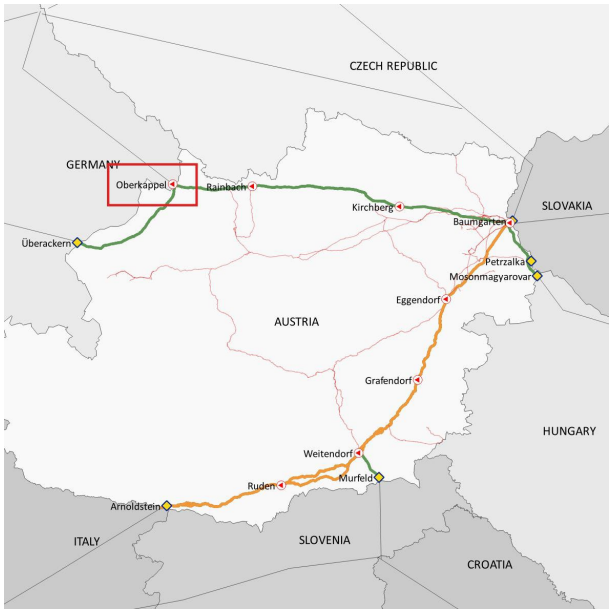
CNDP 2021: Planned investment costs XXX € (cost basis 2021)		
Capacity impact: None		
Project phase: CNDP 2019: Execution phase CNDP 2020: Execution phase CNDP 2021: Execution phase CNDP 2022: Execution phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications:		
Project status: CNDP 2019: Approved as a replacement investment project CNDP 2020: Further monitoring without amendments CNDP 2021: Further monitoring without amendments CNDP 2022: Further monitoring without amendments		

Project name:	**GCA 2021/E2 VS Neustift Renewal of the machine control**		
Project number:	GCA 2021/E2		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	2	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q1/2023		

Project objective:

Renewal of the machine control at VS Neustift

Project description



The three compressor units were purchased as a package from Baker Huges (formerly General Electric) with unit control, transformer, frequency converter and compressor when it was built. The system is designed with a lifecycle time of approx. 10 years. Many electronic systems / individual parts and pieces of equipment have been discontinued by the manufacturers.

Project rationale:

In this project, the unit control of the compressors is brought up to date, the control cabinets for the magnetic bearing control for the motor and compressor are renewed, and the frequency converter is modernized.

Please note in particular:

Connection to other projects:

None

Technical data:

There is no change in existing technical transport capacities.

Economic data:

CNDP 2021: Planned investment costs X € (cost basis 2021). The cost estimate is to be understood

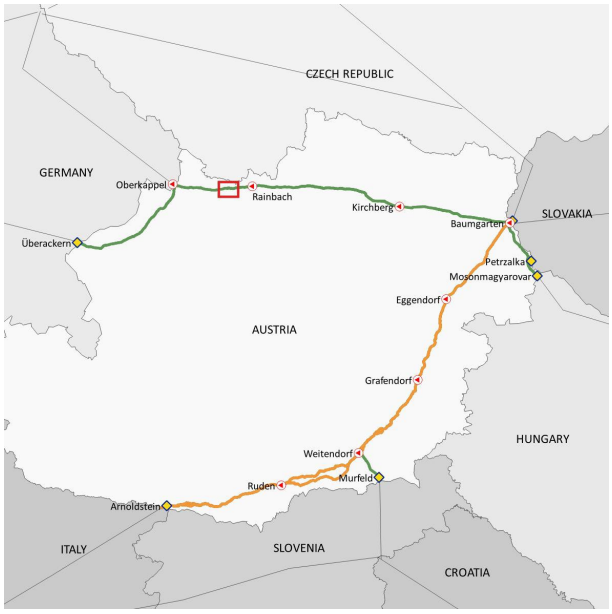
<table>
<tr><td colspan="3">with an accuracy of +/- 25%.
CNDP 2022: Planned investment costs X € (cost basis 2022). The cost estimate is to be understood with an accuracy of +/- 25%.</td></tr>
<tr><td colspan="3">Capacity impact:
No</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2021: Planning Phase
CNDP 2022: Implementation Phase</td></tr>
<tr><td>TYNDP: No</td><td>PCI status: No</td><td>CBCA decision: No</td></tr>
<tr><td colspan="3">Project modifications:
None</td></tr>
<tr><td colspan="3">Project status:
CNDP 2021: Submission for approval as a replacement investment project
CNDP 2022: Continuation without amendments</td></tr>
</table>

Project name:	**GCA 2021/E3 Erneuerung RMA Armaturen Abschnitt 3 (Bad Leonfelden)**		
Project number:	GCA 2021/E3		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	2	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2025		

Project objective:

Valve replacement in the gate valve and pig station in Bad Leonfelden

Project description



The valve station for the WAG I line (DN800) and the pig station for the WAG II line (DN1200) are located on the premises of the Bad Leonfelden station.

In the Bad Leonfelden station, the pig sluice valve 1201 DN1200 will be exchanged, as will the two connection fittings 1202 DN800 and 1203 DN800 for WAG 1.

Project rationale:

As a result of valve checks in the valve and pig station in Bad Leonfelden, it was found that individual valves are leaking. These fittings are exchanged.

Please note in particular:

Connection to other projects:

None

Technical data:

There is no change in existing technical transport capacities.

Economic data:

CNDP 2021: Planned investment costs X € (cost basis 2021). The cost estimate is to be understood with an accuracy of +/- 25%.

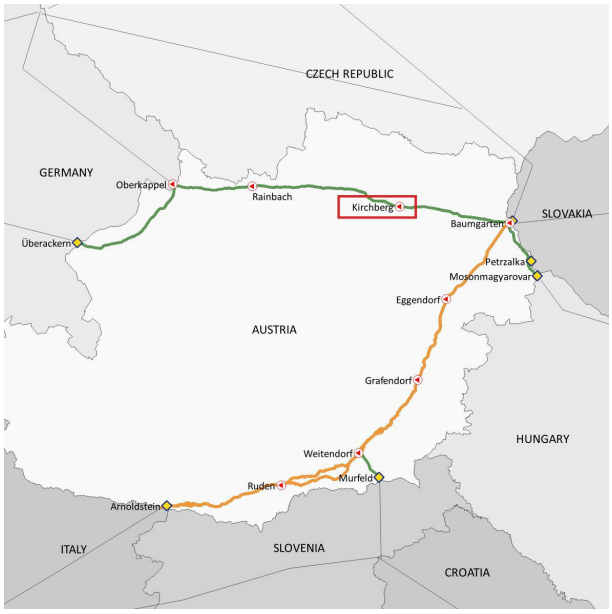
<table>
<tr><td colspan="3">CNDP 2022: Planned investment costs X € (cost basis 2022). The cost estimate is to be understood with an accuracy of +/- 25%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2021: Execution Phase
CNDP 2022: Execution Phase</td></tr>
<tr><td>TYNDP: No</td><td>PCI status: No</td><td>CBCA decision: No</td></tr>
<tr><td colspan="3">Project modifications:
None</td></tr>
<tr><td colspan="3">Project status:
CNDP 2021: Submission for approval as a replacement investment project
CNDP 2021: Continuation without amendments</td></tr>
</table>

Project name:	**GCA 2021/E4 Erneuerung Stationsteuerung VS Kirchberg**		
Project number:	GCA 2021/E4		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	2	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2026		

Project objective:

Renewal of station control VS Kirchberg

Project description



Since the existing station control system (PCS) has reached the end of its life cycle, all components are to be replaced in this project. The installed Siemens PCS7 system was first installed in the course of setting up the station. The life cycle of a DCS is 10 years in the industry standard. With preventive maintenance, GCA can achieve up to 15 years.

Project rationale:

Since the existing station control system (PCS) has reached the end of its life cycle, renovation measures are essential.

Please note in particular:

Connection to other projects:

None

Technical data:

There is no change in existing technical transport capacities.

Economic data:

CNDP 2021: Planned investment costs X € (cost basis 2021). The cost estimate is to be understood with an accuracy of +/- 25%.

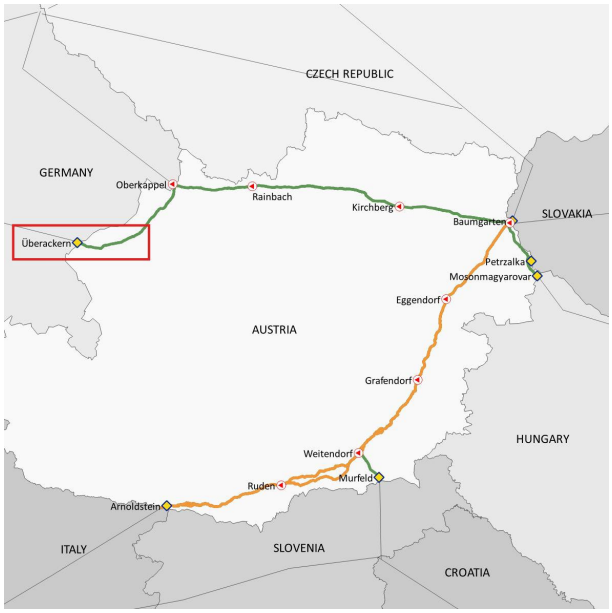
CNDP 2022: Planned investment costs X € (cost basis 2022). The cost estimate is to be understood with an accuracy of +/- 25%.		
Capacity impact: None		
Project phase: CNDP 2021: Execution Phase CNDP 2022: Implementation phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications:		
Project status: CNDP 2021: Submission for approval as a replacement investment project CNDP 2022: Continuation without amendments		

Project name:	**GCA 2021/E5 MS Überackern/Schieberstation Mauerkirchen Erneuerung Isolierkupplung (IK)**		
Project number:	GCA 2021/E5 MS		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	2	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q1/2023		

Project objective:

Renewal of the insulating coupling at MS Überackern and Schieberstation Mauerkirchen

Project description



Exchange of the IKs DN700 (electrical separation point of the KKS) on the Penta West for:

- Schieberstation Mauerkirchen, Überackern page
- ÜST Überackern, Neustift page

Project rationale:

In order to be able to fully maintain the protection of the line again, an exchange of the electrical DN700 separation point (insulating piece) in the Schieberstation Mauerkirchen (line side Überackern) is absolutely necessary. For reasons of efficiency, the technically outdated insulating piece at the entrance to the Üst is now also used. Overtaking replaced with a new isolating coupling. This avoids further line shutdown.

Please note in particular:

Connection to other projects:

None

Technical data:

There is no change in existing technical transport capacities.

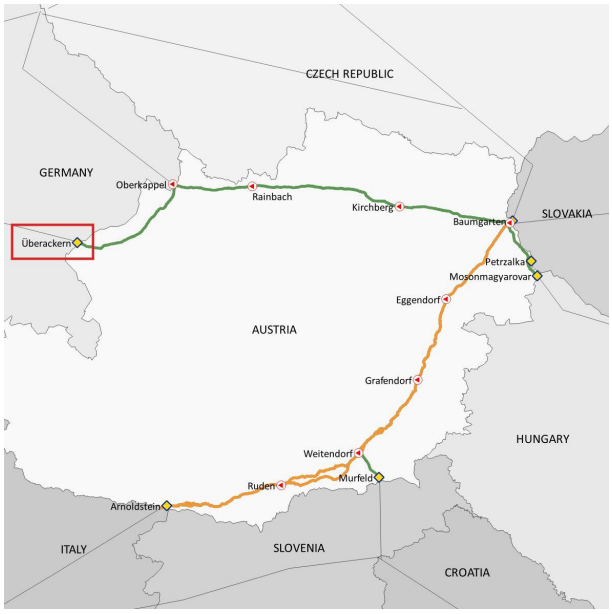
<table>
<tr><td colspan="3">Economic data:
CNDP 2021: Planned investment costs X € (cost basis 2021). The cost estimate is to be understood with an accuracy of +/- 25%.
CNDP 2022: Planned investment costs X € (cost basis 2022). The cost estimate is to be understood with an accuracy of +/- 25%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2021: Executipn Phase
CNDP 2022: Executipn Phase</td></tr>
<tr><td>TYNDP: No</td><td>PCI status: No</td><td>CBCA decision: No</td></tr>
<tr><td colspan="3">Project modifications:
None</td></tr>
<tr><td colspan="3">Project status:
CNDP 2021: Submission for approval as a replacement investment project
CNDP 2022: Continuation without amendments</td></tr>
</table>

Project name:	**GCA 2021/E6 Erneuerung Stationsteuerung MS Überackern**		
Project number:	GCA 2021/E6		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	2	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2024		

Project objective:

Renewal of station control MS Überackern

Project description



Since the existing station control system (PCS) has reached the end of its life cycle, all components are to be replaced in this project. The life cycle of a DCS is 10 years in the industry standard. With preventive maintenance, GCA can achieve up to 15 years.

The entire hardware is to be replaced - essentially servers, clients, redundant and fail-safe CPUs, network components and the I / O peripherals.

Project rationale:

Since the existing station control system (PCS) has reached the end of its life cycle, renovation measures are essential.

Please note in particular:

Connection to other projects:

None

Technical data:

There is no change in existing technical transport capacities.

Economic data:

CNDP 2021: Planned investment costs X € (cost basis 2021). The cost estimate is to be understood with an accuracy of +/- 25%.

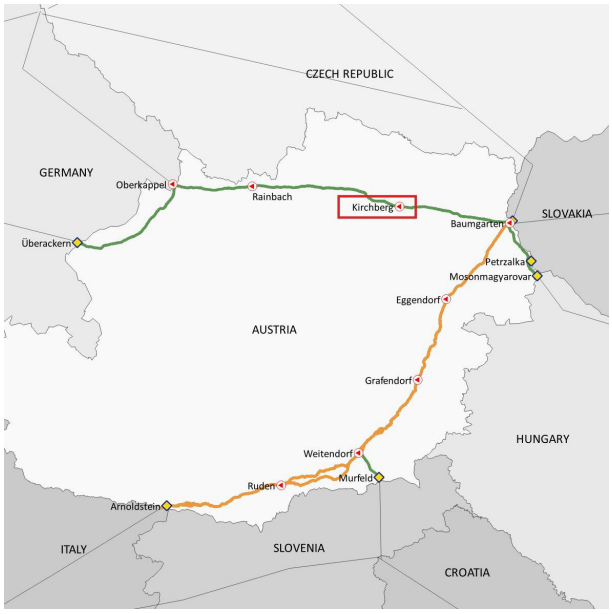
<table>
<tr><td colspan="3">CNDP 2022: Planned investment costs X € (cost basis 2022). The cost estimate is to be understood with an accuracy of +/- 25%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2021: Planning Phase
CNDP 2022: Planning Phase</td></tr>
<tr><td>TYNDP: No</td><td>PCI status: No</td><td>CBCA decision: No</td></tr>
<tr><td colspan="3">Project modifications:
None</td></tr>
<tr><td colspan="3">Project status:
CNDP 2021: Submission for approval as a replacement investment project
CNDP 2022: Continuation without amendments</td></tr>
</table>

Project name:	**GCA 2021/E10 VS Kirchberg Renewal of machine control**		
Project number:	GCA 2021/E10		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	2	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2026		

Project objective:

Renewal of the machine control of VS Kirchberg

Project description



This project is about the adaptation of the machine controls and all system parts to be adapted for the two compressor units in Kirchberg. The adaptation is necessary because components are no longer available and the machine controls have reached the end of their life cycle.

Most of the marshalling distributors are retained and should only be modified. The user software is adapted to the new configuration, the basic functionality remains unchanged

Project rationale:

The adaptation is necessary because components are no longer available and the machine controls have reached the end of their life cycle.

Please note in particular:

Connection to other projects:

None

Technical data:

There is no change in existing technical transport capacities.

Economic data:

CNDP 2021: Planned investment costs X € (cost basis 2021). The cost estimate is to be understood with an accuracy of +/- 25%.

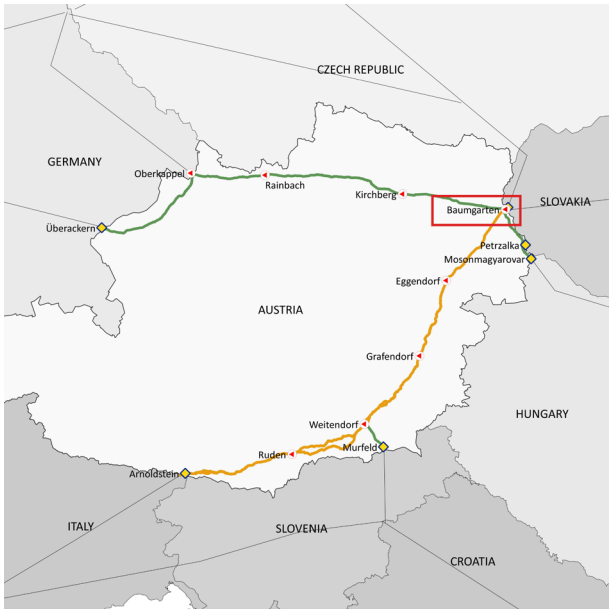
CNDP 2022: Planned investment costs X € (cost basis 2022). The cost estimate is to be understood with an accuracy of +/- 25%.		
Capacity impact: None		
Project phase: CNDP 2021: Planning Phase CNDP 2022: Planning Phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications: None		
Project status: CNDP 2021: Submission for approval as a replacement investment project CNDP 2022: Continuation without amendments		

Project name:	**GCA 2022/E1 VS WAG Baumgarten Renewal of the station control**		
Project number:	GCA 2022/E1		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q2/2025		

Project objective:

Renewal of the station control of VS Baumgarten WAG

Project description



The existing station control system has reached the end of its life cycle, therefore the replacement of all components is to be carried out in this project.

The installed Siemens PCS7 system was built more than 20 years ago and has been continuously upgraded.

A large part of the components has been discontinued by the manufacturer, which means that there is only limited support and spare parts availability for a maximum of 10 years.

The safety control for emergency stop functions is still integrated in the station control system and not built as an independent system (HIMA) like GCA standard.

Project rationale:

As the existing station control system (PCS) has reached the end of its life cycle, a renewal is indispensable.

Please note in particular:

Connection to other projects:

None

Technical data:

There will be no change in existing technical transport capacities.

Economic data:

CNDP 2022: Planned investment costs XXX € (cost basis 2022). The cost estimate is understood with an accuracy of +/- 25%

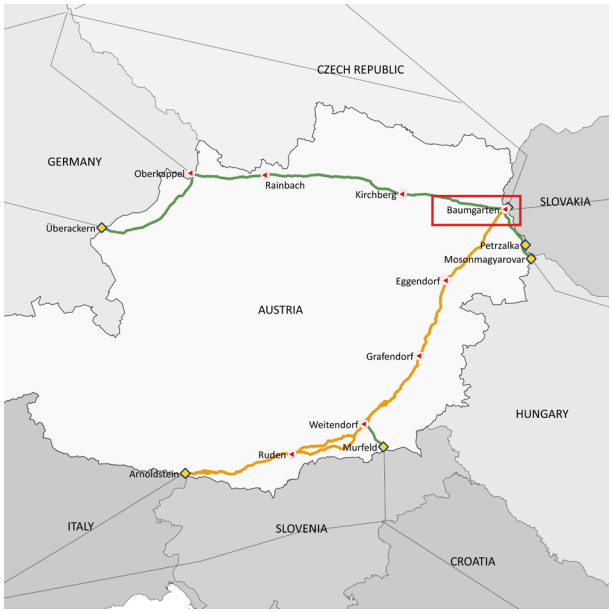
Capacity impact: None		
Project phase: CNDP 2022: Preparation phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications:		
Project status: CNDP 2022: Submission for approval as a replacement investment project		

Project name:	**GCA 2022/E2 HAG+BOP11/12/13 Feldgerätetausch**		
Project number:	GCA 2022/E2		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2025		

Project objective:

In the project, field devices including housings and mounting equipment will be replaced outdoors and in the measuring buildings.

Project description



The HAG Baumgarten plant was commissioned in 1996. A large part of the field installation has been in operation since that time and is no longer state of the art. The associated process control system was renewed in 2019.

The project will replace field equipment including enclosures and mounting equipment outdoors and in the metering buildings. The existing fiberglass boxes, some of which are severely weathered, will be replaced with metal instrument protection boxes. The existing field cables will continue to be used.

Project rationale:

Since the existing field equipment has been in operation since 1996, it no longer corresponds to the current state of the art. For this reason, it is to be modernized.

Please note in particular:

Connection to other projects:

None

Technical data:

There will be no change in existing technical transport capacities.

Economic data:

Planned investment costs XXX € (cost basis 2022). The cost estimate is understood with an accuracy

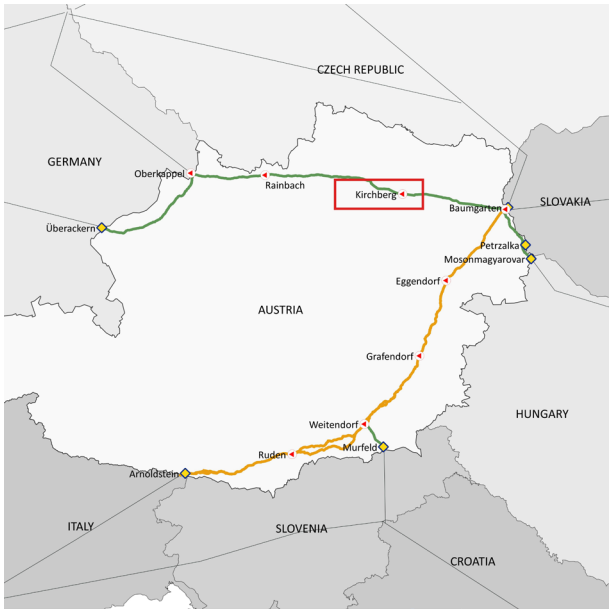
<table>
<tr><td colspan="3">of +/- 25%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2022: Preparation phase</td></tr>
<tr><td>TYNDP: None</td><td>PCI status: None</td><td>CBCA decision: None</td></tr>
<tr><td colspan="3">Project modifications:</td></tr>
<tr><td colspan="3">Project status:
CNDP 2022: Submission for approval as a replacement investment project</td></tr>
</table>

Project name:	**GCA 2022/E3 VS Kichberg renewal of the station control/NISG**		
Project number:	GCA 2022/E3		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2023		

Project objective:

Implementation of Re-HAZOP Action Items. Measures to achieve NIS compliance.

Project description



The renewal of the station control system is presented in the already approved project GCA 2021/E4 (implementation Q4 2026). This project includes:

- the necessary and required action items from the 2021/22 Re-HAZOP are implemented, and
- all necessary measures are taken to ensure compliance with the NIS (Network and Information System Security) Act.

All measures are to be planned and executed in such a way that they can already be considered an integral part of the subsequent PLS exchange project.

Project rationale:

Bring forward the required action items from the Re-HAZOP and implement the actions to achieve NIS compliance.

Please note in particular:

Connection to other projects:

None

Technical data:

There will be no change in existing technical transport capacities.

Economic data:

CNDP 2022: Planned investment costs XXX € (cost basis 2022). The cost estimate is understood with an accuracy of +/- 25%.

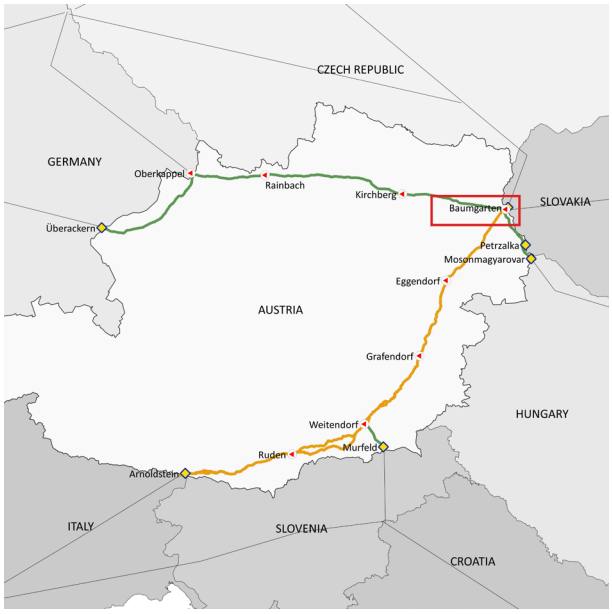
Capacity impact: None		
Project phase: CNDP 2022: Preparation phase		
TYNDP: None	**PCI status:** None	**CBCA decision:** None
Project modifications:		
Project status: CNDP 2022: Submission for approval as a replacement investment project		

Project name:	**GCA 2022/E4 VS WAG Baumgarten Renewal of machine control**		
Project number:	GCA 2022/E4		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2025		

Project objective:

Renewal of the machine control system of VS WAG Baumgarten

Project description



The WAG compressor station in Baumgarten has 3 compressor units. In order to be able to continue to guarantee the high availability of the 3 compressor units, the control systems and the required electronic components that have reached the end of their service life will be replaced according to the manufacturer's specifications.

The new control systems will be designed to meet the new NISG requirements.

Project rationale:

The control systems used have reached the end of their service life. Some of the installed components have already been discontinued by the manufacturers, which means that support can no longer be guaranteed and the availability of spare parts is also severely limited.

Please note in particular:

Connection to other projects:

None

Technical data:

There will be no change in existing technical transport capacities.

Economic data:

CNDP 2022: Planned investment costs XXX € (cost basis 2022). The cost estimate is understood with

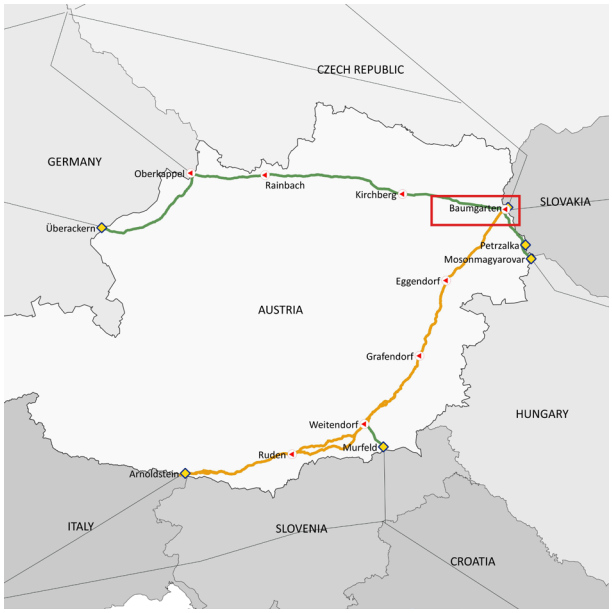
<table>
<tr><td colspan="3">an accuracy of +/- 25%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2022: Preparation phase</td></tr>
<tr><td>TYNDP: None</td><td>PCI status: None</td><td>CBCA decision: None</td></tr>
<tr><td colspan="3">Project modifications:</td></tr>
<tr><td colspan="3">Project status:
CNDP 2022: Submission for approval as a replacement investment project</td></tr>
</table>

Project name:	**GCA 2022/E5 Baumgarten HAG/WAG Reconstruction analysis houses**		
Project number:	GCA 2022/E5		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2024		

Project objective:

Replacement of gas chromatographs with H2-capable devices and renewal of the test and calibration gas supplies.

Project description



The following devices will be exchanged in the plant:

- Gas chromatographs (against H2 suitable devices which can measure up to 20% H2)
- Sulfur gas chromatographs At MS3 and MS5

This also requires a renewal of the test and calibration gas supplies. Since the pressure reductions, sample preparation and piping of the existing PGC's have already reached the end of their service life, these will also be renewed.

In total, 11 new PGC's, 2 new sulfur gas chromatographs and 2 H2O/KWH dew point measurements are required.

Project rationale:

The current gas analyzers cannot measure the hydrogen content in the gas mixture. Therefore, these are being replaced.

Please note in particular:

Connection to other projects:

None

Technical data:

There will be no change in existing technical transport capacities.

Economic data:

CNDP 2022: Planned investment costs XXX € (cost basis 2022). The cost estimate is understood with

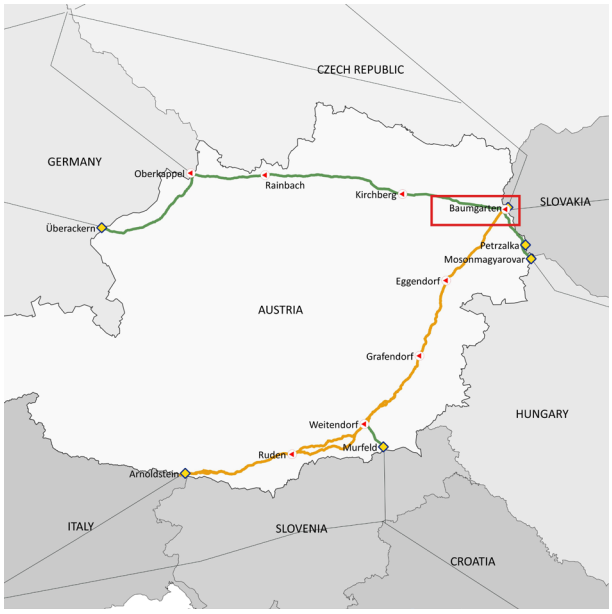
<table>
<tr><td colspan="3">an accuracy of +/- 25%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2022: Preparation phase</td></tr>
<tr><td>TYNDP: None</td><td>PCI status: None</td><td>CBCA decision: None</td></tr>
<tr><td colspan="3">Project modifications:</td></tr>
<tr><td colspan="3">Project status:
CNDP 2022: Submission for approval as a replacement investment project</td></tr>
</table>

Project name:	**GCA 2022/E6 VS OGG Baumgarten Renewal machine control**		
Project number:	GCA 2022/E6		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q2/2026		

Project objective:

Renewal of the machine control system of VS OGG Baumgarten

Project description



The three compressor units were purchased during construction as a package with unit control, transformer, frequency converter and compressor. The plant is designed with a life cycle time of approx. 10 years. On the part of the manufacturer, many electronic systems / individual parts and equipment were discontinued.

This means that spare parts are no longer produced. Thus, in the medium term, there is no procurement of spare parts on the market, and therefore also no update possibility.

In this project, the unit control of the compressors will be updated to the latest system status.

Project rationale:

The control systems used have reached the end of their service life. Some of the installed components have already been discontinued by the manufacturers, which means that support can no longer be guaranteed and the availability of spare parts is also severely limited.

Please note in particular:

Connection to other projects:

None

Technical data:

There will be no change in existing technical transport capacities.

Economic data:

CNDP 2022: Planned investment costs XXX € (cost basis 2022). The cost estimate is understood with

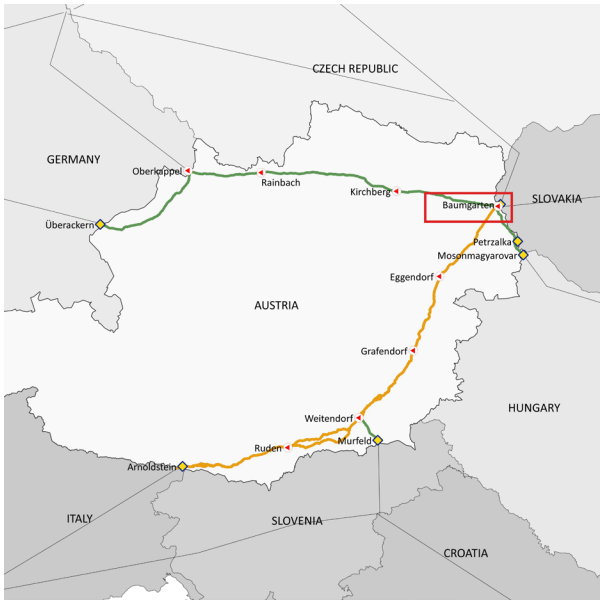
<table>
<tr><td colspan="3">an accuracy of +/- 25%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2022: Preparation phase</td></tr>
<tr><td>TYNDP: None</td><td>PCI status: None</td><td>CBCA decision: None</td></tr>
<tr><td colspan="3">Project modifications:</td></tr>
<tr><td colspan="3">Project status:
CNDP 2022: Submission for approval as a replacement investment project</td></tr>
</table>

Project name:	**GCA 2022/E7 VS OGG + MS 5 Baumgarten Renewal station control**		
Project number:	GCA 2022/E7		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2025		

Project objective:

Complete renewal of the control system components (visualization, control, master computer).

Project description



The existing automation system of the VS OGG compressor station and the MS5 measuring station at the Baumgarten site has reached the end of its life cycle. This means that no more spare parts will be produced. Thus, in the medium term, there is no longer any possibility of procuring spare parts on the market, and thus also no possibility of updating.

Therefore, the complete replacement of the control system components (visualization, control, master computer) is planned.

Project rationale:

The existing automation system of the VS OGG and the MS5 measuring station have reached the end of their service life. Some of the installed components have already been discontinued by the manufacturers, which means that support can no longer be guaranteed and the availability of spare parts is also severely limited.

Please note in particular:

Connection to other projects:

None

Technical data:

There will be no change in existing technical transport capacities.

Economic data:

CNDP 2022: Planned investment costs XXX € (cost basis 2022). The cost estimate is understood with an accuracy of +/- 25%.		
Capacity impact: None		
Project phase: CNDP 2022: Preparation phase		
TYNDP: None	**PCI status:** None	**CBCA decision:** None
Project modifications:		
Project status: CNDP 2022: Submission for approval as a replacement investment project		

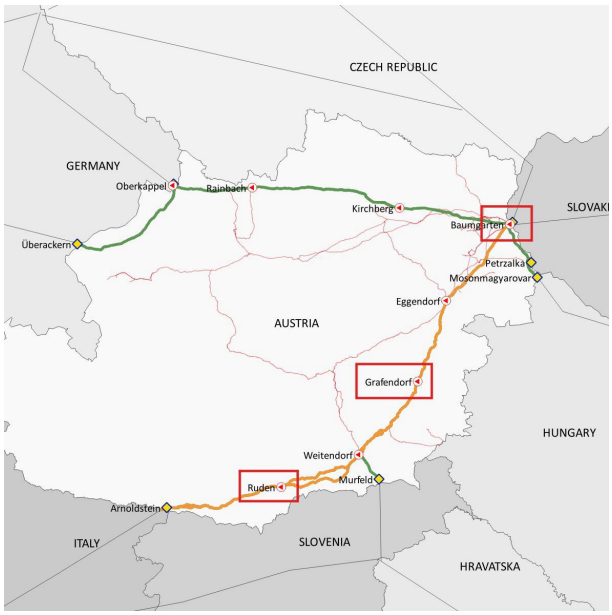
Project name:	**TAG 2016/R12 SCS Replacement, CS Baumgarten-Grafendorf-Ruden**		
Project number:	TAG 2016/R12		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	4	**Date:**	24.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2026		

Project objective:

Replacement of the SCS (Station Control System) and ESD (Emergency Shut Down) in hardware and software, as well as the replacement of the marshalling cabinets and the operating workstations and servers.

In the control room, there is a mimic panel that should be replaced and visualized by a LED flat screen.

Project description



- EPCM
- Engineering and Site Supervision
- System implementation separately for each compressor station
- Commissioning separately for each compressor station

Project rationale:

Due to the age of the system and the low availability of spare parts, TAG GmbH needs to replace the existing SCS by a new one in the compressor stations Ruden, Grafendorf and Baumgarten

Please note in particular:

Potential impact on availability of transportation capacity during the execution: YES

Connection to other projects:

Possible synergies with the projects:

- TAG 2021 / R02 A, B and C Cable ways concept, CS-Baumgarten, Grafendorf and Ruden

- TAG 2021 / R06 Upgrade of safety and control loops CS-Baumgarten

are taken into account in order to reduce the impact on station shutdowns or transport restrictions.

Technical data:

There is no change in the existing technical transport capacities.

Economic data:

CNDP 2016: Planned investment cost XX € (Cost base 2016). (excl. possible replacement of process instruments and valves). The cost estimation is to be understood with an accuracy +/- 25% based on internal estimation.

CNDP 2017: Planned investment cost XX € (Cost base 2017). (excl. possible replacement of process instruments and valves). The cost estimation is to be understood with an accuracy +/- 25% based on internal estimation.

CNDP 2018: Planned investment cost XX € (Cost base 2018). (excl. possible replacement of process instruments and valves). The cost estimation is to be understood with an accuracy +/- 25% based on internal estimation.

CNDP 2019: Planned investment cost XX € (Cost base 2019). (excl. possible replacement of process instruments and valves). The cost estimation is to be understood with an accuracy +/- 25% based on internal estimation.

CNDP 2020: Planned investment cost XX € (Cost base 2020). (excl. possible replacement of process instruments and valves). The cost estimation is to be understood with an accuracy +/- 25% based on internal estimation.

CNDP 2021: Planned investment cost XX € (Cost base 2021). (excl. possible replacement of process instruments and valves). The cost estimation is to be understood with an accuracy +/- 25% based on internal estimation.

CNDP 2022: Planned investment cost XX € (Cost base 2022). (excl. possible replacement of process instruments and valves). The cost estimation is to be understood with an accuracy +/- 25% based on internal estimation.

Capacity impact:

None

Project phase:

CNDP 2016: Planning phase

CNDP 2017: Engineering phase

CNDP 2018: Engineering phase

CNDP 2019: Procurement phase

CNDP 2020: Procurement phase

CNDP 2021: Execution phase

CNDP 2022: Execution phase

TYNDP: No	**PCI status:** No	**CBCA decision:** No

Project modifications:

CNDP 2017: Planned completion, economic data

CNDP 2018: None

CNDP 2019: Economic data, timeline, project scope

CNDP 2020: Economic data, timeline, project scope

CNDP 2021: Economic data, timeline, project scope

CNDP 2022: None

Project status:

CNDP 2016: Approved as a project

CNDP 2017: Approved including amendments

CNDP 2018: Further monitored without amendments

CNDP 2019: Submission for approval including amendments

CNDP 2020: Submission for approval including amendments

CNDP 2021: Submission for approval including amendments

CNDP 2022: Further monitored without amendments

Project name:	**TAG 2019/R09 DLE 1.5 + 72 hole PT module BC500 in CS Baumgarten**		
Project number:	TAG 2019/R09		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	3	**Date:**	24.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2022		

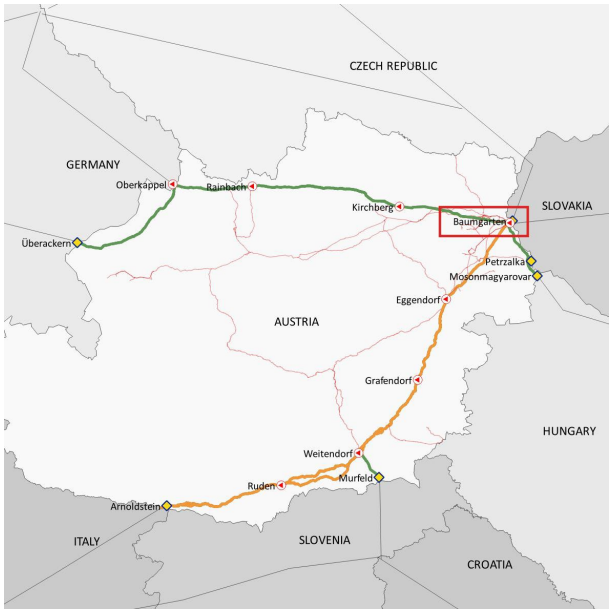
Project objective:

The project goal is to upgrade the existing gas generators of the C500 type PGT 25 DLE 1.0 at the compressor station Baumgarten to the new technology DLE 1.5 XTend.

In addition, the auxiliary systems as the fuel valve skid, vent valves and lines, shut off valves etc. will be changed or adapted to the new design.

Instead to perform the upcoming Major Overhaul (50,000 hours) it is foreseen to upgrade the power turbine.

Project description



Following investments are needed for the execution of the project:

- Substitution of the gas-generators
- Substitution of the power turbine
- Exchange / Adaption of the auxiliary systems

Project rationale:

Instead to perform the upcoming Major Overhaul (50,000 hours) it is foreseen to upgrade the gas generator to new technology DLE 1.5 XTend.

This upgrade will allow the reduction of NOx- and CO-Emissions in line with the most recent state of the art technologies. The usage of XTend parts for the gas generator allow to skip the 25,000 running hour service to 50,000 running hour service which will result in a reduction of maintenance cost.

Instead to perform the upcoming Major Overhaul (50,000 hours) it is foreseen to upgrade the power

turbine. The upgrade allows to skip the 25,000 running hour service to 50,000 running hour service which will result in a reduction of maintenance cost.

Please note in particular:
Potential impact on availability of transportation capacity during the execution: None

Connection to other projects:
None

Technical data:
There is no change in the existing technical transport capacity.

Economic data:
CNDP 2019: Planned investment cost XXX € (Cost base 2019). The cost estimation is to be understood with an accuracy of +/- 25%.

CNDP 2020: Planned investment cost XX € (Cost base 2020). The cost estimation is to be understood with an accuracy of +/- 25%.

CNDP 2021: Planned investment cost XX € (Cost base 2021). The cost estimation is to be understood with an accuracy of +/- 25%.

CNDP 2022: Planned investment cost XX € (Cost base 2022). The cost estimation is to be understood with an accuracy of +/- 25%.

Capacity impact:
None

Project phase:
CNDP 2019: Planning phase

CNDP 2020: Engineering phase

CNDP 2021: Implementation phase

CNDP 2022: Implementation phase

TYNDP: No	**PCI status:** No	**CBCA decision:** No

Project modifications:
CNDP 2020: None

CNDP 2021: None

CNDP 2022: None

Project status:
CNDP 2019: Submission for approval

CNDP 2020: Further monitoring without amendments

CNDP 2021: Further monitoring without amendments

CNDP 2022: Further monitoring without amendments

Project name:	**TAG 2020/R01 DLE 1.5 hole PT module BC600 in CS-Baumgarten**		
Project number:	TAG 2020/R01		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	24.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2023		

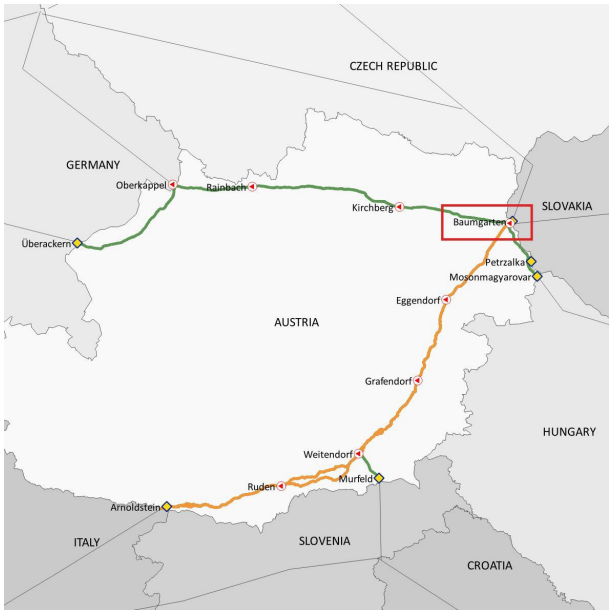
Project objective:

The project goal is to upgrade the existing gas generators of the C600 type PGT 25 DLE 1.0 at the compressor station Baumgarten to the new technology DLE 1.5 XTend.

In addition, the auxiliary systems as the fuel valve skid, vent valves and lines, shut off valves etc. will be changed or adapted to the new design.

Furthermore the 72-hole power turbine will be upgraded.

Project description



Following investments are needed for the execution of the project:

- Substitution of the gas-generators
- Upgrade of the power turbine
- Exchange / Adaption of the auxiliary systems
- Additional installation of E-Starter
- Exhaust plenum exchange

Project rationale:

Instead to perform the upcoming Major Overhaul (50,000 hours) it is foreseen to upgrade the gas generator to new technology DLE 1.5 XTend.

This upgrade will allow the reduction of NOx- and CO-Emissions in line with the most recent state of the art technologies. The usage of XTend parts for the gas generator allow to skip the 25,000 running hour service to 50,000 running hour service which will result in a reduction of maintenance cost.

Please note in particular:

Potential impact on availability of transportation capacity during the execution: None

Connection to other projects:
None

Technical data:
There is no change in the existing technical transport capacity.

Economic data:
CNDP 2020: Planned investment cost XX € (Cost base 2020). The cost estimation is to be understood with an accuracy of +/-25%.

CNDP 2021: Planned investment cost XX € (Cost base 2021). The cost estimation is to be understood with an accuracy of +/-25%.

CNDP 2022: Planned investment cost XX € (Cost base 2022). The cost estimation is to be understood with an accuracy of +/-25%.

Capacity impact:
None

Project phase:
CNDP 2020: Planning phase

CNDP 2021: Planning phase

CNDP 2022: Planning phase

TYNDP: No	**PCI status:** No	**CBCA decision:** No

Project modifications:
CNDP 2021: Economic data

CNDP 2022: Planned completion

Project status:
CNDP 2020: Submission for approval

CNDP 2021: Re-submission for approval including amendments

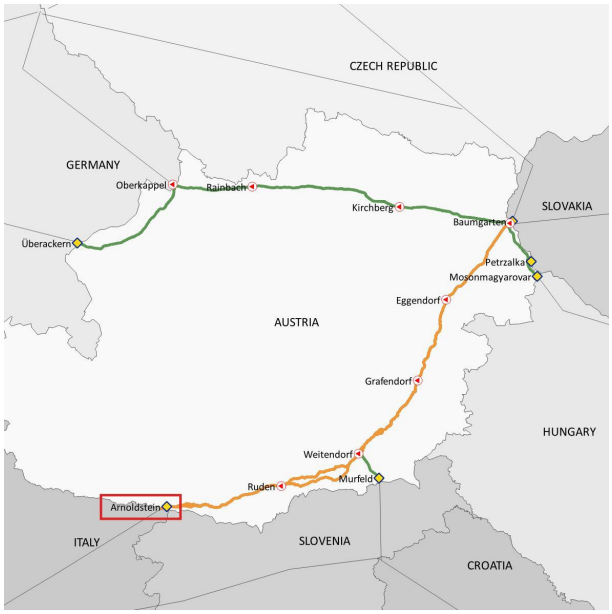
CNDP 2022: Re-submission for approval including amendments

Project name:	**TAG 2020/R05 New Flanges – Measurement Optimization MS Arnoldstein**		
Project number:	TAG 2020/R05		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	24.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q2/2023		

Project objective:

Adaption of the existing metering station to have inlet and outlet metering sections which are not needed to be disassembled after the calibration at Calibration Laboratory. Reduction of swirls in the meter runs by installation of new flow conditioners. Installations needed for data logging and signal diagnostics of the ultrasonic flow meters (USM) including firmware-update.

Project description



- Independent metering system A and metering system B
- Installation of flow conditioners
- Cables and installations for data logging and signal diagnostics
- Firmware-update of USM
- Recalibration of meter runs

Project rationale:

The investment is necessary having inlet and outlet metering sections which are not needed to be disassembled after the calibration and therefore ensure unchanged the obtained results at the Calibration Laboratory and for the installation of flow conditioners.

The recalibration of meter runs at a calibration laboratory has to be performed every 5 years to meet the confirmed requirements.

Installations and firmware-update needed for data logging capacity and signal diagnostics of the existing ultrasonic flow meters.

Please note in particular:

Possible impact on availability of transport capacities during implementation: None

Connection to other projects:
None

Technical data:
There is no change to existing technical transport capacities nor in operations nor processes.

Economic data:
CNDP 2020: Planned investment cost XX € (Cost base 2020) based on internal cost estimate. The cost estimation is to be understood with an accuracy +/- 30%.

CNDP 2021: Planned investment cost XX € (Cost base 2021) based on internal cost estimate. The cost estimation is to be understood with an accuracy +/- 30%.

CNDP 2022: Planned investment cost XX € (Cost base 2022) based on internal cost estimate. The cost estimation is to be understood with an accuracy +/- 25%.

Capacity impact:
None

Project phase:
CNDP 2020: Planning phase

CNDP 2021: Planning phase

CNDP 2022: Execution Phase

TYNDP: No	**PCI status:** No	**CBCA decision:** No

Project modifications:
CNDP 2021: None

CNDP 2022: None

Project status:
CNDP 2020: Submission for approval

CNDP 2021: Monitoring without amendments

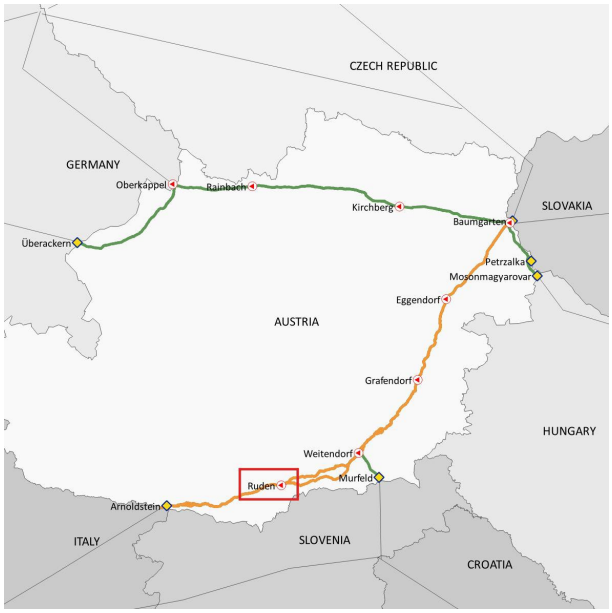
CNDP 2022: Monitoring without amendments

Project name:	**TAG 2020/R06 Optimization TUCOs CS-Ruden**		
Project number:	TAG 2020/R06		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	24.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2025		

Project objective:

Existing vibrations issue on the TUCOs have worsened after the restaging performed during NOxER2 project. Modifications are needed to lower the vibration levels

Project description



- Exchange the Turbocompressor bundles
- Replace the inlet and outlet turbocompressor pipe spool
- Replace the TUCO instruments on the process pipes
- Correction of the performance of the turbo compressor C600

Project rationale:

The investment is necessary to ensure the reliability and safety in operation of the TAG pipeline system.

Please note in particular:

Potential impact on availability of transportation capacity during the execution: Yes

Connection to other projects:

None

Technical data:

There is no change to existing technical transport capacities, nor in operations nor processes.

Economic data:

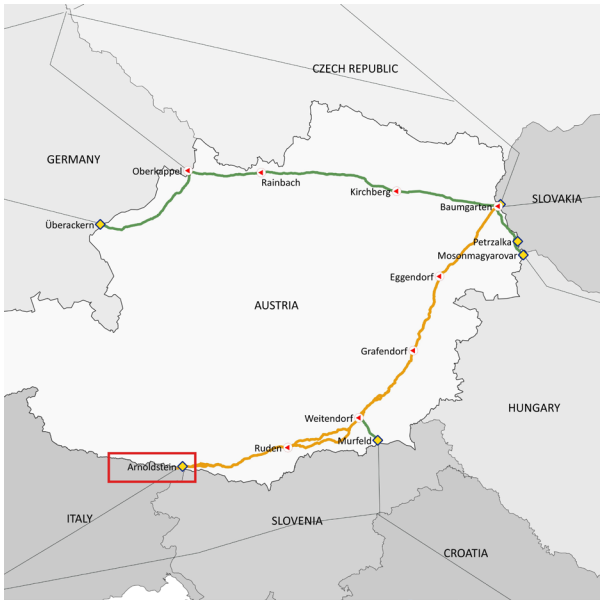
CNDP 2020: Planned investment cost XX € (Cost base 2020). The cost estimation is to be understood with an accuracy +/- 25% on the EPCM basis. CNDP 2021: Planned investment cost XX € (Cost base 2021). The cost estimation is to be understood with an accuracy +/- 25% on the EPCM basis. CNDP 2022: Planned investment cost XX € (Cost base 2022). The cost estimation is to be understood with an accuracy +/- 25% on the EPCM basis.		
Capacity impact: None		
Project phase: CNDP 2020: Execution phase CNDP 2021: Execution phase CNDP 2022: Execution phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications: CNDP 2021: Planned completion, economic data CNDP 2022: Planned completion, economic data		
Project status: CNDP 2020: Submission for approval CNDP 2021: Re-submission for approval including amendments CNDP 2022: Re-submission for approval including amendments		

Project name:	**TAG 2021/R01 Exchange of Insulation Joints Ludmannsdorf & Arnoldstein**		
Project number:	TAG 2021/R01		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	24.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2023		

Project objective:

The last evaluation of insulation joints has shown that three of them are not fully electrically insolating and therefore the protection against corrosion is not given. Hence, the implementation of new insulation joints is planned.

Project description



- Excavation and digging works, exposing of the piping system and insulation joints.
- Recompression to reduce emissions
- Exchange and relocation of the defect insulation joints

• Ludmannsdorf TAG I Intake 36“ (exchange)
• Arnoldstein TAG II Intake 42“ (exchange)
• Arnoldstein TAG II Outtake 42“(relocation)

Project rationale:

The investment is necessary to ensure the reliability and safety in operation of the TAG Metering & Pigging Station Arnoldstein and Valve Station Ludmannsdorf.

Please note in particular:

Potential impact on availability of transportation capacity during the execution: YES

Connection to other projects:

None

Technical data:

There is no change in the existing technical transport capacities.

<table>
<tr><td colspan="3">Economic data:
CNDP 2021: Planned investment cost XX € (Cost base 2021). The cost estimation is to be understood with an accuracy +/-15%.
CNDP 2022: Planned investment cost XX € (Cost base 2022). The cost estimation is to be understood with an accuracy +/-15%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2021: Planning phase
CNDP 2022: Planning phase</td></tr>
<tr><td>TYNDP: No</td><td>PCI status: No</td><td>CBCA decision: No</td></tr>
<tr><td colspan="3">Project modifications:
CNDP 2021: None
CNDP 2022: None</td></tr>
<tr><td colspan="3">Project status:
CNDP 2021: Submission for approval
CNDP 2022: Monitoring without amendments</td></tr>
</table>

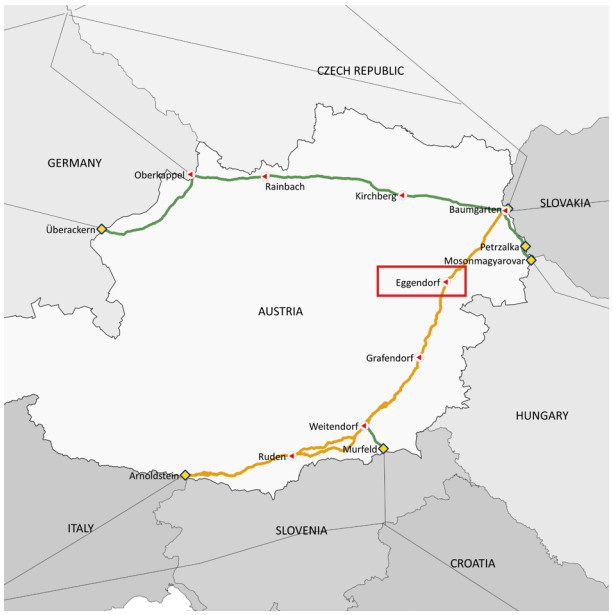
Project name:	**TAG 2021/R03 Substitution MKVI CS Eggendorf**		
Project number:	TAG 2021/R03		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	24.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2024		

Project objective:

The project objective is the replacement of the MKVI Compressor Control System of the EC100, EC200 and EC300 units in Eggendorf, as they reached the end of their lifecycle and maintenance is not supported, as well as spare parts are not available anymore.

The Control System of the units will be updated to the latest version (MKVIe) to maintain the operation reliability of the units and of the gas transportation.

Project description



The project takes place in the compressor station Eggendorf on the EC100, EC200 and EC300 units.

It is foreseen the replacement of the existing control panel MKVI SIMPLEX with a new Unit Control System (UCS) MKVIe including Mark*VIeS Safety System (SIL compliant).

All Fire & Gas protection system, alarming and discharge devices will be connected and managed by new MarkVIeS safety section.

Project rationale:

To ensure the reliability of the gas transport with the compressor station Eggendorf, the Compressor Control System has to be renewed due to the availability of spare parts, which are not available anymore and due to the reached end of life of the control system.

Please note in particular:

The exchange of the control system of the units will be done successively and not simultaneously that will ensure no impact on availability of transportation capacity during the execution.

Connection to other projects:

This project will be coordinated with the substitution of the MKVI Control System of the units W100, W200 and W300 in the compressor station Weitendorf to ensure synergies during the engineering phase. Realization in CS-Weitendorf will occur in 2023.		
Technical data: There is no change in the existing technical transport capacity after the realization of the project.		
Economic data: CNDP 2021: Total planned investment cost XX € (Cost base 2021). The cost estimation is to be understood with an accuracy of +/- 25%. CNDP 2022: Total planned investment cost XX € (Cost base 2021). The cost estimation is to be understood with an accuracy of +/- 25%.		
Capacity impact: No impact on availability of transportation capacity during the execution.		
Project phase: CNDP 2021: Contracting CNDP 2022: Planning Phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications: CNDP 2022: None		
Project status: CNDP 2021: Submission for approval CNDP 2022: Monitoring without amendments		

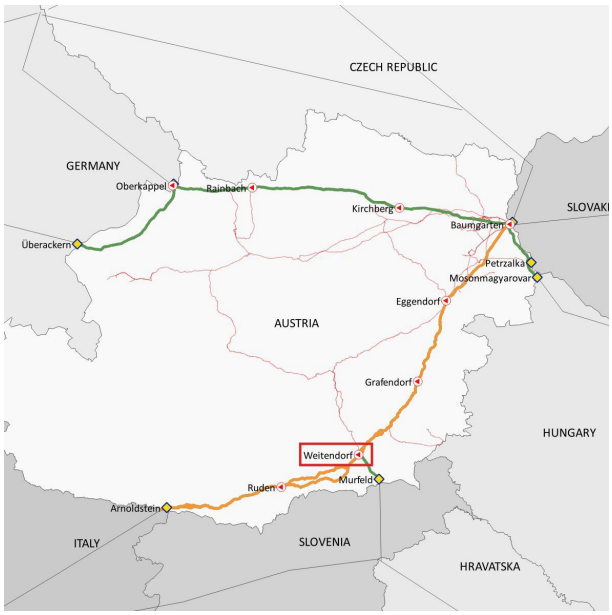
Project name:	**TAG 2021/R04 Substitution MKVI CS Weitendorf**		
Project number:	TAG 2021/R04		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	24.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2023		

Project objective:

The project objective is the replacement of the MKVI Compressor Control System of the WC100, WC200 and WC300 units in Weitendorf, as they reached the end of their lifecycle and maintenance is not supported, as well as spare parts are not available anymore.

The Control System of the units will be updated to the latest version (MKVIe) to maintain the operation reliability of the units and of the gas transportation.

Project description



The project takes place in the compressor station Eggendorf on the WC100, WC200 and WC300 units

It is foreseen the replacement of the existing control panel MKVI SIMPLEX with a new Unit Control System (UCS) MKVIe including Mark*VIeS Safety System (SIL compliant). In addition, the exhaust flapper control system has to be upgraded (WP-1)

All Fire & Gas protection system, alarming and discharge devices will be connected and managed by new MarkVIeS safety section.

Project rationale:

To ensure the reliability of the gas transport with the compressor station Weitendorf, the Compressor Control System has to be renewed due to the availability of spare parts, which are not available anymore and due to the reached end of life of the control system.

Please note in particular:

The exchange of the control system of the units will be done successively and not simultaneously that will ensure no impact on availability of transportation capacity during the execution.

Connection to other projects:

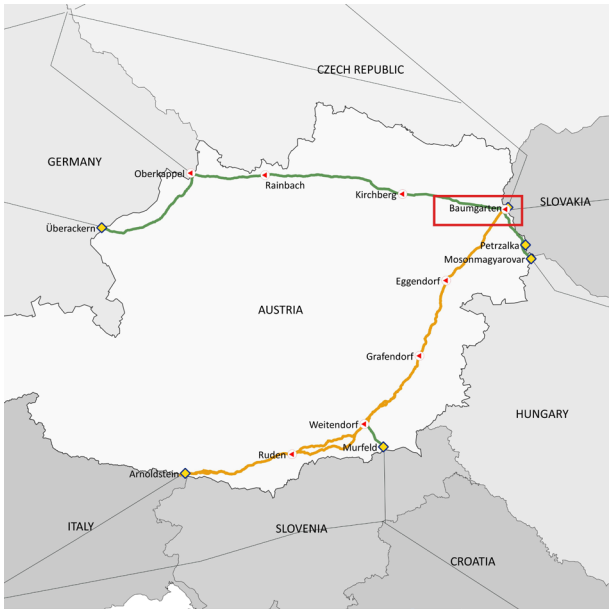
This project will be coordinate with the substitution of the MKVI Control System of the units E100, E200 and E300 in the compressor station Eggendorf to ensure synergies during the engineering phase.		
Technical data: There is no change in the existing technical transport capacity after the realization of the project.		
Economic data: CNDP 2021: Total planned investment cost XX (Cost base 2021). The cost estimation is to be understood with an accuracy of +/- 25%. CNDP 2022: Total planned investment cost XX (Cost base 2022). The cost estimation is to be understood with an accuracy of +/- 25%.		
Capacity impact: No impact on availability of transportation capacity during the execution.		
Project phase: CNDP 2021: Contracting CNDP 2021: Planningphase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications: CNDP 2022: None		
Project status: CNDP 2021: Submission for approval CNDP 2022: Monitoring without amendments		

Project name:	**TAG 2021/R06-A Upgrade of safety and control loops CS Baumgarten**		
Project number:	TAG 2021/R06-A		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	24.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2024		

Project objective:

The HAZOP and SIL assessment conducted during SCS project at the presence of technical certificators, and the preliminary ex-i loops calculations have shown several deficiencies in the field instrumentation, which lead to the necessity of replacing field instruments, cables and pushbuttons. In some cases also mechanical works are needed to install additional instruments on the pipe. Also instruments not directly involved in safety loops but reaching the age limit shall be upgraded to ensure correct interface with the new SCS and availability of spare parts.

Project description



- Replacing field instruments, cables and pushbuttons
- Mechanical works are needed to install additional instruments on the pipe
- Instruments not directly involved in safety loops but reaching the age limit shall be upgraded to ensure correct interface with the new SCS and availability of spare parts.
- The electrical cabinets feeding the new SCS are old and with limited capacity, therefore a replacement is also advisable. All auxiliary system (CEMS, F&G, low voltage, dehydration, etc.) shall be upgraded to ensure correct communication with the new SCS. General restoration of the control room is also needed. All documentation shall be updated reflecting the as-is situation.

Project rationale:

The investment is necessary to ensure the reliability and safety in operation of the TAG pipeline system.

Please note in particular:

Potential impact on availability of transportation capacity during the execution: Directly linked with the replacement of the Station Control System (SCS)

Connection to other projects:

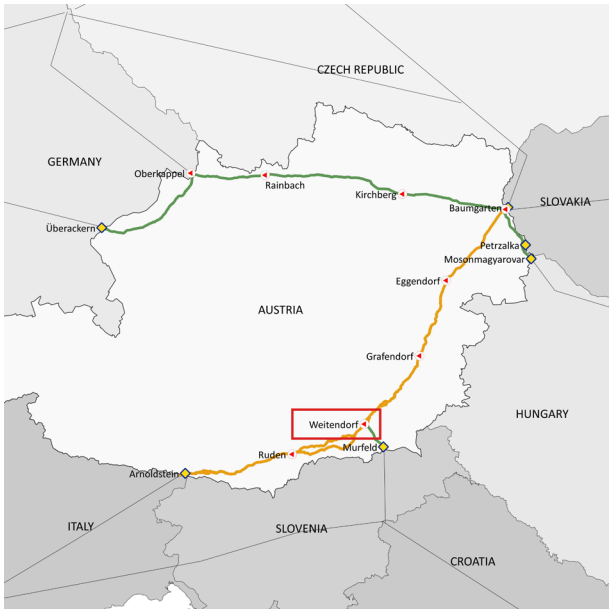
TAG 2016/R12 SCS Replacement CS-B-G-R,		
Technical data: There is no change in the existing technical transport capacities.		
Economic data: CNDP 2021: Planned investment cost XX € (Cost base 2021). The cost estimation is to be understood with an accuracy +/- 25%. CNDP 2022: Planned investment cost XX € (Cost base 2022). The cost estimation is to be understood with an accuracy +/- 25%.		
Capacity impact: None		
Project phase: CNDP 2021: Execution phase CNDP 2022: Engineering phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications: CNDP 2021: None CNDP 2022: Planned completion, economic data		
Project status: CNDP 2021: Submission for approval CNDP 2022: Submission for approval including amendments		

Project name:	**TAG 2022/R01 Exchange of Combustor WC100**		
Project number:	TAG 2022/R01		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2023		

Project objective:

The aim of the project is to replace the combustion chamber of the WC100 compressor unit as part of the "Hot Section Inspection" work.

Project description



After 25,000 running hours, the combustion chamber must be overhauled. Due to the high expected repair costs, it is more economical to replace the combustion chamber. This also reduces the throughput time for the hot section inspection and ensures that the compressor unit is ready for operation more quickly.

Project rationale:

The investment is to maintain and ensure reliable and safe operation of the TAG Pipeline System.

According to the manufacturer's specifications, the "Hot Section Inspection" must be performed every 25,000 operating hours.

Please note in particular:

Possible impact on availability of transport capacity during implementation: No

Connection to other projects:

None

Technical data:

There will be no operational or procedural changes and existing technical transport capacities.

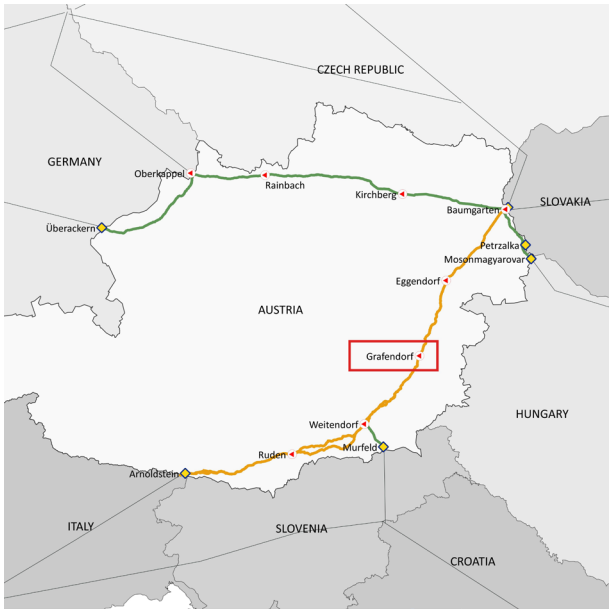
Economic data: CNDP 2022: Planned investment costs XX € (cost basis 2022). The cost estimate is understood with an accuracy of +/- 25%.		
Capacity impact: None		
Project phase: CNDP 2022: Planning phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications:		
Project status: CNDP 2022: Submission for approval		

Project name:	**TAG 2022/R02 Exchange of Fuel Metering Valves GC500**		
Project number:	TAG 2022/R02		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2024		

Project objective:

The aim of the project is to replace the fuel gas valves of the GC500 compressor unit.

Project description



The activities will be carried out in the "Gas Turbine Package". The existing fuel gas and pilot valves will be removed and replaced with new fuel gas valves. The existing isolation valves will also be replaced and piping will be modified as needed to allow the system to be connected to the gas turbine fuel manifolds.

Project rationale:

The investment is to maintain and ensure reliable and safe operation on the TAG pipeline system.

This project is being carried out to ensure the availability of spare parts (spare parts are no longer available for the valves currently installed and are no longer in production). Non-availability of these spare parts poses a risk of non-availability of the compressor unit, which could subsequently lead to a reduction in transport capacity. Failure to function properly may also result in increased emission levels.

Please note in particular:

Possible impact on availability of transport capacity during implementation: No

Connection to other projects:

None

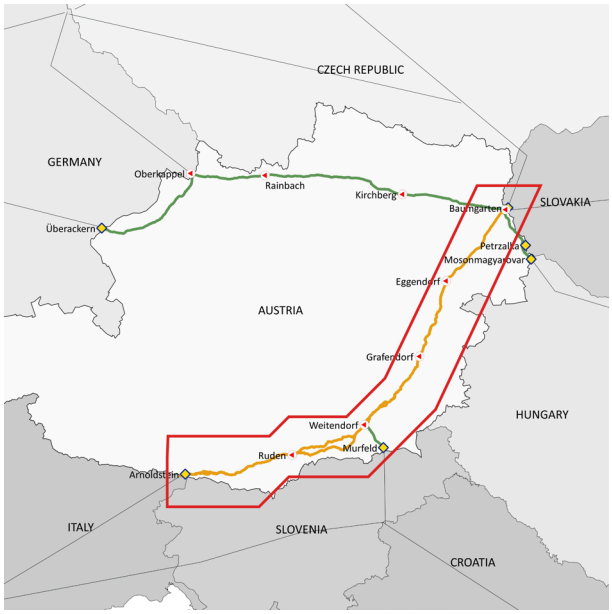
Technical data: There will be no operational or procedural changes and existing technical transport capacities.		
Economic data: CNDP 2022: Planned investment costs XX € (cost basis 2022). The cost estimate is understood with an accuracy of +/- 25%.		
Capacity impact: None		
Project phase: CNDP 2022: Planning phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications:		
Project status: CNDP 2022: Submission for approval		

Project name:	**TAG 2022/R03 Pipeline Integrity Section 1/2/3 Phase 1**		
Project number:	TAG 2022/R03		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2023		

Project objective:

The Pipeline Integrity project is divided into 2 phases. The first phase of the project will run until the end of 2023 and will identify any critical defects. The aim of the project is to use these as a basis for carrying out any necessary repairs and rehabilitation of the TAG pipelines in order to extend the service life.

Project description



The regular pigging and intensive measurement campaigns carried out by TAG in accordance with maintenance requirements provide important information on the condition of TAG pipelines. Based on this information and after an internal analysis, investment projects are defined to ensure the integrity of TAG pipelines by carrying out necessary repairs (for example, deformations, corrosion spots, insulation defects, etc.).

Project rationale:

The investment serves to maintain and ensure reliable and safe operation on the TAG pipeline system.

Please note in particular:

During the project, there may be potential impacts on transportation capacity.

Connection to other projects:

TAG 2023/R00 Pipeline Integrity Section 1/2/3 Phase 2

Technical data:

There will be no operational or procedural changes and existing technical transport capacities.

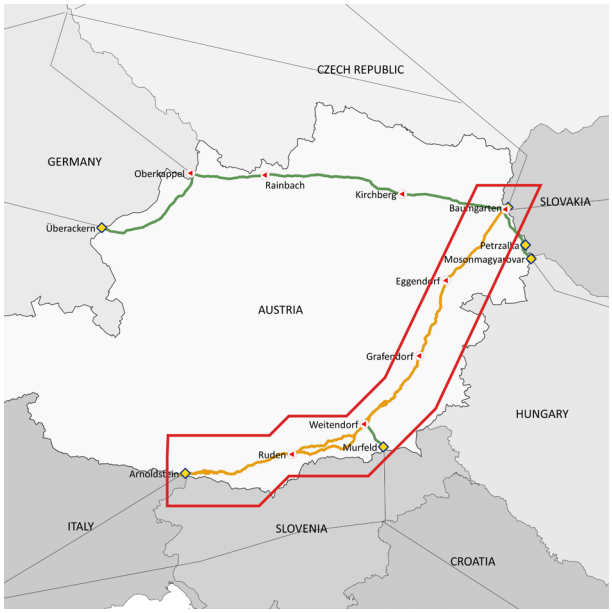
<table>
<tr><td colspan="3">Economic data:
CNDP 2022: Planned investment costs of XX € (cost basis 2022). The cost estimate is understood with an accuracy of +/- 50%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2022: Planning phase</td></tr>
<tr><td>TYNDP: No</td><td>PCI status: No</td><td>CBCA decision: No</td></tr>
<tr><td colspan="3">Project modifications:
-</td></tr>
<tr><td colspan="3">Project status:
CNDP 2022: Submission for approval</td></tr>
</table>

Project name:	**TAG 2022/R04 Pigging 2024**		
Project number:	TAG 2022/R04		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2024		

Project objective:

The objective of this activity is to subject the TAG natural gas pipeline system to cleaning and inspection pigging to determine integrity (pipe wall thickness, position and dimensional stability) in order to initiate further measures to ensure performance and operational capability, if necessary.

Project description



Cleaning and inspection of 19 natural gas pipeline sections including report preparation for further action.

Project rationale:

The execution of this inspection pigging is regulated and required by ÖVGW GB 310.

Please note in particular:

Capacity reduction of the TAG system during cleaning pigging is 50%.

Connection to other projects:

None

Technical data:

There will be no operational or procedural changes and existing technical transport capacities.

Economic data:

CNDP 2022: Planned investment costs XX € (cost basis 2022) from an internal cost estimate. The cost estimate is understood with an accuracy of +/- 50%.		
Capacity impact: None		
Project phase: CNDP 2022: Engineeringphase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications:		
Project status: CNDP 2022: Submission for approval		

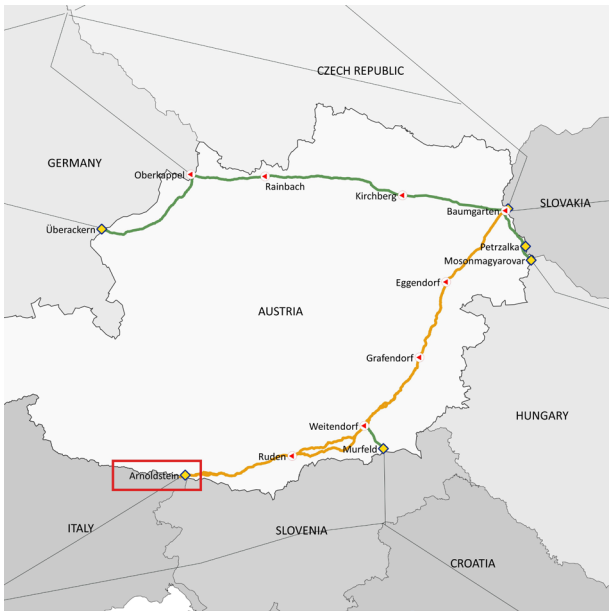
Project name:	**TAG 2022/R05 Automation Reverse Flow MS-A**		
Project number:	TAG 2022/R05		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2024		

Project objective:

The Arnoldstein metering station was converted in the course of the EU co-financed Reverse Flow project for the measurement of gas flows from Italy to Baumgarten.

The aim of this project is to automate the switching process in order to increase availability and operability as well as to be able to react quickly to the more frequent "reverse flow" operation.

Project description



Installation of valves and instruments, software programming

Project rationale:

The investment serves to maintain and ensure reliable and safe operation on the TAG pipeline system.

Please note in particular:

Possible impact on availability of transport capacity during implementation: No

Connection to other projects:

TAG 2016/01 TAG Reverse Flow Weitendorf/Eggendorf

Technical data:

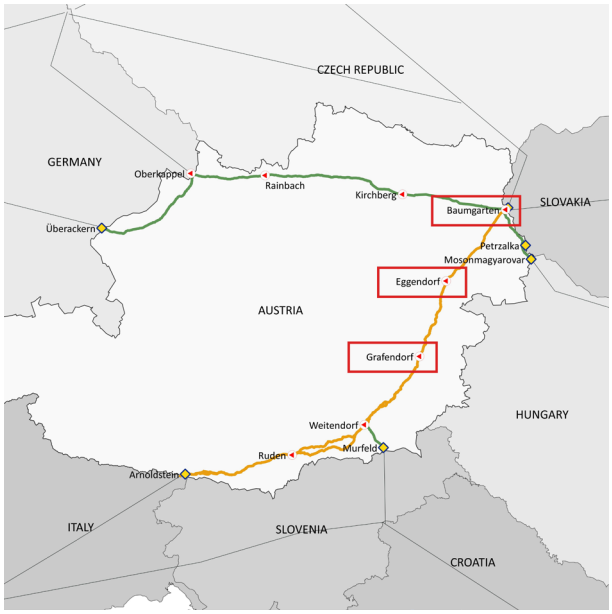
<table>
<tr><td colspan="3">There will be no operational or procedural changes and existing technical transport capacities.</td></tr>
<tr><td colspan="3">Economic data:
KNEP 2022: Planned XX € (cost basis 2022) from internal cost estimate. The cost estimate is understood with an accuracy of +/- 50%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2022: Engineering phase</td></tr>
<tr><td>TYNDP: No</td><td>PCI status: No</td><td>CBCA decision: No</td></tr>
<tr><td colspan="3">Project modifications:</td></tr>
<tr><td colspan="3">Project status:
CNDP 2022: Submission for approval</td></tr>
</table>

Project name:	**TAG 2022/R06 Installation of RC Snubbers at ELCO Transformers CS-B/E/G**		
Project number:	TAG 2022/R06		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	1	**Date:**	31.10.2022
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Economic test according to CAM NC:**	No
Planned completion:	Q4/2024		

Project objective:

It has been found that transient overvoltages occur when circuit breakers are opened. To eliminate the dielectric stresses on the transformers of ELCOs (CS-B/E/G), it is necessary to install the high voltage (HV) resistor capacitor (RC) snubber (filter) to minimize the risk of transport reduction due to damage to the ELCOs transformer.

Project description



Installation of RC Snubbers on the individual ELCOs transformers

Project rationale:

The investment serves to maintain and ensure reliable and safe operation on the TAG pipeline system.

Please note in particular:

Possible impact on availability of transport capacity during implementation: No

Connection to other projects:

None

Technical data:

There will be no operational or procedural changes and existing technical transport capacities.

Economic data: CNDP 2022: Planned investment costs XX € (cost basis 2022) from cost estimate by EPCM contractor. The cost estimate is understood with an accuracy of +/- 50%.		
Capacity impact: None		
Project phase: CNDP 2022: Engineering phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications:		
Project status: CNDP 2022: Submission for approval		

Appendix 2:

München, den 27.01.2023

Fristgerechte Einreichung einer Stellungnahme seitens *bayernets* zum „Koordinierten Netzentwicklungsplan 2022" sowie zur „Langfristigen und integrierten Planung 2022"

Stellungnahme zur Konsultation des Koordinierten Netzentwicklungsplan 2022

Sehr geehrte Damen und Herren,

wir möchten uns für die Möglichkeit bedanken, an der Konsultation zum KNEP 2022 sowie der Langfristigen und integrierten Planung 2022 teilzunehmen.

Zur Sicherstellung der Gasversorgung benachbarter Länder ist insbesondere durch die veränderte geopolitische Lage die enge Zusammenarbeit beim grenzüberschreitenden Gasaustausch sinnvoll und notwendig.

Wir sind der Meinung, dass zur Gestaltung der zukünftigen Energiewirtschaft, grüner Wasserstoff ein unerlässlicher Energieträger ist und zur Gewährleistung einer klimaneutralen Energieversorgung unabdingbar sein wird. Zum Aufbau der dafür nötigen Infrastruktur ist die Schaffung eines Regulierungsrahmens auf nationaler, als auch europäischer Ebene dringend nötig. Nur so können Planungen und Investitionen in die Bereitstellung eines Wasserstoffnetzes realisiert werden. Die Fernleitungsnetzbetreiber mit dem Gastransportnetz sind hierfür die ersten Ansprechpartner. Neben dem Neubau von Leitungen und Regelanlagen können bereits vorhandene Assets zur Umstellung von derzeit Erdgasleitungen auf Wasserstoffleitungen, die Schaffung eines überregionalen und grenzübergreifenden Wasserstoffnetzes sichern.

In Bayern werden bereits ab 2026 unter anderem im Chemiedreieck Burghausen Wasserstoffcluster entstehen. Die Bereitstellung von Wasserstoff hat für den Industriestandort Burghausen und dessen ambitionierten Ziele zur Dekarbonisierung einen entscheidenden Stellenwert. In den Datenabfragen zum TYNDP wurden grenzüberschreitende Wasserstoffkapazitäten für das Jahr 2030 in Höhe von bis zu 150 GWh/d am Grenzübergangspunkt Überackern gemeldet. Der Wasserstoffausspeisebedarf für Bayern liegt laut Wasserstoffbedarfsabfrage, welche im Rahmen des deutschen Netzentwicklungsplans Gas 2022-2032 durchgeführt wurde, im Jahr 2030 bei über 6 GWh/h.

Darüber hinaus hat die Forschungsstelle für Energiewirtschaft e. V. (kurz FfE) mit der Studie Trans4In den zukünftigen Wasserstoffbedarf im Industriecluster Burghausen untersucht. Hierin

wurden im Wasserstoffpfad ein Ausspeisebedarf in Höhe von mindestens 1,1 GWh/h festgestellt. Da der Wasserstoff überwiegend durch bestehende Gastransportsysteme der *bayernets* bereitgestellt wird, führt dies zu geringeren Ausbaukosten für die Energieinfrastruktur.

Zur Versorgung des Industrieraumes Burghausen mit Wasserstoff sind grenzüberschreitende Transportkapazitäten in Überackern/Burghausen unerlässlich. Da die Anbindung der großen Gasspeicher in Oberösterreich/Salzburger Land an das österreichische Ferngasnetz und der Grenzübergangspunkt Überackern über das Transportsystem Penta-West aus Gründen der Versorgungssicherheit erhalten bleiben müssen, ist eine zeitnahe Realisierung eines H2-Leitungssystems parallel der Penta-West zwingend erforderlich.

Des Weiteren nehmen Sie auf Seite 21 im KNEP22 Bezug auf die Neuerrichtung einer Verdichterstation in Überackern.

Diese Maßnahme wurde bereits in früheren Koordinierten Netzentwicklungsplänen unter der Projektnummer „GCA 2018/01" (KNEP20) aufgeführt, nach unserer Ansicht im KNEP21 sachgerecht nicht weiter berücksichtigt. Trotz des erheblichen Einflusses der geopolitischen Ereignisse auf die europäische Energieversorgung bzw. die damit verbundene Gasflussumkehr, sehen wir weiterhin die Errichtung einer Verdichterstation im Raum Überackern aus strömungsmechanischer Sicht als nicht erforderlich an. Eine ggf. erforderlichen Verdichtung von Gasmengen ist über die bestehende Verdichterstation in Haiming möglich.

Für weitere Fragen stehen wir Ihnen gerne zur Verfügung und wünschen Ihnen eine erfolgreiche Konsultation mit zahlreichen Rückmeldungen von allen Beteiligten.

Weitere Informationen unter anderem zur bayerischen Wasserstoffnetzplanung finden Sie unter https://www.bayernets.de/infrastruktur/wasserstoff/wasserstoff-fuer-bayern.

Mit freundlichen Grüßen

bayernets GmbH

ppa. Richard Unterseer

i. A. Daniel von Wachter

AGGM Austrian Gas Grid Management AG
Floridsdorfer Hauptstraße 1,
Peak Vienna
1210 Wien
per Email: netzplanung@aggm.at.

27.01.2023

OMV Energy

Stellungnahme zum Koordinierten Netzentwicklungsplan 2022

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Sowohl die langfristige Planung als auch der koordinierte Netzentwicklungsplan stehen in diesem Jahr unter dem besonderen Vorzeichen der sich durch den russischen Angriffskrieg ergebenden Gasmarktsituation. Der gemeinsamen Anstrengung der österreichischen Erdgasversorgungsunternehmen, der (Fern-) Leitungsnetzbetreiber, der Speicherbetreiber, der E-Control, der AGGM, des CEGH und der politischen Entscheidungsträger sowie dem konstruktiven Zusammenwirken dieser und vieler weiterer Stakeholder ist es zu verdanken, dass die leitungsgebundenen Energieträger Strom und Erdgas bislang unterbrechungsfrei von den jeweiligen Endabnehmern bezogen werden konnten.

Der Bereitschaft und Zuverlässigkeit der (Fern-) Leitungsnetz- und Speicherbetreiber ist es besonders zu verdanken, dass die bestehende Erdgasinfrastruktur ohne ungeplante Unterbrechungen betrieben werden konnte. Die teils gravierenden Änderungen der Importe und Gasflüsse in Österreich ließen sich vollumfänglich abbilden und die Versorgung als auch der Handel konnten zu jeder Zeit zuverlässig gewährleistet werden.

Die OMV hat und wird alles unternehmen, um weiterhin die Versorgung ihrer Kunden sicher und zuverlässig zu gewährleisten und wird dazu bestehende Infrastruktur im In- und Ausland nach den Prinzipien der Wirtschaftlichkeit und Zuverlässigkeit betreiben und nutzen. Die OMV, in ihrer Rolle als Speicherbetreiber, Lieferant, Netznutzer und Händler von Erdgas kümmert sich dabei um die Bevorratung, Beschaffung und Verteilung von OMV Equity Gas, LNG und aus weiteren diversen Beschaffungsquellen. Wie schon in der Vergangenheit möchten wir uns aktiv an den Diskussionen rund um den bedarfsgerechten und effizienten Netzaus- und Umbau beteiligen.

Neben dem akuten Bedarf der Diversifizierung von Gasquellen und Transportrouten sind wir davon überzeugt, dass ein rascher Aufbau einer Wasserstoffinfrastruktur notwendig ist, um die nationalen und internationalen Klimaziele zu erreichen.

DS DS

Mehr denn je ist es daher unerlässlich die beiden (noch) getrennten Themenfelder Versorgungssicherheit und Dekarbonisierung voranzutreiben. Der langfristigen Planung und dem koordinierten Netzentwicklungsplan 2022 gelingt dies gleichermaßen, wenngleich die Planungsannahmen für die Zukunft noch sehr unsicher sind.

Angesichts des Umfangs und der Komplexität der mit dem Netzentwicklungsplan einhergehenden Themen hätten wir uns eine längere Konsultationsfrist gewünscht und behalten uns daher vor, etwaige noch nicht oder nicht vollumfänglich in dieser Stellungnahme behandelte Themen nachzureichen.

Kapazitätsbedarfserhebung Fernleitung

Die Standard-Kapazitätsbedarfserhebung für neu zu schaffende Kapazitäten gemäß der Verordnung (EU) 2017/459 (NC CAM) bietet unter den aktuellen Rahmenbedingungen wie der zeitlichen Dringlichkeit, der einzelstaatlichen Betroffenheit der eingeschränkten Gasversorgung, der geografischen und wirtschaftlichen Unterschiede der europäischen Mitgliedstaaten und vielen weiteren Gesichtspunkten, aus unserer Sicht kein geeignetes Instrument mehr. Die zeitliche Abfolge der Marktabfrageschritte sowie die Bedingungen, unter welchen ein Kapazitätsbedarf befriedigt wird, sind äußerst starr und tragen zudem den Zielsetzungen der Dekarbonisierung keinerlei Rechnung. Wie auch im koordinierten Netzentwicklungsplan korrekt angemerkt, wird es von Seiten der Händler keinerlei langfristige Buchungen mehr geben, sofern sich die Bedingungen, unter welchen neu zu schaffende Transportkapazität vergeben werden, nicht gravierend ändern.

Seit Jahren fordert die OMV eine Berücksichtigung der sich maßgeblich ändernden Transportbedingungen in ihren bestehenden langfristigen Transportverträgen mit Fernleitungsnetzbetreibern. Anstelle von einseitigen Vertragsanpassungen ohne entsprechende Entschädigungen oder Vertragskündigungsoptionen werden, wie auch im KNEP angemerkt, Händler dazu gezwungen in den Verträgen zu „verharren".

Ohne die dringend notwendige Anpassung der österreichischen Netzregulierung und (der damit verbundenen) Bereitschaft der Fernleitungsnetzbetreiber für eine Ausgewogenheit des wirtschaftlichen Risikos zwischen Fernleitungsnetzbetreiber und Transportkunde zu sorgen, wird sich die Bereitschaft von Transportkunden bzw. Händlern, längerfristige Kapazitäten zu erwerben, auch nicht wieder einstellen.

Kein Transportkunde bzw. Händler wird für 15-20 Jahre oder länger Transportverträge für neu zu schaffende Kapazitäten für den ausschließlichen Erdgastransport abschließen, wenn unser Energieverbrauch in absehbarer Zukunft keine Treibhausgasemissionen mehr verursachen soll und Österreich bis 2040 (also in weniger als 17 Jahren) klimaneutral werden muss.

Wir fordern daher rasch alternative Kapazitätsvergabeverfahren zu entwickeln und umzusetzen die eine flexiblere Ausgestaltung der Verträge inklusive cross-commodity Nutzung über die Zeit, Verlagerungsrechten zu alternativen En/Ex Punkten erlauben und Änderungen wesentlicher wirtschaftlicher Umstände Rechnung tragen.

Anderenfalls bleibt hier nur als Alternative, die Finanzierung durch die öffentliche Hand ohne dahinerliegende Beurteilung und Bestätigung durch den Markt.

Übererlöse aus den jüngsten Auktionsaufschlägen sollten in den bedarfsgerechten Ausbau sowie in ein nachhaltiges (Re-)Sizing von konventioneller Erdgasinfrastruktur und gleichzeitigem Aufbau von Wasserstoffinfrastruktur fließen.

Wichtige Importrouten – neue Kapazitätsbedarfe

Wir begrüßen grundsätzlich die Bestrebungen der Gas Connect Austria die WAG weiter auszubauen und als Wasserstoffleitung für die Zukunft mitzudenken. Allerdings sehen wir aufgrund des jüngst vorgestellten Netzentwicklungsplans Gas der deutschen FNBs, dass eine Erhöhung der Transitkapazitäten aus Deutschland in Richtung Österreich nicht angedacht ist. Der deutsche Netzentwicklungsplan befindet sich aktuell zwar noch in Konsultation, aber derzeit sieht dieser kein Szenario einer Anhebung der direkten und frei zuordenbaren Kapazitäten aus den neuen LNG Einspeisequellen im Norden Deutschlands zu den Grenzübergangspunkten nach Österreich vor. Damit ist weder für den Ausspeisepunkt Oberkappel noch für Überackern mit einer Anhebung der festen und frei zuordenbaren Kapazitäten aus Deutschland zu rechnen.

Realistischer scheint hier wohl, dass die zusätzlichen LNG Mengen aus Norddeutschland über die bestehenden Pipelines der EUGAL und OPAL nach Tschechien und der Slowakei nach Zentral- und Osteuropa fließen werden.

Vor diesem Hintergrund scheint es uns aktuell – unter Berufung der eingangs genannter Unsicherheiten – sinnvoll die zwischen Entry Oberkappel und Entry Überackern bestehende Konkurrenzsituation dauerhaft zu eliminieren und den Ausbauplan dahingehend auszurichten.

Wie in Kapitel 6.3.5 des KNEP beschrieben, konnte schon jetzt durch Maßnahmen der GCA mit den vorgelagerten Netzbetreibern die WAG in West->Ost Richtung regelmäßig über die technisch ausgewiesene Kapazität betrieben werden. Dieses im Kalenderjahr 2022 beobachtete Level von zeitweise bis zu 13-14 GWh/h ist aus unserer Sicht dem besonderen Umstand geschuldet, dass kurzzeitige Supply-Diversifizierungsanstrengungen der Erdgasversorgungsunternehmen in Verbindung mit Speicherfüllstandsvorgaben in Österreich und umliegenden Ländern erfolgreich umgesetzt wurden.

Auch wenn mittelfristig nicht mit einer Entspannung der Lage gerechnet werden darf, so liegt es unseres Erachtens auf der Hand, dass sich dieses Transportlevel für die österreichisch-deutschen Kopplungspunkte in besondere Stresssituationen einstellen kann, aber dauerhaft nicht vom Markt nachgefragt und damit nicht gehalten werden wird. Aus dem Buchungsverhalten der Netznutzer seit Beginn der Energiekrise lässt sich aus heutiger Sicht kein langfristiger, über dieses Level hinausgehender Bedarf ableiten.

Wir unterstützen daher die geplanten Maßnahmen seitens GCA mit dem Projekt GCA 2022/01 WAG Teil-Loop, sehen aber gleichzeitig ein über dieses Projekt hinausgehendes Kapazitätsangebot vor dem Hintergrund der Effizienz und Sparsamkeit als kritisch.

Neben den oben genannten Überlegungen zur zukünftigen Dimensionierung und deren Abhängigkeiten an den österreichisch-deutschen Kopplungspunkten, möchte wir weiters die (Über-) Prüfung der angebotenen Kapazitätsprodukte anregen, und dabei konkret die kurzfristige Schaffung eines DZK Produkts für den Entry Punkt Oberkappel vorschlagen. Mit einer entsprechenden Zuordnungsauflage für die Ausspeisung ins österreichische Verteilergebiet könnte die Kapazität in das Angebot und die Vermarktung fester Kapazitäten aufgenommen werden, was wiederum die Planungssicherheit für Netznutzer mit entsprechendem Bedarf deutlich erhöht. Im Vergleich zum Status Quo, nämlich der Bereitstellung unterbrechbarer FZK, ergäbe sich somit für die Inlandsversorgung eine echte und planbare Kapazitätserhöhungs-Maßnahme bei gleichzeitigem Erhalt der für den Transit wichtigen festen FZK Kapazitäten.

Wasserstoffbedarfe und Projekte

Wir sind der Meinung, dass der vorliegende KNEP einen entscheidenden ersten Meilenstein auf dem Weg zur Etablierung eines Wasserstoffnetzes auf Fernleitungsebene in Österreich darstellt. Von größter Wichtigkeit ist für uns dabei eine ausreichende Planungssicherheit.

OMV hat sich zu den EU-Zielen zur Dekarbonisierung kommittiert, unterstützt diese und hat in diesem Zusammenhang folgende Ziele bis 2030 bekanntgeben:

- Reduktion der Scope-1- und Scope-2-Emissionen des OMV Konzerns um 30%
- Reduktion der Scope-3-Emissionen des OMV Konzerns um 20%
- Reduktion der CO2-Intensität der Energieversorgung des OMV Konzerns um 20%

Erneuerbarem Wasserstoff wird für die Erreichung der Dekarbonisierungsziele der EU und speziell der OMV eine entscheidende Rolle zukommen. Aus diesem Grund rechnen wir auf nationaler und insbesondere auf internationaler Ebene mit einem, dem stark steigenden Bedarf folgenden Angebot von nachhaltigem Wasserstoff.

In diesem Zusammenhang wird die erfolgreiche und vor allem rasche Realisierung von H2 Importmöglichkeiten entscheidend zur Attraktivität des Wirtschaftsstandorts Österreich beitragen. In erster Linie jedoch werden solche Möglichkeiten über die zukünftige Wettbewerbsfähigkeit der österreichischen Industrie entscheiden.

Zur Sicherstellung der H2 Importmöglichkeiten ist unter anderem eine Einbindung der Fernleitungsnetzbetreiber der angrenzenden Länder nicht nur zielführend, sondern entscheidend. Für die geplante Umstellung von Methan auf Wasserstoff und der Etablierung dieses zukünftigen Energieträgers bedarf es der Einbindung und der gemeinsamen Kraftanstrengung aller involvierten Parteien. Ein Hochlauf der österreichischen Wasserstoffwirtschaft von der Erzeugung über den Transport bis hin zum Verbrauch kann nur gelingen, wenn die einzelnen Wertschöpfungsstufen, für ihre Investitionsentscheidungen, Planungssicherheit über die gesamte Wertschöpfungskette haben.

Der äußerst knappe Zeithorizont zur Erreichung der ambitionierten Klimaziele macht darüber hinaus ein rasches und entschlossenes Handeln erforderlich.

Daher begrüßen wir als OMV die Berücksichtigung von Projekten zur Entwicklung eines Wasserstoffnetzes auf Fernleitungsebene im Koordinierten Netzentwicklungsplans 2022 und unterstützen die zeitnahe Umsetzung der dafür notwendigen Netzausbauten.

Für Fragen und weiterführende Diskussion zu den oben genannten Punkten stehen Ihnen Herr Andreas Holler (andreas.holler@omv.com; +43 664 6121774) und Herr Jörg Weissgerber (joerg.weissgerber@omv.com; +43 6646103845) jederzeit gerne zu Verfügung.

Mit freundlichen Grüßen

DocuSigned by:
Erich Holzer
FD9632454054BF...

Erich Holzer

Senior Vice President - OMV Energy

DS DS

Bayerisches Staatsministerium für
Wirtschaft, Landesentwicklung und Energie
Amtschefin

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per E-Mail

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Ihr Zeichen
Ihre Nachricht vom

Bitte bei Antwort angeben
Unser Zeichen, Unsere Nachricht vom
StMWi-85-8220/323/1

München,
27.01.2023

Stellungnahme zur Konsultation des Koordinierten Netzentwicklungsplans 2022

Sehr geehrte Damen und Herren,

gerne nutzen wir im Rahmen der Konsultation des Koordinierten Netzentwicklungsplans 2022 die Möglichkeit zur Stellungnahme.

Im Zuge der neuen geopolitischen Rahmenbedingungen stehen wir in Europa vor großen Herausforderungen und müssen tiefgreifende energiewirtschaftliche Anpassungen vornehmen. Diese betreffen wegen der notwendigen Diversifizierung der Energielieferanten und der Umstellung auf klimaneutralen Wasserstoff ganz wesentlich auch die Gasnetze. Dem Freistaat Bayern ist aufgrund der mit dem Nachbarland eng verbundenen Energieinfrastruktur besonders daran gelegen, auch in Zukunft eine verlässliche Energieversorgung sicherstellen zu können. Dafür bauen wir auf die bewährte und gute Zusammenarbeit mit allen Partnern.

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Was den Aufbau eines Wasserstoffnetzes betrifft, so streben wir den Anschluss Bayerns an das deutsche und europäische Netz bis spätestens 2030 an und setzen hier neben der Versorgung aus Norddeutschland auch auf die Anbindung aus Süd- und Südosteuropa über Österreich. Die Gasfernleitungsnetzbetreiber in Bayern haben im Dezember 2022 im Rahmen der Transeuropäischen Energienetze ihre Vorhaben für Wasserstoff als Projects of Common Interest eingereicht, die wir ausdrücklich begrüßen und unterstützen.

Letztlich kommt es darauf an, die grenzüberschreitend geplanten Wasserstoffleitungen zwischen Bayern/Deutschland und Österreich gut abzustimmen und gemeinsam rasch die benötigen Transportkapazitäten zu schaffen. Dies ist besonders wichtig und dringlich, weil die Unternehmen an den südbayerischen Chemie- und Raffineriestandorten Burghausen und Ingolstadt große Wasserstoffbedarfe angekündigt haben, um die Dekarbonisierung ihrer Produktion auf den Weg zu bringen. Dies bestätigt auch die vor kurzem von der Forschungsstelle für Energiewirtschaft e. V. vorgestellte Studie Trans4In zum zukünftigen Energiebedarf und seiner Bereitstellung im Industriecluster Burghausen.

Insofern begrüßen wir die im KNEP 2022 vorgesehenen Maßnahmen zum Aufbau einer Wasserstoffinfrastruktur, die insbesondere die Leitungssysteme der Trans Austria Gasleitung – TAG, der West-Austria-Gasleitung – WAG sowie der Penta-West und den damit verbundenen Grenzübergangspunkt Überackern betreffen. Grenzüberschreitende Kapazitäten zwischen Österreich und Bayern sind unerlässlich.

Mit freundlichen Grüßen

Jarothe Sabine

Dr. Sabine Jarothe
Ministerialdirektorin

Linz, am 27.01.2023

Stellungnahme von Borealis Arolinz Melamine GmbH zur Langfristigen und integrierten Planung 2023 (LFiP 2023) und zum Koordinierten Netzentwicklungsplan KNEP 2023

BOREALIS AGROLINZ MELAMINE GMBH bedankt sich für die Möglichkeit, zu den vorgelegten Planungsdokumenten im Bereich der Gas-Verteilnetzinfrastruktur (LFiP) sowie der Gasfernleitungsinfrastruktur (KNEP) 2023 Stellung nehmen zu können.

BOREALIS AGROLINZ MELAMINE GMBH beschäftigt und engagiert sich intensiv im Bereich grüner Wasserstoff. Aufgrund der Tatsache, dass heimisch erzeugbare Wasserstoffmengen den hohen Industriebedarf nicht kosteneffizient decken werden können, müssen Importrouten für den Import von grünem Wasserstoff aus Drittstaaten erschlossen werden. Die Entwicklung einer dezidierten Leitungs-Infrastruktur für Wasserstoff ist daher von essenzieller Bedeutung.

Es ist begrüßenswert, dass der Hochlauf der Wasserstoffwirtschaft und die damit verbundenen umfassenden Anforderungen an die Leitungsinfrastruktur in der LFiP 2023 sowie dem KNEP eine erstmals bedeutende Rolle spielen.

Die Entwicklung der Wasserstoff-Wirtschaft kann nur durch einen synchronisierten Hochlauf der gesamten Wasserstoff-Wertschöpfungskette von der Erzeugung über den Transport bis hin zum Verbrauch gelingen. Die einzelnen Wertschöpfungsstufen sind eng miteinander verwoben und bedingen sich gegenseitig - für Investitionsentscheidungen in einer Wertschöpfungsstufe ist Planungssicherheit in anderen Stufen der Wertschöpfungskette Grundvoraussetzung.

Um unseren Unternehmensstandort zukünftig mit Wasserstoff versorgen zu können, werden auch frühzeitige Planungen von dezidierten Leitungen im Verteilnetzgebiet benötigt wie sie in der Langfristigen und integrierten Planung (LFiP) dargestellt wurden. Auch die Umsetzung des Projekts „H2Collector Ost" ist ein wichtiger Schritt, da es als Vorzeigeprojekt eine Blaupause für die zukünftige Versorgung von anderen Industriestandorten mit grünem Wasserstoff dienen kann.

Die im Koordinierten Netzentwicklungsplan (KNEP) präsentierten Projekte von Gas Connect Austria und Trans Gas Austria werden von BOREALIS AGROLINZ MELAMINE GMBH ausdrücklich begrüßt. Die Schaffung der entsprechenden Rahmenbedingungen zur Realisierung ist aus Sicht von BOREALIS AGROLINZ MELAMINE GMBH prioritär für den Wirtschafts- und Industriestandort Österreich. Die geographische Lage Österreichs als Binnenland in Zentrum Europas ist im Hinblick auf den geplanten Import von grünem Wasserstoff eine große Herausforderung. Es ist essenziell, dass das österreichische Fernleitungsnetz rasch an die entstehende Wasserstoff-Leitungsinfrastruktur angebunden wird, um die Wasserstoffversorgung der Industrie langfristig zu gewährleisten und Standort- sowie Wettbewerbsnachteile zu vermeiden.

Es wird einer umfassenden und gemeinsamen Kraftanstrengung von Politik, Regulatoren und Unternehmen bedürfen, um die Synchronisierung des Hochlaufs der Wasserstoff-Import-Wertschöpfungskette über Länder- bzw. Kontinentalgrenzen entsprechend zu gewährleisten. Die Integration von entsprechenden Projekten im KNEP und LFiP wird daher von BOREALIS AGROLINZ MELAMINE GMBH als wichtigen Schritt angesehen.

Freundliche Grüße

R. Schlesinger

DI Dr. Robert Schlesinger
Borealis Agrolinz Melamine GmbH

2/2

Sensitivity: Internal

CEGH
Central European Gas Hub AG

Austrian Gas Grid Management AG
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Per-Mail: netzplanung@aggm.at

Wien, 24. Jänner 2023

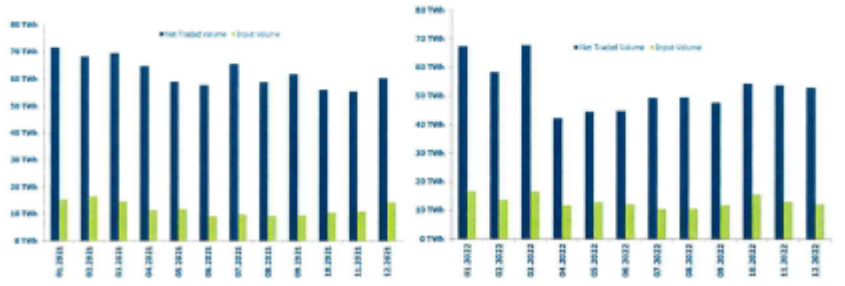
Stellungnahme zu KNEP und LFP

Sehr geehrte Damen und Herren,

Wir nehmen Bezug auf die derzeit laufenden Konsultationen zum Koordinierten Netzentwicklungsplan 2022 (KNEP) und der Langfristigen integrierten Planung 2022 (LFP) und geben dazu folgende Stellungnahme ab:

Central European Gas Hub AG (CEGH) begrüßt und befürwortet die vorliegenden Berichte des KNEP und der LFP, welche aus unserer Sicht die gegebenen Zielsetzungen sehr zufriedenstellend erfüllen. Insbesondere ist die Aufnahme eines Kapazitätsszenarios mit diversifizierten Versorgungsrouten wichtig, um vor dem Hintergrund des Krieges Russlands gegen die Ukraine auch zukünftig die Gasversorgung Österreichs in ausreichendem Maß zu gewährleisten. Darüber hinaus ist die Berücksichtigung von Maßnahmen zum Ausbau von Wasserstoff- und Biogas-Infrastruktur ein wichtiger Schritt zur Erreichung der Klimaneutralität Österreichs sowie der nationalen und europäischen Klimaziele.

Das Jahr 2022 hat aus gaswirtschaftlicher Sicht in vielen Bereichen besondere Herausforderungen mit sich gebracht, welche sich auch auf die Tätigkeit von CEGH als Betreiber des Virtuellen Handelspunktes (VHP) ausgewirkt haben. Insbesondere die verminderten Gasanlieferungen aus Russland haben sich auf die am österreichischen VHP übergebenen Mengen ausgewirkt.



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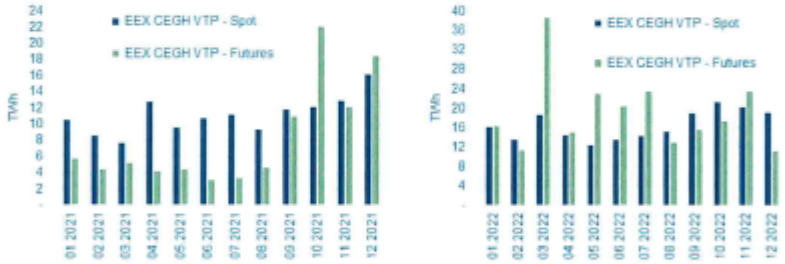
CEGH
Central European Gas Hub AG

Seit April 2022 ist es aufgrund der reduzierten Gasflüsse über die Slowakei zu einer Reduktion der VHP-Handelsvolumen und der Churn-Rate gekommen. Die Reduktion des VHP-Volumens ist dabei auch auf einen verminderten Gastransit via die TAG-Pipeline nach Italien zurückzuführen. Positiv ist allerdings zu vermerken, dass die Anzahl der am CEGH aktiv tätigen Unternehmen im Jahr 2022 im Wesentlichen stabil geblieben und die Mitgliederanzahl deutlich gestiegen ist.

Aufgrund des hohen Gaspreisniveaus in Österreich und auch auf allen anderen europäischen Handelsplätzen und der damit verbundenen Problematik der adäquaten Risikoabsicherung von Transaktionen ist es zu einem spürbaren Rückgang des Over-the-Counter (OTC) Handels gekommen. Handelsteilnehmer sind daher dazu übergegangen, ihren kurzfristigen Gasbedarf vermehrt über EEX CEGH Gasbörseprodukte zu decken. Durch das damit verbundene Clearing der Transaktionen über eine zentrale Gegenpartei (ECC AG) konnte das Ausfallsrisiko minimiert und der Handel aufrechterhalten werden.



Der EEX CEGH Spotmarkt konnte im Jahr 2022 eine Steigerung von über 50 Prozent im Vergleich zum Vorjahreszeitraum verzeichnen; am EEX CEGH Futuresmarkt konnte im Wesentlichen das Niveau des Vorjahres gehalten werden.

In Hinblick auf die Notwendigkeit der Dekarbonisierung des Energiesystems hat CEGH im Jahr 2022 erste konkrete Maßnahmen gesetzt:

- Die neu entwickelte und erfolgreich gestartete CEGH GreenGas Plattform ermöglicht erstmals in Europa den plattformbasierten Handel von Biomethan und Grüngas-Herkunftsnachweisen.

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CEGH
Central European Gas Hub AG

- Außerdem veröffentlicht CEGH seit Anfang Dezember 2022 den CEGH Green Hydrogen Index, der die Produktionskosten von grünem Wasserstoff in Österreich abbildet und als Preisreferenz für Österreich und Zentraleuropa dienen soll. Die österreichische Wasserstoffstrategie sieht bis 2030 den Aufbau einer Elektrolysekapazität von 1 Gigawatt (GW) vor. Dies kann nur durch den Aufbau einer entsprechenden Produktions-, Transport- und Handelsinfrastruktur erreicht werden, wofür Preissignale wie die des CEGH Green Hydrogen Index eine unerlässliche Voraussetzung sind.

CEGH unterstützt daher den vorliegenden KNEP und die LFP, insbesondere in Hinblick auf den zeitgerechten und adäquaten Aufbau einer Infrastruktur für Biomethan- und Wasserstofftransport in Österreich.

Gottfried Steiner
(CEO)

ppa.
Frederick Bernthaler
(Prokurist)

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Awetisjan Vartan

Von: [redacted]
Gesendet: Donnerstag, 26. Januar 2023 16:52
An: AGGM | Netzplanung
Betreff: Stellungnahme Flughafen Wien zu H2-Infrastrukturpläne

Sehr geehrte Damen und Herren,

Die Flughafen Wien AG als bedeutendes Verkehrs-Infrastrukturunternehmen in Österreich und in Europa befürwortet den raschen Ausbau der Wasserstoff-Infrastruktur. Die Technologie hilft, den mittlerweile CO2-neutral betriebenen Flughafen Wien in seinen Bestrebungen, weiter zur Dekarbonisierung beizutragen und dies auch seinen Kunden zu ermöglichen.

Grüner Wasserstoff wird zudem wichtiger Bestandteil in der Luftfahrt und der Logistik im Fernverkehr als Treibstoff selbst bzw. als unbedingt notwendige Komponente zur Herstellung nachhaltiger Treibstoffe werden.

Wir unterstützen daher alle Aktivitäten, welche die Erforschung von Technologien und Anwendungen von grünem Wasserstoff, sowie insbesondere den raschen Ausbau der Versorgungsinfrastruktur, fördern und forcieren.

Mit freundlichen Grüßen,

Thomas Valentin
Immobilien- und Standortmanagement
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per Mail an: netzplanung@aggm.at

Wien, am 25.01.2023

Stellungnahme zur Langfristigen und integrierten Planung 2022 und des Koordinierten Netzentwicklungsplanes 2022

Sehr geehrte Damen und Herren!

Österreichs Gasversorgung ist nach wie vor stark von russischen Erdgas abhängig. In absoluten Zahlen bedeutet dies, dass im Zeitraum Jänner bis November 2022 rund 62 TWh russisches Pipelinegas in Österreich verbraucht bzw. eingespeichert wurden. Dies entspricht rund 2/3 des Jahresbedarfs an Gas.

Die Abhängigkeit von Russland konnte noch nicht in dem gewünschten Ausmaß reduziert werden. Hauptgrund dafür sind fehlende Investitionen in das österreichische Gasnetz und insbesondere in die vorgelagerten Netze in Deutschland und Italien. Vor allem eine Wiederbefüllung unserer heimischen Gasspeicher für den Winter 23/24 wird aufgrund dieser Versäumnisse ohne Gas aus Russland nicht möglich sein.

Die vom BMK kommunizierten Zahlen, dass Österreich nur mehr zu 23% (Oktober 2022) von russischem Erdgas abhängig sei, stellen eine punktuelle Betrachtung der Gasflüsse nach Österreich in einem Monat dar. Sie berücksichtigen nicht, dass das Gas in unseren Speichern zu einem großen Teil aus Russland stammt und auch aus Deutschland importierte LNG-Mengen teils russischer Herkunft sind.

Für mehr Unabhängigkeit von russischem Gas braucht Österreich daher Investitionen in die Gas-Infrastruktur, um Gastransportflüsse aus nicht-russischen Quellen zu gewährleisten und die heimische Produktion von Grünem Gas zu erhöhen. Hierbei ist auch Bedacht darauf zu nehmen, dass diese notwendigen Infrastrukturen zukunftssicher und daher wasserstofftauglich ausgelegt sein sollten.

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Entscheidend ist in diesem Zusammenhang aber vor allem eine entsprechende Energiestrategie auf europäischer Ebene. Nur mit einem abgestimmten Ausbau der Gasinfrastruktur auch in vorgelagerten, ausländischen Netzen (insbesondere in Deutschland und Italien) sind Investitionen in Österreich wirklich sinnvoll. Österreich sollte sich mit aller Kraft dafür einsetzen, um hier länderübergreifende Lösungen zu finden.

Die zur Konsultation aufliegende **langfristige und integrierte Planung 2022 (LFiP)** und der **koordinierte Netzentwicklungsplan 2022 (KNEP)** berücksichtigen die oben angeführten Punkte und **fördern insbesondere die Integration von erneuerbarem Wasserstoff in das Energiesystem** und stellen damit eine wesentliche **Voraussetzung für den raschen Aufbau einer funktionierenden Wasserstoffwirtschaft in Österreich dar. Diese Bestrebungen sind aus unserer Sicht zu begrüßen.**

Wir danken für die Möglichkeit der Stellungnahme, bitten um Berücksichtigung und stehen für weitere Fragen gerne zur Verfügung.

Freundliche Grüße

Mag. Michael Mock
Geschäftsführer

Seite 2

Stellungnahme von RHI Magnesita GmbH zur Langfristigen und integrierten Planung 2023 (LFiP 2023) und zum Koordinierten Netzentwicklungsplan KNEP 2023

RHI Magnesita GmbH bedankt sich für die Möglichkeit, zu den vorgelegten Planungsdokumenten im Bereich der Gas-Verteilnetzinfrastruktur (LFiP) sowie der Gasfernleitungsinfrastruktur (KNEP) 2023 Stellung nehmen zu können.

RHI Magnesita GmbH beschäftigt und engagiert sich intensiv im Bereich grüner Wasserstoff. Aufgrund der Tatsache, dass heimisch erzeugbare Wasserstoffmengen den hohen Industriebedarf nicht kosteneffizient decken werden können, müssen Importrouten für den Import von grünem Wasserstoff aus Drittstaaten erschlossen werden. Die Entwicklung einer dezidierten Leitungs-Infrastruktur für Wasserstoff ist daher von essenzieller Bedeutung.

Es ist begrüßenswert, dass der Hochlauf der Wasserstoffwirtschaft und die damit verbundenen umfassenden Anforderungen an die Leitungsinfrastruktur in der LFiP 2023 sowie dem KNEP eine erstmals bedeutende Rolle spielen.

Die Entwicklung der Wasserstoff-Wirtschaft kann nur durch einen synchronisierten Hochlauf der gesamten Wasserstoff-Wertschöpfungskette von der Erzeugung über den Transport bis hin zum Verbrauch gelingen. Die einzelnen Wertschöpfungsstufen sind eng miteinander verwoben und bedingen sich gegenseitig - für Investitionsentscheidungen in einer Wertschöpfungsstufe ist Planungssicherheit in anderen Stufen der Wertschöpfungskette Grundvoraussetzung.

Um unseren Unternehmensstandort(e) zukünftig mit Wasserstoff versorgen zu können, werden auch frühzeitige Planungen von dezidierten Leitungen im Verteilnetzgebiet benötigt wie sie in der Langfristigen und integrierten Planung (LFiP) dargestellt wurden. Auch die Umsetzung des Projekts „H2Collector Ost" ist ein wichtiger Schritt, da es als Vorzeigeprojekt eine Blaupause für die zukünftige Versorgung von anderen Industriestandorten mit grünem Wasserstoff dienen kann.

Die im Koordinierten Netzentwicklungsplan (KNEP) präsentierten Projekte von Gas Connect Austria und Trans Gas Austria werden von RHI Magnesita GmbH ausdrücklich begrüßt. Die Schaffung der entsprechenden Rahmenbedingungen zur Realisierung ist aus Sicht von RHI Magnesita GmbH prioritär für den Wirtschafts- und Industriestandort Österreich. Die geographische Lage Österreichs als Binnenland in Zentrum Europas ist im Hinblick auf den geplanten Import von grünem Wasserstoff eine große Herausforderung. Es ist essenziell, dass das österreichische Fernleitungsnetz rasch an die entstehende Wasserstoff-Leitungsinfrastruktur angebunden wird, um die Wasserstoffversorgung der Industrie langfristig zu gewährleisten und Standort- sowie Wettbewerbsnachteile zu vermeiden.

Es wird einer umfassenden und gemeinsamen Kraftanstrengung von Politik, Regulatoren und Unternehmen bedürfen, um die Synchronisierung des Hochlaufs der Wasserstoff-Import-Wertschöpfungskette über Länder- bzw. Kontinentalgrenzen entsprechend zu gewährleisten. Die Integration von entsprechenden Projekten im KNEP und LFiP wird daher von RHI Magnesita GmbH als wichtigen Schritt angesehen.

Verbund

Stellungnahme der VERBUND AG zur Langfristigen und integrierten Planung 2022 (LFiP 2022) und zum Koordinierten Netzentwicklungsplan 2022 (KNEP 2022)

VERBUND bedankt sich für die Möglichkeit, zu den vorgelegten Planungsdokumenten im Bereich der Gas-Verteilnetzinfrastruktur sowie der Gas-Fernleitungsinfrastruktur 2022 Stellung nehmen zu können.

Seit einigen Jahren beschäftigt sich VERBUND intensiv mit der Entwicklung von Projekten im Bereich grüner Wasserstoff. Ziel dieser Projekte ist es, den österreichischen Industriestandort in einem zukünftig klimaneutralen Europa mit grünem Wasserstoff zu versorgen und so einen substanziellen Beitrag zur Erreichung der österreichischen bzw. europäischen Klima- und Energieziele zu leisten. Die Wasserstoff-Aktivitäten des Konzerns verfolgen grundsätzlich zwei strategische Stoßrichtungen: Zum einen soll die Versorgung der heimischen Industrie über lokale Elektrolyseprojekte sichergestellt werden. Zum anderen – insbesondere auch aufgrund der Tatsache, dass die realistisch im Inland erzeugbaren Mengen den hohen Industriebedarf nicht werden decken können – sollen auch Importrouten für den Import von grünem Wasserstoff aus Drittstaaten erschlossen werden.

Im Zuge der LFiP wurde der zukünftige grundsätzliche Wasserstoffbedarf basierend auf Befragung der Netzbetreiber dargestellt. Es wird ein Bedarf von ca. 12 TWh im Jahr 2030 und 47 TWh im Jahre 2040 angegeben. VERBUND beschäftigt sich seit 2019 mit dem Thema des Wasserstoffbedarfs. Die konzerninternen Einschätzungen, basierend auf einer top-down und bottom up Abfrage unter Berücksichtigung regulatorischer Unsicherheiten, kommen im Hinblick auf den Bedarf im Jahre 2040/2050 zu ähnlichen Schlussfolgerungen.

Sowohl für die Entwicklung von lokalen Projekten als auch für den zukünftigen Wasserstoff-Import ist die rasche Etablierung einer dedizierten Leitungsinfrastruktur für Wasserstoff von essenzieller Bedeutung. Es ist begrüßenswert, dass der Hochlauf der Wasserstoffwirtschaft und die damit verbundenen umfassenden Anforderungen an die Leitungsinfrastruktur in der LFiP 2022 sowie dem KNEP 2022 eine bedeutende Rolle spielen.

Die Entwicklung der Wasserstoff-Wirtschaft kann nur durch einen synchronisierten Hochlauf der gesamten Wasserstoff-Wertschöpfungskette von der Erzeugung über den Transport bis hin zum Verbrauch gelingen. Die einzelnen Wertschöpfungsstufen sind eng miteinander verwoben und bedingen sich gegenseitig - für Investitionsentscheidungen in einer Wertschöpfungsstufe sind entsprechende Hochlaufentwicklungen bzw. zumindest Planungssicherheit in anderen Stufen Grundvoraussetzung. Für zukünftige Produzenten von grünem Wasserstoff ist insbesondere die rasche Entwicklung einer Wasserstoff-Infrastruktur essenziell, um die konkrete Upstream-Projektentwicklung vorantreiben zu können und Projekte auch zeitnah zu realisieren. Ohne entsprechende Leitungen kann der erzeugte Wasserstoff nicht zu den Abnehmern transportiert werden. Fehlt Planungssicherheit

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hinsichtlich des Transports des Wasserstoffs von der Erzeugung zu den Endkunden, können keine entsprechenden Abnahmeverträge abgeschlossen werden, wodurch wiederum erzeugungsseitige Investitionsentscheidungen verzögert werden. Der Hochlauf der gesamten Wertschöpfungskette kommt ins Stocken.

VERBUND begrüßt daher, dass in der LFiP für das Verteilnetz der H2 Collector Ost bereits mit detaillierten Variantenplanungen enthalten ist. Diese Leitung ist essenziell für die Realisierung des Projekts Pannonian Green Hydrogen (PanHy), das VERBUND gemeinsam mit der Burgenland Energie entwickelt. Es handelt sich dabei um die derzeit größte österreichische Elektrolyse-Anlage (60 MW in der ersten Ausbaustufe, 300 MW im Endausbau[1]), welche laut Plan bereits Ende 2026 in Betrieb gehen soll. In diesem Projekt wird jedoch auch die Problematik deutlich, dass Regionen mit guten Wasserstofferzeugungsbedingungen (wie z.B. das Nordburgenland mit hohen Winderträgen) nicht unbedingt auch jene Regionen sind, wo Wasserstoff benötigt wird (Industriezonen). Um einen zeitnahen Abtransport des grünen Wasserstoffs zu ermöglichen, wurde das Projekt „H2Collector Ost" ausgearbeitet. Dieses Vorzeigeprojekt plant Österreichs erste reine Wasserstoff-Leitung zur Verbindung von guten Elektrolyse-Standorten mit einem industriellen Verbrauchszentrum und ist somit Blueprint für die Umsetzung von kommerziellen Wasserstoff-Wertschöpfungsketten. Damit das Projekt PanHy in Realisierung gehen kann, braucht es eine Sicherheit, dass der produzierte grüne Wasserstoff abtransportiert werden kann. Daher ist die zeitnahe Entscheidung zu den regulatorischen Realisierungsoptionen für die Leitung dringend geboten, damit weitere Planungsschritte im Projekt PanHy in die Wege geleitet werden können

Um die prognostizierten Wasserstoff-Bedarfe decken zu können, sind neben lokaler Erzeugung in Österreich insbesondere Importe über bestehende und neue Pipelinesysteme erforderlich. Die im Koordinierten Netzentwicklungsplan (KNEP) präsentierten Projekte von Gas Connect Austria GmbH und Trans Austria Gasleitung GmbH werden von VERBUND ausdrücklich begrüßt. Die Schaffung der entsprechenden Rahmenbedingungen zur Realisierung ist aus Sicht von VERBUND von zentraler Bedeutung für den Wirtschaftsstandort Österreich. Die geographische Lage Österreichs als Binnenland in Zentrum Europas ist im Hinblick auf den geplanten Import von grünem Wasserstoff eine große Herausforderung, da andere Transportwege, wie beispielsweise der Seetransport und die Anlandung über große Häfen, nicht möglich ist. Es ist daher essenziell, dass das österreichische Fernleitungsnetz rasch an die entstehende europäische Wasserstoff-Leitungsinfrastruktur angebunden wird, um die Versorgung der österreichischen Industrie langfristig zu gewährleisten und Standortnachteile zu vermeiden. Durch die Schaffung grenzüberschreitender bidirektionaler Transportkapazitäten für Wasserstoff wird neben signifikanten Wasserstoff-Importmöglichkeiten für Österreich auch der Transit von beträchtlichen Mengen an Wasserstoff in umliegende Verbrauchsregionen, wie z.B. den

[1] Entspricht rund einem Drittel der Zielsetzung der österreichischen Wasserstoffstrategie.

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südbayerischen Raum, ermöglicht. Unter diesen Voraussetzungen kann sich Österreich als wichtige Wasserstoff-Drehscheibe in Zentraleuropa etablieren.

Die Entwicklungen der letzten Monate haben gezeigt, dass es für die Aufrechterhaltung der Versorgungssicherheit in Bezug auf Erdgas für die österreichische Volkswirtschaft essenziell ist, Importmöglichkeiten so rasch wie möglich zu flexibilisieren und zu diversifizieren. Allen voran schaffen ein Ausbau der WAG sowie die Auskreuzung der SOL am grenzquerenden Punkt Murfeld wichtige zusätzliche Kapazitäten, um die Bedarfe von Gas aus nicht-russischen Quellen, etwa LNG aus Nordwesteuropa und über Krk, zu decken. Zentral bei beiden Projekten (WAG-Loop und Entry Murfeld) ist zudem, dass sie wasserstofftauglich konzipiert werden und somit nicht nur zur kurzfristigen Erhöhung der Versorgungssicherheit mit Erdgas bzw. LNG beitragen, sondern auch in Kombination mit den im KNEP angeführten Wasserstoff-Projekten wesentliche Elemente für die Entstehung einer zukünftigen europäischen Wasserstoff-Infrastruktur darstellen. VERBUND begrüßt die Möglichkeit zur Verknüpfung von Erdgas- und Wasserstoffprojekten hin zu einer integrierten Netzplanung.

Wie oben in den Anmerkungen zur LFiP bereits beschrieben, ist auch im Hinblick auf den Import von grünem Wasserstoff das Vorhandensein einer Leitungsinfrastruktur die Grund-voraussetzung für den Hochlauf von Erzeugungskapazitäten. Es wird einer umfassenden und gemeinsamen Kraftanstrengung von Politik, Regulatoren und Unternehmen bedürfen, um die Synchronisierung des Hochlaufs der Import-Wertschöpfungskette über Länder- bzw. Kontinentalgrenzen entsprechend zu gewährleisten.

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Stellungnahme zum Entwurf des Koordinierten Netzentwicklungsplans für das Fernleitungsnetz

Sehr geehrter Herr Damen und Herren,

Wien Energie bedankt sich für die Möglichkeit zur Stellungnahme zum „Koordinierten Netzentwicklungsplan für das Fernleitungsnetz (KNEP)". Nachfolgend finden Sie unsere Positionen.

Nicht nur die demokratiepolitisch beschlossenen Klimaziele, sondern auch der vorherrschende Krieg Russlands gegen die Ukraine machen eine rasche Transformation des Energiesystems weg von fossilem Erdgas hin zu Wasserstoff unumgänglich. In diesem Zusammenhang ist unumstritten, dass Wasserstoffleitungen bzw. -netze auf kommunaler Ebene ein wichtiger Baustein dieser Wende sein werden, da diese notwendig sind, um die Dekarbonisierung energieintensiver Unternehmen zu ermöglichen. In der **Langfristigen und integrierten Planung für das Verteilernetz (LFiP)** und im **Koordinierten Netzentwicklungsplan für das Fernleitungsnetz (KNEP)** werden die notwendigen Ausbau- und Erhaltungsmaßnahmen für diese Gas- bzw. Wasserstoffinfrastrukturen nun festgelegt.

Aus diesem Grund begrüßt Wien Energie den vorgelegten Netzentwicklungsplan ausdrücklich. Insbesondere die Aufnahme der Projekte des „H2 Collector Ost für erneuerbares Gas" ist aus unserer Sicht äußerst positiv. Damit wird ein wichtiger Meilenstein für die zukünftige Gasinfrastruktur gesetzt und ermöglicht so die Deckung des langfristigen Bedarfs der energieintensiven Industrie bzw. der Kraftwerke der Region durch eine rasche Umsetzung der Projekte. Darüber hinaus wird so ein zeitnaher Zubau erneuerbarer Stromerzeugungskapazitäten sichergestellt, welche für die Sicherstellung der Netzstabilität von enormer Bedeutung sind.

Wir bitten um Berücksichtigung unserer Stellungnahme uns stehen bei Rückfragen jederzeit gerne zur Verfügung.

Mit freundlichen Grüßen,

Micha Gruber, MSc