2019 Coordinated Network Development Plan

for the Gas Transmission System Infrastructure in Austria

for the period from 2020 – 2029

Cover page photo: Gas station Baumgarten
Photo courtesy: Gas Connect Austria GmbH

Document History

Edition	Date	Changes
1	04 Oct 2019	Edition for the consultation by the market area manager

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- Appendix 1: Projects of the 2019 Coordinated Network Development Plan

1 Introduction

In accordance with the legislation in force since 21 November 2011, the market area manager is obliged to prepare a Coordinated Network Development Plan (hereinafter "CNDP") once a year in accordance with section 14 (1) (7) in conjunction with section 63 of the Austrian Gaswirtschaftsgesetz (Natural Gas Act, GWG) in line with the aims of section 63 (4) GWG.

Since the assumption of the duties of the market area manager (MAM) by 01 June 2017, due to the nomination by the transmission system operators Gas Connect Austria GmbH and Trans Austria Gasleitung GmbH (TAG GmbH) and the ensuing approval by the authority E-Control Austria (ECA), Austrian Gas Grid Management AG (AGGM) is within this role responsible for establishing the coordinated network development plan. Gas Connect Austria and TAG GmbH contribute to the Coordinated Network Development Plan by submitting their respective company-specific network development plan to the market area manager.

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 objectives of the coordinated network development plan are:

- Meeting the demand for capacities to supply consumers while considering emergency scenarios,
- 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

in the market area.

In drawing up 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 plan shall be taken into consideration.

1.2 Approach

Potential clients can submit their capacity requirements to the transmission system operators (TSOs) within a consistent and structured manner in the course of the process according the Network code on Capacity Allocation Mechanisms (NC CAM). Based on that process of 2017, the last submitted incremental capacitiy requests are the basis for the 2019 Coordinated Network Develoment Plan. See also Chapter 4.2. As a result, the market area manager (MAM) established

together with the TSOs the capacity scenario and coordinated it with E-Control Austria on 05 June 2019.

Based on this capacity scenario, the TSOs have developed projects in order to meet the submitted demand. Each TSO submitted their individual network contribution to the Austrian network development planning on 09 August 2019 to the MAM. Several meetings between the MAM and the TSOs took place from 22 March 2019 to 09 August 2019 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 Appendix 1.

The first edition of the 2019 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 (2019 CNDP edition 1) will take place from 7 October to 25 Oktober 2019. The consultation document will be published on the homepage of AGGM.

The 2019 CNDP edition 1 will be presented to the market participants during the Austrian Gas Infrastructre Day (AGID) on the 15 October 2019.

2 Description Market Area East

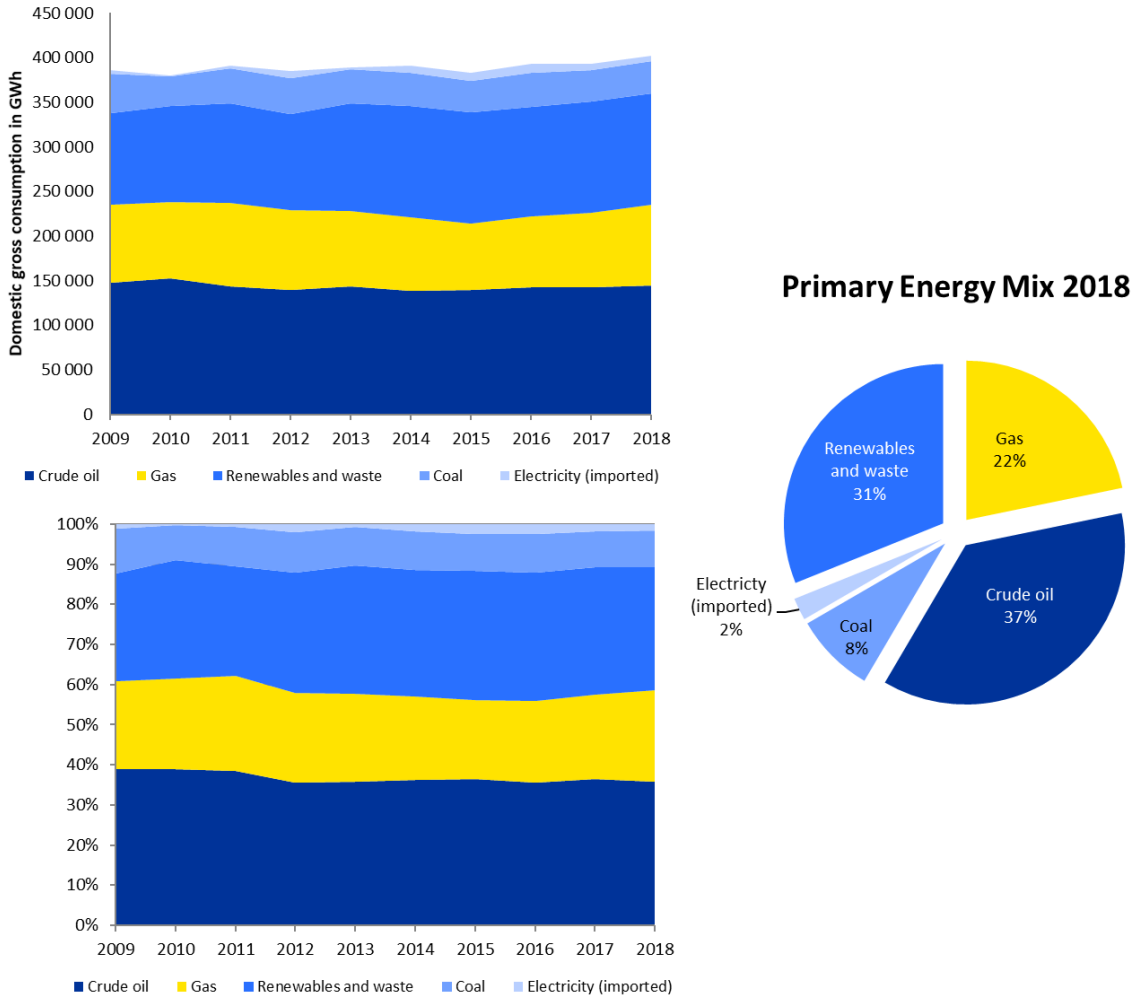
2.1 Consumption, Energy mix and Role of Gas in Austria

Gas has certain significance for the Austrian economy. Apart from the production, the infrastructure, respectively the gas hub in Baumgarten, the transport of gas as well as trading gas and the consumption play an important role.

Figure 1 shows that approximately 22% of the primary energy demand in Austria is covered by gas. This demand of 80-90 TWh per year, which remained constant over the last 10 years and consists of the following consumption contributors (see also Figure 2):

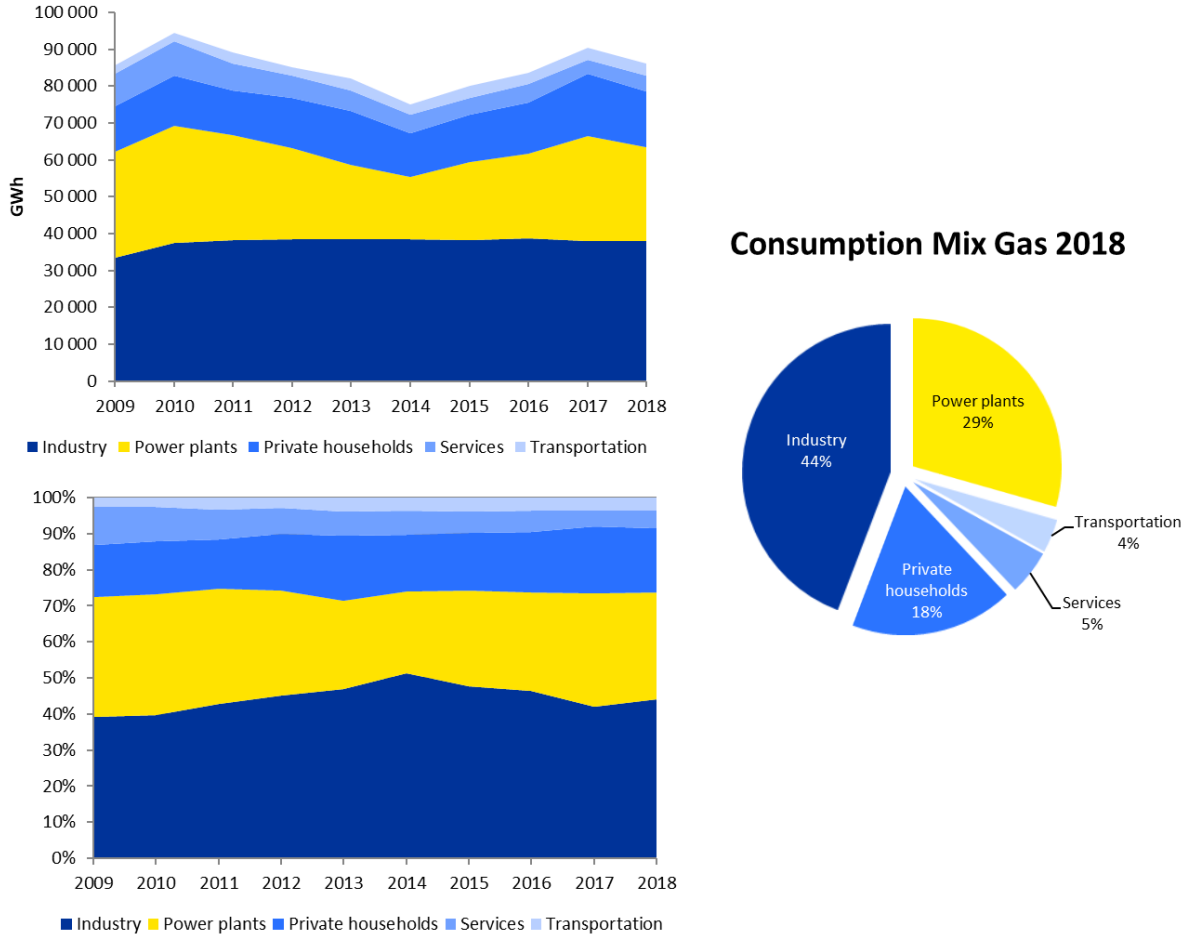
- Industry (production of goods, energy sector, non-energy consumption and agriculture)
- Private households
- Power plants for generation of electricity and heat
- Transportation
- Services

Figure 1: Primary energy mix of Austria



Source: Statistik Austria

Figure 2: Consumption mix gas of Austria

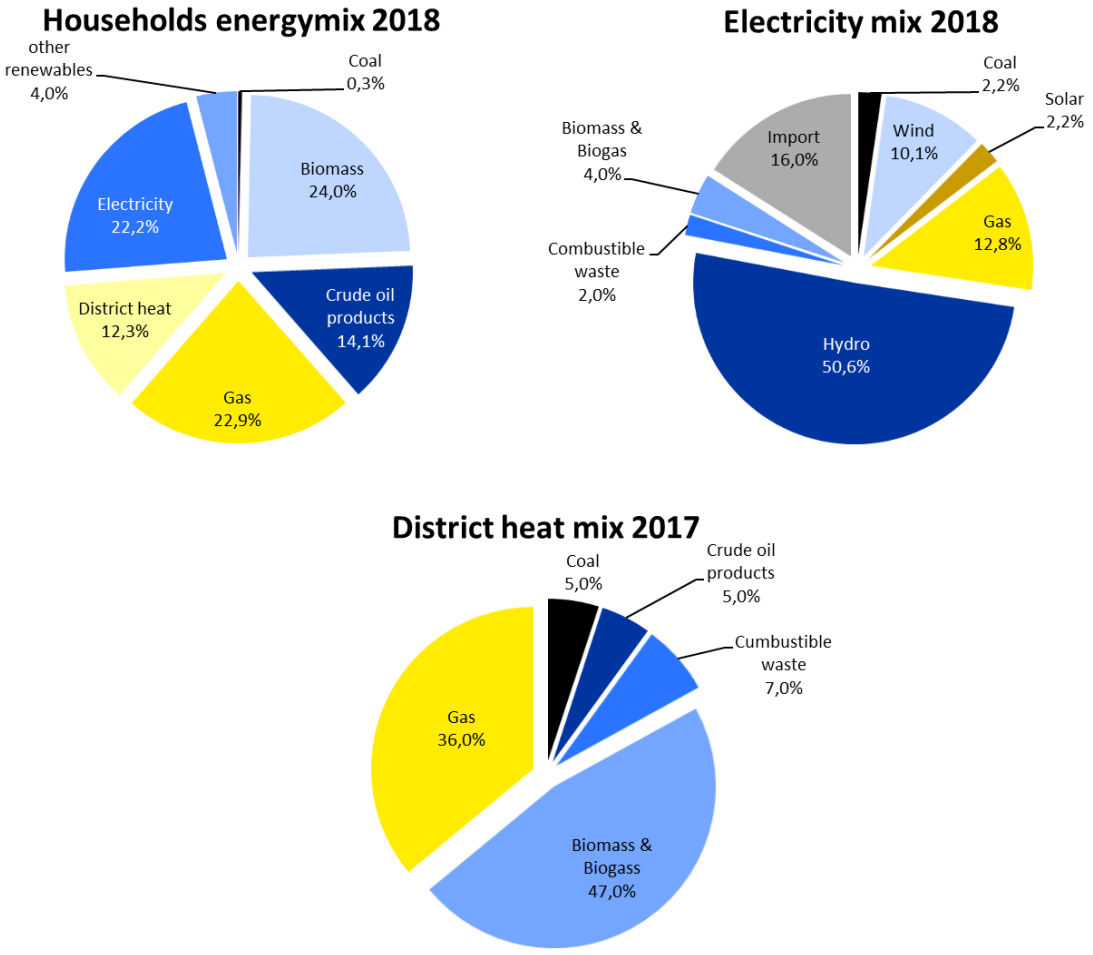


Source: Statistik Austria

In particular, the Austrian industry sector, having a constant consumption over the past 10 years, is the main consumer with a share of 44%. The power plants, including modern CHP-systems and heating plants had a slight recession in consumption between 2008 and 2014, followed by a steady increase, have a share of approx. 29%. The demand of private households also remains more or less constant with a share of approx. 18%.

Figure 3 shows that gas is an important part ofthe energymix of the Austrian households with a share of about 23%. Gas also plays an important role in the domestic electricity production with a share of about 13%, especially by the provision of flexible and quickly retrievable capacities for stabilization of the power grid. Besides biogenous resources, gas is with approx. 36% an essential resource for the generation of district heat in highly efficient CHP systems and heating plants in Austria.

Figure 3: **Energymix of households, electricity and district heating by production in Austria.**

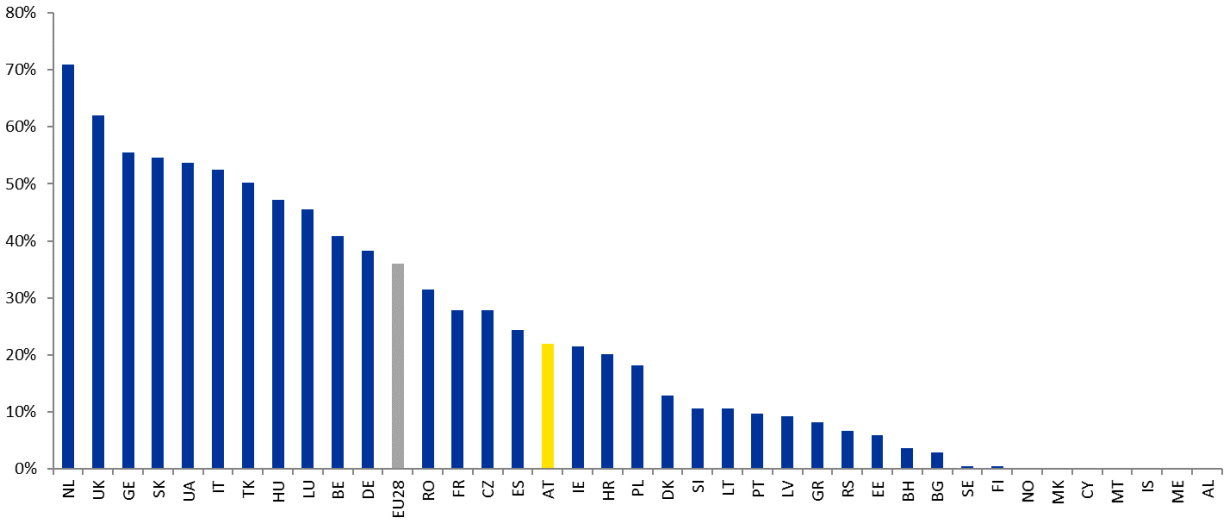


Source: Statistik Austria, APG, FGW

Considering a bigger picture and taking the EU28 countries into account, the gas share of 23% in the Austrian households is below average, as illustrated in Figure 4. Therefore, there is still potential to increase the share of gas in the household sector by substitution of oil-fired heating with gas heating for example. Additionally, the very low percentage of gas in the transportation sector offers a great potential to promote compressed gas (CNG) powered cars. In order to achieve all that, political incentives are necessary.

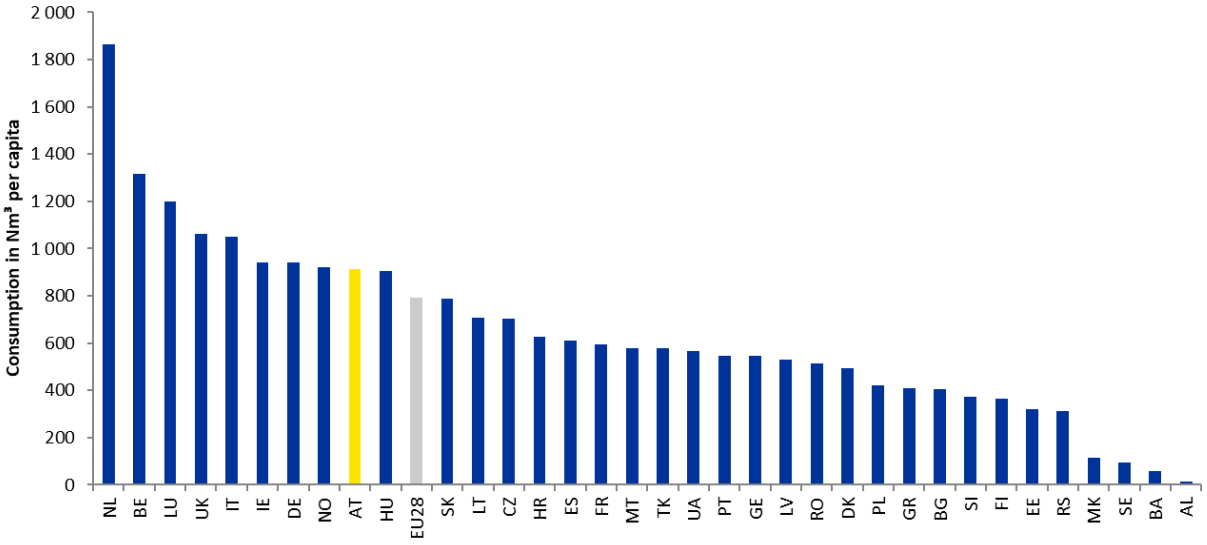
Considering the annual gas consumption per capita, Austria is slightly above average in the European Union, displayed in Figure 5.

Figure 4: Share of gas in private households in Austria and in the European context, 2017



Source: Eurostat

Figure 5: Annual consumption per capita in the European context, 2017

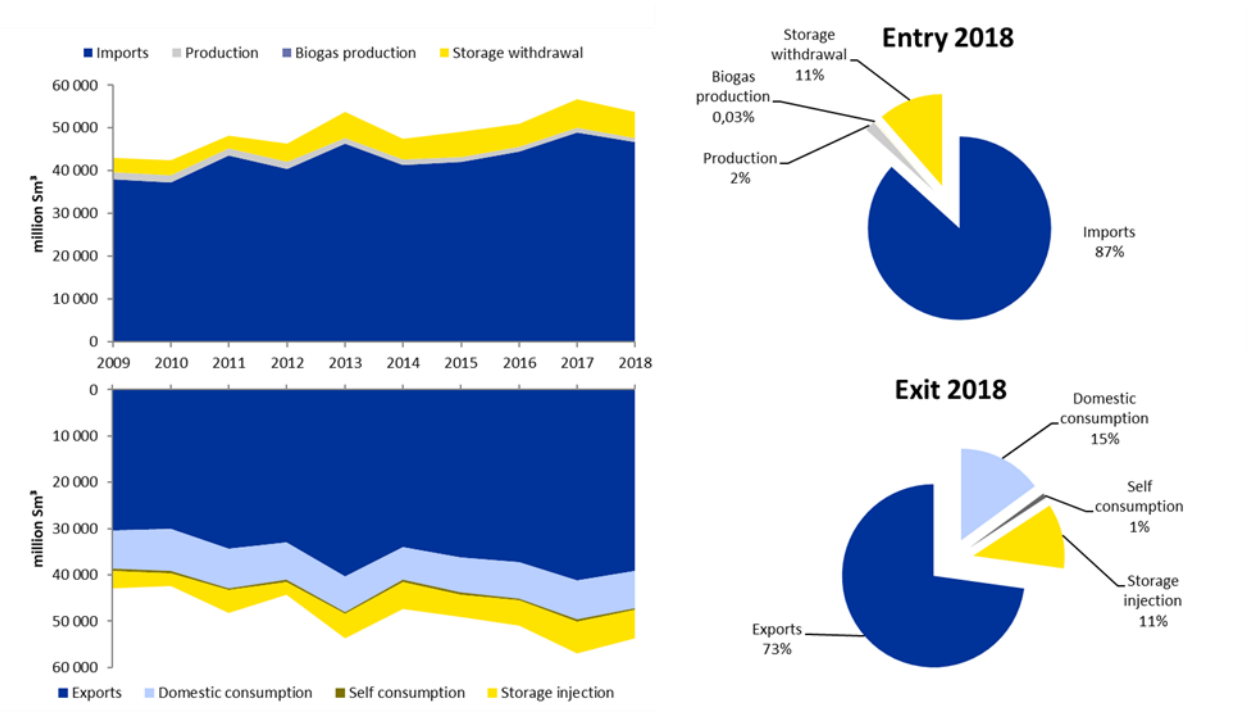


Source: Eurostat

2.2 Gas transportation in Austria

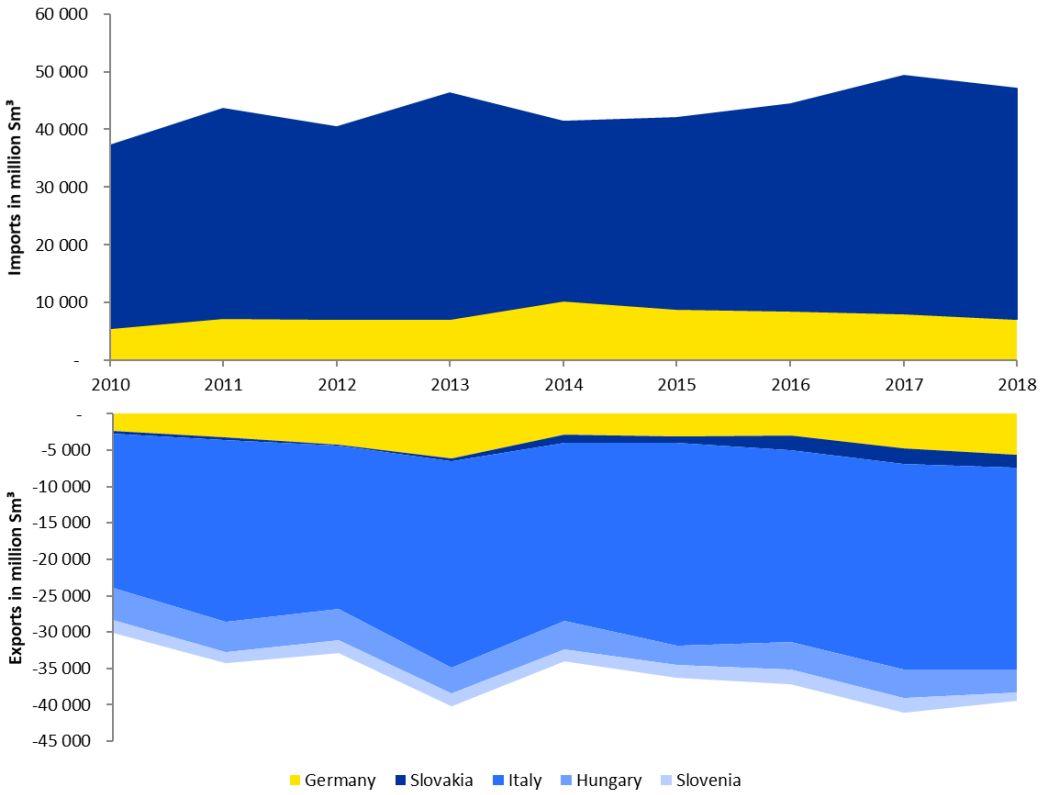
Due to its specific geographic location, Austria is considered a transit country for gas. Figure 6 illustrates that, the exports cover about three quarters of the total supply. Because of the relatively low domestic production (approx. 2% of total supply or approx. 11% of domestic consumption), Austria is highly dependent on foreign imports. Apart from that, there has been an increase in imports and exports over the last 10 years of about 10 billion Nm³.

Figure 6: Supply and usage of gas in Austria



Source: E-Control Austria

Figure 7: Imports and Exports 2018

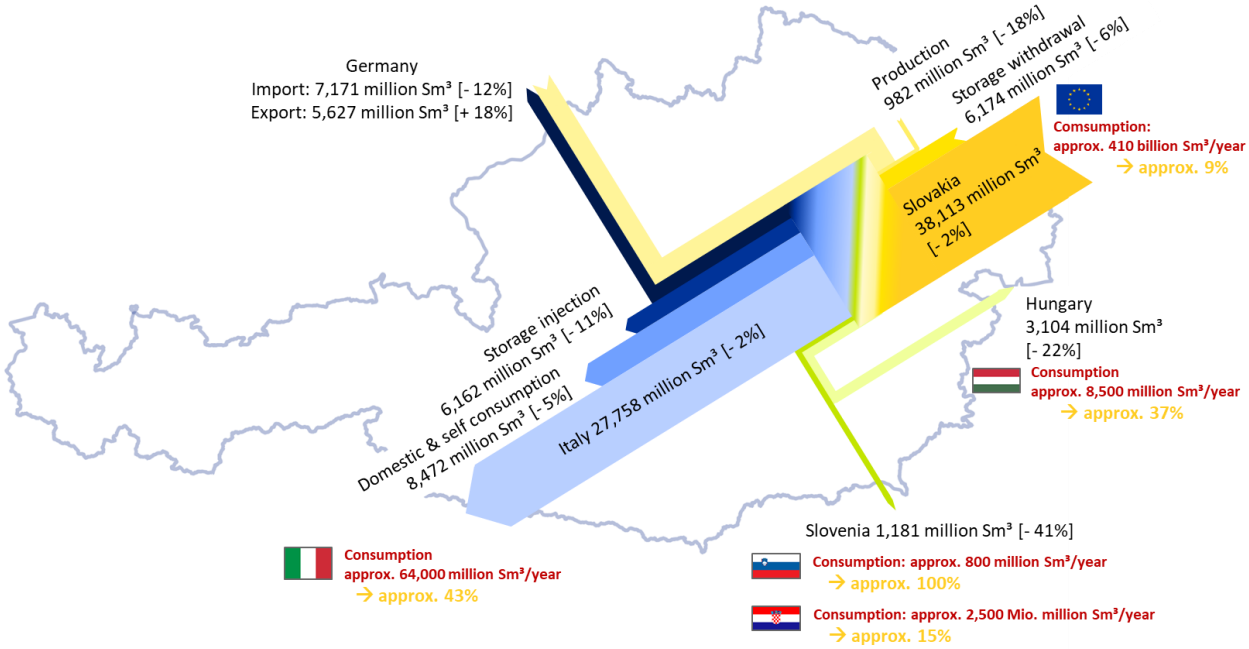


Source: E-Control Austria

Figure 7 shows the imports from Slovakia and Germany as well as the exports to Italy, Hungary, Slovenia, Germany and Slovakia. While the Imports from Slovakia and Italy remain almost the same, the imports from Germany decreased by approx. 12% and the exports to Germany increased by approx. 18% from 2017 to 2018. Additionally in 2018, the exports to Slovenia declined by approx. 41% and also the exports to Hungary declined by approx. 22% compared to 2017.

The schematic physical gas flow for 2018 is illustrated in Figure 8. It can be seen that over 80% of imports to Austria are from Slovakia. The remaining 20% transports are from Germany. By far the biggest share of exports is going to Italy. Exports to Hungary, Germany and Slovenia had been carried out in smaller amounts.

Figure 8: **Schematic physical gas flow, 2018**
Numbers in []: Changes compared to last year
Numbers in yellow: Share of the demand of the respective country



Source: E-Control Austria

2.3 Transmission system operators in the market area East

Website: www.taggmbh.at

Total length of transmission grid:
3 Pipelines with 380 km each
Approx. 1,140 km in total

Total compressor power:
5 compressor stations
Approx. 480 MW ISO

Physical entry points:
Baumgarten TAG (border to Slovakia)
Arnoldstein (border to Italy)

Neighbouring 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 (border to Italy)

Non-physical exit points
Baumgarten (border to Slovakia)

(Status 30.06.2019)

TAG GmbH is a company governed by Austrian law. In its capacity as a TSO it is responsible both for transit and for supply of the Austrian market and 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 the 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 the 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:
554.2 km

Total compressor power:
146 MW

Total energy transported (gas):
See ENTSOG Transparency Platform

Physical entry points:
Baumgarten GCA (border to Slovakia)
Baumgarten WAG (border to Slovakia)
Überackern ABG (border to Germany)
Überackern SUDAL (border to Germany)
Speicherpunkt 7Fields
Oberkappel (border to Germany)
Speicherpunkt MAB/WAG

Non-physical (virtual) entry points
Mosonmagyaróvár (border to Hungary)
Murfeld (border to Slovenia)
Petrzalka (border to Slovakia)

Neighbouring 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

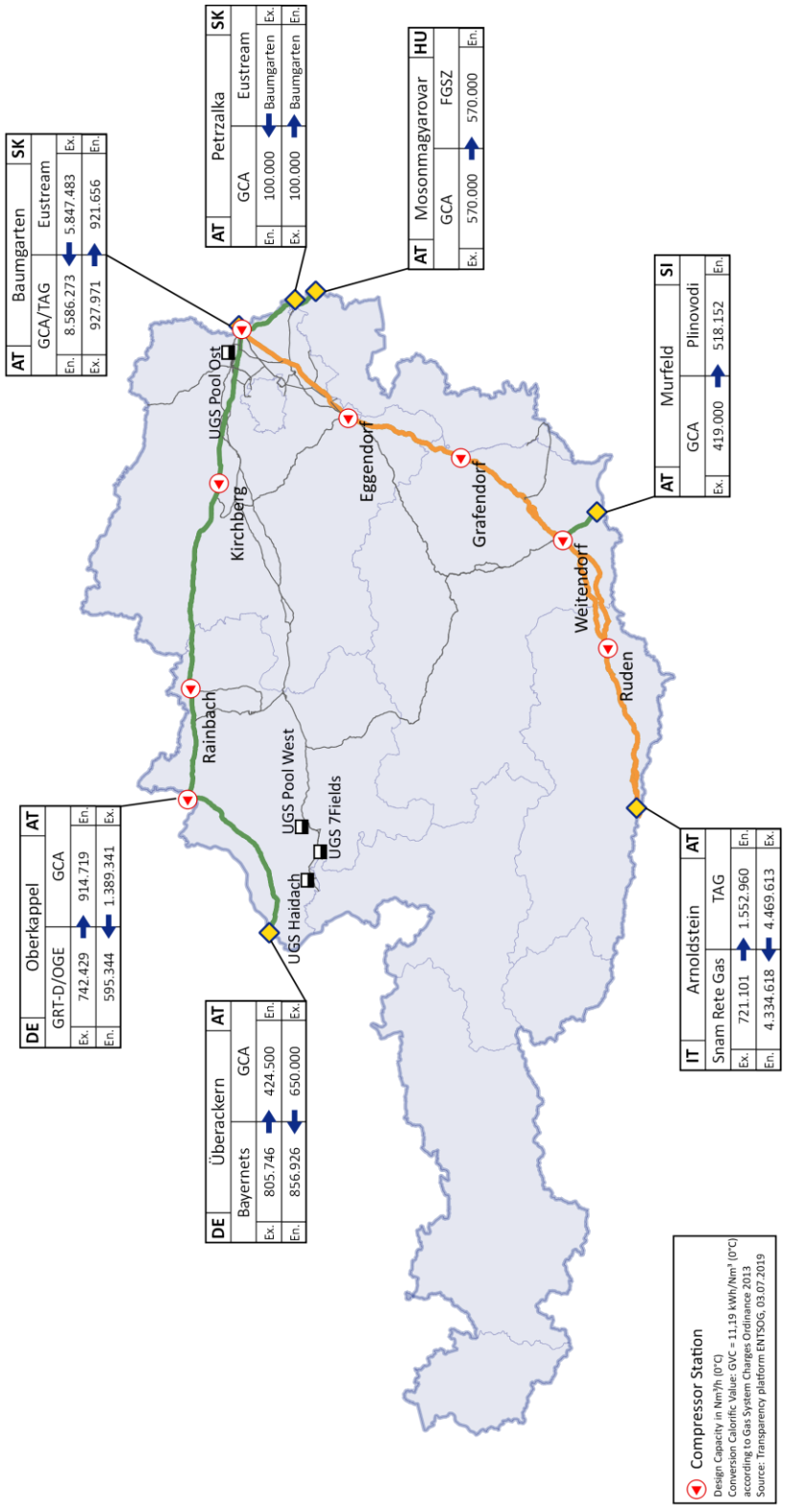
Physical exit points:
Mosonmagyaróvár (border to Hungary)
Überackern ABG (border to Germany)
Überackern SUDAL (border to Germany)
Murfeld (border to Slovenia)
Petrzalka (border to Slovakia)
Speicherpunkt 7Fields
Baumgarten WAG (border to Slovakia)
Oberkappel (border to Germany)
Storage point MAB/WAG

Gas Connect Austria is a gas transmission system operator and distribution system operator based in Vienna. It has a staff of 280 across six locations in Vienna, Lower Austria and Upper Austria. Centred 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, 40 metering and transfer stations and 100 transfer metering points.

2.4 Present gas transmission system infrastructure and technical capacities

Number of transmission system operators	2
Total length of transmission grids:	approx. 1,690 km
Total compressor power:	626 MW
Virtual trading point:	CEGH (www.cegh.at)

Figure 9: **Technical capacities at relevant interconnection points in the market area East in Nm³/h**



2.5 Gas Storage Infrastructure and Gas Production in Austria

Another important asset of Austria is the excellent connections of the large demstic storage capacities to the virtual tradint point. Table 1 show the characteristics (working gas volume, injection and withdrawal rate and connection) of the Austrian gas storage facilities.

Table 1: Gas storage characteristics Austria

Gas Storage Facility	Working Gas Volume [GWh]	Injection Rate [GW]	Withdrawal Rate [GW]	Connection
Astora (UGS Haidach)	10,400	4	4	Transmission system DE*
GSA LLC (UGS Haidach)	20,000	7	8	Transmission system DE *
OMV Gas Storage (UGS Pool Ost)	25,200	9	13	Distribution system
RAG ES (UGS Pool West)	17,100	8	8	Distribution system Transmission system AT** & DE*
Uniper (UGS 7Fields)	19,400	7	10	Distribution system Transmission system AT** & DE*
Total	92,100	35	43	

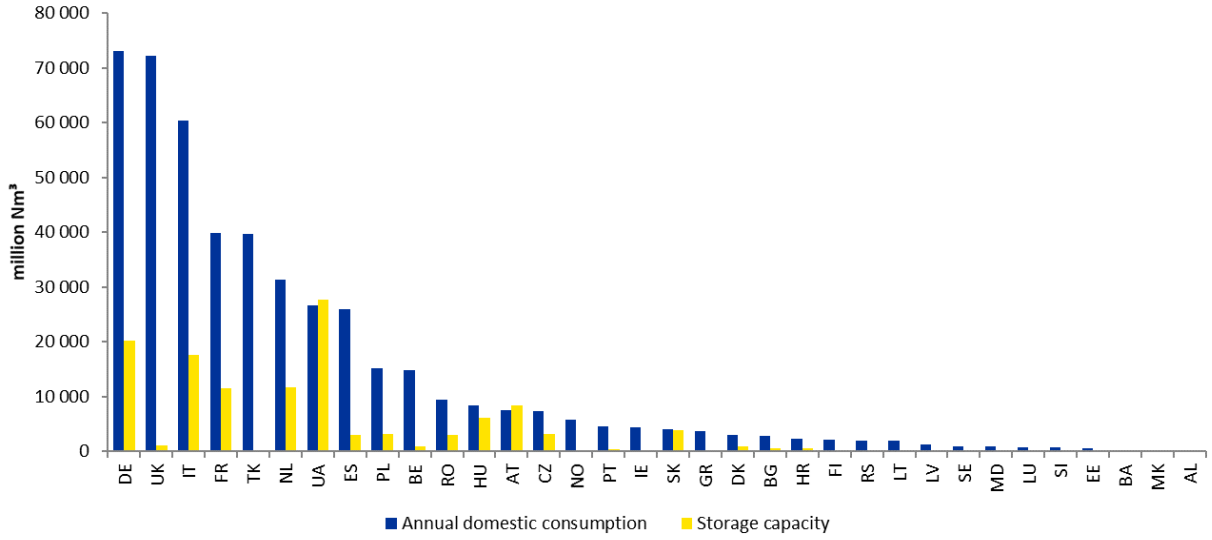
*) Direct connection to the German transmission system via the storage connection points USP Haidach and Haiming 3 as well as Haiming 2-7F and Haiming 2-RAGES
**) Direct connection to the Austrian transmission system (Penta-West) via the storage connection point Überackern 7Fields

Source: https://agsi.gie.eu, 2019

The storage capacity in Austria of approx 8.2 billion Nm³ (approx. 92 TWh) is the sixth largest domestic storage capacity in Europe (see Figure 10). This amount is about 1.5 times of the Austrian power demand (approx. 63 TWh) of 2018 and is about the total Austrian gas demand (approx. 90 TWh) of 2017. Given that, Austria and Latvia are the only countries in the European Union which have a storage capacity larger than their domestic gas demand.

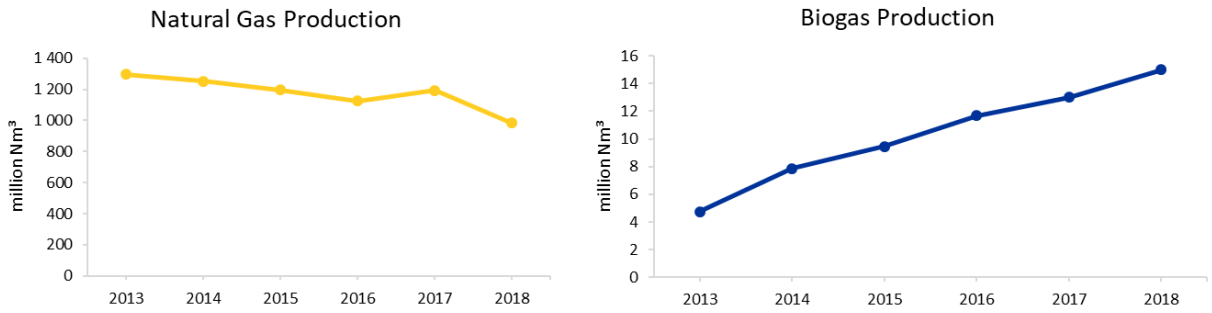
In Austria, natural gas production from fields in Lower Austria, Upper Austria and Salzburg achieved in 2018 up to 1 billion Nm³. The procution of biogas in Austria coming from 14 biogasplants was about 15 million Nm³ in 2018 (Figure 11).

Figure 10: Comparison of storage capacity and annual domestic consumption in the European context, 2017



Source: Eurostat

Figure 11: Natural gas and biogas production Austria



Source: E-Control Austria

2.6 Infrastructure standard

The infrastructure standard has been calculated in accordance with the Regulation (EU) 2017/1938, the Regulation concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No. 994/2010.

According to the infrastructure standard, the capacity in the observation area (market area East in Austria) must be able to meet a very high demand even in the case of an outage of the largest infrastructure facility, in this case Baumgarten.

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

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

Facility	Technical 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	0	currently DZK, therefore zero
Freilassing&Laa/ Thaya	0.87	available technical capacity
EPm	**163.16**	
Production OMV	2.46	booked standard capacity
Production RAG	0.44	booked standard capacity
Pm	**2.90**	
Gas Storage OMV	23.36	at a working gas volume of 30%
Gas Storage RAG ES	14.16	at a working gas volume of 30%
7Fields transmission pipeline	0	only interruptible capacity
7Fields distribution area	4.51	at a working gas volume of 30%
Haidach distribution area	0	
Sm	**42.03**	
LNGm	**0**	
Im	**140.34**	
Dmax	**51.36**	Baseline scenario max. from the next 10 years
N - 1	**132%**	

Source: AGGM; 2019

The result of the N-1 formula for the market area East is 132 %. This result shows that the gas supply in the market area East meets the requirement of being larger than 100% according Regulation (EU) No. 2017/1938.

An infrastructure standard with 132% reflects a good security of supply with regard to the infrastructure. Projects that additionally support the integration with the neighboring countries are to be evaluated positively for the further improvement of security of supply.

The previous result of the N-1 formula in 2018 according to Regulation (EU) No. 2017/1938 was 130%. The slight increase compared to last year is caused by a slight reduction of the forecasted maximum daily consumtion.

Before 2017, the infrastructure standard was calculated according to Regulation (EU) 994/2010. The results of the n-1 formula were quite higher because the crossborder capacitites were not taken into account transnationally according to the “lesser-of” rule, which is now applied. In addition, the S_m storage capacities were taken into account at 100% working gas volume.

Description and justification of the parameters

Calculated Area:

In accordance with the provisions of the national Austrian preventive action plan (version 3, December 2016) the infrastructure standard is calculated for the Austrian market area East.

"D_{max}" total daily gas demand:

Regulation (EU) 2017/1938 Annex II (2) defines the parameter "Dmax", in Article 5 of Regulation (EU) 2017/1938 the addition is made with regard to the development of gas consumption and the long term effects of energy efficiency measures.

Long-term planning 2019 describes three gas demand scenarios:

- Minimum scenario
- Baseline scenario with the highest probability of occurence
- Maximum scenario

The minimum scenario assumes an aliquoted implementation of the energy efficiency guideline (energy savings are the same for all primary energy sources). As described in Chapter 2.3.1.4 and Chapter 2.3.1.5 of the 2019 long-term planning, there is no clear trend towards a reduction in gas sales apparent.

The baseline scenario of the 2019 long-term planning is therefore used as the base for the determination of D_{max} as well as 10-year planning period (2020-2029). There is a reduction of the maximum hourly capacity of the power generating sector compared to the long-term planning 2018. The baseline scenario assumes in the other sectors a slight increase in the maximum possible hourly demand until 2029. According to decrease of the power sector and this slight increase in the maximum hourly demand of the other sectors, a total daily gas demand of

51.36 million Nm³ is possible in 2029 and is therefore applied in the calculation of the infrastructure standard for D_{max}.

"EP_m" technical capacity of entry points

The technical capacity is defined in detail in regulation (EU) 2017/1938 by referring to regulation (EU) 715/2009. As the technical capacity the maximum firm capacity, which can be offered by the TSO, is defined. According to the common European practice, which is also applied in the TYNDP process, the “lesser-of” rule is applied per interconnection point considering only the minimum of entry and exit capacity per flow direction.

The definition of technical capacity also states "taking into account network integrity", which suggests that the smaller value of entry and exit capacity is to be set at a network connection point.

For the entry point Baumgarten, the smaller value of the technical capacity is taken from Exit Slovakia and Entry Austria. The eustream has a technical exit capacity of 140.34 million Nm³/d (Source: www.transparency.entsog.eu). The Austrian transmission system operators Gas Connect Austria and TAG GmbH have a total technical entry capacity of 206.07 million Nm³/d. The smaller value is set for the new calculation as explained above, since the higher entry capacity in Austria cannot be fully used.

Oberkappel und Überackern are marketed competitively each other. The sum of the entry capacities from the market area NCG is greater than the technical capacity of the WAG from Oberkappel towards Baumgarten. If the gas is to be transported to the end customer in market are east, the capacity of the WAG from Oberkappel towards Baumgaren is the limiting factor. For this reason, the maximum capacity of the WAG is set for the entry points Oberkappel and Überackern, including the storage 7 fields. Therefore, the above-mentioned 21.95 million Nm³/d has taken into account.

TAG GmbH is offering in Arnoldstein currently interruptible entry capacity (DZK) of 1,552,960 Nm³/h (with the completion point Weitendorf). SNAM is offering in Tarvisio a firm exit capacity of 723,325 Nm³/h [*Source: ENTSOG transparency platform*] in competition to exit Passo Gries (border IT -> CH). Since there is currently no freely allocable entry capacity available in Arnoldstein, no potential supply to the virtual trading point according to the calculation method has to be assumed. It has to be mentioned that the total available DZK can be used until Weitendorf in case of an emergeny. With the implementation of the project “TAG 2016/01 TAG Reverseflow Weitendorf/Eggendorf” (completition according actual planning 12/2020), TAG GmbH will consider freely allocable entry capacity at Arnoldstein. Therefore, a potential supply to the VTP will be taken into account for the N-1 calculation. This consideration will have a positive impact on the N-1 factor.

Freilassing & Laa an der Thaya: At the interconnection points in the distribution area, Freilassing and Laa / Thaya, the reported standard capacity is assumed.

"P_m" maximal technical production capacity

The booked standard capacity was set for the maximum technical production capacity. The actual maximum hourly production rate from GY 2018 will reach the level of the booked standard capacity.

"S_m": maximal technical storage deliverability

In VO 2017/1938, there are several indications which require consideration of the working gas volume when determining the maximum technical withdrawal capacity.

For the market area East, it is assumed that the coldest day can occur until the end of February. The working gas volume of the Austrian storage facilities in the years 2014 to 2017 by end of February was 22% to 38%. In the determination of the maximum technical withdrawal capacity an average value of 30% working gas volume is assumed. This percentage is also given in the specifications of the new SoS VO. Since the withdrawal capacity changes as a function of the working gas volume, this factor must be taken into account when calculating the N-1 value. The published withdrawal curve was set for each storage facility. Based on the above data the maximal technical daily withdrawal capacity is 42.04 million Nm^3/d.

For the calculation of the maximal technical storage deliverability the technical withdrawal capacity is used and not only the marketed withdrawal capacity

The use of a lower working gas volume does not appear to be appropriate, since in the case of storage management, efforts should be made to obtain proper working gas volume and thus withdrawal rate as far as possible until the end of the winter period.

"LNG_m": maximal technical LNG facility capacity

Has no relevance for Austria

"I_m": means the technical capacity of the single largest gas infrastructure

This is for the market area East Baumgarten, therefore, this value is deducted accordingly in the calculation of the infrastructure standard.

3 Planning horizon for the 2019 Coordinated Network Development Plan

This chapter describes the Austrian and Europen framework for network development planning. The reader will gain an insight about the close developments in the surrounding countries as well as a brief overview about current and future regional projects in Europe and their potential influences on the Austrian gas market.

3.1 The future of energy

3.1.1 Governmental strategies and initiatives derived from the #mission2030 and the National Energy- and Climate Plan ("NEKP")

Decarbonization

The Austrian climate- and energy strategy #mission2030 states, that Austria will reduce its greenhouse gas emmissions of 36% compared to 2005. This reduction should be mostly achieved through measures in the transportation and space heating sectors. The transportation sector is with a share of 46% (outside the emmissions trading) the biggest pollutant of green house gases. The reduction should be achived by avoiding (expansion of public transport) as well as e-mobility and alternative propulsion systems. In the building sector, the reductions should be achieved primarily through the thermal rehabilitation and the abandonment of fossil fuels in new buildings.

Until 2050, the Federal Government plans to implement a consistent decarbonisation path.

As a first step, the total national electricity demand by 2030 should be covered by 100% renewable energy sources (on balance nationally). In order to achieve this, it is necessary to expand all renewable energy sources, the infrastructure, storage facilities and investments in energy efficiency.

In the long term, conventional gas should be replaced by renewable gas (e.g. biomethane from biogenic sources, hydrogen and synthetic methane) in the gas system.

Additionally feeding biomethane produced in biogas plants directly into the gas system instead of generating power should improve the resilience of the entire systema at the interface between electricity and gas, by utilizing the offset between generation and consumption through the storage flexibility of the gas system.

One of the main objectives is to produce renewable gases locally and to use the well-developed gas system to transport the energy.

Security of energy supply

In transforming the energy system, the top priority is to maintain the high level of security of supply at all times. In addition, efforts are being made in order to increase the extent of the decentralized domestic energy supply and to strengthen the regional supply concepts. In order to achieve this decentralization, a high level of full-scale biogas feed-in at the lower grid levels (levels 3 and 2) of the gas distribution network will play a significant role.

Additionally, in order to reach the 100% on balance electricity supply through renewable energy, sufficient and adequate control and imbalance energy capacities as well as necessary internal network flexibilities must be provided and available at all times. In addition to storage and pumped storage power plants, the highly efficient combined heat and power plants (CHP plants) play a significante role in maintaining the electricity and heat supply in conurbations.

Furthermore, the goal is to increase investments in the storage infrastructure (short-term to seasonal) and the transmission and distribution network as well as to adapt it to the increased demand. Existing efficient plants and already made investments such as pipelines, storage facilities or power plants actively contribute to the transformation of the energy system. Existing capacities must be used and existing energy infrastructures must take over additional tasks (e.g. power-to-gas, power-to-heat, wind-to-hydrogen, and power-to-liquids).

The very well developed and modern Austrian gas infrastructure, which had been realized by economic investments, already plays an essential part today. The highly efficient and fast responding Austrian gas-fired power plants already make an irreplaceable contribution to the immediate network stabilisation of the electricity network as well as providing balance and control to energy capacities. This achieved by the high infrastructure standard due to the large and very well connected Austrian gas storage facilities to the distribution system and the high flexibility due to the large capacities of the gas grid. In order to achieve energy security the already available infrastructure must be maintained or expanded as needed.

Energy efficiency

In addition to increasing renewable energy, promoting energy efficiency is another pillar of the Austrian climate and energy strategy #mission2030.

Since economic growth, especially in the industrial sector, needs to be possible in the future as well the target for Austria is to improve the primary energy intensity by 25-30 % compared to 2015. If the primary energy demand of 1,200 petajoules (PJ) will be exceeded by 2030, the additional energy quantities should be covered by energy from renewable sources.

European internal energy market

The following benchmarks need to be taken into account in order to achieve the objectives under the framework of the Energy Union strategy.

- Synchronize grid and renewable energy expansion
- Securing reserve capacities (redispatch measures of the power grid)
- Enabling local networks and storage operators
- Waste heat utilisation

The main projects of the Austrian gas transmission system infrastructure in order to achieve the objectives and requirements of a common European Energy Union are part of the third List of the Union for projects of common interest (PCI list) and described in detail in Chapter 3.2.3.

In addition, Austria's special role as an important hub for the European gas market and gas storage, in particular for the pan-European security of supply, should remain in the future. In 2018, approx. 10% of the European Union's gas consumption was handled via the Austrian hub Baumgarten, supplying Italy, Germany, France, Slovenia, Hungary, Slovakia and Croatia (see Figure 8).

Research, innovation and competitiveness

By developing key technologies to modernise the energy system, successful technical achievements and solutions have to be be developed. This should enable Austria to position itself as an innovative leader on the global technology markets. Because of that, applied research projects with pilot plants for competitive long-term energy storage from renewable sources will be promoted and driven forward.

The flexible energy system of the future will have to transport and store different media (electricity, heat, gas) from different sources (solar, wind, biogenic sources). New innovative storage technologies, especially for electricity and heat of approx. five TWh, are required for this purpose. For these reasons the FTI focus „Innovative Energiespeicher in und aus Österreich“ was established.

The research projects Underground Sun Storage and Underground Sun Conversion currently lead the way to achieving these goals.These projects promisingly investigate, the technical possibility of seasonal storage of renewable gas in gas reservoirs through the coupling of renewable electricity generation and the gas infrastructure.

In addition, a specially developed electrolysis pilot plant was in operation over a period of 3 years as part of the „Wind2Hydrogen" research project by Gas Connect Austria in Auersthal, Lower Austria. This plant was designed for converting rapidly changing loads of electricity from wind turbines into transportable and storable hydrogen, which in turn was fed into the existing gas network.

3.1.1 Projects in #mission2030, especially "flagship projects"

Flagship project 5: Renewable heat

The objective of this project is to drastically reduce the energy demand (heating and cooling) in the building sector and at the same time replace fossil fuels with renewable energy (and district heating).

One way to achieve this would be to use the waste heat (possibly converted into cold in the summer) from the future installed power-to-gas plants in order to increase the efficiency of this process.

Flagship project 7: Renewable hydrogen and biomethane

The purpose of this flagship project is to continue to use the advantages of the well-developed gas distribution network, the large underground storage capacities and the gas hub Baumgarten for the European gas supply by successively replacing conventional gas with renewable gas (hydrogen and biogas). This will enable the decarbonization of energy-intensive industries and cushion short-term power fluctuations from wind and sun. In addition, the current gas infrastructure already offers excellent long-term (seasonal) energy storage.

3.2 Considered Network Development Plans

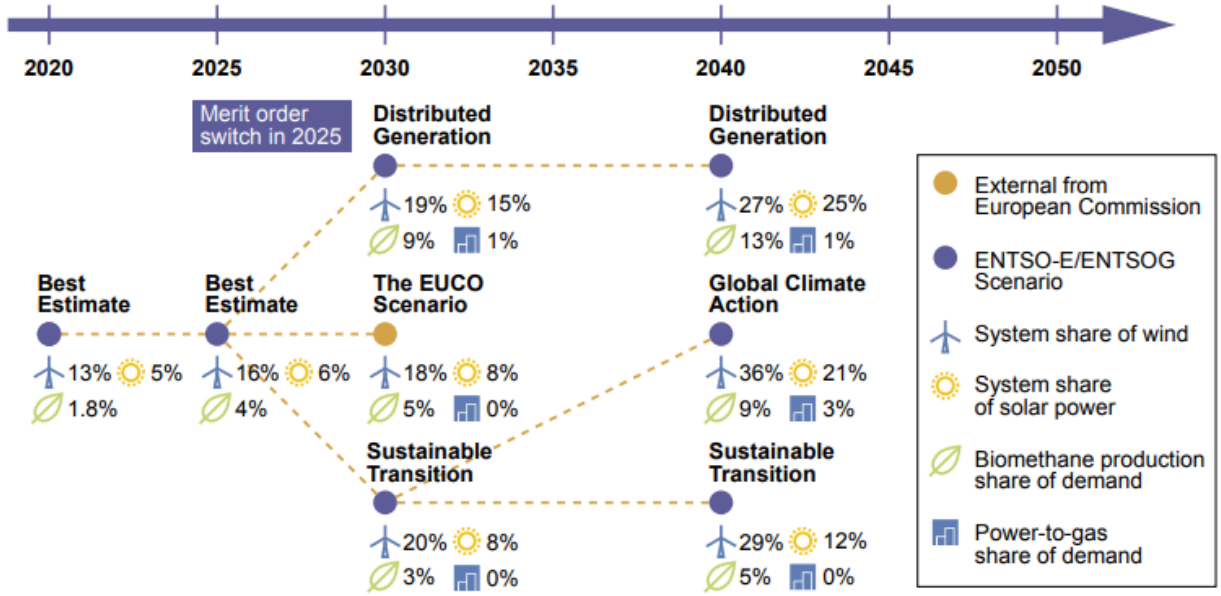
3.2.1 Ten Year Network Development Plan 2018

One of the key tasks of the European Network of Transmission System Operators for Gas (ENTSOG) is to prepare the Community-wide Ten-Year Network Development Plan (TYNDP), which has a planning horizon of twenty years and has to be created every second year. 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 this way reflecting the overall dynamics of the European gas market. One of the objectives of the TYNDP is, however, to provide modelling of the integrated gas network in order to be able to identify future 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 plan as appropriate.

In the TYNDP 2018, ENTSOG developed for the first time together with ENTSO-E scenarios of a future low-carbon energysystem throughout an integrated approach of power generation and load together with gas demand and supply as well as in accordance with the climate goals of the EU and future commodity prices.

The scenarios (Figure 12) show different possible future energy developments of the Europeon Union, so called “storylines” for the European gas- and electricity market up to 2040.

Figure 12: TYNDP 2018 scenarios



Source: ENTSOG, TYNDP 2018, Scenario report

The Best Estimate scenario for 2020 and 2025 is based on the input of the transmission system operators (electricity and gas) and reflects all current national and European regulations as well as the merit oder switch gas before coal (GBC) 2025. Following three storylines, which were developed bottom-up by the ENTSOs and the stakeholders were assumed for 2030 and 2040.

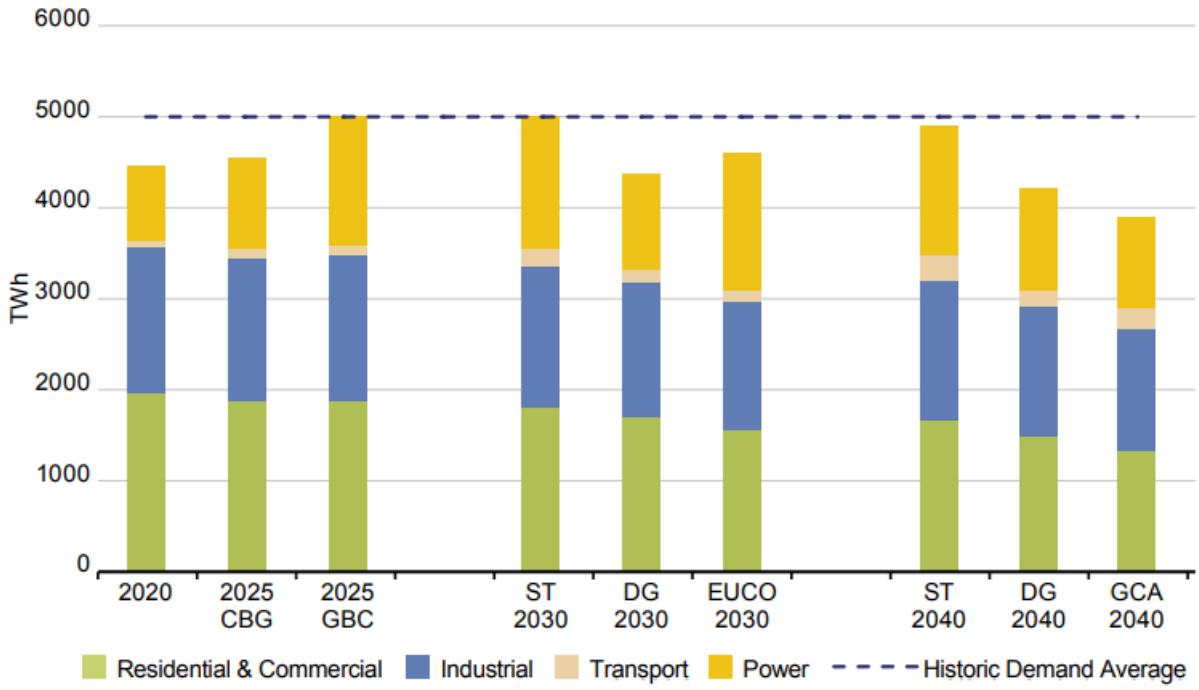
- **Sustainable Transition (ST)**
  - Fast and economically sustainable reduction of CO_2
  - Replacement of coal and lignite by gas in power generation
  - Partial replecement of heavy oil in heavy and maritime transportation
  - Slow electrification of the heating and transportation sector
  - The EU goal of 80-95% reduction of CO_2 by 2050 requires a rapid development in the 2040s due to increased technology adaption and progression
- **Distributed Generation (DG)**
  - The focus will be on the consumer due to dezentralisation with an emphasis on end-use techologies
  - Strong electrification of private transport in combination with photovoltaic modules and battiers in households
  - High level of demand side management and demand response
  - High biogas shares including the injection into the local distribution system
- **Global Climate Action (GCA)**
  - Global ambition towards a swift complete decarbionisation
  - Renewable energy and nuclear energy in power generation

- Continous reduction of gas in the heating sector due to continous electrification
- Decarbonisation of the transportation sector by utilization of electric and gas verhicles
- Strong energy efficiency measurments in all sectors
- Strongest impact of power-to-gas in this scenario

Furthermore, the European Commission introduced the scenario „EUCO 30". This scenario should model the achievements of the 2030 climate and energy targetsby the European Council of 2014 inculding an energy efficiency of 30%

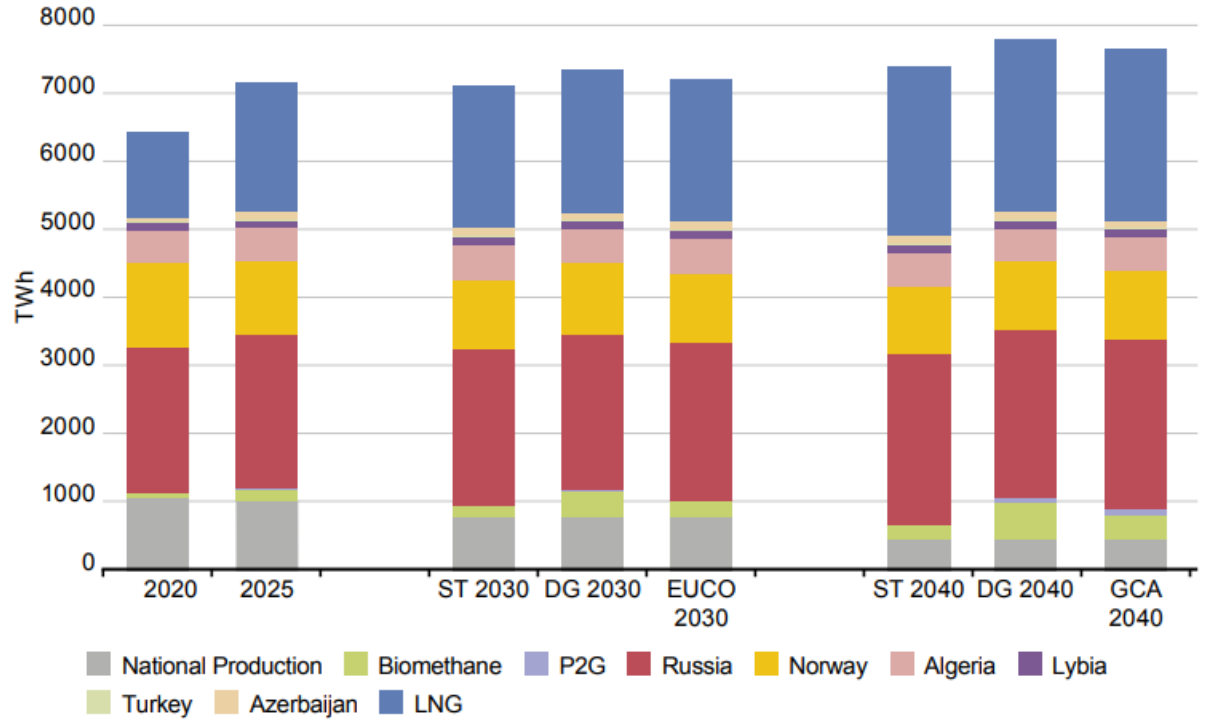
Figure 12 shows the different assumptions of the gas demand for each TYNDP 2018 secnario and sector. Figure 14 displays the trends of gas supply by source. A strong decline of domestic production will be expected, which has to be compensated by the production of bio methane and power-to-gas (see Figure 15 and Figure 16) as well as by an increased import from Russia, Azerbaijan and by LNG.

Figure 13: Annual gas demand by sector.



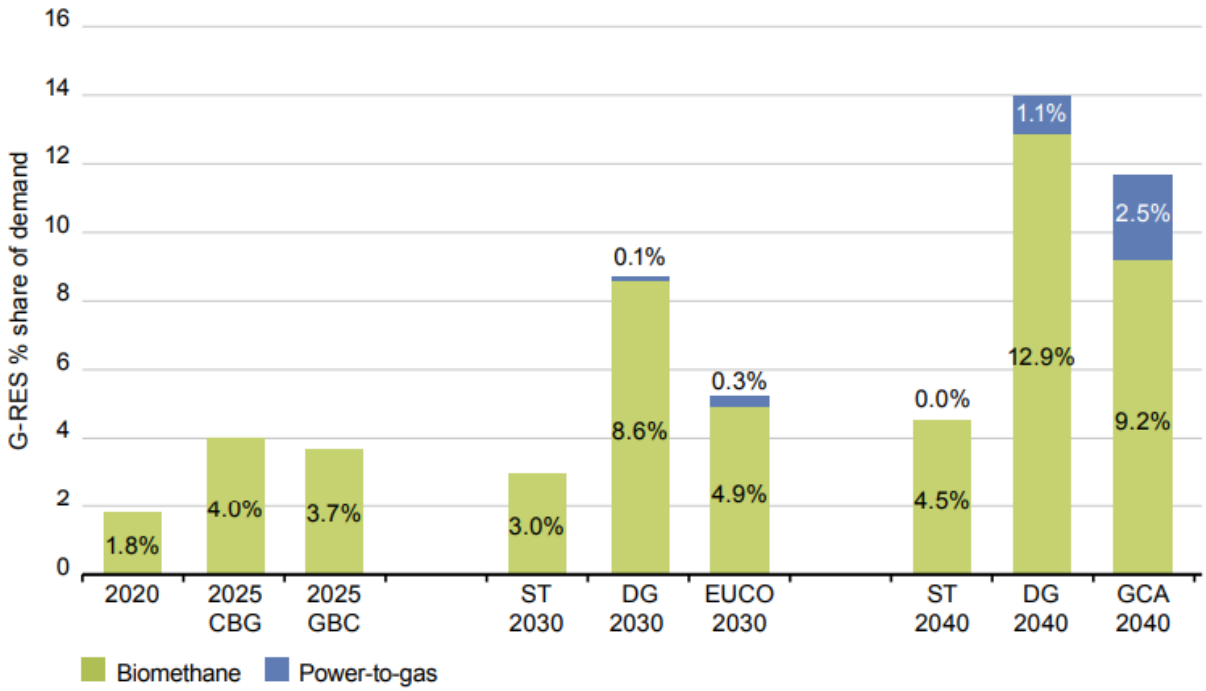
Source: ENTSOG, TYNDP 2018, Scenario report

Figure 14: Gas supply and potential by source.



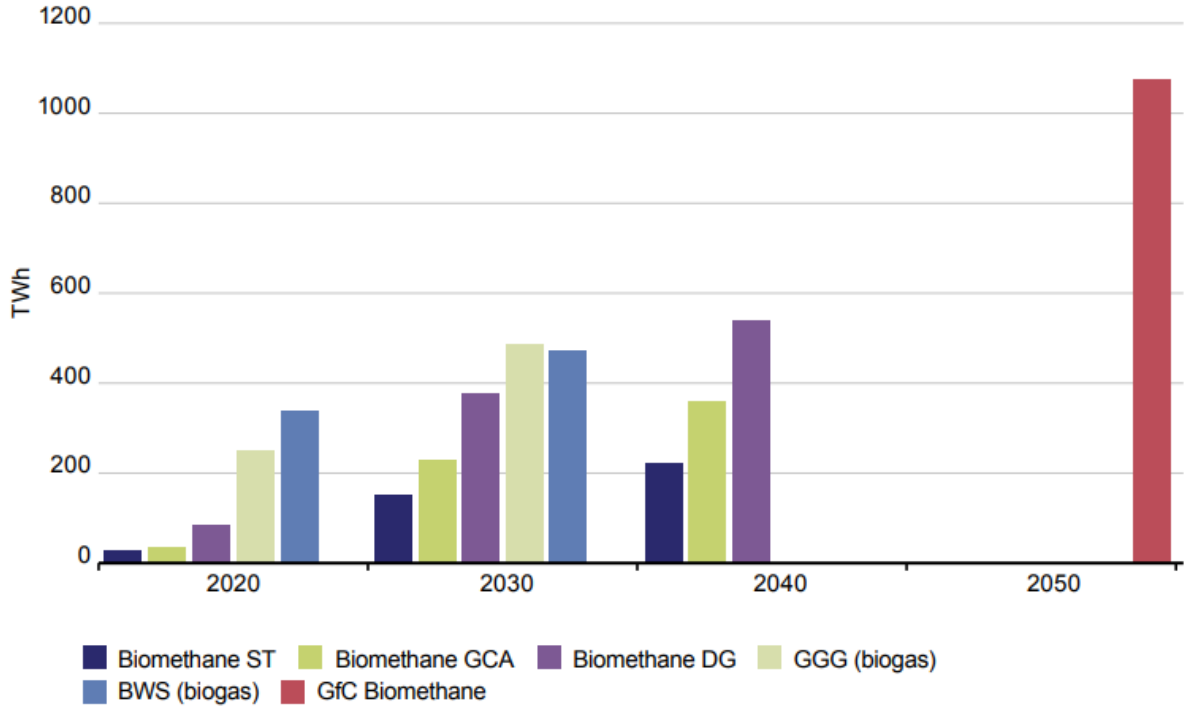
Source: TYNDP 2018, Scenario report

Figure 15: Share of renewable gas (bio methan & PtG) on total demand



Source: TYNDP 2018, Scenario Report

Figure 16 Biomethan production forecast by scenario compared with Green Gas Grids 2014 (GGG), Biogas Waste Streams 2017 (BWS) and Gas for Climate Initiative 2018 (GfC)



Source: TYNDP 2018, Scenario report

The respective project categories in the TYNDP are analysed in terms of their direct and indirect benefit in the different sales, consumption and congestion scenarios.

The analysed scenarios and assumptions are based on the energy system-wide cost-benefit analysis undertaken by ENTSOG in accordance with regulation (EU) 347/2013. In conjunction with the project-specific cost-benefit analysis, the direct and indirect benefit of the individual project groups for European Member States was presented and rated in the various demand, consumption and congestion (security of supply) scenarios based on the option of ACER, the statements of stakeholders and the criteria of the Florence School of Regulation.

Projects in the TYNDP 2018 are categorised 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 investemnt descision („FID“)
- Projects without final investemnt descision
  - with advanced status („Advanced“)
  - with less advanced status („Less-Advanced“)

Table 3 shows the Austrian projects that are part of the 2018 TYNDP (see also this Link for more detailed information)

Table 3: 2018 TYNDP projects concerning Austria

TYNDP Projectno.	Projectname	2018 TYNDP Status	2019 CNDP Projects	3rd PCI List
TRA-N-954	TAG Reverse Flow	FID	TAG2016/01 TAG 2016/03	No
TRA-N-361	GCA 2015/08: Entry/Exit Murfeld	Advanced	GCA 2015/08	Yes, 6.26.4
TRA-N-021	Bidirectional Austrian-Czech Interconnector (BACI)	Advanced	GCA 2015/01a	Yes, 6.4
TRA-N-423	GCA Mosonmagyaróvár	Advanced	GCA 2015/05	Yes, 6.24.1

Source: ENTSOG, TYNDP 2018

3.2.2 Gas Regional Investment Plan 2017 – 2026

The gas regional investment plans (GRIP) are established and published by the respective concerning transmission system operators in coordination every two years according to directive (EC) 2009/74 (2) and Regulation (EC) 715/2009. The GRIPs build upon the TYNDP data sets and have in comparison to the TYNDP a shorter planning horizon of 10 years. The aim of the regional plans is to give an overall view of future dynamic developments in the gas market by an integrated and regional view of supply scenarios, market integration, security of supply as well as hydraulic analyses.

Six (sometimes overlapping) regional investment plans had been established and have already been published in their third edition:

- GRIP North-West
- **GRIP Central Eastern Europe CEE** (with Austrian contribution TAG GmbH & Gas Connect Austria)
  - see Link for further details (edition 2017-2026)
- GRIP Baltic Energy Market Interconnection Plan (BEMIP)
- **GRIP Southern Corridor SC** (with Austrian contribution TAG GmbH & Gas Connect Austria)
  - see Link for further details (edition 2017-2026)
- GRIP South-North Corridor
- GRIP South

Since the database of the GRIps build upon the ones from the TYNDP, all the projects in Table 3 are also part of the GRIP CCE and SC.

3.2.3 PCI projects concerning Austria

PCI are key infrastructure projects (gas, electricity, oil, smartgrid, CO_2), mainly cross-border projects, 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 Union list is created and published as a delegated regulation by the European Commission biennially. The current PCI list, the third of its kind, was published in April 2018 (see link). Currently the fourth PCI List is in the final stage of preparation.

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

These projects were selected according to the following criteria:

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

Following projects in Austria are part of the third PCI List. These projects are also candidates for the current consultation version of the fourth PCI List.

Table 4: PCI projects concerning Austria

Project number	Project name	2019 CNDP projects
PCI 6.26.4 as part of: Cluster Croatia – Slovenia – Austria	GCA 2015/08: Entry/Exit Murfeld	GCA 2015/08
PCI 6.4: Bidirectional Austrian Czech Interconnection (BACI)	Bidirectional Austrian-Czech Interconnector (BACI)	GCA 2015/01a
PCI 6.24.1 as part of: Cluster Bulgaria – Romania – Hungary – Austria	GCA Mosonmagyaróvár	GCA 2015/05

Source: European Commission, Technichal information on Projects of Common Interest, April 2018

3.3 Network development planning of neighouring countries

This chapter gives a short overview of the transmission system network development of Germny, Italy and Slovenia with special focus on relevant projects and developments for the Austrian market. The respecitve network development plans of these neighbouring countries are published in the English language.

The network developments plans of the other neighbouring countires Czech Republic and Slovakia could not have been taken into account since they are not published in English and therefore only available in their own respective language.

3.3.1 Germany

Sources: Netzentwicklungsplan Gas 2018-2028
Umsetzungsbericht zum Netzentwicklungsplan Gas 2018-2028
Szenariorahmen Netzentwicklungsplan Gas 2020-2030

The Network Development Plan Gas is the primary focus of the association of transmission systemoperators gas (Vereinigung der Fernleitungsnetzbetreiber Gas e.V). This association creates and publishes this plan since 2012 on an annual basis. Since 2016, the plan is published every even year. The aim of the Network Development Plan Gas is determine the future transport capacities for gas in intensive coordination with the German national regulator Bundesnetzagentur (BNetzA). The requirements concerning this plan are determined in the German energy act (Energiewirtschaftsgesetz) taking the TYNDP into account. The first elaborations by the transmission system operators lead in nine phases including several consultation and revision phases from the first draft of the scenario framework to the final network development plan.

In the current scenario framework to the (currently in development) Network Development Plan 2020-2030 examines two secnarios for the development of the German gas demand. Scenario 1 is based on the dena study “Integrierte Energiewende” (2018) with an outlook until 2050. Scenario 2 is based on the “EUCO30” scenario by the European Commission in order to realise the European climate and energy targets of 2030. In addition to that, the roadmap of the coal phase-out is also depicted in these several secnarios as well as the subject Green Gases with consideration of the study of the “Forschungsstelle für Energiewirtschaft (FfE)” and a marketsurvey play an important role.

On the one hand, Scenario 1 assumes a slighly increased gas demand of 7% in 2030 based on 2017, which is mainly caused by an increase in the industry sector, the power sector and the non-energy related consumption. With regards to 2050, this scenario assumes an increase of 20% compared to 2017, cased by an increased demand of the industry as well as the transportation sector (CNG, LNG, hydrogen). This means that the total demand increases from 980 TWh (2020) to 1,038 TWh (2030) and therefore the import rises from 914 TWh (2020) to 968 TWh (2030).

On the other hand, Scenario 2 assumes reduction in demand of about 9%

It is assumed, that the conventioal natural gas production will face a sharp 49% fall by 2030. The biomethan production is expected to rise about 0.18 TWh per year up to 0.9 TWh.

Besides the L-Gas to H-Gas switch in the German gas grid, the biggest challenge for the German transmission system operators will be the merger of the market areas NCG and GASPOOL with the persued target 01 October 2021. As a result of that merger, one of the biggest and most liquid market areas in Europe will develop with the premise to sustain the current quality and quantity of capacities according to the 2018-2028 network development plan in Germany. The biggest problem will be the relatively low interconnection capactities between NCG and GASPOOL. Without appropriate measures the reduction of excisting entry capcitites (bFZK and FZK) of about 200 GWh/h (-78%) will be the result in a merged market area, whereas already booked capacities and the reservation rate will remain unaffected[1]. The German transmission system operators did not offer any FZK entry capacitites from 01 October 2021 onwards already at the annual capacity auction on 01 July 2019. In order to avoid such a drastical reduction of entry capacitites, infrastructure measurements and/or the utilization of additional market-based instruments such as wheeling, the exchange-based spread product or the use of third party grids will be necessary. One instrument of using third party grids could be for example the project developed by Gas Connect Austria, which aims to strengthen the transport route between the interconnection points Überackern and Oberkappel (see GCA 2018/01 in chapter 5.4.3).

At the moment, a new capacity model based on historical flow data and information about planned infrastructure projects is in development. This model derive from the simulation results possible consequence for the market merger,

As regards interruptions to interruptible capacities, the German network development plan for 2018-2018 analyses the three points with the highest level of interruptions historically and develops measures in response:

- Haiming 2 Exit & USP Haidach Exit
  - Connect the NCG market area with the Austrian storage facilities 7Fields and Nussdorf/Zagling or Haidach.
  - Interruptions due to temporary congestion in upstream grid areas.
  - In view of the measures implemented (MONACO 1 etc.), the German transmission system operators do not feel that expansion at this cross-border point is required.
- Oberkappel Exit:
  - Interruptions due to grid expansion and alteration works in the upstream system.
  - The German network development plan assumes that there will be a fall in exit capacities as other routes (EUGAL, ROHUAT, etc.) for filling storage facilities during the summer months are opened up. No additional demand was reported for Oberkappel in the market demand assessment carried out in accordance with the CAM NC in 2017. It is therefore assumed that no expansion is required.

[1]Consulationdocument: FNB Gas, Network Development Plan Gas 2020-2030, Scenario framework, 17 June 2019

The capacity restriction (approx. 50% at the Wallbach cross-border IP) on TENP I as a result of corrosion damage to one of the two lines is particularly significant for the Tyrol and Vorarlberg market areas. This restriction has been extended to September 2020. In addition, further checks on pipeline integrity and implementation of measures identified are currently under way. To ensure that future demand in Baden-Württemberg and thus the Vorarlberg MA can be safely covered in the theoretical event that this capacity restriction continues beyond the date set, the German NDP for 2018-2028 includes a security of supply scenario for TENP I.

The construction of the new EUGAL pipeline (DN 1400, 480 km, PN 100). will increase the capacity from the Lubmin II gas receiving station of the Nord Stream pipeline towards the Czech grid system. Commissioning of the first line is scheduled for December 2019.

3.3.2 Hungary

Source: National Ten-Year Network Development Proposal Public Consultation 2018

The Hungarian network development plan is prepared as a proposal on a yearly basis by the Hungarian transmission system operator FGSZ Ltd. After consultation with the connected system operators, the plan is presented to the national regulatory authority. The aim is to depict the developments of the Hungarian gas infrastructure for the next 10 years.

Gas is the biggest source of energy in the Hungarian primary energy mix with a share of 36%, followed by oil products with 26% and nuclear energy with approx. 18%. The share of renewable energy in Hungary is about 9%. Regarding the power mix, nuclear energy is the main source with about 50% followed by gas with 25% and lignite and coal with a share of 15%. The remaining 10% are coming from renewable sources.

The Hungarian gas demand of about 11 billion m³ per year is assumed to remain constant until 2020. Afterwords an increase up to 14.5 billion m³ per year is forecasted, mainly cause by the implementation of new gas fired power plant capacities. The domestic production of about 1.5 billion m³ per year will decrease by 50% over the next 10 years.

The biggest entry point in Hungary is the interconnection point Beregdaróc with Ukraine with a firm capacity of 516 GWh/d. The Hungarian transmission system is connected to the Austrian system of Gas Connect Austria in Mosonmagyaróvár with a firm entry capacity of 153 GWh/d. Other entry points are Blassagyarmat (Slovakia, firm). Drávaszerdahley (Croatia, currently interruptible) and expected in 2022 Csanádpalota (Romania, firm). Addtionally, exports to Serbia (firm 142 GWh/d), Croatia (firm currently 77 GWh/d, by 2022 206 GWh/d), Romania (firm currently 52 GWh/d, by 2022 130 GWh/d, Slovakia (interruptible currently 52 GWh/d, by 2022 firm 156 GWh/d) as well as to the Ukraine (interruptible currently 206 GWh/d, by 2022 firm) can be realized via Hungary.

According to the Proposal of the 2018 Hungarian network development plan, the interconnection point to Romania as part of the PCI Project *PCI 6.24.1 & 6.24.4 ROHUAT/BRUA* (see also

Chapter 3.5.5 for further imformation) is currently being implemented with planned commission by the end of 2019.

Following further pojects are currently in the planning phase but not net being implemented:

Table 5: Projects withing the proposal to 2018 Hungarian network development plan

Project	Capacity	Planned commission	Condition
RO-HU Phase 2	4.4 bcm/a bidirectional	Q4 2022	Positive economic test
HUSKAT/HUSK	1.75 bcm/a bidirectional	Q4 2022	Positive economic test *Update: Could not be met in the 2019 annual auction*
HU-SRB Phase 1	Up to 6 bcm/a SRB -> HU	FID + 1,5 years	FID/Technical C´coordination
HU-SRB Phase 2	Up to 10 bcm/a SRB -> HU	FID + 2 - 3,5 years	FID/Market demand
Ukraine Firm	6.1 bcm/a HU -> UK	Q3 2022	Long-term capacity allocation
HU-SI (Phase 1 & 2)	0.4 – 2.6 bcm/a bidirectional	FID + 2 - 3,5 years	Long-term capacity allocation
SK -> HU	7 bcm/a SK -> HU	Fid + 2 years	Long-term capacity allocation

Source: FGSZ

3.3.3 Slovenia

Source: TEN-YEAR GAS TRANSMISSION NETWORK DEVELOPMENT PLAN FOR THE 2019 – 2028 PERIOD

The Slovenian Ten-Year Gas Transmission Network Development Plan is carried out every year by the Slovenian transmission system operator Plinovodi in order to determine the main transmission infrastructure developments, illustrate all the decided and future investments within the next three years and constitute a time frame for all investment projects. This plan is based on existing and expected supply and demand with necessary and efficient measures to fulfill the requirements of the market on the system and the security of supply. The development plan is consulted by the national energy agency as well by the relevant stakeholders.

The gas market in Slovenia is supplied almost solely by the upstream Austrian transmission system. More than 90% of the gas used for domestic consumption as well as for transit purposes to Croatia in the past years has been imported via the interconnection point Murfeld/Cersak.

Since Slovenia itself has no signifikant gas storage facilities or LNG terminals and is only connected via three cross-border connections to neighouring transmission systems, Slovenia currently has an infrastructure standard of 52.6 %. This level will slightly increase in the next years due to infrastructure measures, which enable the physical entry from Croatia in Rogatec. For the

long term, future projects at the Hungarian interconnection point are planned to increase the infrastructure standard above 100% after 2024. The monthly average monthly utilization of the interconnectionpoint Murfeld/Cersak was 44.6% in 2017.

Concerning the forecast of domestic consumption and booked transmission capacity, an increase of 20-30% over the next ten years is expected, mainly caused by the commission of a new gas power plant in 2020. Furthermore, it is estimated that the transmission capacity booking at the IP Murfeld will increase in 2021 by 10.000 kWh/day.

The most important project in Slovenia, affecting the Austrian transmission infrastructure concerns the PCI 6.26 Project called “Cluster Croatia-Slovenia-Austria”. This project is further illustrated in Chapter 3.5.4 and 5.4.4.

The PCI Project 6.23 called “Hungary-Slovenia-Interconnection” will connect the Slovenian and the Hungarian gas market. Commissioning is planned by 2023.

3.3.4 Italy

Source: Ten-year development plan of the natural gas transmission network 2017 – 2026

As the current Italian network development plan is unfortunately not available in English, the network development plan 2017-2026 is reflected here.

The Italian ten-year network development plan is done annually by Snam Rete Gas, the Italian transmission system operator according to European Directive 2009/73/EC, Regulation 715/2009 and 994/2010[2]. The plan determines the main development of gas infrastructure projects for the national and regional transmission network owned by Snam Rete Gas. The development plan is made in consent with European and Italian legislative and regulatory frameworks, the National Energy Strategy, ENTSOG TYNDP, relevant stakeholders as well as the general strategy of the parent company Snam.

The Italian gas market is strongly linked to the Austrian gas infrastructur by the important interconnection point Tavisio/Arnoldstein. Almost 43% (in 2018) of the total imported volumes were supplied towards Italy via this interconnection point over the past years.

The natural gas demand in Italy increased over the past three years by 5%, whereas the demand is expected to remain more or less constant over the next 10 years in the low assumption. In the high case, an increase of about 18% in 2035 compared to 2016 is forecasted. It is remarkable tha in both scenarios a significant growth of the transportation sector is expected. With regards to the contribution of bio-methane in the gas consumption in order to meet the European emission reduction targets, an increase up to 4 bcm in 2026 and up to 10.4 bcm in 2035 is predicted, which will be about 12% of the forecasted demand in Italy.

[2] The Regulation (EU) 994/2010 had been replaced by Regulation (EU) 2017/1938.

According the Italian national energy strategy (SEN), the storage capacity in Italy needs to be expanded in the upcoming years in order to increase the capacity margin as well as the flexibility in supply during peak demand situations and/or supply interruptions. Currently the storage facilities in Fiume, Treste, Minerbio, Ripalta and Settala are under expansion. Additionally, new gas storage sites are under construction or authorization. This can lead to an additional completion for the Austrian storage operators.

The biggest infrastructure development project in Italy is the connection to the Trans Adriatic Pipeline (TAP). See Chapter 3.5.7 for further information.

Another project called “Import developments from North East” with planned completion in 2034 is presented in the Italien network development plan. This project includes the construction of a new transmission pipeline (DN1400, approx. 120 km) between Bordano and Istrana in parallel to the already existing route in the Northeast of Italy. The aim of this project is on the one hand to increase the dissipation capacity from Arnoldstein/Tarvisio and on the other hand to enable a connection with the future LNG Terminal Krk (see also Chapter 3.5.4) in Croatia by constructing another new transmission pipeline (DN1050, 15km) in the direction of Slovenia (IP Gorizia).

3.4 2019 Long Term Planning

Alongside with the role as market area manager in the CNDP, AGGM prepares the long-term planning (LTP) for the gas distribution network infrastructure in Austria.

The overall objective of the LTP is to ensure the transport capacities in the distribution area that are required to supply end consumers and meet the transport needs of storage facilities and producers.

Consumer demand is analysed using three demand scenarios: to this end, two different evolution scenarios of the performance of gas-fired power stations and two different scenarios of consumer behaviour were combined.

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 transport the maximum possible hourly flow rate safely.

Peak demand in the Eastern distribution area was measured at 2,386,000 Nm³/h in February 2012. This high demand was due both to a prolonged cold spell and high levels of electricity generation. Demand was at a similarly high level in January 2017 (clearing values: 2,233 kNm³/h). The demand scenarios considered in the LTP 2018 are based on this historical peak demand value recorded in February 2012.Figure 18 shows actual hourly flow rates and development of the maximum hourly flow rate in the eastern distribution area over the period from 2004 to 2029. The chart shows future maximum hourly flow rates for the three scenarios defined.

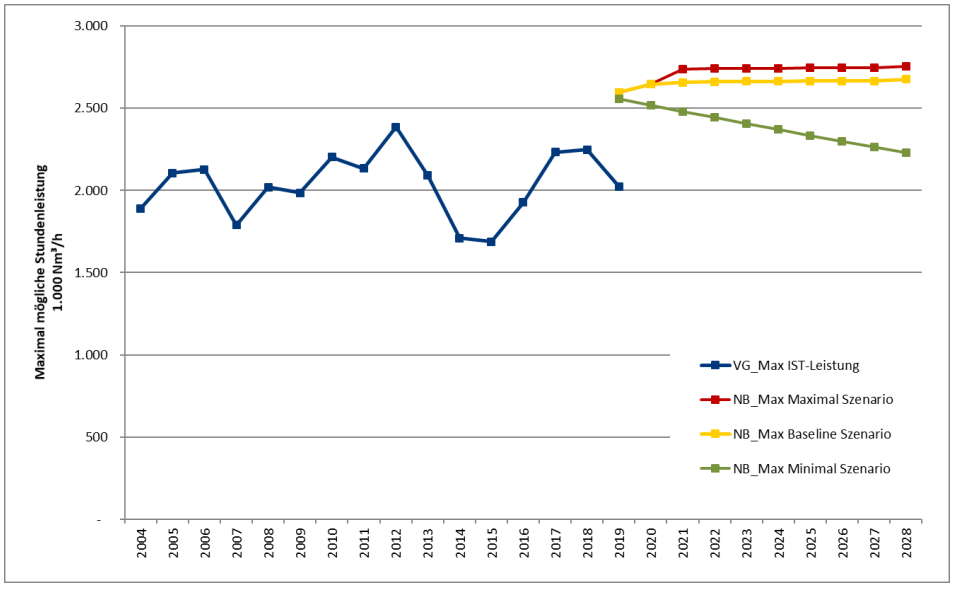
Figure 17: Demand scenarios in the distribution area

		Development of gas power plants	
		Stagnation on Status Quo 6/2019	Considering all submitted system operator demands
Developments of other end consumers	Considering all future changes published by system operators	**Baseline Scenario**	**Maximum Scenario**
	Considering all future changes published by system operators including an annual demand reduction of 1.5%	**Minimum Scenario**	

Source: AGGM, 2019 Long Term Planning

The actual flow rates and the future maximum possible flow rate in Figure 13 were determined using different approaches. The actual flow rates shown reflect the historical simultaneous gas demand measured in the distribution area (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). The NB_MAX value for maximum possible hourly flow rate is used in hydraulic calculations for grid design across the entire distribution network. The maximum possible hourly flow rate in the maximum scenario is closer to the baseline scenario in the 2018 LTP. This is because only one additional gas-fired power station is included in the maximum scenario in the 2018 LTP. The expected maximum demand was reduced by approx.. 100.000 Nm³/h in the baseline and maximum scenario compared to the LTP 2018 due to the reduction of contracted capacities of the gas-fired power plants.

Figure 18: Demand scenarios, maximum hourly demand, market area East



Source: AGGM, 2019 Long Term Planning

3.5 Development of the European gas infrastructure – selected projects

3.5.1 North Stream II

The privately funded project North Stream II, which is also mentioned in the 2018 TYNDP (TRA-F-937), is supposed to secure the supply reliability of the EU through a direct connection to Russia. The 1230 km long DN1200 pipeline is currently under construction parallel to the already existing North Stream I. The starting point is the gas compressor station Slawjanskaja close to the Narwa-bay, from there the gas travels to Lubmin in Greifswald, Germany, where the transmission system operator Gascade feeds it into the European pipeline system.

The construction started in February 2018 and should be finished in October 2019. With the beginning of 2020, the pipeline should be used commercially with a capacity of 1,750 GWh/d. This is also confirmed on the ENTSOG transparency platform confirms since bookings of 580 GWh/d can be found for the new interconnection point Lubmin II starting 01 October 2019, and a total booking of 1,172 GWh/d by 01 October 2020. At the same time, the transit agreements between Russia and Ukraine will expire by the end of 2019, which will help to cushion any potential shortage in case of no further continuation.

In order to be able to distribute the available quantity of gas within the EU, further infrastructure development measures were set up in Germany, the Czech Republic and Slovakia under the Capacity4Gas project. These measures are intended to make the Central European network more robust and flexible and to secure supplies for Germany, the Czech Republic and other European countries. The German transmission system operators GASCADE, Fluxys, Gasunie and ONTRAS are building the 485 km long EUGAL (“Europäische Gasanbindungsleitung”) pipeline through the federal states of Mecklenburg-Vorpommern, Brandenburg and Saxony, in order to connect Lubmin to the Czech interconnection point Brandov (CZ)/Deutschneudorf (DE). The commissioning for EUGAL is planned for December 2019 with a capacity of 962 GWh/d and in 2020, it should reach a capacity of 1,741 GWh/d. As a result, the interconnection Point Brandov (CZ)/Deutschneudorf (DE) is being upgraded to be able to hand over 665 GWh/d by 2019 and then to import a total of 1,119 GWh/d to the Czech Republic from 2021 onwards. By 2020, a majority of the North Stream II gas is supposed to be transported via Czech Republic to Southern Germany as well as through Slovakia to Baumgarten.

Another measure within the Capacity4Gas project is to upgrade the interconnection point Lanžhot between the Czech Republic and Slovakia. On the Czech side, an exit capacity increase of 333 GWh/d towards Slovenia should be available by September 2020. On the Slovak side, the construction of a new compressor station, which will be completed in November 2019, will increase the entry capacity by 884 GWh/d, primarily to distribute volumes across Slovakia and more gas for the Eastring project as well as to support the supply stability of Ukraine and Poland.

Thus, it becomes clear that gas from the North Stream II will reach the Austrian gas hub Baumgarten through Slovakia. A direct connection between Austria the Czech Republic via the BACI project (see chapter 3.5.2) would not only be a direct improvement of Austria’s security of supply, but would also support the Czech market though a direct connection to the large Austrian

storage capacitites. Furthermore, a direct connection to the Austrian virtual trading point CEGH would valorize the Czech market. In the past, the prices at the Czech gas market were mostly lower than the ones at the Austrian gas market.

3.5.2 BACI und Projekt Trading Region Upgrade („TRU“)

The Project BACI provides a direct link between the gas transmission system of Gas Connect Austria on the Austrian side and of NET4GAS, s.r.o. on the Czech side. The purpose of the project is to create a new bidirectional connection on FZK basis and the entry and exit point Reintal between the Austrian and the Czech market.

Infrastructure:	New transmission pipeline CZ: Břeclav - Rheintal (DN800, 12 km) New transmission pipeline AT: Rheintal – Baumgarten (DN800, 49 km)
Aim & Capacity::	Flow CZ <-> AT with additional capacity of 201.4 GWh/d
Commissioning	Planned 2024 *(Source: Gas Connect Austria)*

The implementation of this project would create entirely new transport capacities between the Austrian and Czech markets and consequently their virtual trading points. In addition to further market integration, planned market connection concepts and new flexibilities for network users, BACI also makes a decisive contribution to the realization of the "North-South" corridor. Through the implementation of the projects North Stream II and EUGAL, gas can be transported from the merged market areas in Germany to Austria via Czech Republic in the future.

TRU is a new and dedicated service to connect the Austrian and Czech gas markets through offering additional connections. TRU has been set up by Gas Connect Austria together with the Czech transmission system operator NET4GAS, s.r.o. ("NET4GAS") and had been marketed for the first time at the annual auction on July 2nd2018. By now, TRU is also offered on daily basis.

The following figure shows the basic use of TRU.

Figure 19: TRU operating principle and application

Source: Gas Connect Austria

TRU offers customers a new possibility of transporting gas through a connection between the Austrian market area east and the Czech market area. Existing infrastructure enables simultaneous access to the virtual trading points of both market areas. TRU is represented in the daily business by a standardized nomination: with a TRU nomination in Austria at Gas Connect Austria, the transport from the Austrian market area East to the Czech market area are conducted on a firm basis and with a TRU nomination at NET4GAS in the other direction also on a firm basis.

The TRU pilot project will end as planned on 01 October 2019. Afterwards, the evaluation by the project sponsors Gas Connect Austria and NET4GAS will be carried out.

3.5.3 Connection DE-AT: Additional offered capacity

From April 2017 to July 2017, Gas Connect Austria, together with the German transmission system operators bayernets GmbH ("bayernets"), GRTgaz Deutschland GmbH and Open Grid Europe GmbH, carried out a market demand analysis for the joint coupling points Oberkappel and Überackern. As a result, there was a non-binding demand for FZK capacity at the Überackern SUDAL entry point of around 2,500 MWh/h, which the Austrian side of the interconnection point cannot sustain in terms of available capacity. As a result, project GCA 2015/02a Entry Überackern was submitted and approved as part of the CNDP17.

Subsequently, for the annual auction on 2ndJuly 2018, the Gas Connect Austria and bayernets offered this incremental capacity for auction by for the coupling point Überackern 2/Überackern SUDAL in the direction DE -> AT in accordance with Article 29 NC CAM.

However, no obligatory bookings were made in the auctions, according to this negative profitability check the market currently does not seem able to sustain the additional costs of the higher capacity offered at the Austrian virtual trading point (VHP).

Further optimization of the underlying technical measures aimed at reducing costs and hence future tariffs have resulted in the GCA 2018/01 Überackern - Oberkappel project (see Chapter 5.4.3) being submitted for approval within the 2018 CNDP and approved by the Authorities.

In the past, the prices at the German gas market NCG VTP were mostly lower than the ones at the Austrian gas market CEGH VTP, whoever the influence of the market area merger in Germandy on the prices cannot be predicted currently.

3.5.4 LNG Corridor

Originally, the LNG Krk project aimed to assure the supply reliability of 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 Union. This cluster describes a project intended to ensure gas transport from the Croatian LNG

terminal to neighboring countries. Concerning the individual projects, this initiative only intended to transport LNG gas to Italy and Slovenia, but not to Hungary.

The European commission created and published in 2015 the second PCI list. The LNG KRK project still occupied Cluster 6.5 but was called: „Cluster Krk LNG terminal and evacuation pipelines towards Hungary and beyond“. The projects towards Italy and Slovenia were no longer included. The expansion of the liquid markets in AT and IT were apparently not pursued any further at that time, but a route towards Hungary was devised for the first time.

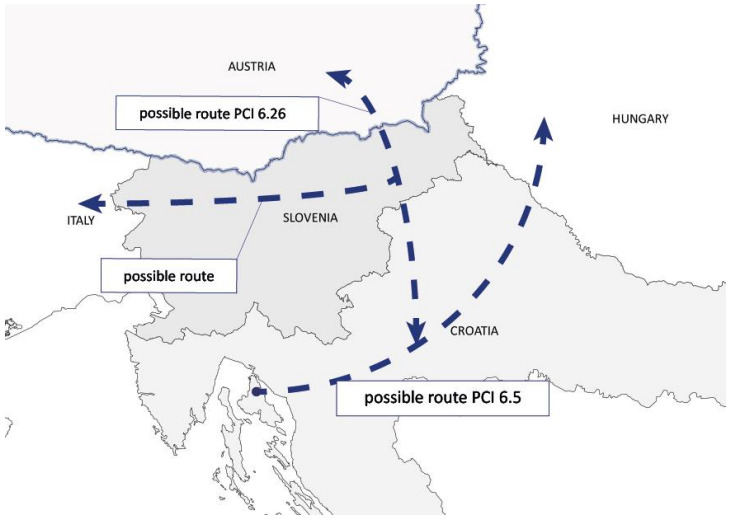
The LNG Krk project was also included in the third (and currently valid) PCI List from 2017. The designation of Cluster 6.5 stayed nearly the same: „Cluster Krk LNG terminal with connecting and evacuation pipelines towards Hungary and beyond“. The LNG KRK project became more refined having detailed quantities for the first time. In August 2018, Plinacro started the project 6.5.5. Compressor station 1 (in Velika Ludina) with a capacity of 4.5MW and 201,000 Nm^3/h, which is required for ensuring the guaranteed capacity at the Croatian Hungarian border crossing point Drávaszerdahely. With the completion of the project, 0.5 bcm/a can be transported from Croatia to Hungary.

In April 2019, the construction of the Omisalij-Zlobin pipeline began, connecting the LNG Krk terminal with the currently existing Croatian transmission system. In autumn 2020, the construction of the 18 km long pipeline should be finished. The commissioning of the LNG terminal is scheduled with 01 January 2021, with a capacity of 2.63 bcm/a.

The PCI Cluster 6.26, which has also relevance for the Austrian market is also linked to Cluster 6.5. It contains projects to strengthen the transmission system infrastructure between Austria, Slovenia und Croatia, Gas Connect Austria project GCA 2018/08„Entry/Exit Murfeld“being one of them.

An additional source of LNG with the Terminal in Krk connected to the liquid Austrian gas hub CEGH would be practical and beneficial in order to fulfill the aim of the European Union of efficiently strengthening the internal energy market.

Figure 20: LNG corridor and possible and preferred routes



Source AGGM; 2019

3.5.5 ROHUAT and HUSKAT corridor with the source black sea region

As an integral part of the PCI corridor "NSI East Gas", the Cluster Bulgaria-Romania-Hungary-Austria will primarily make the resources of the Black Sea region more accessible to the already mentioned countries. This would further contribute to the diversification of gas sources and the import independence of Europe. The Cluster plans to enable a bidirectional increase of capacity on the Bulgarian-Romanian-Hungarian-Austrian route (known as „ROHUAT“or „BRUA“). In the first phase, the capacity should increase to 1.75 billion m³/year and in the second phase to 4.4 billion m³/year.

The following projects should be realized as part of the PCI projects PCI 6.24.1 & 6.24.4 ROHUAT/BRUA (first and second phase):

Hungary (First phase):

Infrastructure:	New compressor station Csanádpalota (2 x 4.5 MW)
Aim & Capacity:	Flow HU <-> RO with additional capacity of 48.9 GWh/d
Commissioning:	Planned end of 2019

Romania (First Phase)

Infrastructure:	New transmission pipeline Podișor — Recas (DN800, 63 bar, 479 km) 3 new compressor stations (Jupa, Bibești and Podișor)
Aim & Capacity:	Flow RO -> HU with additional capacity of 50.6 GWh/d Flow RO -> BG with additional capacity of 29.3 GWh/d
Commissioning:	Planned end of 2019 (Construction started 06/2018)

Austria (First phase):

GCA 2015/05 Mosonmagyaróvár (See also Chapter 5.4.5 for further information)

Infrastructure:	Adaption of cross border station Mosonmagyaróvár New compressor station on HAG
Aim & Capacity:	Flow HU -> AT with additional capacity of 153.1 GWh/d
Commissioning:	Planned 2024 (*Source: Gas Connect Austria*)

Hungary (Second phase):

Infrastructure:	New transmission pipeline Városföld – Ercsi - Győr (DN1000, 100 bar, 210 km) New transmission pipeline Ercsi – Szazhalombatta (DN800, 63 bar, 11 km) Adaption of compressor station Csanádpalota/Algyö (1 x 4.5 MW) New compressor station Városföld (5.7 MW)
Aim & Capacity:	Flow HU -> AT with additional capacity of 153 GWh/d Flow AT -> HU with additional capacity of 25 GWh/d Flow HU <-> RO with additional capacity of 76.5 GWh/d
Commissioning:	Planned 2024 (*Source: Gas Connect Austria*)

Romania (Second phase)

Infrastructure:	New transmission pipeline Recas - Horia (DN800, 63 bar, 50 km) Adaption of compressor stations (Jupa, Bibești and Podișor)
Aim & Capacity:	Flow RO -> HU with additional capacity of 75.9 GWh/d Flow HU -> RO with additional capacity of 78.1 GWh/d
Commissioning:	Planned 2022

Infrastructure:	New transmission pipeline Black Sea – Podișor (DN1200/1000, 308 km)
Aim & Capacity:	Access to natural gas resources in the Black Sea region
Commissioning:	Planned 2020

The transported gas volumes are primarily coming from new resources from Black Sea reservoirs to be developed as part of an upstream initiative. The pipeline runs through the already mentioned countries Romania, Hungary and Austria, not only by building new piplines but also by using part of the existing grid with some capacity increases at relevant points.

ROHUAT

To implement this transport corridor, Gas Connect Austria, together with the Hungarian transmission system operator FGSZ Zrt. (“FGSZ”) and the Romanian transmission system operator Transgaz S.A., prepared a joint binding allocation process for gas transport from Romania via Hungary to Austria. However, FGSZ withdrew from the project, forcing a situation in which allocation would apply to the Romanian/Hungarian cross-border interconnection point only. This process is being implemented as the “ROHU” alternative allocation process, while the open process for the "HUAT” Hungarian/Austrian interconnection point is in the course of settlement according to the standard process for the allocation of incremental capacity stated in the Network Code on Capacity Allocation Mechanisms (NC CAM).

Despite the unilateral withdrawal from binding allocation for the “ROHUAT” corridor project by the Hungarian transmission system operator FGSZ Zrt. („FGSZ“) immediately before the scheduled start of capacity allocation, non-binding demand for transport capacity of gas from the Black Sea region to the central European gas hub at Baumgarten is rising. In addition to the incremental capacity of around 6,400 MWh/h per year that “ROHUAT” would provide, the market demand assessment carried out by Gas Connect Austria and its neighbouring transmission system operators between 6 April 2017 and 1 June 2017 revealed non-binding demand for another 4,700 MWh/h per year at the Mosonmagyaróvár interconnection point. This demand was apparent on both sides of the interconnection point in the Hungary to Austria flow direction. Gas Connect Austria and FGSZ therefore conducted technical studies in accordance with Article 27 of the Network Code on Capacity Allocation Mechanisms in order to design incremental capacity projects and coordinated offer levels.

From 19 October 2017 to 19 November 2017, FGSZ and Gas Connect Austria carried out a binding, joint and public consultation on the draft proposal for the incremental capacity project. It

comprises two coordinated offer levels of approximately 10,000 MWh/h per year and 5,700 MWh/h per year.

Based on non-binding demand, Gas Connect Austria worked with the Slovakian transmission system operator Eustream a.s. ("Eustream") and the Hungarian transmission system operator Magyar Gaz Transit Zrt. ("MGT") to develop the "HUSKAT" alternative transport corridor (as an alternative to the direct route from Hungary to Austria – "HUAT"). This route goes via the Hungarian and Slovakian entry/exit systems to the central European gas hub at Baumgarten.

While the Austrian regulatory authority ultimately approved per notice from 27 April 2018 the HUAT project proposal submitted by Gas Connect Austria and so gave the green light for system users to select their preferred transport route – either "(RO)HUAT" or "HUSKAT". Nevertheless, the Hungarian regulatory authority did not approve FGSZ's corresponding proposal for an incremental capacity project at the Mosonmagyaróvár interconnection point.

As a result of these diverging decisions of the two national regulatory authorities, the decision on the HUAT project was brought to the next higher instance, ACER, in accordance with Articles 7 (7) and 8 (1) (a) of Regulation (EC) No 713/2009. As part of this process, on 09 April 2019, ACER published the decision that Gas Connect Austria and FGSZ should offer the incremental capacities to the market at the interconnection point Mosonmagyaróvár in accordance with Articles 11 and 29 of the NC CAM in the already mentioned bid levels at the annual acution. As a result, FGSZ as well as the Hungarian regulator have made use of their right to appeal against this decision, which had no suspensive effect. Therefore, Gas Connect Austria offered the incremental capacity in Mosonmagyaróvár at the annual auction via the capacity booking platform "Regional Booking Platform" on 01 July 2019. However, despite the decision 05/2019 by ACER no offer was set up by FGSZ and because of that, the incremental auction at Mosonmagyaróvár could not have been carried out accordingly. The board of complaint at ACER rejected the complaint by FGSZ and the Hungarian regulation authority in the decisicion from 6 August 2019, which was publisched on 20 August 2019 on the website of ACER.

HUSKAT

In October 2017, Gas Connect Austria and the Slovak transmission system operator Eustream received non-binding capacity demand requests of approximately 4,648 MWh/h per year for the Baumgarten interconnection point for the period from 2022 to 2037 in the Slovakia to Austria flow direction. The non-binding capacity demand can be covered on the Austrian side of the Baumgarten interconnection point by existing capacity, but cannot be covered by existing capacity on the Slovak side. The market demand assessment also showed corresponding demand at the Slovak/Hungarian interconnection point at Veľké Zlievce/Balassagyarmat.

Although this demand was submitted after the market demand assessment reporting period was over, the transmission system operators opted to address it in the market demand assessment for the current incremental capacity process. Therefore, Gas Connect Austria, together with Eustream and the operator of the Hungarian-Slovak interconnector, MGT, developed an alternative capacity allocation mechanism in accordance with Article 30 of the NC CAM. Unlike the standard incremental capacity procedure, under which transport customers are tied to the

rigid rules relating to ascending clock auctions and as such are “price takers”, here capacity is allocated according to customers’ actual willingness to pay. As with the corridor project at the Mosonmagyaróvár entry point the “HUSKAT” project also gives transport customers a special right to terminate contracts to enable them to synchronise their transport portfolios with other relevant projects it the Southern Corridor region.

The allocation mechanism allowed customers to submit bids for booking capacity at both interconnection points in a total of four rounds from 27 July 2018 to 30 April 2019. After successful booking in bid window II, however, the market participants made use of their special right of withdrawal. On 03 May 2019, the transmission system operators in charge reported that the economic test of bid window IV was also negative, thus completing the project under the HUSKAT procedure, with the result that no interconnection capacity between Hungary, Slovakia and Austria was allocated.

HUSK – Expansion of the interconnector HU-SK

On 30 April 2019, eustream and Magyar Gaz Transit (hereafter “MGT”) published the announcement that the HUSK corridor, therefore excluding Baumgarten, will be offered at the annual auction on 01 July 2019 in accordance with Article 29 of the NC CAM.

The development of the Balassagyarmat (HU) / Velké Zlievce (SK) interconnection point between Hungary and Slovakia aims to increase technical capacity in both directions. Althought the auction ended without any capacity allocation, the selected procedure by eustream and MGT, which was also approved by the respective national regulating authorities in charge. This offers a useful precedence for future incremental proceses: the auction of new incremental capacities was justified based on the steps of article 26 and 27 of the NC CAM of a different, namely the HUSKAT, procedure. Such an approach can contribute positively in order to respond fast and flexibly to shortly amended market demands.

PCI 6.2.13 Enhancement of Transmission Capacity of Slovak-Hungarian interconnector

Infrastructure:	New compressor station in Szada (HU) 2x 7.5 MW
Aim & Capacity:	Flow HU -> SK with additional capacity of 102 GWh/d Flow SK -> HU with additional capacity of 26 GWh/d
Commissioning:	Planned 2022

3.5.6 Excursus - Sales restrictions at the point Mosonmagyaróvár

Limited by obligation to bundle. After the Hungarian regulatory authority had temporarily prohibited the Hungarian transmission system operator FGSZ from marketing any annual capacity in the course of the 2017 annual auctions, Gas Connect Austria was only able to offer bundled capacities for a period of 2 years instead of 15 years due to the bundling obligation of the Regulation (EU) 2017459 (“NC CAM). The marketing of annual capacity was again significantly restricted by a decision of the Hungarian regulatory authority in 2018, so that only 19% of the capacity available on the Austrian side of the interconnection point could be offered.

Less of the same. For the auctions for annual capacity on 2nd July2019, the Hungarian regulatory authority again issued retention quotas above those set out in Article 8 of the NC CAM. For the gas years 2021 to 2023, retention quotas of 50% of technical capacity were set instead of the 10% set out in the NC CAM, and for the gas years 2024 to 2033, retention quotas of 100% (sic!) were set instead of the 20% set out in the NC CAM. As in the previous year, the Austrian regulatory authority also fixed identical quotas for the Austrian side of the Mosonmagyaróvár interconnection point by official decision. In addition to the bundled allocation already restricted by the Hungarian decision, this would have meant that Gas Connect Austria would not have been able to offer unbundled annual products from the gas year 2021, but the Hungarian transmission system operator FGSZ would have been. Gas Connect Austria therefore had no other choice than appealling the decision. Nevertheless, due to the bundling obligation and the setting of quotas on the Hungarian side, only 23% of the capacity available on the Austrian side of the tying point could be offered.

Core business. Gas Connect Austria regards this renewed intervention in its core business, namely the marketing of cross-border transports, as conflicting with European legislation, in particular with regard to the obligation to bundle capacity allocation mechanisms in accordance with Article 19 of the NC CAM. The Hungarian regulatory authority's argument is the following:

> *„Uncertainty regarding future gas flow directions and the liquidity of the regional markets means that traders active in the region without sources guaranteed by long term contracts could only book capacities by accepting larger than usual levels of risks. On the other hand, those companies possessing information advantages with regard to prospective gas flows and routes have a competitive advantage compared to other traders. This situation may create a possibility for downstream market foreclosure. Well-informed traders can book large part of the marketed import capacities, while other traders are forced to postpone capacity booking decisions until the supply patterns get clear. Consequently, the shippers with no or limited information can only book the remaining capacities and they would be likely to pay congestion premiums, thus suffering a competitive disadvantage to the shippers contracting long termcapacities".*[3]

In addition, the Hungarian regulatory authority simultaneously supports projects for new capacity to be created, such as "ROHU" or "HUSKAT (see 3.5.5 chapter), although these capacities could also trigger market foreclosure if the Hungarian line of argument is followed. Gas Connect Austria, on the other hand, takes the view that the market alone should decide on the use of existing transport routes by means of auctions for existing capacity and/or on the realisation of new transport corridors by means of auctions for newly created capacity. The task of the transmission system operators in association with the regulatory authorities is therefore to create and maximise opportunities for market participants.

[3] Public Consultation in relation to the level of capacities to be offered at the 2019 yearly capacity auctions with regards to the AT-HU and SK-HU interconnection points, Page 3f, 6 Mai 2019, HUNGARIAN ENERGY AND PUBLIC UTILITY REGULATORY AUTHORITY

3.5.7 Southern Gas Corridor with sources Azerbaijan/Turkmenistan

This new corridor starting in 2020 will transport a minimum of 10 billion m³/year and up to 20 billion m³/year, by 2026, from the Caspian region via Georgia (South Caucasus Pipeline "SCP" and South Caucasus Expansion Pipeline "SCPX") and Turkey (Trans-Anatolian Pipeline "TANAP"). This project is on the third PCI list as a priority corridor and consists of two PCI projects. PCI 7.1.1. represents the pipelines from the Caspian region and PCI 7.1.3. describes the construction of the connection from the Turkish border to Italy. This connection, called the Trans-Adriatic Pipeline (TAP), is currently one of the largest gas infrastructure projects alongside North Stream 2, to create new import capacities towards Europe and thus diversifying sources. The 878 km long pipeline through Greece, Albania towards Italy is currently under construction and already 90% completed. The primary source will be the Shah Deniz gas condensate field in Azerbaijan with an expected initial volume of approximately 1000 billion m³ of gas and approximately two billion barrels of gas condensate. The production capacity currently stands at around 11 billion m³/year of gas and can be expanded by additional 16 billion m³/year. In addition, the sources in Turkmenistan should be opened up via the Trans-Caspian Gas Pipeline (TCP).

Currently Italy does not have a sufficient interconnection between the north and the south to transport these additional quantities of gas to the northern parts of the country completely. Therefore, according to the Italian network development plan, a new north-south pipeline called "Adriatica Pipeline" (Minerbio - Sulmona, DN 1200, about 470 km) and a new compressor station (about 33 MW) are planned for an intended commissioning 2024[4].

In addition to Italy, Bulgaria will also be integrated by this corridor with the project PCI 6.8 Interconnection Greece-Bulgaria via the new IGB pipeline. This project (182 km, DN800, bidirectional), with a planned start of construction in September 2019 and commissioning in 2021, has a capacity of 3 billion m³/year and is expandable up to 5 billion m³/year. Its primary focus is to increase the security of supply of Bulgaria and further Southeastern Europe. According to the operator IGB AD, the integration of gas markets will be increased by further cross - border projects between Bulgarian - Romania and Romania - Hungary. It does not mention an integration of the liquid Austrian market.

Croatia can also be connected to this corridor via the 2018 TYNDP project Ionic-Adriatic-Pipeline "IAP" TRA-N-68 (516 km, DN800). The project is already two years behind schedule and the likelihood of implementation is low as the region could be supplied directly from Russia via Bulgaria and Hungary through the currently built Turkstream project.

3.5.8 Corridor TR-BG-SRB-HU - Turkstream

The dual pipeline called Turkstream built by Gazprom leads from Russia through the Black Sea to Turkey. The first strand of the pipeline should supply the Turkish market with Russian gas, and

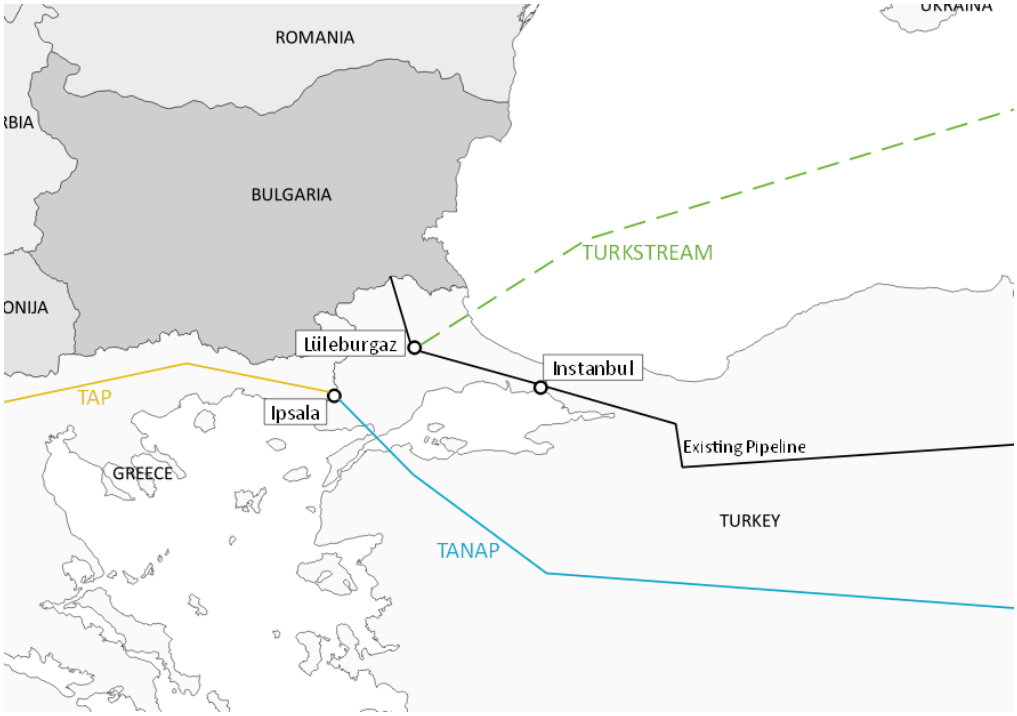
[4] Ten-year development plan of the natural gas transmission network 2017 – 2026; Page 57 and 65

the second strand, in conjunction with a new transmission pipeline in Turkey to the neighbouring countries, will supply the South and Southeastern European region.

The construction of the 930 km long pipeline began in May 2017, and the route through the Black Sea was completed in November 2018. Commissioning is planned for the end of 2019 and therefore the two pieplines can transport up to 31.5 billion m³/year of gas.

Peak demand in the Eastern distribution area was measured at 2,386,000 Nm³/h in February 2012. This high demand was due both to a prolonged cold spell and high levels of electricity generation. Demand was at a similarly high level in January 2017 (clearing values: 2,233 kNm³/h). The demand scenarios considered in the LTP 2018 are based on this historical peak demand value recorded in February 2012.Figure 18 shows actual hourly flow rates and development of the maximum hourly flow rate in the eastern distribution area over the period from 2004 to 2029. The chart shows future maximum hourly flow rates for the three scenarios defined.

Figure 21: Turkstream Corridor



Source: AGGM

This is partly due to the development of the Eastring Project, which foresees a new bidirectional pipeline from the Turkish-Bulgarian border to Romania and Hungary up to Slovakia until 2023, as well as projects to upgrade the network within Bulgaria. This project (TRA-N-1197 in the 2019 TYNDP) schedules a new DN 1200 pipeline in northwestern Bulgaria connecting to Serbia. At the same time, a 400 km long pipeline to the Hungarian interconnection point Horgoš will be built in Serbia by the system operator Gastrans and should be completed by the beginning of 2020. Thus, part of the Russian gas ends up in Hungary increasing its role as a gas hub. In order to allow direct access to the Austrian gas market with its liquid gas hub, Gas Connect Austria launched the project "GCA 2015/05 Entry Mosonmagyaróvár" (see chapter 3.5.5 and 5.4.5).

3.6 Implemented projects of the 2018 CNDP

The projects listed in Table 6 have been approved within former CNDP and had been implemented during the last planning period. These projects are not part of the current 2019 CNDP anymore.

Table 6: Implemented projects during the last planning period (8/2018 to 8/2019).

Project type*	Project owner	Project number	Project name
K	GCA	2015/07b	Additional Demand in Distribution Area +
K	GCA	2015/10	Entry Arnoldstein
E	GCA	2017/E4	Extension of Baumngarten Substation TAG NOxER 2
E	GCA	2017/E6	SOL Revamp
E	TAG	2015/R04	NOxER II
E	TAG	2017/R02-D	Major Overhaul Valve Station Ludmannsdorf
E	TAG	2017/R06	DLE 1.5 + 72 hole PT module RC400 in CS-Ruden
E	TAG	2017/R07	Gas Generator BC800 in CS-Baumgarten

*) C – Project for additional capacities; R – Replacement investment project

Source: Gas Connect Austria, TAG GmbH, AGGM; 2019

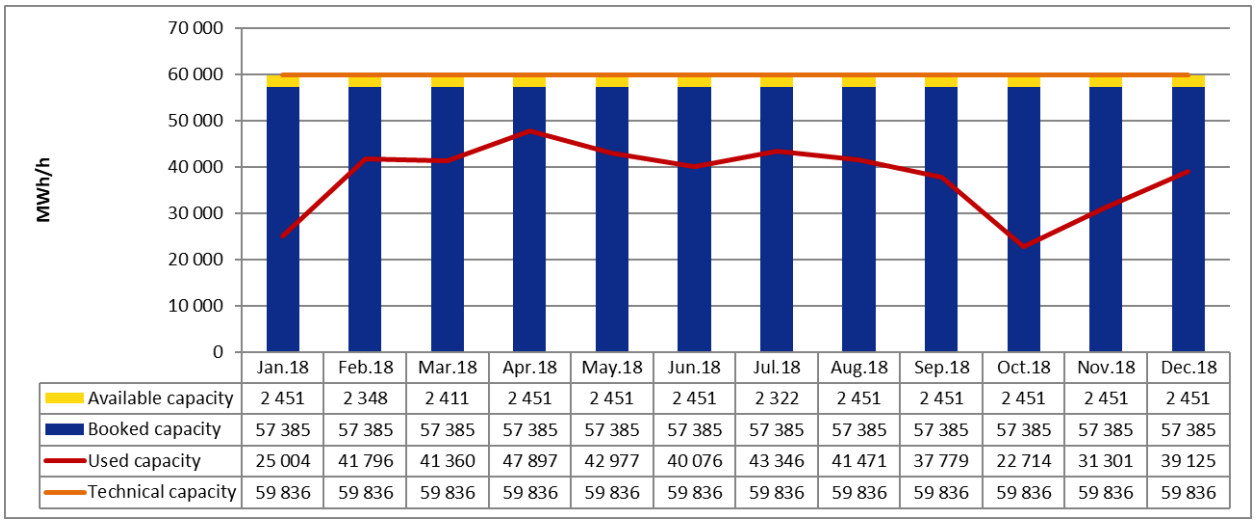
4 Capacity Demand

4.1 Capacity booking and capacity usage – 2018 status report

Figure 22 to Figure 33 show technically marketable capacity, available capacity, booked capacity and used capacity for each point and direction from 1 January 2018 to 31 December 2018.

Fluctuations of technically marketable capacity are attributable to maintenance work that restricts capacity. The current maintenance work schedules of the transmission system operators are available from the Gas Connect Austria website **here** and on the TAG GmbH website **here**.

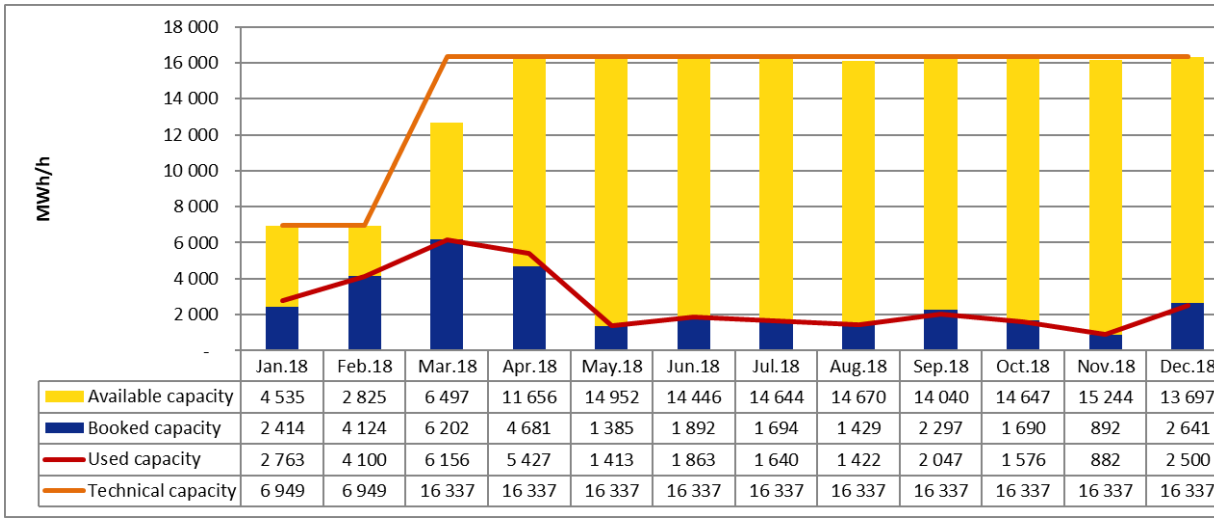
Figure 22: TAG GmbH - Entry Baumgarten TAG



	Jan.18	Feb.18	Mar.18	Apr.18	May.18	Jun.18	Jul.18	Aug.18	Sep.18	Oct.18	Nov.18	Dec.18
Available capacity	2 451	2 348	2 411	2 451	2 451	2 451	2 322	2 451	2 451	2 451	2 451	2 451
Booked capacity	57 385	57 385	57 385	57 385	57 385	57 385	57 385	57 385	57 385	57 385	57 385	57 385
Used capacity	25 004	41 796	41 360	47 897	42 977	40 076	43 346	41 471	37 779	22 714	31 301	39 125
Technical capacity	59 836	59 836	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)

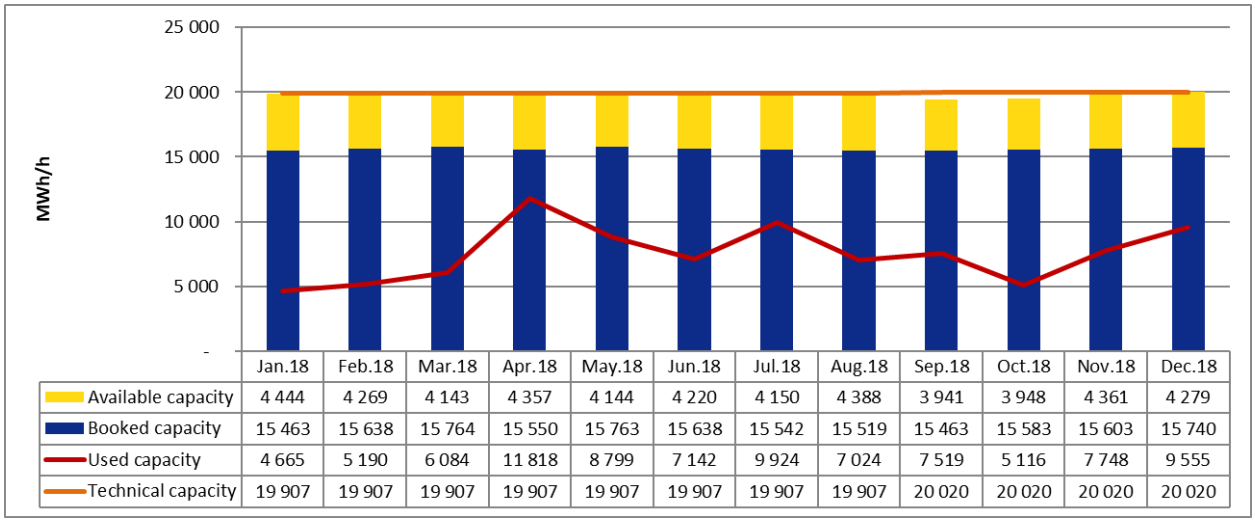
Figure 23: Gas Connect Austria - Entry Baumgarten GCA



	Jan.18	Feb.18	Mar.18	Apr.18	May.18	Jun.18	Jul.18	Aug.18	Sep.18	Oct.18	Nov.18	Dec.18
Available capacity	4 535	2 825	6 497	11 656	14 952	14 446	14 644	14 670	14 040	14 647	15 244	13 697
Booked capacity	2 414	4 124	6 202	4 681	1 385	1 892	1 694	1 429	2 297	1 690	892	2 641
Used capacity	2 763	4 100	6 156	5 427	1 413	1 863	1 640	1 422	2 047	1 576	882	2 500
Technical capacity	6 949	6 949	16 337	16 337	16 337	16 337	16 337	16 337	16 337	16 337	16 337	16 337

Source: AGGM platform

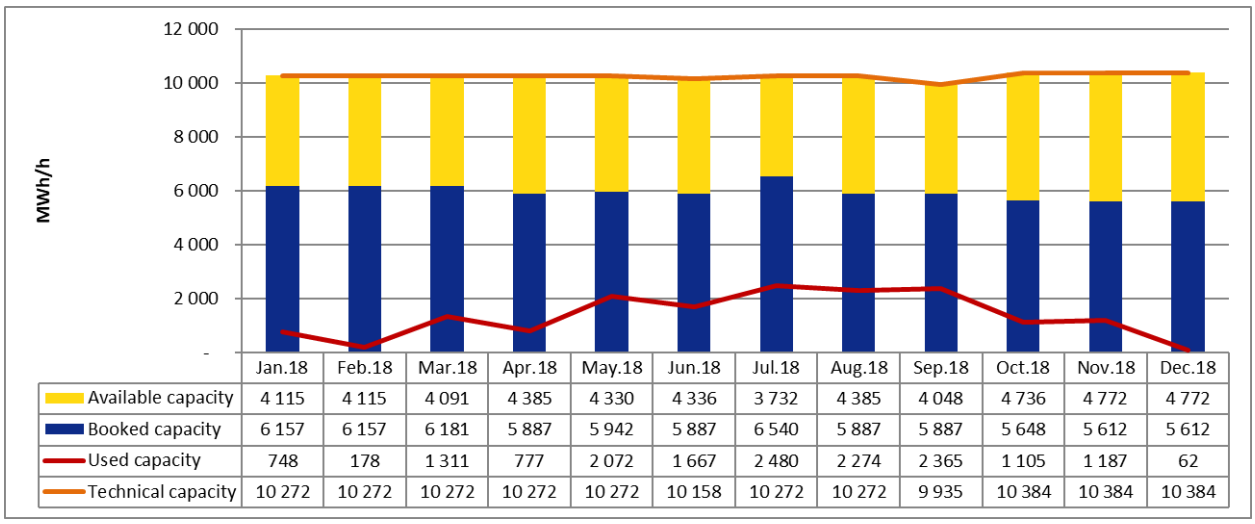
Figure 24: Gas Connect Austria - Entry Baumgarten WAG



	Jan.18	Feb.18	Mar.18	Apr.18	May.18	Jun.18	Jul.18	Aug.18	Sep.18	Oct.18	Nov.18	Dec.18
Available capacity	4 444	4 269	4 143	4 357	4 144	4 220	4 150	4 388	3 941	3 948	4 361	4 279
Booked capacity	15 463	15 638	15 764	15 550	15 763	15 638	15 542	15 519	15 463	15 583	15 603	15 740
Used capacity	4 665	5 190	6 084	11 818	8 799	7 142	9 924	7 024	7 519	5 116	7 748	9 555
Technical capacity	19 907	19 907	19 907	19 907	19 907	19 907	19 907	19 907	20 020	20 020	20 020	20 020

Source: AGGM platform

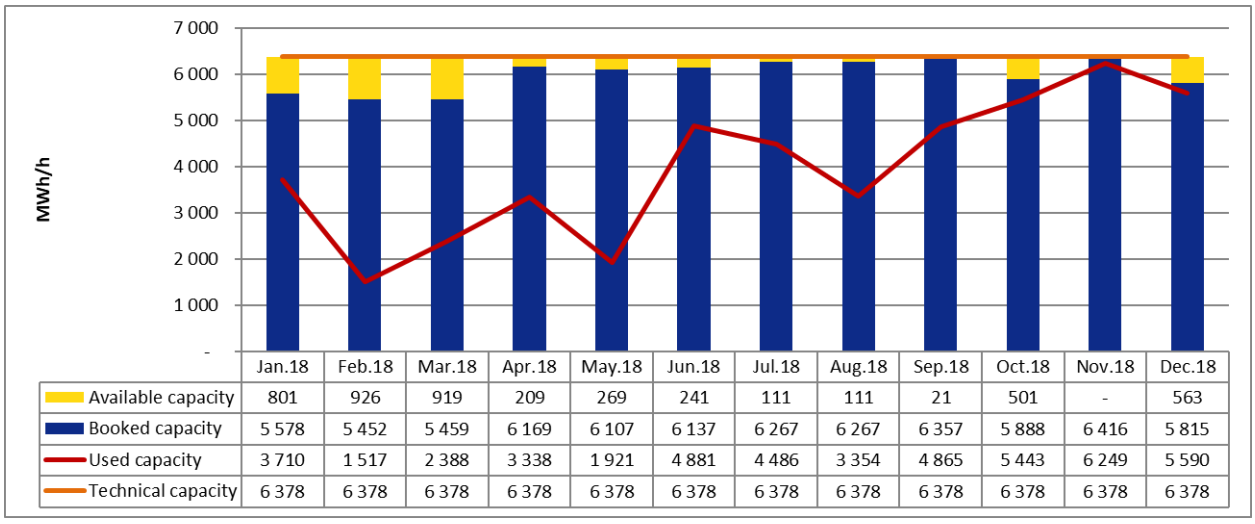
Figure 25: Gas Connect Austria – Exit Baumgarten WAG



	Jan.18	Feb.18	Mar.18	Apr.18	May.18	Jun.18	Jul.18	Aug.18	Sep.18	Oct.18	Nov.18	Dec.18
Available capacity	4 115	4 115	4 091	4 385	4 330	4 336	3 732	4 385	4 048	4 736	4 772	4 772
Booked capacity	6 157	6 157	6 181	5 887	5 942	5 887	6 540	5 887	5 887	5 648	5 612	5 612
Used capacity	748	178	1 311	777	2 072	1 667	2 480	2 274	2 365	1 105	1 187	62
Technical capacity	10 272	10 272	10 272	10 272	10 272	10 158	10 272	10 272	9 935	10 384	10 384	10 384

Source: AGGM platform

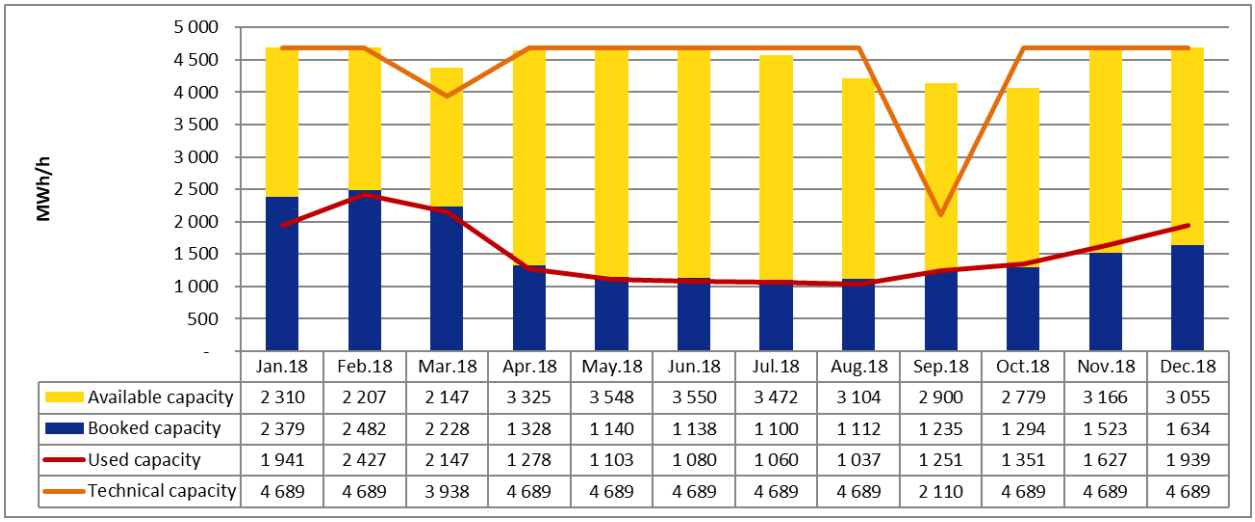
Figure 26: Gas Connect Austria – Exit Mosonmagyaróvár



	Jan.18	Feb.18	Mar.18	Apr.18	May.18	Jun.18	Jul.18	Aug.18	Sep.18	Oct.18	Nov.18	Dec.18
Available capacity	801	926	919	209	269	241	111	111	21	501	-	563
Booked capacity	5 578	5 452	5 459	6 169	6 107	6 137	6 267	6 267	6 357	5 888	6 416	5 815
Used capacity	3 710	1 517	2 388	3 338	1 921	4 881	4 486	3 354	4 865	5 443	6 249	5 590
Technical capacity	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

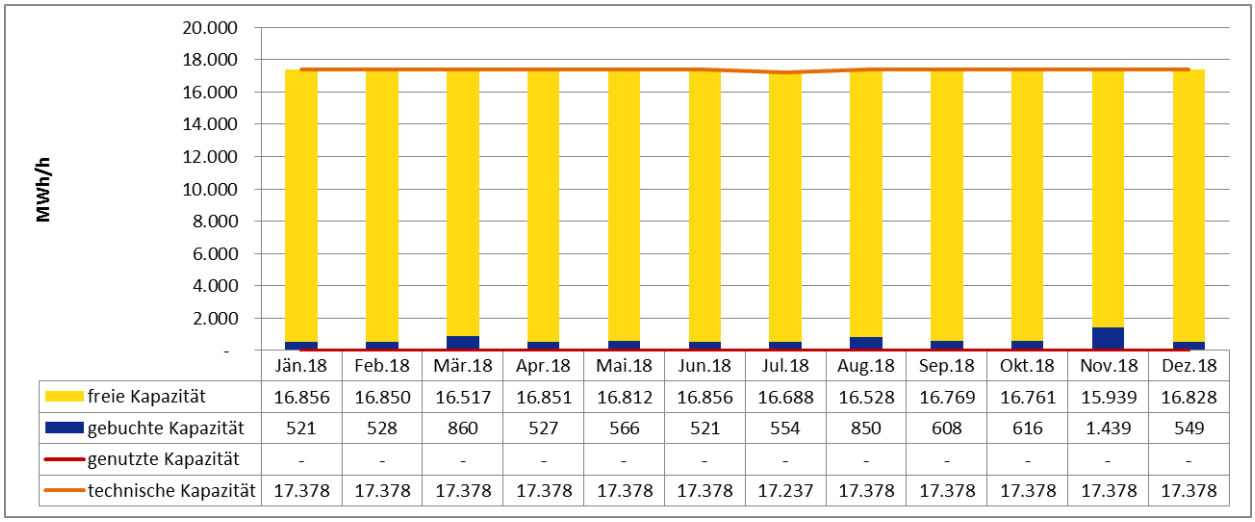
Figure 27: Gas Connect Austria – Exit Murfeld



	Jan.18	Feb.18	Mar.18	Apr.18	May.18	Jun.18	Jul.18	Aug.18	Sep.18	Oct.18	Nov.18	Dec.18
Available capacity	2 310	2 207	2 147	3 325	3 548	3 550	3 472	3 104	2 900	2 779	3 166	3 055
Booked capacity	2 379	2 482	2 228	1 328	1 140	1 138	1 100	1 112	1 235	1 294	1 523	1 634
Used capacity	1 941	2 427	2 147	1 278	1 103	1 080	1 060	1 037	1 251	1 351	1 627	1 939
Technical capacity	4 689	4 689	3 938	4 689	4 689	4 689	4 689	4 689	2 110	4 689	4 689	4 689

Source: AGGM platform

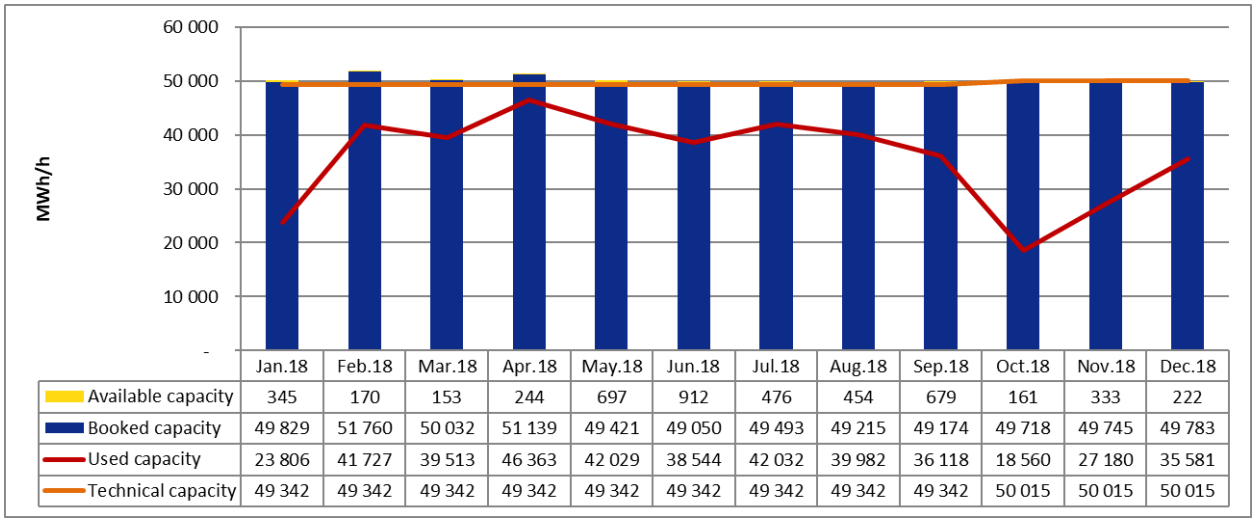
Figure 28: TAG GmbH – Entry Arnoldstein



	Jän.18	Feb.18	Mär.18	Apr.18	Mai.18	Jun.18	Jul.18	Aug.18	Sep.18	Okt.18	Nov.18	Dez.18
freie Kapazität	16.856	16.850	16.517	16.851	16.812	16.856	16.688	16.528	16.769	16.761	15.939	16.828
gebuchte Kapazität	521	528	860	527	566	521	554	850	608	616	1.439	549
genutzte Kapazität	-	-	-	-	-	-	-	-	-	-	-	-
technische Kapazität	17.378	17.378	17.378	17.378	17.378	17.378	17.237	17.378	17.378	17.378	17.378	17.378

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

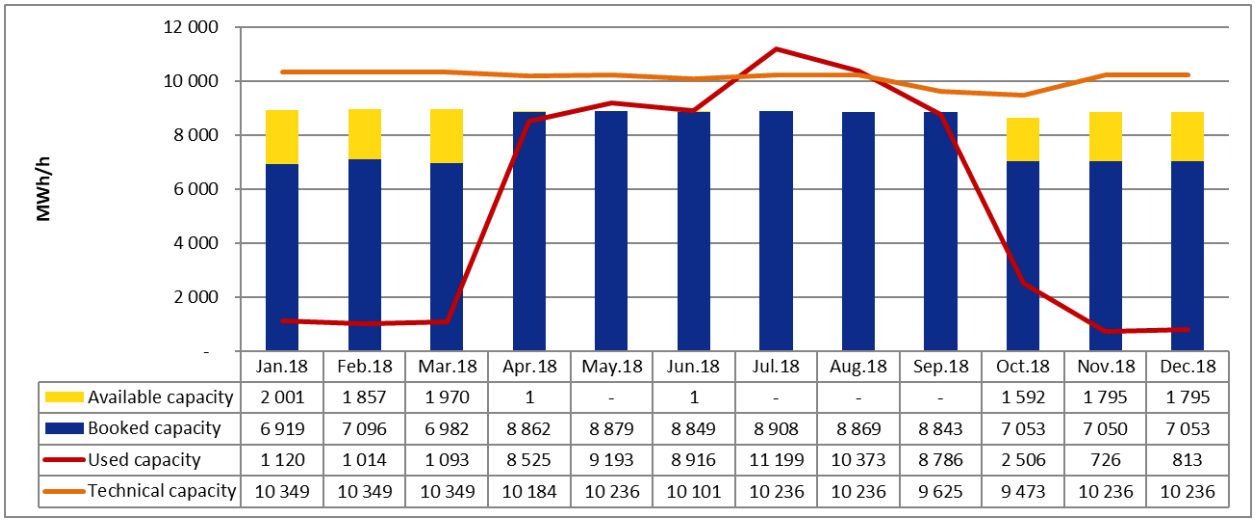
Figure 29: TAG GmbH – Exit Arnoldstein



	Jan.18	Feb.18	Mar.18	Apr.18	May.18	Jun.18	Jul.18	Aug.18	Sep.18	Oct.18	Nov.18	Dec.18
Available capacity	345	170	153	244	697	912	476	454	679	161	333	222
Booked capacity	49 829	51 760	50 032	51 139	49 421	49 050	49 493	49 215	49 174	49 718	49 745	49 783
Used capacity	23 806	41 727	39 513	46 363	42 029	38 544	42 032	39 982	36 118	18 560	27 180	35 581
Technical capacity	49 342	49 342	49 342	49 342	49 342	49 342	49 342	49 342	49 342	50 015	50 015	50 015

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

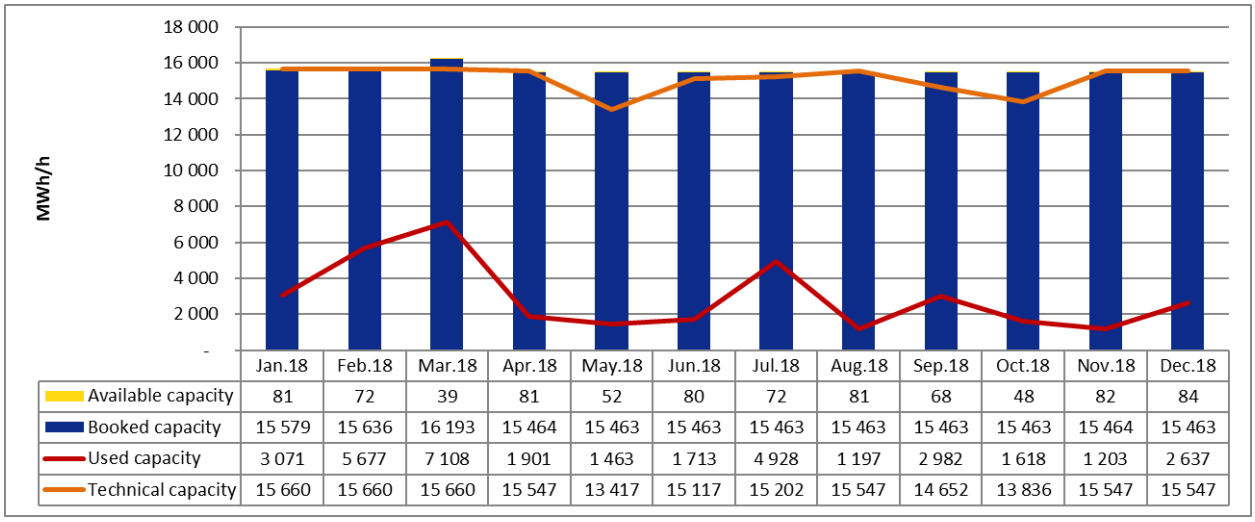
Figure 30: Gas Connect Austria – Entry Oberkappel



	Jan.18	Feb.18	Mar.18	Apr.18	May.18	Jun.18	Jul.18	Aug.18	Sep.18	Oct.18	Nov.18	Dec.18
Available capacity	2 001	1 857	1 970	1	-	1	-	-	-	1 592	1 795	1 795
Booked capacity	6 919	7 096	6 982	8 862	8 879	8 849	8 908	8 869	8 843	7 053	7 050	7 053
Used capacity	1 120	1 014	1 093	8 525	9 193	8 916	11 199	10 373	8 786	2 506	726	813
Technical capacity	10 349	10 349	10 349	10 184	10 236	10 101	10 236	10 236	9 625	9 473	10 236	10 236

Source: AGGM platform

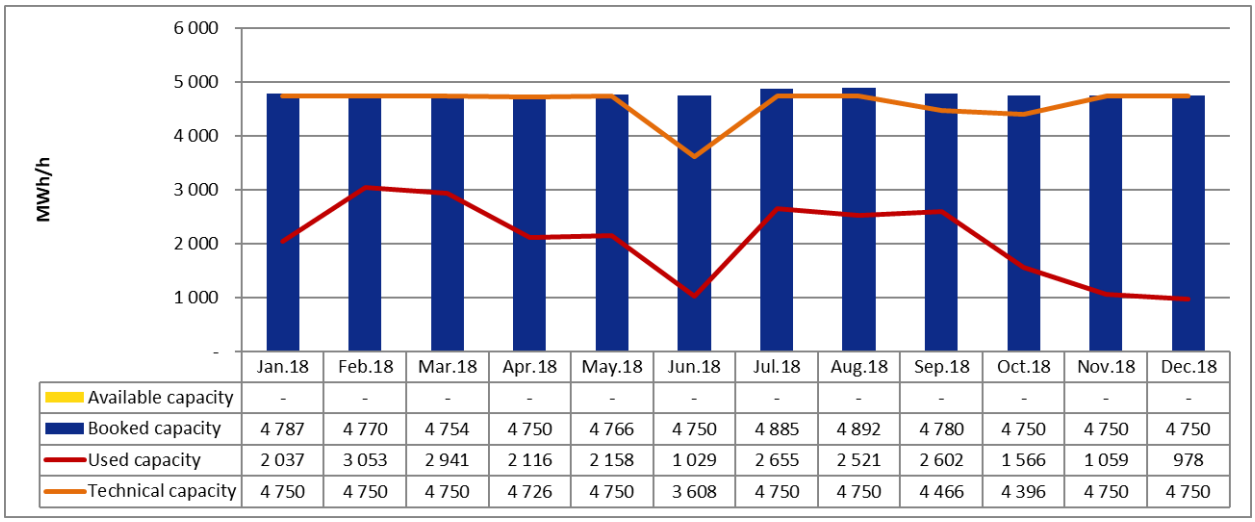
Figure 31: Gas Connect Austria – Exit Oberkappel



	Jan.18	Feb.18	Mar.18	Apr.18	May.18	Jun.18	Jul.18	Aug.18	Sep.18	Oct.18	Nov.18	Dec.18
Available capacity	81	72	39	81	52	80	72	81	68	48	82	84
Booked capacity	15 579	15 636	16 193	15 464	15 463	15 463	15 463	15 463	15 463	15 463	15 464	15 463
Used capacity	3 071	5 677	7 108	1 901	1 463	1 713	4 928	1 197	2 982	1 618	1 203	2 637
Technical capacity	15 660	15 660	15 660	15 547	13 417	15 117	15 202	15 547	14 652	13 836	15 547	15 547

Source: AGGM platform

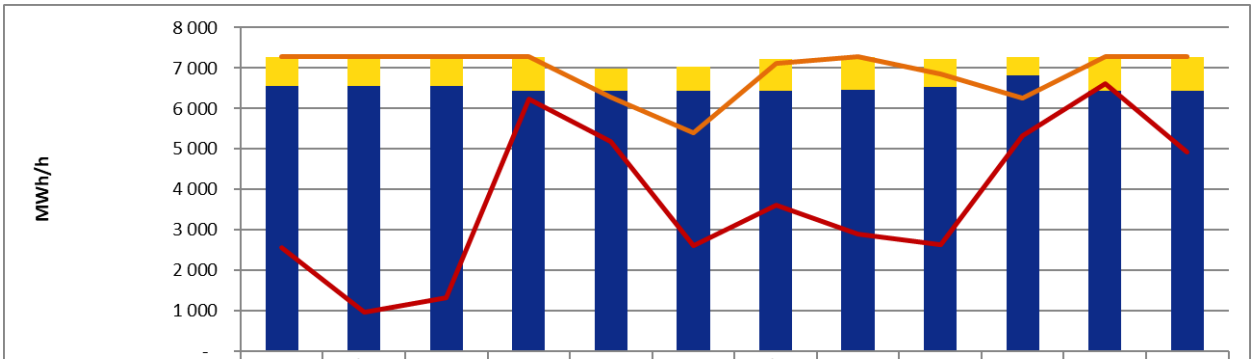
Figure 32: Gas Connect Austria – Entry Überackern ABG/SUDAL



	Jan.18	Feb.18	Mar.18	Apr.18	May.18	Jun.18	Jul.18	Aug.18	Sep.18	Oct.18	Nov.18	Dec.18
Available capacity	-	-	-	-	-	-	-	-	-	-	-	-
Booked capacity	4 787	4 770	4 754	4 750	4 766	4 750	4 885	4 892	4 780	4 750	4 750	4 750
Used capacity	2 037	3 053	2 941	2 116	2 158	1 029	2 655	2 521	2 602	1 566	1 059	978
Technical capacity	4 750	4 750	4 750	4 726	4 750	3 608	4 750	4 750	4 466	4 396	4 750	4 750

Source: AGGM platform

Figure 33: Gas Connect Austria – Exit Überackern ABG/SUDAL



	Jan.18	Feb.18	Mar.18	Apr.18	May.18	Jun.18	Jul.18	Aug.18	Sep.18	Oct.18	Nov.18	Dec.18
Available capacity	723	723	715	840	541	600	792	820	688	436	842	842
Booked capacity	6 550	6 550	6 558	6 433	6 433	6 431	6 441	6 454	6 525	6 827	6 431	6 431
Used capacity	2 556	972	1 323	6 236	5 191	2 604	3 606	2 900	2 642	5 318	6 611	4 917
Technical capacity	7 274	7 274	7 274	7 274	6 277	5 406	7 122	7 274	6 855	6 249	7 274	7 274

Source: AGGM platform

4.2 Capacity scenario for the 2019 CNDP

4.2.1 Submitted capacity demands and resulting capacity scenario

During reconcilement of the CNDP process with the NC CAM process, it concluded in coordination with E-Control Austria that the last capacitiy demands from the NC CAM process are considered for the current CNDP in order to keep the consistency. Additionally, demands from the distribution system side, strategic projects by the transmissions system operators or requirements by the regulation authority will be considered as well as the capacity demands from current PCI Projects.

The market area manager in cooperation with the transmission system operators have aggregated the submitted demands and created the resulting capacity scenario for the 2019 CNDP. The capacity scenario is illustrated in Figure 34.

The capacity demand is divided into four categories:

- Capacity requirements arising from the 2017 market demand assessment in accordance with NC CAM: These capacity requirements were submitted by the shippers and are marked in Figure 34 in yellow.
- Capacity requirements based on project data collection including PCIs. These capacity requirements are marked in Figure 34 in green.
- Capacity requirements which were submitted previously and are currently in the implementation phase. These capacity requirements are marked in Figure 34 blue.
- Capacity demand included in the planning by the transmission system operators themselves or in order to meet requirements imposed by the authority. These capacity requirements are marked in Figure 34 in grey.

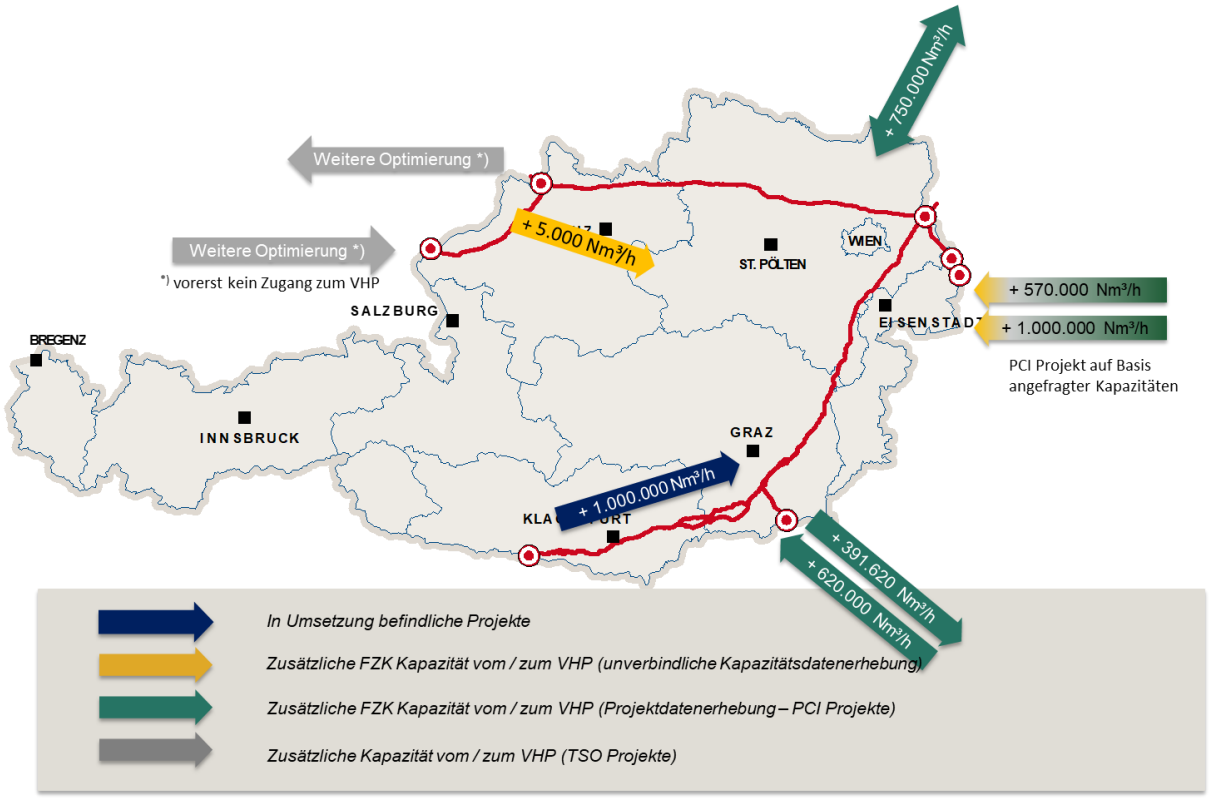
The capacity scenario had been presented to E-Control Austria on 05 July 2019 and thereafter approved by E-Control Austria.

Table 7: Capacitiy demands of the 2019 capacity scenario

Interconnection Point	Direction	Capacity [Nm³/h]	Origin of the demand
Reintal	Entry/Exit	750,000	PCI 6.4 BACI
Mosonmagyaróvár	Entry	570,000	PCI 6.24.1 ROHUAT
Mosonmagyaróvár	Entry	1,000,000	PCI 6.24.1 ROHUAT and Market demand assesment Gas Connect Austria & FGSZ (6.4.17 till 1.6.17)
Murfeld	Entry Exit	620,000 391,620	PCI 6.26.4
Arnoldstein	Entry	1,000,000	Obligation by national regulation authority E-Control
Peta West	Exit	5,000	Demand of the distribution system
Überackern/Oberkappel	Entry/Exit		Optimization of the transmission system operator

Source: Gas Connect Austria, TAG GmbH, AGGM; 2019

Figure 34: Capacity Scenario



Source: AGGM, Gas Connect Austria, TAG GmbH; 2019

4.2.1 Outlook on the capacity scenario of the 2020 CNDP

According to Article 5 of the NC CAM, on 01 July 2019 the biennial mandatory process for new incremental capacities started. During the time window of 8 weeks within the conduct of the market demand assessment following non-binding demands were reported to the transmission system operators:

Table 8: Non-binding transportation demands from the NC CAM process

System Operator	Direction	Location	Capacity [Nm³/h]	Period [gasyear]
Gas Connect Austria	HU -> AT	Mosonmagyaróvár	114,155	2020 - 2034
Gas Connect Austria	CZ -> AT	Reintal	114,155	2020 - 2034

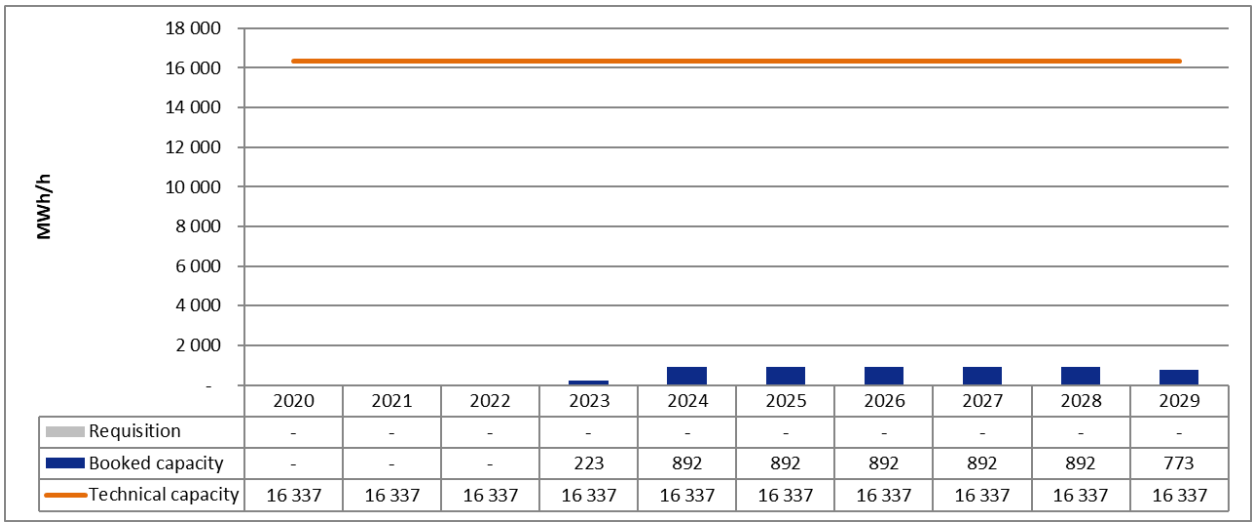
Source: Gas Connect Austria, TAG GmbH, AGGM; 2019

These capacity demands will be taken into account in capacity scenario of the 2020 CNDP next year.

4.2.2 Booked capacities and capacity demand by entry/exit point from 2020 to 2029.

The following figures illustrate the capacities booked at each entry/exit point and the capacity demand from the capacity scenario of the 2019 CNDP covering 2020 to 2029.

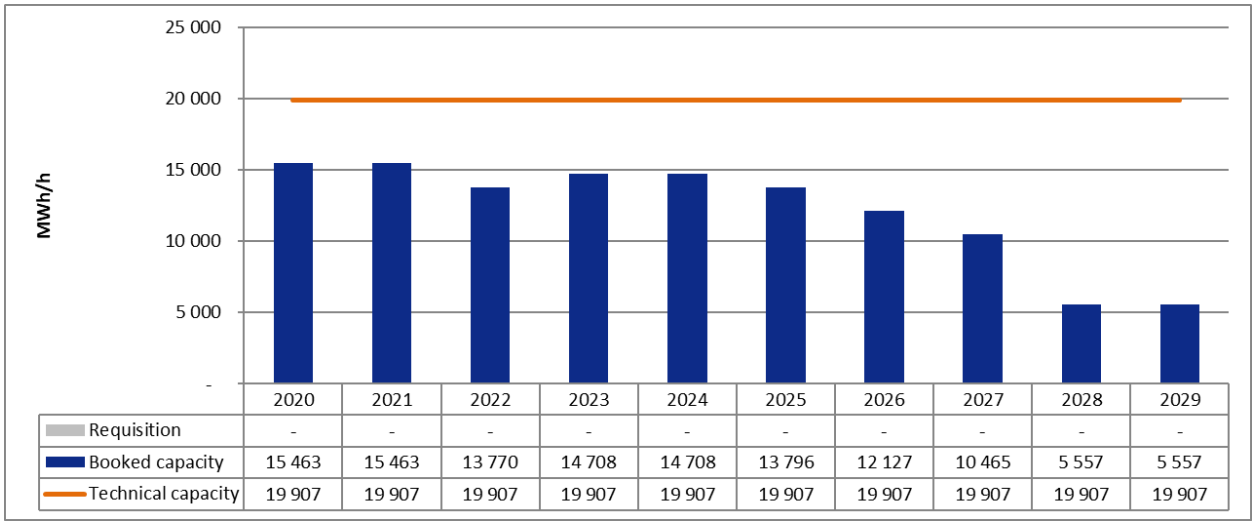
Figure 35: Entry Baumgarten GCA, capacities booked and capacity demand 2020-2029



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	-	-	-	223	892	892	892	892	892	773
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; 2019

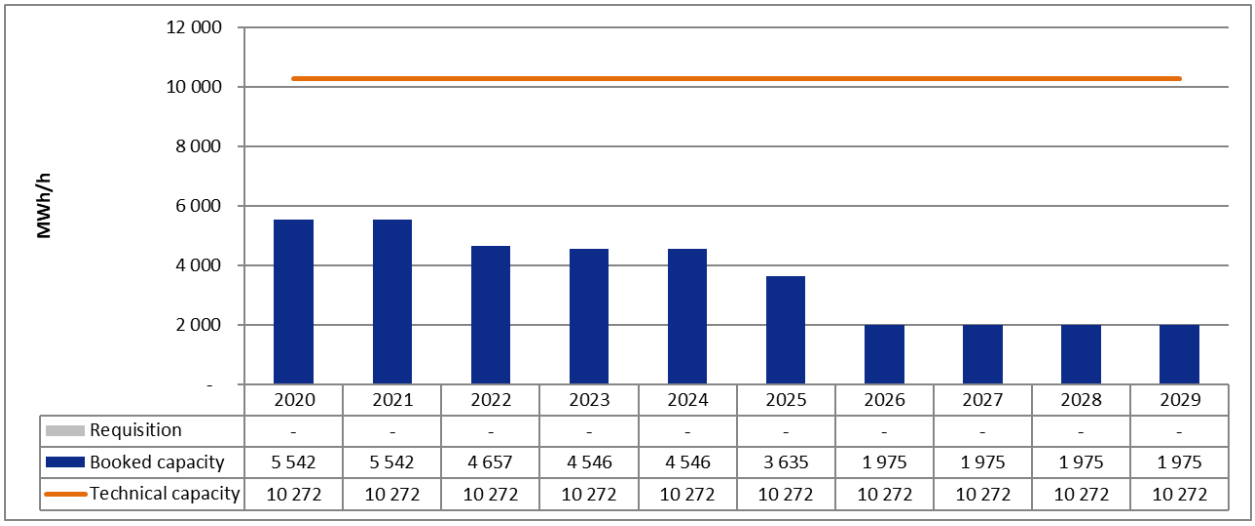
Figure 36: Entry Baumgarten WAG, capacities booked and capacity demand 2020-2029



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	15 463	15 463	13 770	14 708	14 708	13 796	12 127	10 465	5 557	5 557
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; 2019

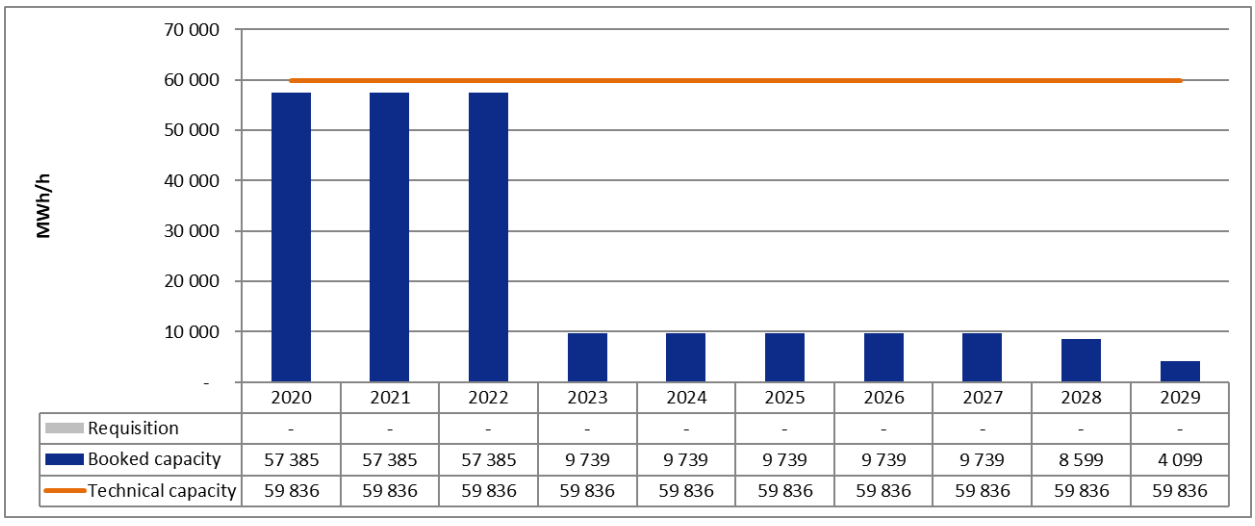
Figure 37: Exit Baumgarten WAG, capacities booked and capacity demand 2020-2029



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	5 542	5 542	4 657	4 546	4 546	3 635	1 975	1 975	1 975	1 975
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; 2019

Figure 38: Entry Baumgarten TAG, capacities booked and capacity demand 2020-2029

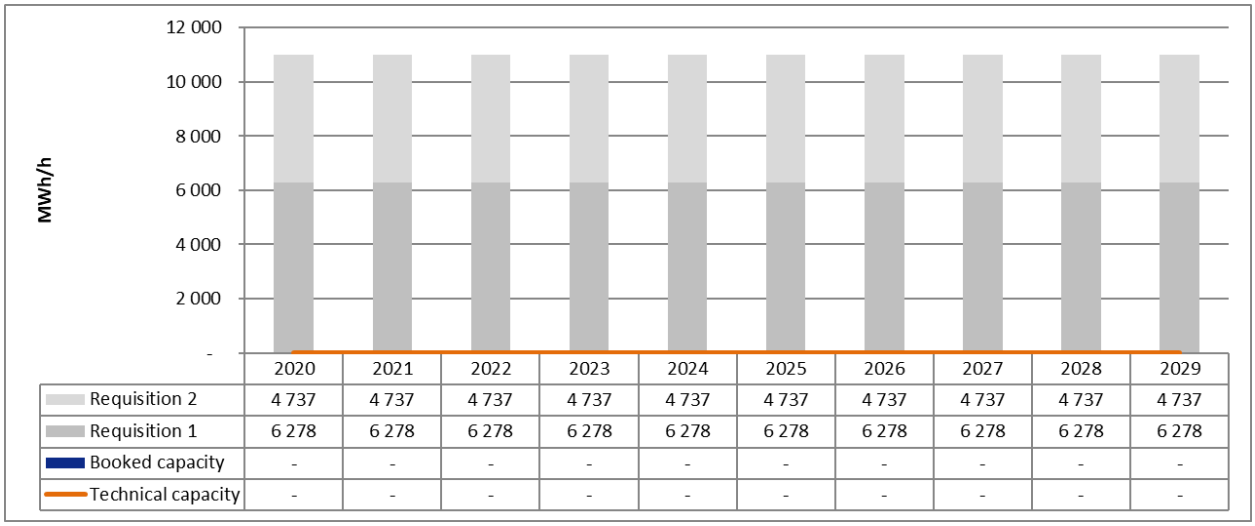


	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	57 385	57 385	57 385	9 739	9 739	9 739	9 739	9 739	8 599	4 099
Technical capacity	59 836	59 836	59 836	59 836	59 836	59 836	59 836	59 836	59 836	59 836

Source: AGGM platform (based on TAG GmbH submitted data), capacity demand; 2019

Figure 38 shows that both the technical as well as the booked capacity at the Baumgarten TAG entry point will remain steady from 2020 to 2022. As several long-term contracts will expire, the available free capacity will increase significantly from 2023.

Figure 39: Entry Mosonmagyaróvár, capacities booked and capacity demand 2020-2029

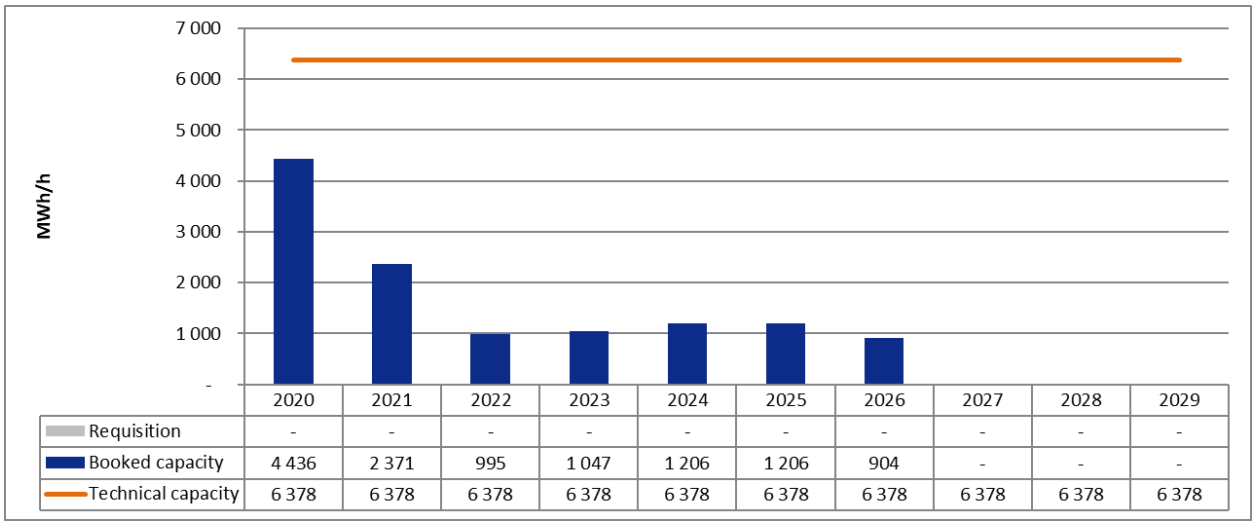


	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Requisition 2	4 737	4 737	4 737	4 737	4 737	4 737	4 737	4 737	4 737	4 737
Requisition 1	6 278	6 278	6 278	6 278	6 278	6 278	6 278	6 278	6 278	6 278
Booked capacity	-	-	-	-	-	-	-	-	-	-
Technical capacity	-	-	-	-	-	-	-	-	-	-

Source: AGGM platform capacity demand; 2019

Physical flow at the Mosonmagyaróvár entry point is currently impossible. The demand comprises 6,278 MWh/h, which were approved in a project in the course of the PCI corridor "ROHUAT" and a reported demand of 4,737 MWh/h. See also Chapter 5.4.5.

Figure 40: Exit Mosonmagyaróvár, capacities booked and capacity demand 2020-2029

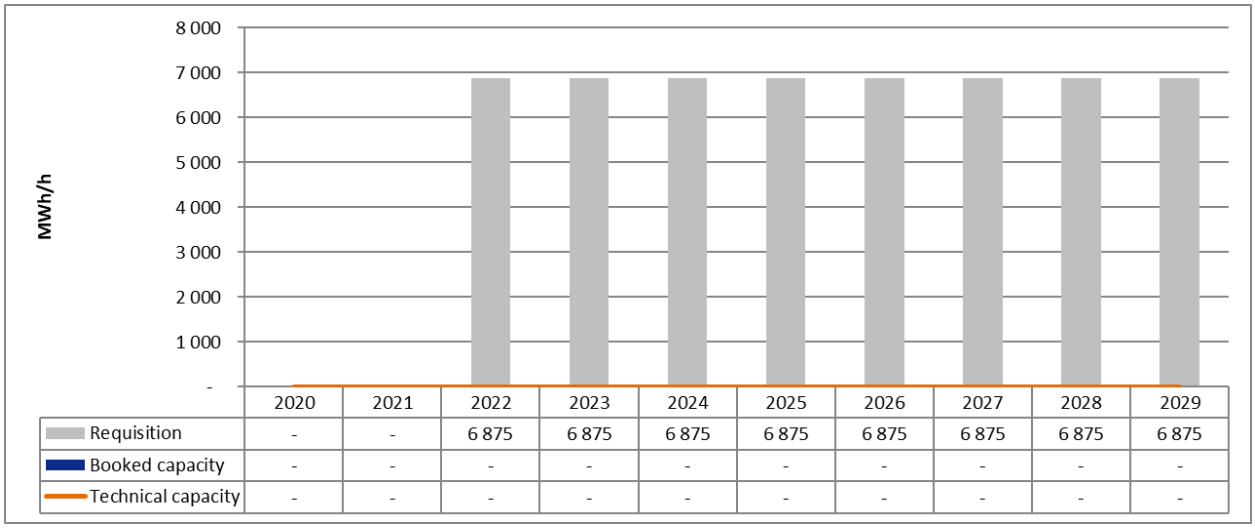


	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	4 436	2 371	995	1 047	1 206	1 206	904	-	-	-
Technical capacity	6 378	6 378	6 378	6 378	6 378	6 378	6 378	6 378	6 378	6 378

Source: AGGM platform, capacity demand; 2019

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 the procedure of the NC CAM. The aim is to provide entry capacity in the amount of 6,875 MWh/h and a total exit capacity of 9,081 MWh/h. See also Figure 41 and Figure 42.

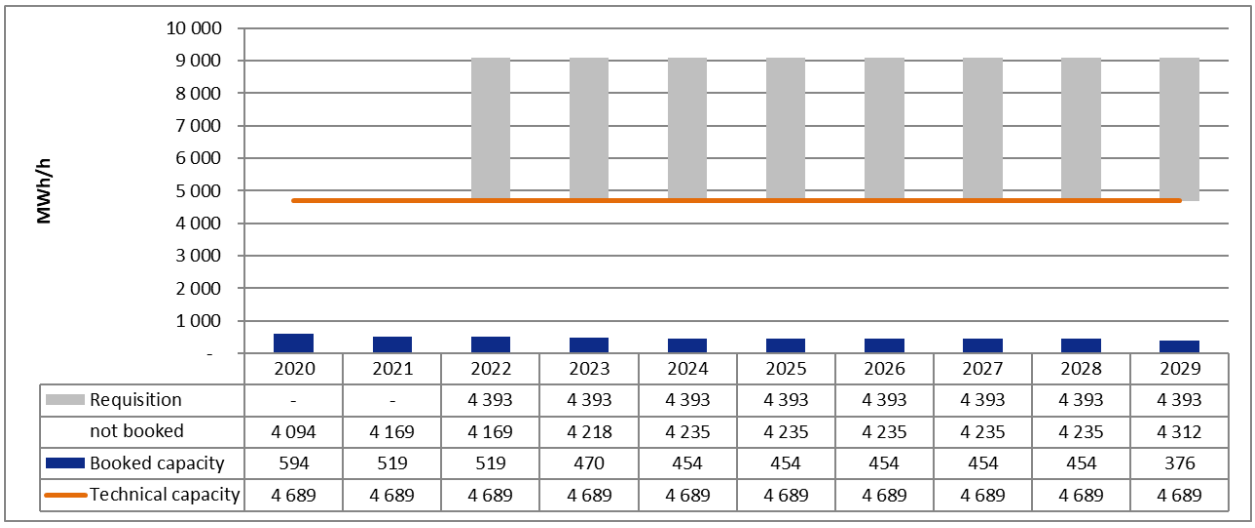
Figure 41: Entry Murfeld, capacities booked and capacity demand 2020-2029



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Requisition	-	-	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; 2019

Figure 42: Exit Murfeld, capacities booked and capacity demand 2020-2029

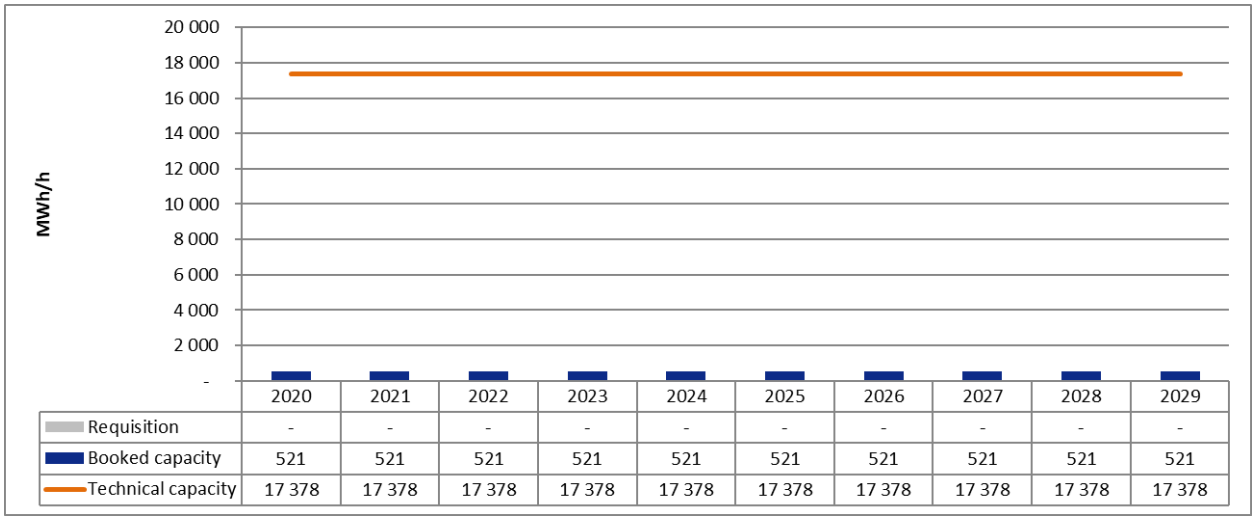


	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Requisition	-	-	4 393	4 393	4 393	4 393	4 393	4 393	4 393	4 393
not booked	4 094	4 169	4 169	4 218	4 235	4 235	4 235	4 235	4 235	4 312
Booked capacity	594	519	519	470	454	454	454	454	454	376
Technical capacity	4 689	4 689	4 689	4 689	4 689	4 689	4 689	4 689	4 689	4 689

Source: AGGM platform, capacity demand; 2019

Figure 43 shows that both the technical capacity and the capacity booked at the Arnoldstein entry point remain steady during the forecast period of 2020 to 2029.

Figure 43: Entry Arnoldstein, capacities booked and capacity demand 2020-2029

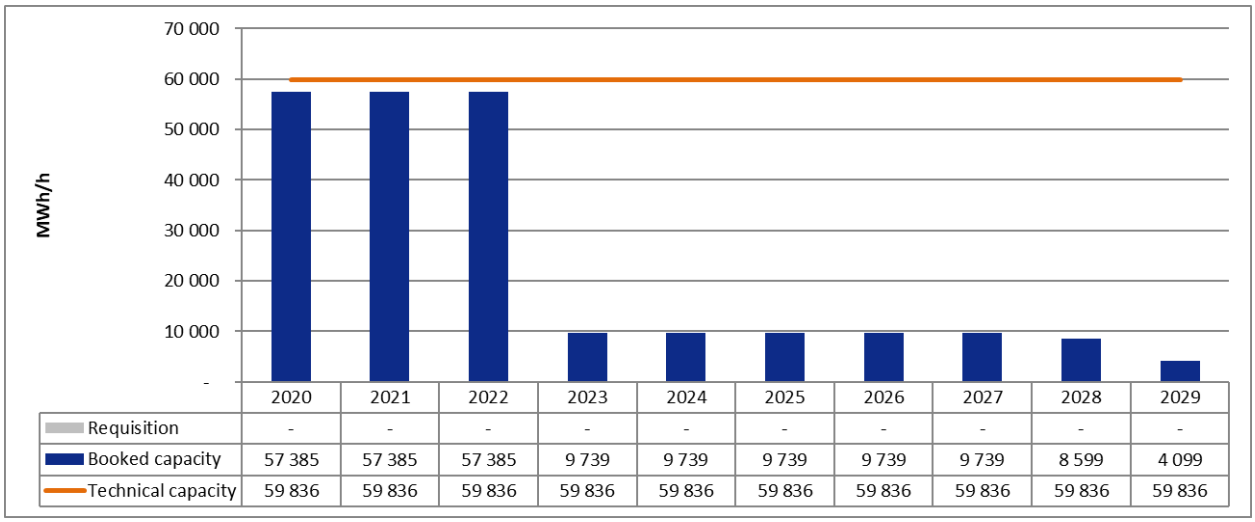


	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	521	521	521	521	521	521	521	521	521	521
Technical capacity	17 378	17 378	17 378	17 378	17 378	17 378	17 378	17 378	17 378	17 378

Source: AGGM platform (based on TAG GmbH transmitted data), capacity demand; 2019

The technical as well as the booked capacity at the Arnoldstein exit point will remain constant from 2020 to 2022. Similar to the Baumgarten entry point, free capacity will increase markedly from 2023 because of the expiry of long-term contracts spanning several years.

Figure 44: Exit Arnoldstein, capacities booked and capacity demand 2020-2029



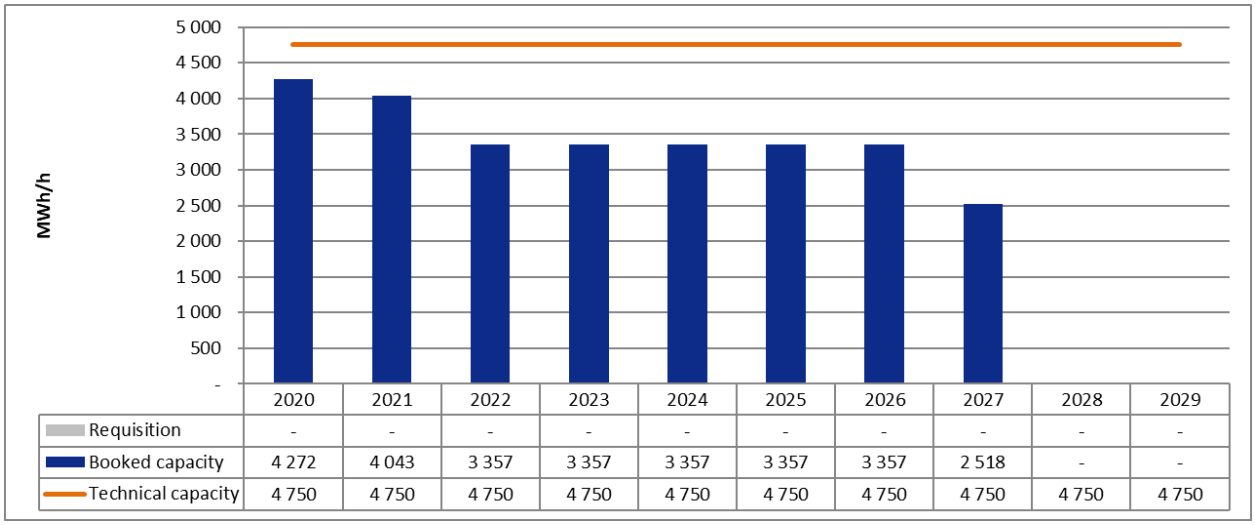
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	57 385	57 385	57 385	9 739	9 739	9 739	9 739	9 739	8 599	4 099
Technical capacity	59 836	59 836	59 836	59 836	59 836	59 836	59 836	59 836	59 836	59 836

Source: AGGM platform (based on TAG GmbH submitted data), capacity demand; 2019

No additional demand was reported at the Überackern entry and exit point in the 2019 CNDP. See also Figure 45 and Figure 46.

Nevertheless, Gas Connect Austria prepared a project to increase the entry capacity at Überackern and to be able to offer wheeling services between the Überackern entry point and the Oberkappel exit point.

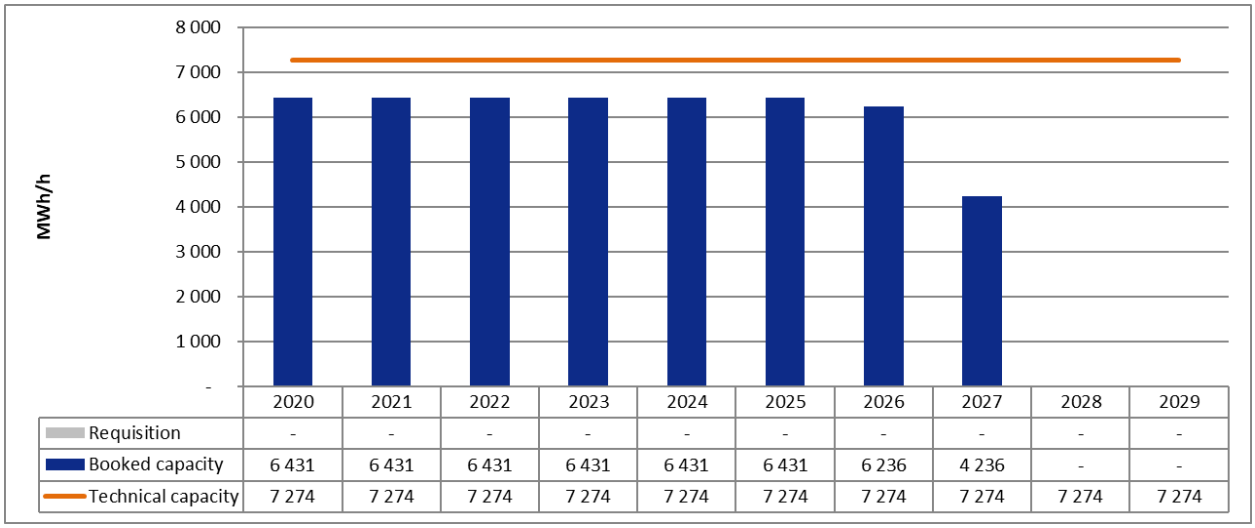
Figure 45: Entry Überackern ABG and SUDAL, capacities booked and capacity demand 2020-2028



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	4 272	4 043	3 357	3 357	3 357	3 357	3 357	2 518	-	-
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; 2019

Figure 46: Exit Überackern ABG and SUDAL, capacities booked and capacity demand 2020-2029

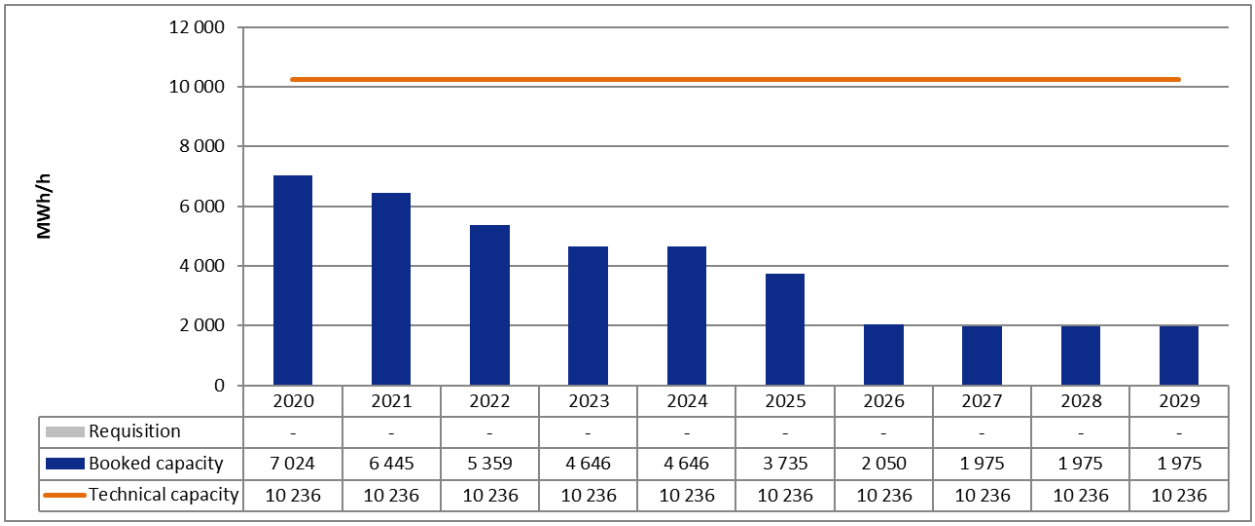


	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	6 431	6 431	6 431	6 431	6 431	6 431	6 236	4 236	-	-
Technical capacity	7 274	7 274	7 274	7 274	7 274	7 274	7 274	7 274	7 274	7 274

Source: AGGM platform, capacity demand; 2019

No additional demand was reported at the Oberkappel entry and exit point in the 2019 CNDP. See also Figure 47 and Figure 48.

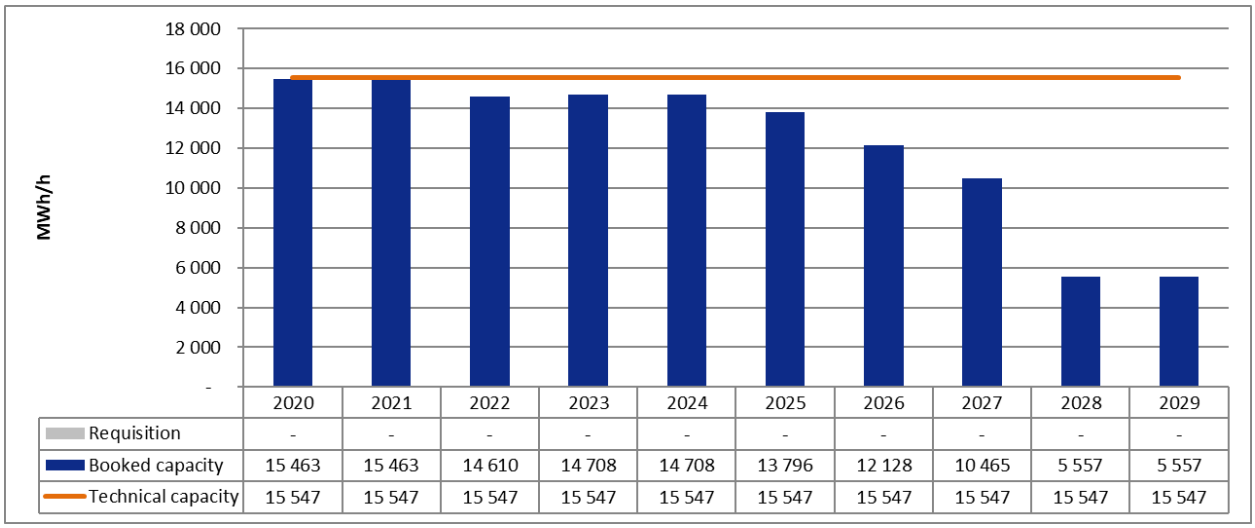
Figure 47: Entry Oberkappel, capacities booked and capacity demand 2020-2029



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	7 024	6 445	5 359	4 646	4 646	3 735	2 050	1 975	1 975	1 975
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; 2019

Figure 48: Exit Oberkappel, capacities booked and capacity demand 2020-2029



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Requisition	-	-	-	-	-	-	-	-	-	-
Booked capacity	15 463	15 463	14 610	14 708	14 708	13 796	12 128	10 465	5 557	5 557
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; 2019

4.2.3 Capacity demand requests 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 9 shows the assigned capacity demand per respective project

Table 9: 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 / Exit Reintal + 750.000 Nm³/h					
	GCA	2015/01a	Bidirectional Austrian Czech Interconnector	4,5	
	TAG	2016/05	TAG Baumgarten interconnector capacity (BACI)	4,5	
Entry Mosonmagyaróvár + 570.000 Nm³/h					
	GCA	2015/05	Entry Mosonmagyaróvár	4,5	
	TAG	2016/04	TAG Baumgarten interconnector capacity (Mosonmagyaróvár)		Q4/2021
Entry Mosonmagyaróvár + 1.000.000 Nm³/h					
	GCA	2017/01	Entry Mosonmagyaróvár Plus	4,5	
	TAG	2017/01	TAG Baumgarten interconnector capacity (Mosonmagyaróvár) II	4,5	
Entry Murfeld + 620.000 Nm³/h / Exit Murfeld + 391.620 Nm³/h					
	GCA	2015/08	Entry/Exit Murfeld	4,5	
	TAG	2016/01	TAG Reverse Flow Weitendorf / Eggendorf		Q4/2020
	TAG	2018/01	Murfeld Exit Capacity Increase	4,5	
Entry Arnoldstein + 1.000.000 Nm³/h					
	TAG	2016/01	TAG Reverse Flow Weitendorf / Eggendorf		Q4/2020
Exit Andorf + 5.000 Nm³/h					
	GCA	2017/02	Penta West – Exit distribution area	1,5	

Source: AGGM, Gas Connect Austria; TAG GmbH, 2019

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

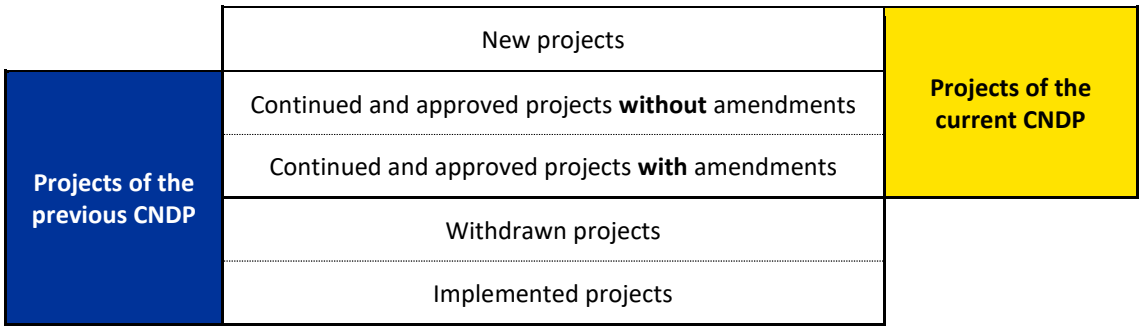
5.1 Classification of projects

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

5.1.1 Project categories

The projects of the CNDP are divided into 5 project categories (see Figure 49) which reflects the procedure of approval.

Figure 49: Project categories



Source: AGGM

New Projekte

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 para. 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.

5.1.2 Project types

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

Planning projects for addional 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 optimisation or for which marketing modalities have not yet been finalised.

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 whose 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 realised in order for a project listed under item a. to entirely fulfil its function. 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 projects 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.).

Replacement investment projects

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

5.2 Withdrawn projects of the 2018 CNDP

Table 10 lists the approved projects of previous CNDPs, which will be withdrawn in the CNDP 2018, because:

- due to the lack of necessity in order to meet the requested capacity demands, or
- replacment investment projects should not be realised now

Subject to the approval of E-Control Austria these projects are regarded as CNDP projects anymore.

Table 10: Withdrawn projects

Project type*	Project sponsor	Project no.	Project name
E	TAG	2017/R02-A	Major Overhaul Valve Station Lichtenegg
E	TAG	2018/R03	Major Overhaul Valve Station Wettmannstätten
E	TAG	2018/R06	Major Overhaul Valve Station Reisenberg

*) C – Project for additonal capacities; E – Replacement investment project

Source: Gas Connect Austria, TAG GmbH, AGGM; 2019

The project GCA 2016/E4 " Baumgarten MS3 & Oberkappel – Switch from orifice to ultrasound metering " was split for better implementation on the projects GCA 2016/E2 "MS3 Reverse Flow" and GCA 2016/E5 "Revamp Oberkappel". Thus, the project GCA 2016/E4 "Baumgarten MS3 & Oberkappel – Switch from orifice to ultrasound metering " is no longer included in 2019 CNDP.

5.3 Projekte im KNEP 2019

The CNDP 2019 includes following projects listed in Table 11,

Table 12, Table 13, Table 14, Table 15 and Table 16.

Table 11 and Table 14 show the projects of the CNDP 2018 which are continued without amendments. These projects have already been approved by E-Control Austria and will be further continued according to plan.

Table 12 and Table 15 display the already approved projects of the precious CNDPs, which have been amended based on new knowledge or changed demands. These projects will be submitted for approval to the regulation authority in the amout of their changes.

Table 13 and Table 16 illustrate the newly developed projects or planning projects of the 2019 CNDP. These projects will be submitted for approval to the regulation authority.

The project sheets containing the essential project data are attached in Appendix 1. The projects are listed by project type and project number.

Information concerning possible impacts on existing transportation capacities during the implementation of the projects can be found on the following Links:

- AGGM: https://www.aggm.at/en/network-information/maintenance-coordination
- Gas Connect Austria: https://www.gasconnect.at/en/network-information/network-development/maintenance/
- TAG GmbH: https://www.taggmbh.at/en/for-system-users/maintenance-works/

5.3.1 Projects for additional capacities

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

These projects including the technical measures are presented in Appendix 1. Further details are provided seperately by the transmission system operators to the regulation authority as confidential supplements and will therefore not be published.

Table 11: Projects for additional capacities – Continued and approved projects without amendments

Project sponsor	Project number	Project name	Implementation time frame [years]	Planned completion [date]
GCA	2015/01a	Bidirectional Austria Czech Interconnector	4,5	
GCA	2015/01b	Projekt 1b: BACI DN 1200	4,25	
GCA	2015/02a	Entry Überackern	4,5	
GCA	2015/03	Entry/Exit Überackern - Maximum	6	
GCA	2015/04	Entry Mosonmagyaróvár - Minimum	1,5	
GCA	2015/05	Entry Mosonmagyarovar	4,5	
GCA	2015/08	Entry/Exit Murfeld	4,5	
GCA	2017/01	Entry Mosonmagyaróvár Plus	4,5	
GCA	2017/02	Penta West – Exit Distribution Area	1,5	
GCA	2018/01	Überackern – Oberkappel	4,5	
TAG	2016/04	TAG Baumgarten interconnection capacity (Mosonmagyaróvár)		Q4 2021
TAG	2016/05	TAG Baumgarten interconnection capacity (BACI)	4,5	
TAG	2017/01	TAG Baumgarten interconnection capacity (Mosonmagyaróvár) II	4,5	
TAG	2018/01	Murfeld Exit Capacity Increase	4,5	

Source: Gas Connect Austria, TAG GmbH; 2019

Table 12: Projects for additional capacities – Continued and approved projects with amendments

Project sponsor	Project number	Project name	Implementation time frame [years]	Planned completion [date]
TAG	2016/01	TAG Reverse Flow Weitendorf / Eggendorf		Q4/2020

Source: TAG GmbH; 2019

Table 13: Projects for additional capacities – New projects

Project sponsor	Project number	Project name	Implementation time frame [years]	Planned completion [date]
GCA	2019/01	Exit Mosonmagyaróvár (Planning project)	4,5	

Source: Gas Connect Austria; 2019

5.3.2 Replacement investment projects

An overview of the individual replacement investment projects can be found in Table 14, Table 15 and Table 16. These projects including the techniacl measures are presented in Appendix 1. Further details will be provided seperately by the transmission system operators to the regulation authority as confidential supplements.

Table 14: Replacment 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		Q4 2021
GCA	2017/E5	VS Rainbach Tausch Prozessleitsystem		Q4 2019
GCA	2018/E01	Vorfall Baumgarten		Q3 2022
TAG	2016/R09	Exchange leaking valves St. Paul / Ruden / Arnoldstein		Q4 2019
TAG	2017/R01	MS2 Refurbishment		Q4 2019
TAG	2017/R02-B	Major Overhaul Valve Station, Wielfresen 1		Q4 2022
TAG	2017/R03-B	Major Overhaul Valve Station Sulmeck-Greith		Q4 2019
TAG	2017/R03-C	Major Overhaul Valve Station St. Paul		Q4 2019
TAG	2017/R08	Gas Generator RC600 in CS-Ruden		Q4 2019
TAG	2018/R05	Major Overhaul Pigging Station Weitendorf		Q4 2021
TAG	2018/R09	Sec.1/Sec.2/Sec.3: Corrosion Refurbishment and Repair		Q4 2019
TAG	2018/R10	DLE 1.5 + 72 hole PT module BC700 in CS-Baumgarten		Q4 2020
TAG	2018/R12	Shut Off Valve MS2, CS Baumgarten		Q4 2019
TAG	2018/R13	Major Overhaul AZ3-AZ3L Eggendorf		Q4 2020

Source: Gas Connect Austria, TAG GmbH; 2019

Table 15: Replacement investment projects – Continued and approved projects with amendments

Project sponsor	Project number	Project name	Implementation time frame [years]	Planned completion [date]
GCA	2016/E2	MS3 Reverse Flow		Q3 2020
GCA	2016/E5	Revamp Oberkappel		Q1 2021
TAG	2016/R11	Replacement of Gashydraulic Actuators, CS-Baumgarten, Grafendorf and Ruden		Q4 2023
TAG	2016/R12	SCS Replacement, CS Baumgarten-Grafendorf-Ruden		Q4 2022
TAG	2017/R02-C	Major Overhaul Valve Station, Ettendorf		Q4 2021

TAG	2017/R03-A	Major Overhaul Valve Station Lanzenkirchen	Q4 2019
TAG	2017/R03-D	Major Overhaul Pigging Station Ruden	Q4 2019
TAG	2017/R03-E	Major Overhaul Valve Station Arnoldstein	Q4 2019
TAG	2017/R04	Substitution Gas Hydraulic Actuators TUCO, CS Baumgarten Grafendorf Ruden	Q4 2023
TAG	2017/R05	Replacement E-Actuators Filter Separators & Metering Station MS2 CS-Baumgarten	Q4 2020
TAG	2018/R01	SCS Replacement, CS Eggendorf-Weitendorf	Q4 2021
TAG	2018/R02	Major Overhaul Valve Station Ebenthal	Q4 2021
TAG	2018/R04	Major Overhaul Valve Station Weitendorf	Q4 2021
TAG	2018/R07	Major Overhaul Valve Station Zöbern	Q4 2021

Source: Gas Connect Austria, TAG GmbH; 2019

Table 16: Replacement investment projects – New projects

Project sponsor	Project number	Project name	Implementation time frame [years]	Planned completion [date]
GCA	2019/E1	Neubau Büro- und Mannschaftsgebäude Rainbach		Q3 2020
GCA	2019/E2	VS Rainbach Erneuerung Maschinensteuerung		Q4 2020
GCA	2019/E3	HAG Erneuerung Niederspannungsschaltanlage		Q4 2019
GCA	2019/E4	VS WAG Erneuerung Notstromgenerator		Q4 2020
GCA	2019/E5	MS Neustift Compilation		Q4 2021
GCA	2019/E6	UW Baumgarten Netzqualität		Q4 2020
TAG	2019/R01	Major Overhaul Valve Stations CS Weitendorf		Q4 2020
TAG	2019/R04	Replacement ball valves GOV 502 & 504 CS Baumgarten		Q4 2019
TAG	2019/R06	Exchange of Leaking Valve CS Eggendorf		Q4 2020
TAG	2019/R07	Exchange of Leaking Valve CS Ruden		Q4 2021
TAG	2019/R09	DLE 1.5 + 72 hole PT module BC500 in CS Baumgarten		Q4 2021
TAG	2019/R10	DLE 1.5 hole PT module BC600 in CS Baumgarten		Q4 2022
TAG	2019/R11	Sec.1/Sec.2/Sec.3: Corrosion Refurbishment and Repair 2019-20		Q4 2020

Source: Gas Connect Austria, TAG GmbH; 2019

5.4 Projects and activities of Gas Connect Austria

The Core business of Gas Connect Austria is the marketing of transport capacity at international border points and for domestic gas supplies. With a marketed transport volume of 150 billion m³ per year, the company is an important hub in Central Europe. In order to secure the gas supply in the long term, the existing infrastructure is continuously checked, maintained and kept up to date with the latest technology. As a customer-oriented logistics service provider, the company is constantly developing its products and services to meet the needs of the market.

Projects as building blocks. Gas Connect Austria carries out detailed planning for the technical measures that will make our offer possible in the future. The planning of projects as a specific part of network development planning is subject to the procedure described in Chapter 5.1.

Coordinated. Gas Connect Austria's network development plan is an integral part of the coordinated network development plan. Therefore, the planned projects were developed in coordination with the Austrian transmission system operator Trans Austria Gasleitung GmbH ("TAG GmbH") and the neighbouring transmission system operators.

Beautiful New World. In accordance with the climate and energy policy of the European Union, Austria pursues the goal of reducing greenhouse gas emissions. Gas plays a key role in achieving these goals as a reliable partner in terms of security of supply, transport and storage options.

5.4.1 Contribution to the energy future

Now. Gas Connect Austria participates actively in shaping the climate policy in relevant national and European working groups in order to support the achievement of the set goals. Years of experience in gas logistics and technical know-how form the basis for the identification of innovative, efficient and socio-economically justifiable solutions for the future. Due to its properties as a low-emission fossil energy source and its versatility as a heat supplier, industrial raw material and fuel, gas is an optimal pathfinder for a steady increase in the use of renewable gases.

CNG (Compressed Natural Gas) is used as compressed gas for refuelling vehicles and can already make a significant contribution to achieving climate targets. In Austria, a nationwide network of gas filling stations has been established in recent years. There are currently 175 public CNG fuel stations available. Ambitious expansion plans will create even more opportunities to refuel in the coming years. Current plans already include the possibility of CNG home filling stations to further increase flexibility for end users. The aim is to analyse how existing infrastructure can be used to meet future renewable energy transport and storage challenges. As the generation and availability of renewable energy are more volatile than that of fossil fuels, maintaining security of supply plays a major role. First experiences with hydrogen in the current infrastructure will show which investments are necessary to meet not only the security of supply but also the high safety standard.

Prospective. In the future, it will be necessary to exploit infrastructure potential in order to be ready for the transport and storage of alternative energy sources.

"Power to Gas" enables excess electricity from alternative energy sources to be converted into hydrogen by means of electrolysis. This can be fed directly into the gas grid or previously converted into renewable methane."Power to Gas" would offer the advantage that excess energy can be stored simply and in large quantities and ultimately transformed back into electricity when needed. Alternatively, hydrogen can be used directly as a green raw material (e.g. in the industry or as fuel).

Another approach, *"Greening the Gas"* is concerned with the possibility of feeding biogas into the gas grid in a processed form and using it locally to generate electricity and heat. It underlines that gas is also sustainable and renewable and therefore leads to a reduction of greenhouse gas emissions.

The *"sector coupling"* i. e. the networking of the individual sectors within the energy industry, and the associated synergy effects in the integration of high proportions of renewable energies is regarded as an important concept for achieving the decarbonisation targets. Especially the coupling of the individual sectors with predominantly renewable energy sources and the utilisation of the existing infrastructure as storage and transport function can contribute to an efficient energy system of the future.

Sustainable. Through the consistent use and further development of existing gas infrastructures, through the openness of technology and above all through the combination of different climate protection technologies, gas as an energy source can make a significant contribution to comprehensive decarbonisation and emission reduction.

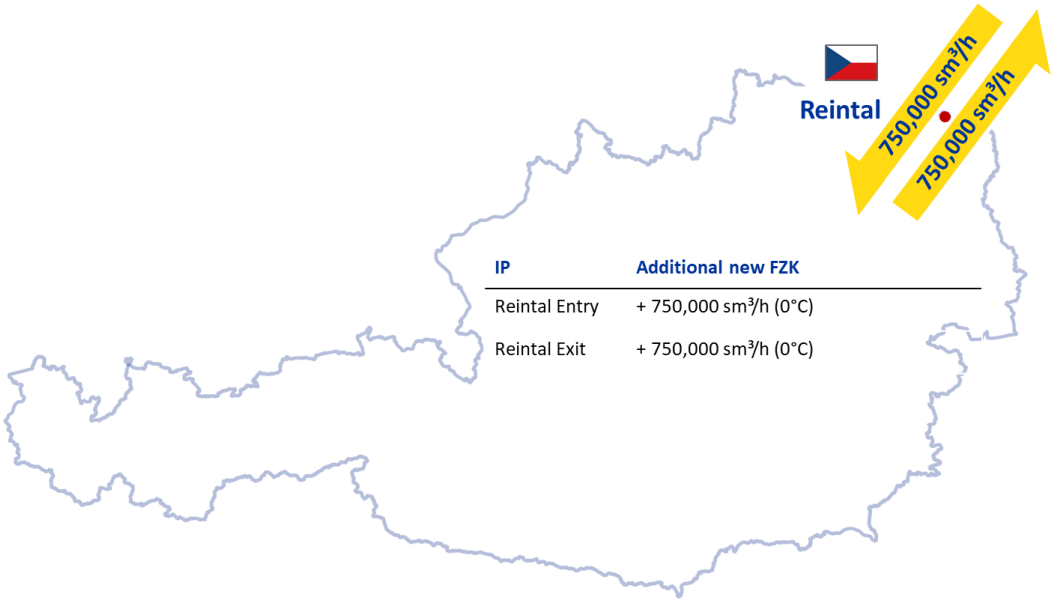
For the *research and development* of projects related to renewable energies, Gas Connect Austria estimates a separate budget to meet future challenges and developments. Specifically, Gas Connect Austria is currently commissioning studies to analyse the "H_2 fitness" of the systems in order to make our infrastructure "hydrogen fit" for the future. In addition, Gas Connect Austria is engaged in studies on the real implementation of "Power to Gas" projects and on projects for own power generation (sector coupling).

5.4.2 Bidirectional Austrian-Czech Interconnector - "BACI" (GCA 2015/01a)

Market demand analysis as starting point. In the report on market demand analysis in accordance to Article 26 NC CAM from June 2017, the Czech TSO NET4GAS and Gas Connect Austria identified a bidirectional capacity requirement for newly created, freely allocable capacities on a firm basis (referred to as "FZK") at the potential new Reintal entry and exit point of around 8,393 MWh/h and 750,000 Nm³/h (0°C), respectively.

*New capacitites to be created.*The following Figure schows the the capacity condition at the potentially new entry and exit point Reintal.

Figure 50: GCA2015/01a Bidirectional Austrian-Czech Interconnector



Source: Gas Connect Austria

Approval in the network development plan. The project GCA 2015/01a was authoriesed in the Gas Connect Austria network development plan. The necessary measures for the creation of the FZK were analysed over the planning horizon 2020 - 2029 and updated in the corresponding project data sheet (see project GCA 2015/01a)

Concepts for the capacitiy allocation. The new capacity to be created would be allocated at the new Reintal connection point on the Austrian/Czech border in accordance with Article 29 NC CAM.

European integration takes place. The project GCA 2015/01a is a project of common interest under Regulation (EU) No 347/2013 on guidelines for trans-European infrastructure (referred to as the TEN-E Regulation) and as such forms part of the third Union list of projects of common interest (referred to as PCI or PCI Union list). The project is also provided with the addition &quot,"The implementation of the BACI as PCI will depend on the results of the pilot project Trading Regional Upgrade".

The future is wide open. Since the pilot “Trading Region Upgrade" is still being implemented (see Kapitel 3.5.2) and therefore no evaluation of its results is available yet, Gas Connect Austria has entered the GCA 2015/01a project into the Pan-European Ten-Year Network Development Plan (“TYNDP") 2020 and nominated it as a candidate for inclusion in the current fourth PCI Union list. The fourth PCI Union list is expected to be adopted in October 2019.

Outlook. The (mandatory) procedure for incremental capacity in accordance with Article 5 of the NC CAM started on 1 July 2019. Potential transport clients announced at Gas Connect Austria during the market demand assessment a non-binding transport demand of approx. 1,277 MWh/h or approx. 114,155 Nm³/h (0°C) from the Czech market area to the Austrian market area east for the gas year period 2020 – 2034.

5.4.3 Überackern - Oberkappel (GCA 2018/01)

Auctions for new capacity to be created as a starting point. The auction of new capacity to be created at the Überackern coupling point according to the specifications of NC CAM, which was held for the first time throughout Europe in July 2018, showed no demand for access to the Austrian virtual trading point (“VTP”). However, feedback from market participants indicated an interest in new, firm capacity to be created between the entry and exit points Überackern and Oberkappel.

*New opportunities to be created.*This would strengthen the link between the German VTP Net Connect Germany, the Haidach storage facility in Germany connected to the bayernets network, and the 7Fields storage facility connected to the Penta West pipeline system. Gas Connect Austria therefore planned to upgrade this transport link between the storage facility and the German VHP by around 2,798 MWh/h or 250,000 Nm³/h (0°C) of new, firm capacities to be created (see capter 3.5.3).

Approval in the network development plan. The GCA 2018/01 project was approved with the Gas Connect Austria Network Development Plan 2018. The necessary measures for the creation of the firm capacities were analysed over the planning horizon 2020 - 2029 and updated in the corresponding project data sheet (see project GCA 2018/01).

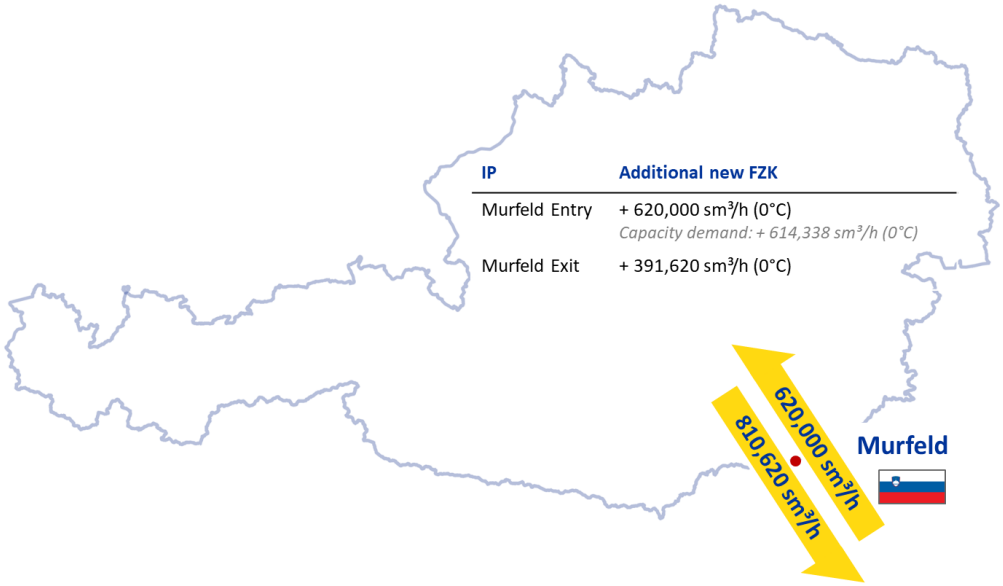
Concepts for capacity allocation. Gas Connect Austria plans to auction the capacity at the annual auctions in 2020. The transport service would be offered in this first step without access to the Austrian VTP and would be similar in nature to the existing short-distance transport service Überackern SUDAL - Überackern ABG (“Wheeling”).

5.4.4 Entry / Exit Murfeld (GCA 2015/08)

Market demand analysis as starting point. In the report on the market demand analysis pursuant to Article 26 NC CAM dated 27thJune2017, the Slovenian transmission system operator Plinovodi and Gas Connect Austria identified a capacity requirement for new FZKs to be created. At the Murfeld entry point the capacity requirement is around 6,875 MWh/h or 614,388 Nm³/h (0°C) and at the Murfeld exit point the capacity requirement is around 4,393 MWh/h or 391,620 Nm³/h (0°C).

New capacity to be created. The following figure shows the capacity situation at the Murfeld entry and exit point. At present, the FZK at the Murfeld exit point is limited to around 4,688 MWh/h or 419,000 Nm³/h (0°C). There is currently no FZK at the entry point and transports are carried out on an interruptible virtual basis.

Figure 51: GCA 2015/08 Entry / Exit Murfeld



Source: Gas Connect Austria

Approval in the network development plan. The GCA 2015/08 project was approved with the Gas Connect Austria Network Development Plan 2015. The necessary measures for the creation of the FZK were analysed over the planning horizon 2020 - 2029 and updated in the corresponding project data sheet (see project GCA 2015/08).

Concepts for capacity allocation.

In April 2018, Gas Connect Austria submitted a project proposal to the Austrian regulatory authority for the auctioning of agreed bid levels in the framework of the annual capacity auctions in July 2018, which had been agreed with Plinovodi. However, Plinovodi did not submit a corresponding project proposal to the Slovenian regulatory authority. Thus, there was no legal basis for auctions for new capacity to be created according to NC CAM. Gas Connect Austria therefore pursued the goal of allocating the new capacity to be created within the framework of the annual capacity auctions in July 2019. In March 2019, Gas Connect Austria announced that

Plinovodi's preparations for the award would not be continued and justified this with the low booking situation of landing capacities at the Croatian LNG terminal in Krk (see capter 3.5.4). However, Plinovodi is committed to a joint further development of the gas corridor "Croatia-Slovenia-Austria" and refers in this context to the second procedure for new capacity to be created in accordance with NC CAM, which was started in July 2019.

European integration takes place. The GCA 2015/08 project is a project of common interest under the TEN-E Regulation and as such forms part of the third PCI Union list. Gas Connect Austria has entered the project in the TYNDP 2020 and nominated it as a candidate for inclusion in the fourth PCI Union list, which is currently being prepared. The fourth PCI Union list is expected to be adopted in October 2019.

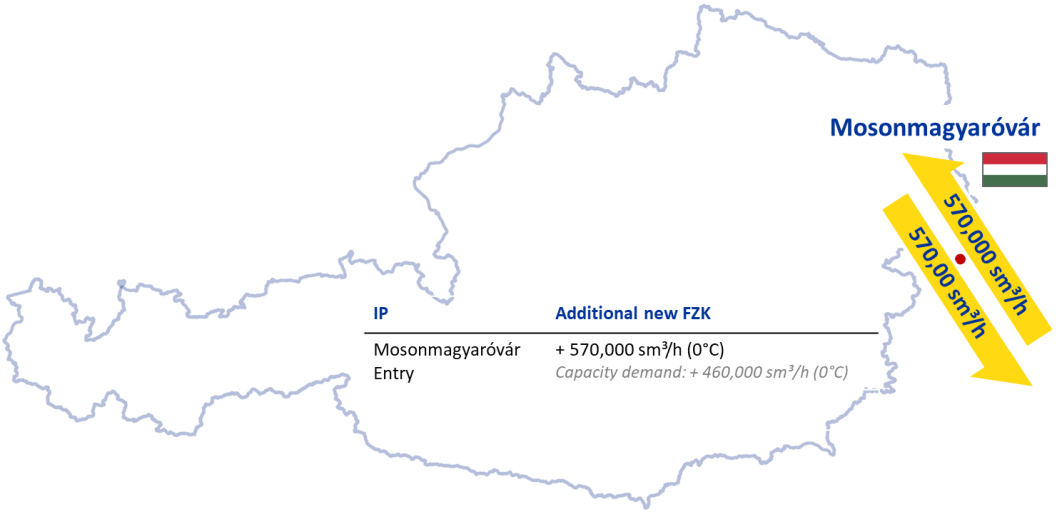
5.4.5 Entry Mosonmagyaróvár (GCA 2015/05, GCA 2017/01 & GCA 2015/04)

Market demand analysis as starting point. In the report on the market demand analysis pursuant to Article 26 NC CAM from June 2017, the Hungarian transmission system operator FGSZ and Gas Connect Austria recorded a capacity requirement of up to 11,115 MWh/h and 993,325 Nm³/h (0°C) respectively at the Mosonmagyaróvár entry point for new FZK to be created. The demand comprises a capacity application of around 4,737 MWh/h or 423,325 Nm³/h (0°C) as part of the market demand analysis carried out in 2017 and the project planning of around 6,278 MWh/h or 570,000 Nm³/h (0°C) already approved in the Gas Connect Austria Network Development Plan 2015 as part of "ROHUAT".

New capacity to be created. The following figures show the capacity situation at the potential physical entry point Mosonmagyaróvár. The capacities presented are based on the project GCA 2015/05 with 6,378 MWh/h or 570,000 Nm³/h (0°C) of new capacity to be created[5] and the additional demand of 4,737 MWh/h or 423,325 Nm³/h (0°C) in 2017. These requirements were added to the Gas Connect Austria network development plan 2017 as project GCA 2017/01. There is currently no FZK at the Mosonmagyaróvár entry point and transports are carried out on an interruptible virtual basis.

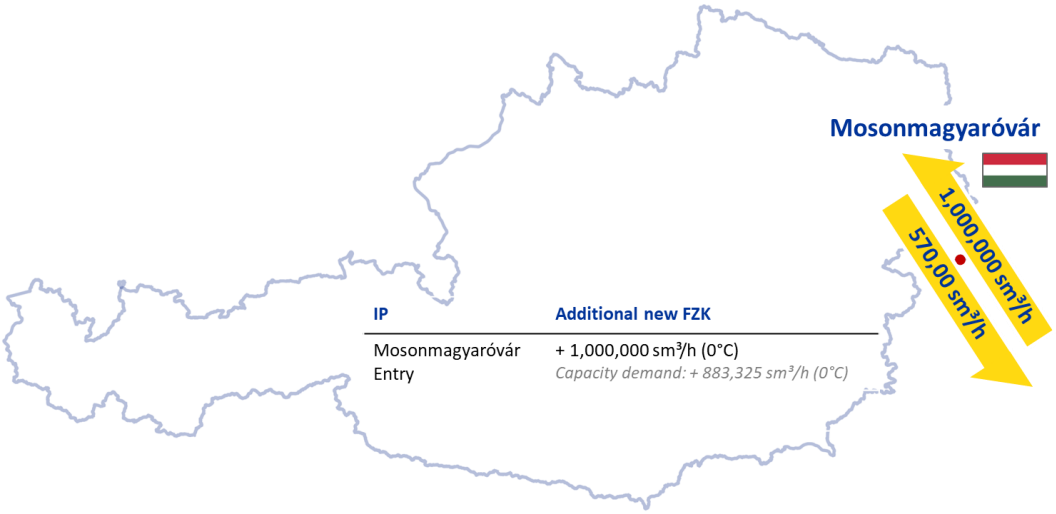
[5] This project stage was selected in the normal flow direction due to the technichal capacitiy of the existing infrastructure in place

Figure 52: GCA 2015/05 Entry Mosonmagyaróvár



Source: Gas Connect Austria

Figure 53: GCA 2017/01 Entry Mosonmagyaróvár Plus



Source: Gas Connect Austria

Approval in the network development plan. The GCA 2015/05 project was approved with the Gas Connect Austria Network Development Plan 2015. The GCA2 017/01 project was approved with the Gas Connect Austria Network Development Plan 2017. The necessary measures for the creation of the FZK were analysed over the planning horizon 2020 - 2029 and updated in the corresponding project data sheets (see projects GCA 2015/05 and GCA 2017/01).

Concepts for capacity allocation. In April 2018, Gas Connect Austria submitted to the Austrian regulatory authority a project proposal pursuant to Article 28 CAM NC, coordinated with FGSZ, for the auctioning of coordinated bid levels within the framework of the annual capacity auctions in July 2018. The regulatory authority approved the project proposal. The Hungarian regulatory authority (see chapter 3.5.6) did not approve the corresponding project proposal submitted by FGSZ for the other side of the Mosonmagyaróvár interconnection point. As the competent national regulatory authorities were unable to reach agreement on the submitted project

proposal within six months, the Agency for the Cooperation of Energy Regulators (ACER) initiated a decision making process.

The Agency. Gas Connect Austria and FGSZ prescribe „Decision No 05/2019 of the Agency for the Cooperation of Energy Regulators of 9 April 2019 on the incremental capacity project proposal for the Mosonmagyarovar interconnection point"[6] the auctioning of the new capacity to be created in the annual auction for annual capacity. Gas Connect Austria therefore put the new capacity to be created on the capacity booking platform "Regional Booking Platform©" up for auction. However, FGSZ failed to do so, so that no award could be made in the course of the annual auctions in July 2019 due to the obligation to jointly offer bundled capacity products. FGSZ and the Hungarian regulatory authority lodged complaints against ACER's decision. However, the ACER's board of complaint had rejected these complaints on 6 August 2019.

European integration takes place. The GCA 2015/05 project is a project of common interest under the TEN-E Regulation and as such forms part of the third PCI Union list. Gas Connect Austria has entered the project in the TYNDP 2020 and nominated it as a candidate for inclusion in the fourth PCI Union list, which is currently being prepared. The fourth PCI Union list is expected to be adopted in October 2019.

Lowest common denominator? The project GCA 2015/04 Entry Mosonmagyaróvár Minimum provides for a new fixed capacity to be created of around 1,343 MWh/h or 120,000 Nm³/h (0°C). The project was approved with the Gas Connect Austria Network Development Plan 2017. The necessary measures for the creation of the firm capacities were analysed over the planning horizon 2020 - 2029 and updated in the corresponding project data sheet (see project GCA 2015/04). At the instigation of Gas Connect Austria and after talks at ministerial level, FGSZ could be won over for cooperation. FGSZ has started to prepare a preliminary study for a corresponding project on the Hungarian side. As an alternative to market-based project development according to NC CAM, the project could also be operated with a view to increasing security of supply, i. e. within the regulatory framework of Regulation (EU) 2017/1938 on measures to safeguard security of gas supply.

Outlook. The (mandatory) procedure for incremental capacity in accordance with Article 5 of the NC CAM started on 1 July 2019. Potential transport clients announced at Gas Connect Austria during the market demand assessment a non-binding transport demand of approx. 1,277 MWh/h or approx. 114,155 Nm³/h (0°C) at the entry point Mosonmayaróvár the gas year period 2020 – 2034.

[6]Siehe https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Individual%20decisions/ACER%20Decision%2005-2019%20on%20HUAT.pdf

5.4.6 Exit Mosonmagyaróvár (GCA 2019/01)

Official call as starting point. The Austrian regulatory authority has requested Gas Connect Austria to project the market-based expansion threshold of about 1,000,000 Nm³/h (0°C) of the project GCA 2017/01 Entry Mosonmagyaróvár Plus also in the normal flow, i. e. for the flow direction from Austria to Hungary. The necessary measures for the creation of the FZK at the exit point Mosonmagyaróvár are described in the corresponding project data sheet (see project GCA 2019/01).

5.4.7 Mehrbedarf Verteilergebiet plus (GCA 2015/07b)

The project *Mehrbedarf Verteilergebiet* was completed in the first quarter of 2019. The project was implemented as part of the 2015 network development plan due to the registration of an additional capacity requirement of 6,714 MWh/h or 600,000 Nm³/h (0°C) by AGGM Austrian Gas Grid Management AG ("AGGM") as a network user with Gas Connect Austria as the transmission system operator. 10,742 MWh/h or 960,000 Nm³/h (0°C) in FZK quality is now available at the virtual feed-in point from the distribution area into the pipeline network.

5.4.8 Penta West Exit Verteilergebiet (GCA 2017/02)

The *Penta West Exit distribution area* project was designed on the basis of capacities for supplying the Schärding area, which were registered by AGGM as grid users in 2017. The aim of the project is to create FZK of around 56 MWh/h or 5,000 Nm³/h (0°C) at the Andorf gate station of the Penta West pipeline system for feeding into the distribution area. The implementation depends on the specification of the demand report by the AGGM as the grid user. This is particularly because AGGM, as the distribution area manager, has not yet submitted a corresponding project for long-term planning. Therefore, the project is left as a planning project in the network development plan (see project GCA 2017/02).

5.4.9 Entry Arnoldstein (GCA 2015/10)

In cooperation with the pipeline network operator Trans Austria Gasleitung ("TAG GmbH"), a project for the corresponding upgrading of the pipeline systems of Gas Connect Austria was developed for the *newly created FZK* at the Arnoldstein entry point. The GCA 2015/10 project implemented technical measures to derive the FZK of 11,190 MWh/h or 1,000,000 Nm³/h (0°C) coordinated with TAG GmbH into downstream pipeline systems of Gas Connect Austria. The project was completed in the fourth quarter of 2018.

5.5 Projekte und Aktivität der Trans Austria Gasleitung GmbH

Laid on the intersection between the North-South and West-East european („NSI East Gas“) and southern („SGC“) priority gas corridors, Austria and its virtual trading point play due to their geographical situation a crucial role in the supply of gas of the European Union. The international new or extended interconnections for the gas supply originating from the Black Sea, respectively of Russian gas through the North Europe will probably further reinforce this function of physical and trading hub, particularly linked with the node Baumgarten.

Due to that central place, Trans Austria Gasleitung GmbH („TAG GmbH“) constitutes a vital transportation artery from the Slovakian to the Italian borders. In constant exchange with the other national adjacent TSO Gas Connect Austria GmbH, TAG GmbH makes a considerable contribution to the Austrian security of supply in the direction of the domestic distribution system and to the international security of transit towards the adjacent Italian, Slovakian and furthermore Croatian networks.

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

- On the one hand, maintain through re-investments the existing transportation infrastructure of the TAG system reliable, efficient and optimized, in order to guarantee the hitherto existing transportation requirements
- On the other hand, 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“.

The contribution of TAG GmbH to the Coordinated Network Development Plan (“CNDP”) 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, consumers. The listing of the main investments articulated between 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 also introduces the link of the activity of the TSOs in the broader context of the further development of the European gas market, some aspects of the innovation and the technology, the current and potential commercial activity.

The contribution of TAG GmbH was established in an integrative way in closed cooperation with Gas Connect Austria 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) and market area manager (MAM).

5.5.1 Commercial activity

Introduction of a standard harmonized Contract framework for capacity booking: the TAG Frame Capacity Contract

The Transmission Network Access of TAG GmbH is based on the offer of standard capacity products according to Art. 3 section 4 of the Reg. (EU) 2017/459 (NC CAM) and can be cur-rently contracted via product-based capacity contracts (yearly, quarterly, monthly and short-term). Driven by the perpetuation of the high satisfaction of its customer and as important step of its commercial strategy, TAG GmbH intends to introduce from 1st October 2019 a unique Frame Contract, unlimited in time, for the contracting of all standard capacity products.

Through the conclusion of the Frame capacity contract between TAG GmbH and its System Users, the adapted framework enables for the system user a still easier access to the network of TAG GmbH, as the administration effort in comparison to the current process will be re-duced substantially. Several optimizations will be applied in the course of this introduction: noteworthy, the registration process for potential new System User will be unified for all stand-ard products; it is also strived that the invoice linked to the Frame Capacity Contract contains the invoicing information of all standard products.

Improvements in the field of financial security are also under analysis, without changes of the valid amount defined in the General Terms and Conditions of the network access.

Customer relations as a success factor

TAG GmbH introduced in the course of 2017 an internal process to analyze the customer sat-isfaction. The goal is to continuously assess the quality of the commercial service offered and to improve it, with the target to maintain future-orientated the current high quality of customer management. The key tool of this process is the market survey performed from 12.04.2017 to 12.05.2017, which served as input to define performance and steering indicators.

The analysis of the survey results and the listing of corresponding measures were finalized by the beginning of 2018 and apply for the next years till end of 2020.

In this period, beyond the customer care, a specific focus will be given to further noteworthy criteria like “transparency and data quality”, “environment aspects” or “reliability of the transpor-tation”.

A second market survey takes place from mid-September 2019, in which System Users are invited to give again their quantitative and qualitative feedbacks.

5.5.2 Quality, Security, Environment and certification

The security of facilities and employees and the fulfilment of all the environment standards find in TAG GmbH paramount importance, in the daily operation as well as in the realization of projects. Hence, TAG GmbH put in place continuously appropriate measures in the fields of health, job safety, security and environment.

Health and Security

TAG GmbH adopts a proactive approach to ensure the health and integrity of its employees and contractors. TAG GmbH is convinced that any accident can be prevented. For example, insecure conditions and actions are reported immediately and corrective measures are imple-mented stringently.

The crisis and emergency management system also ensures that any incidents are profes-sionally handled.

The activities of TAG GmbH comply with all applicable law provisions and the highest state of the art. TAG GmbH is aiming for certification according to ISO 45001:2018 (standard for a cer-tified work safety management system) in 2019.

The health of their employees is particular care of TAG GmbH. Special attention will be paid to the workplace evaluation. Furthermore, the employees are offered various health actions.

Environment

TAG GmbH considers the impacts on people, animals and environment extremely seriously and strives to minimize them constantly in the broadest extent possible. A continuous control of the emissions, the regular collection of reference and performance environmental indicators including the definition of appropriate measures and the sensitization of our employees enable a constant improvement of the environment protection.

The core activity based on all the legal provisions and the most recent state of the art of the technology. TAG GmbH strives for the certification ISO 14001:2015 (Norm for a certificated system of the environmental management) for the year 2019.

Security

TAG GmbH is aware of its role as a crucial infrastructure. In close coordination with authorities and ministries, it takes precautions to protect against intentional dangers.

5.5.3 Renewal of the transportation system to the latest state of the innovation and technology

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 reinvestment projects and programs, TAG GmbH dedicates a significant focus on the innovation and technology, with the goal to generate socio-economic benefits for the society, which refer for example to the emission reduction, the optimization of the OPEX, the diminution of transportation interruptions, the increase of the operational reliability or the optimization of the energy consumption for compression.

NOxER II Project: the commissioning

Due to the requirements of the new emission protection law for boiler plants (EGK) as well as due to the age and the achieved operation hours (over 100.000 per unit) of the 10 gas-driven compressor units (type GE Frame 3) installed in 1975, TAG will take these units out of opera-tion step by step in order to reduce the burden with NOx and CO2 emissions on its system.

Already in Q3 2018, power energy could be used for the first time for the gas transportation in the TAG system as part of the mechanical and functional tests.

The first functional commissioning of the electric compressors took place in December 2018 and already up to April 2019, approximately 12,200 MWh of electricity were consumed for the compression of gas.

From the first initiation of the project, the selection of the technology, the feasibility studies up to the engineering phase and implementation, the NOxER II project took not less than 5 years without taking into account the remaining works scheduled for 2019-2020.

Thanks to its experience in the management and implementation of large projects, the optimal use of its resources and the professionalism and commitment of its employees, TAG GmbH was able to execute this project – one of the biggest since 10 years and the last major expan-sion of the TAG system - with the highest standard of efficiency, safety and reliability. A capaci-ty of around 45 MW of most modern electro-compression capacity is now available to ensure the long-term transport of gas for Austria, Italy, Slovenia and Croatia. Through the optimal management of its compressors' fleet, the project could be executed with few and small transport reductions.

Figure 54: New electric-driven compressors of TAG in Grafendorf (from KNEP 2019 – 2028; Cover picture)

Compressor-station	Gas-compressor	Elektro-compressor
Baumgarten	4	1
Eggendorf	3	1
Grafendorf	3	2
Weitendorf	3	
Ruden	3	

Source: TAG GmbH

Upgrade of state-of-the-art gas generators and turbines

The 16 remaining youngest gas-driven compressors (from type GE PGT25 DLE), distributed in 5 different compressor stations, forms the backbone of the TAG system. The drive of the gas compressor is realized by a gas generator (GE LM2500 DLE) combined with a power turbine (PGT25).

Re-investments concerning the turbo-compressors are currently followed for two different types of works and are realized in the latest technic and technology offered by the manufacturer:

- The upgrade of the gas generators from the so-called DLE1.0 to DLE1.5 respectively DLE1.5 Xtend product generation with extended service interval reduces the NOx emissions according to the new legal obligation and leads to a positive impact on the CO emissions
- The upgrade of the obsolete 46 hole housing flange of the power turbines, or of the old generation 72 hole housing flange, to the latest generation 72 hole housing flange with extended service interval, ensures a high reliable operation of the compressor units

All these measures substantially reduce the inspection and maintenance service and are therefore only realized when the respective machines have reached a certain number of operating hours (each with a 25,000 or 50,000 operating hours service), which is related to maintenance costs and maintenance downtime lowering effect. As a result, this technological leap is first applied to the heavily loaded compressors of the Baumgarten and Ruden compressor stations.

TAG GmbH already reported in 2018 on the upgrade situation of the existing gas compressors. Within the current year 2019, two further upgrade projects in the compressor station Ruden and Baumgarten were completed. The project "DAY 2017 / R08: Gas generator RC600 in CS-Ruden" should also be finalized by the end of 2019.

Table 17: Gas generators and turbine projects

Compressor station and units	Turbine Type	Potential Technology Upgrade	Gas Generator Type	Potential Technology Upgrade	Project Phase
Baumgarten C500	72-hole old	72-hole new	DLE 1.0	DLE 1.5 Xtend	Planning
Baumgarten C600	72-hole new	/	DLE 1.0	DLE 1.5 Xtend	Planning
Baumgarten C700	46-hole	72-hole new	DLE 1.0	DLE 1.5 Xtend	Engineering
Baumgarten C800	72-hole new	/	DLE 1.5	DLE 1.5 Xtend	Executed
Ruden C400	46-hole	72-hole new	DLE 1.0	DLE 1.5 Xtend	Executed
Ruden C500	46-hole	72-hole new	DLE 1.0	DLE 1.5	Executed
Ruden C600	72-hole new	/	DLE 1.5	DLE 1.5 Xtend	Execution

Source: TAG GmBH

5.5.1 Focus on the future: sustainable gas and digitalization

Sustainable gases

Based on the strategy plan communicated by the European commission for a low CO2 economy till 2050[7], respectively the strategy for the climate and energy of the Austrian government8 (see also Chapter 3.1), the topics of the decarbonization and the development of the sustainable gases (bio-, green-, synthetic- gases) are taking always more place and importance in the dedicated mid-term development national, regional and European scenarios. In this scope, TAG GmbH started in 2018 to assess the potential business and intervention fields in Austria, where TSOs, as central element of the energy value chain, can bring their contribution and orientation in the most efficient way.

The identified focus fields concern currently the mobility and the conversion of power to gases (hydrogen or synthetic gases) as sectoral power-gas coupling and will be deepen in close collaboration with the other actors of the gas and energy sector in the upcoming time. A potential assessment of the aptitude of the TAG system related to transportation of hydrogen as well as a stronger interlinkage between power and gas systems are at the focus.

Digitalization

In order to meet the huge challenges of the societal decarbonization and energy transition impacting the European Union, one of the vectors at the utmost importance is the digitalization of the infrastructures. Smart Grid, Smart Meter, Virtualization of business elements, steering and control techniques by means of digital technologies, blockchains frames the integrative elements

[7] https://ec.europa.eu/clima/policies/strategies/2050_de

[8] http://www.mission2030.info

for the transformation of the energy sectors. TAG GmbH puts a strong strategic focus on the transformation of its system, in order to prepare gradually the future.

As a good illustration of this transformation, TAG GmbH plans currently to introduce a remote diagnostic system in all the compression stations, in order to start implementing on-condition maintenance, optimizing intervention times, increasing reliability and reducing maintenance costs.

5.5.2 TAG Reverse Flow Weitendorf/Eggendorf [TAG 2016/01]

Upgraded FZK capacity and security of supply as basis: The project fulfills the requirements of the decree V KNEP G 01/15 of 27.10.2015, issued by ECA with reference to CNDP 2016-2015, together with projects TAG 2016/02, GCA 2015/10, and GCA 2015/08, by creating new and non competing freely allocable capacity (FZK) at the entry points Arnoldstein and Murfeld.

Capacity at the entry point Arnoldstein and Murfeld: The project foresees the possibility to reverse the flow in the Weitendorf and Eggendorf CSs in an automatised way, allowing the transportation of the existing capacity at the entry point Arnoldstein in the upgraded FZK quality in addition to the planned new additional capacity at entry point Murfeld toward Baumgarten, by also fulfilling all the contractual obligations at the exit points toward the Austrian distribution system. The project also foresees encompasses corresponding adaptations of the piping and of the station control systems in both TAG compressor stations, allowing reverse flow to be operated in usual operating conditions without need for local intervention.

The implementation of the project "TAG 2016/01 TAG Reverse Flow Weitendorf/Eggendorf" will allow the operation of the CS Weitendorf and all the necessary modifications of the station control system, the physical transportation of at least 17.904.000 kWh/h (1.600.000 Nm³/h, 0°C), i.e. at least 11.190.000 kWh/h (1.000.000 Nm³/h, 0°C) at the entry point Arnoldstein and 6.714.000 kWh/h (600.000 Nm³/h, 0°C) at the entry point Murfeld. The project will additionally ensure, even though unlikely from the current point of view, possible physical flow from the entry point Murfeld towards Italy via the SOL and TAG Systems.

Coordination with the adjacent TSOs: The coordination at operational level between TAG GmbH and Gas Connect Austria takes place since 2016. The coordination process for the detailled planing has been continued based on identified additional required technical along the CNDP capacity scenario.

Concepts for the capacity allocation: The project, in combination with the projects GCA 2015/10 (execution currently strived for end 2018) and TAG 2016/02 (executed) will enable the upgrade of existing DZK capacity into FZK capacity at the entry point Arnoldstein and represents an important milestone for a complete reverse flow of the TAG System.

Achievement of European connection: As of 28.04.2017, this project is officially part of the TYNDP 2017 (TRA-N-954), has been further represented in TYNDP 2018 and will be part of TYNDP 2020. The project TAG 2016/01, together with projects TAG 2016/02 and GCA 2016/E2, strives for

strengthening the local security of supply by diversification of the supply roads and sources, and the resulting increased access from Italy to Austria. The project underpins the North-South-East corridor in the supply of further physical transport possibilities in Reverse Flow in the directions South-North and South-East, and is therefore meaningful for the Austrian market area.

Approval already within CNDP 2017 –2026, monitoring and amendment: The project TAG 2016/01 was already approved within the CNDP 2017 – 2026. The project is currently in line with the expected budget and is in the planning phase. Due to re-planning and as results of the procurement process, the planned completion is shifted in 2020. The project is submitted for approval under the terms specified in the economic data section with the amendments indicated.

5.5.3 TAG Baumgarten interconnection capacity (Mosonmagyaróvár) [TAG 2016/04]

Non-binding demand from Gas Connect Austria and Austrian internal connection capacity as basis: The project TAG 2016/04, as complementary project to the project GCA 2015/05, will create additional interconnection capacity in Baumgarten on the freely allocable basis (FZK) at the Gas Connect Austria entry point Mosonmagyaróvár (see Chapter 5.4.5). The project ensures the modification of TAG Baumgarten Station in order to allow an increased gas flow into the TAG System and to guarantee the access to the VTP. The project is required in order to increase the technical interconnection capacity between the transit systems of TAG GmbH and Gas Connect Austria within the Baumgarten Station, and furthermore to improve the Security of Supply of the Austrian and Hungarian markets. The increase of the interconnection capacity entails improved liquidity of the European markets, as well as an increase of the Austrian and European Security of Supply by enabling alternative transport routes for alternative gas supply sources.

Additional capacities at the entry point Mosonmagyorovar: The Project TAG 2016/04 itself does not create additional new capacities at the relevant points, but it creates the conditions to ensure the access to VTP, which allows additional FZK capacity at the entry and exit points of the Austrian Eastern market area. In the framework of the network development plan of Gas Connect Austria an additional non-binding capacity demand was adressed at the entry point Mosonmagyorovar in the amount of up to 5.113.000 kWh/h, i.e. 453.927 Nm³/h (0°C) (see project GCA 2015/05 for more details).

Concepts for the capacity allocation: As the additional connection capacity does not impact the amount of capacity at the relevant points of the TAG system, an allocation of capacity will not be performed by TAG GmbH itself.

Coordination with the adjacent TSOs: TAG GmbH and Gas Connect Austria carried on the coordination process for the detailed project planning on the basis of additional technical capacities up to the amount of 6.378.000 kWh/h, i.e. 570.000 Nm³/h (0°C). Depending on the implementation of the project TAG 2016/02, on the schedule plan of the Project GCA 2015/05, as well as on the results of the measures aimed at creating the planned incremental capacity offer on FZK basis by the TSO directly involved from Austria and Hungary, the necessity to implement the project TAG 2016/04 will be further analyzed.

Approval already within CNDP 2017-2026 and Monitoring: The Project TAG 2016/04 was already approved as planning project within the CNDP 2017 – 2026 and carried forward in CNDP 2018-2019. The project is currently in the planning phase.

5.5.4 TAG Baumgarten interconnection capacity (BACI) [TAG 2016/05]

Non-binding capacity demand from Gas Connect Austria and Austrian internal connection capacity as basis: The project TAG 2016/05, as complementary project to the project GCA 2015/01a, will create additional interconnection capacity in Baumgarten on the freely allocable basis (FZK) at the planned entry/exit point Reintal between the Austrian Gas Connect Austria System and the Czech N4G-System (see Chapter 5.4.2). The project allows the modification of the TAG Baumgarten Station in order to allow an increased gas flow from/into the TAG System and to guarantee the access to VTP. The project is required to increase the technical interconnection capacity between the transit systems of TAG GmbH and Gas Connect Austria within the Baumgarten station and, furthermore, to improve the security of supply of the Austrian and Czech markets. The increase of connection capacity entails improved liquidity of the European market as well as an increase of the Austrian and European Security of Supply by enabling alternative transport routes for alternative gas supply sources.

Additional capacity at the Entry/Exit Point Reintal: The Project TAG 2016/05 itself does not create additional new capacity at the relevant points, but it allows the possibility to a guaranteed access to the VTP, which provides additional FZK capacity at the entry and exit points of the Austrian Eastern Market Area. Additional not-binding bidirectional capacity demand up to the amount of 8.392.500 kWh/h, i.e. 750.000 Nm³/h (0°C) at the entry/exit point Reintal has been notified as planning basis in the network development plan by Gas Connect Austria.

Concepts for the capacity allocation: As the additional capacity does not impact the amount of capacity at the TAG relevant points, an allocation of capacity will not be performed by TAG GmbH itself.

Coordination with the adjacent TSOs: The process of coordination for the detailed project planning has been carried on by TAG GmbH and Gas Connect Austria. Based on the coordination between both TSOs TAG GmbH and Gas Connect Austria and on the dependency of this project with the complemen-tary project GCA 2015/01a, the potential completion of the planning project TAG 2016/05 is estimated as a relative project duration to the maximal amount of 4,5 years, potentially begin-ning from 2018 and subject to the approval of the relevant authorities.

Approval already within CNDP 2017-2026: The project TAG 2016/05 was approved within the CNDP 2017 – 2026 as planning project. The project TAG 2016/05 with amendments was re-approved within the CNDP 2018 – 2027 as planning project subject to the condition that Gas Conect Austria or TAG GmbH, as the case may be, in coordination with the market area manager and prior to the final investment decision, or, in the case of planning projects at the latest in the

CNDP 2018, optimise the technical and economic efficiency of the planned measures. The Project is currently in the planning phase.

Taking into consideration the specified changes (timeline), the project will be re-submitted as planing project for approval under the terms specified in the economic data section.

5.5.5 TAG Baumgarten interconnection capacity (Mosonmagyaróvár) II [TAG 2017/01]

Non-binding demand from Gas Connect Austria and Austrian internal connection capacity as basis: The project TAG 2017/01, as complementary project to the project GCA 2017/01, shall create additional interconnection capacity in Baumgarten on the basis of additional FZK capacity at the planned entry point Mosonmagyaróvár of the GCA System (see Chapter 5.4.5). The project ensures the modification of the TAG Baumgarten Station in order to allow a higher gas flow into the TAG System and to guarantee the access to the VTP. The project is necessary to increase the interconnection capacity between the transit systems of TAG GmbH and Gas Connect Austria within the Baumgarten Station and to further improve the security of supply of the Austrian and Hungarian markets. The increase of the interconnection capacity improves the liquidity of the Austrian markets and increases the Austrian and European Security of Supply by creating alternative transport routes for alternative gas supply sources. This project is an alternative to the project TAG 2016/04 with higher connection capacities.

Additional capacity at the Entry Point Mosonmagyorovar: The project itself does not create additional new capacity at the relevant points, but it guarantees the conditions for the access to the VTP, that allows additional FZK Capacity at the entry/exit points of the Austrian Eastern Market Area. Additional not-binding bi-directional capacity demand amounting to up to 11.190.000 kWh/h i.e. 1.000.000 Nm^3/h (0°C) at the entry point Mosonmagyaróvár has been notified in the network development plan by Gas Connect Austria.

Concepts for the capacity allocation: As the additional capacity does not impact the amount of capacity at the TAG relevant points, an allocation of capacity will not be performed by TAG GmbH itself.

Coordination with the adjacent TSOs: The coordination process for the detailed project planning was initiated and carried on by TAG GmbH and Gas Connect Austria within the preparation of the CNDP 2017. Based on the coordination between both TSOs TAG GmbH and Gas Connect Austria and on the dependency of this project with the complementary project GCA 2017/01, the potential comple-tion duration of the planning project TAG 2017/01 is estimated to the maximal amount of 4,5 years, potentially beginning from 2018 and subject to the approval of the relevant authorities.

Approval already in CNDP 2018 – 2027: The Project TAG 2017/01 was approved within the CNDP 2018–2027 as planning project. The project is currently in the planning phase.

5.5.6 TAG Exit Murfeld [TAG 2018/01]

PCI and non-binding capacity demand from Plinovodi as basis: in the framework of the project and capacity demand survey from 2016 taken by Gas Connect Austria, the Slovenian TSO Plinovodi notified the projects „Upgrade of Murfeld-Cersak interconnection“, „Upgrade of Rogatec interconnection“ und „CS Kidricevo“ in the network development plan of Gas Connect Austria. The project TAG 2018/01, as complementary pro-ject of the project GCA 2015/08 for potential additional FZK capacity in the direction from Aus-tria to Slovenia, enables through the extension of the TAG system between the compressor stations Baumgarten and Weitendorf in the North-South flow direction the foreseen additional FZ capacities at the Exit Point Murfeld (see Chapter 5.4.4).

Additional Capacity in Exit Point Murfeld: The current technical capacity in Exit Point Murfeld amounts to 419,000 Nm³/h (0°C). The TAG project TAG 2018/01 itself does not create additional new capacity at the relevant points, but is necessary as complementary project of the project GCA 2015/08 to enable the creation of additional freely allocable capacity in Exit Point Murfeld in the amount of 391.620 Nm³/h (0°C).

Concepts for the capacity allocation: As the additional capacity does not impact the amount of capacity at the TAG relevant points, an allocation of capacity will not be performed by TAG GmbH itself.

Coordination with the adjacent TSOs: The process of coordination for the detailed project planning has been carried on by TAG GmbH and Gas Connect Austria. Based on the coordination between both TSOs TAG GmbH and Gas Connect Austria and on the dependency of this project with the complemen-tary project GCA 2015/08, the potential completion of the planning project TAG 2018/01 is es-timated as a relative project duration to the maximal amount of 4.5 years, potentially beginning from 2018 and subject to the approval of the relevant authorities.

Submission for approval in CNDP 2019–2028: The TAG 2018/01 project was approved within the CNDP 2019–2028 as planning project. The project is currently in the planning phase.

6 Summary

The new capacity requirements submitted were included in the 2019 CNDP and the transmission system operators developed corresponding projects which are suitable to meet the demand for additional capacity. The projects were developed in accordance with the European planning tools and in coordination with domestic and foreign transmission system operators. The demand of the distribution area was taken into consideration as well.

The TSOs provided information on the projects to be realised in the planning horizon 2020-2029 in order to be able to meet the capacity requirements submitted, see Table 9. The projects which will be continued without changes based on earlier approvals were listed in the CNDP (Table 11 and Table 14). The projects which will be continued with changes based on earlier approvals were listed in the CNDP (Table 12and Table 15).

The projects approved in earlier Coordinated Network Development Plans which are no longer required based on the current capacity scenario and were therefore withdrawn by the transmission system operators were listed in Table 10.

Newly submitted projects in the 2019 CNDP are listed in Table 13 and Table 16. For each project, an implementation schedule was prepared and the expected date of completion or the expected implementation period was specified in the project sheet (Appendix 1).

The 2019 CNDP meets the aims set out in section 63 (4): The security of supply for consumers can be guaranteed by the already existing network. In planning new projects, great importance was placed on the high level of availability of pipeline capacity. Covering transport needs was ensured and the obligation to meet the infrastructure standard according to Article 5 Regulation (EU) No. 2017/1938 was complied with.

Gas Connect Austria submitted one new planning project for new capacities. A total of 13 new replacement investment projects have been submitted.

7 Disclaimer

The 2019 Coordinated Network Development Plan exists in both German and English version; any conflicts between them are unintentional. The binding language version shall be the German one. The English translation shall not be binding and is provided solely for information purposes. The market area manager and the transmission system operator accept no liability for any variations in content or errors of translation.

Abbreviations

ACER	Agency for the Cooperation of Energy Regulators
AGGM	AGGM Austrian Gas Grid Management AG
AT	Austria
BG	Bulgaria
CBCA	Cross Border Cost Allocation
CEGH	Central European Gas Hub
CNDP	Coordinated Network Development Plan
CZ	Czech Republic
DAM	Distribution Area Manager
DE	Germany
DZK	Dynamic allocable capacity
ECA	Energie-Control Austria
ENTSOG	European Network of Transmission System Operators Gas
FZK	Freely allocable capacity (Freie zuordenbare Kapazität)
GCA	Gas Connect Austria GmbH
GWG	Natural gas act (Gaswirtschaftsgesetz)
GWh	Gigawatthours
GRIP	Gas Regional Investment Plan
HR	Croatia
HU	Hungary
IP	Interconnection Point
IT	Italy
kWh	Kilowatthours
LNG	Liquified Natural Gas
LTP	Long Term Plan
MAB	March Baumgarten Gasleitung
MAM	Market Area Manager
MW	Megawatt
MWh	Megawatthours
NC CAM	Network Code Capacity Allocation Mechanism
NCG	Net Connect Germany
Nm^3/h	standardkubikmeter pro Stunde (Temperature 0°C; 1013 mbar)
PCI	Project of Common Interest
RO	Romania
SEL	Süddeutsche Erdgasleitung
SI	Slovenia
SK	Slovakia
SOL	Süd Ost Leitung
SoS	Security of Supply
TAG	Trans Austria Gasleitung
TR	Turkey
TSO	Transmission System Operator
TWh	Terrawatthours
TYNDP	Ten Year Network Development Plan
UK	Interruptible capacity (unterbrechbare Kapazität)
VTP	Virtal Tradingpoint
WAG	West Austria Gasleitung

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Appendix 1:

Projects for additional capacities

Project-sponsor	Project-number	Project name	Implement-ation time frame [years]	Planned completition [date]	Development compared to CNDP 2018 *)
GCA	2015/01a	Bidirectional Austria Czech Interconnector	4,5		continuation
GCA	2015/01b	Projekt 1b: BACI DN 1200	4,25		continuation
GCA	2015/02a	Entry Überackern	4,5		continuation
GCA	2015/03	Entry/Exit Überackern - Maximum	6		continuation
GCA	2015/04	Entry Mosonmagyaróvár - Minimum	1,5		continuation
GCA	2015/05	Entry Mosonmagyarovar	4,5		continuation
GCA	2015/08	Entry/Exit Murfeld	4,5		continuation
GCA	2017/01	Entry Mosonmagyaróvár Plus	4,5		continuation
GCA	2017/02	Penta West – Exit Distribution Area	1,5		continuation
GCA	2018/01	Überackern - Oberkappel	4,5		continuation
GCA	2019/01	Exit Mosonmagyaróvár	4,5		new
TAG	2016/01	TAG Reverse Flow Weitendorf / Eggendorf		Q4/2020	amendment
TAG	2016/04	TAG Baumgarten interconnection capacity (Mosonmagyaróvár)		Q4 2021	continuation
TAG	2016/05	TAG Baumgarten interconnection capacity (BACI)	4,5		continuation
TAG	2017/01	TAG Baumgarten interconnection capacity (Mosonmagyaróvár) II	4,5		continuation
TAG	2018/01	Murfeld Exit Capacity Increase	4,5		continuation

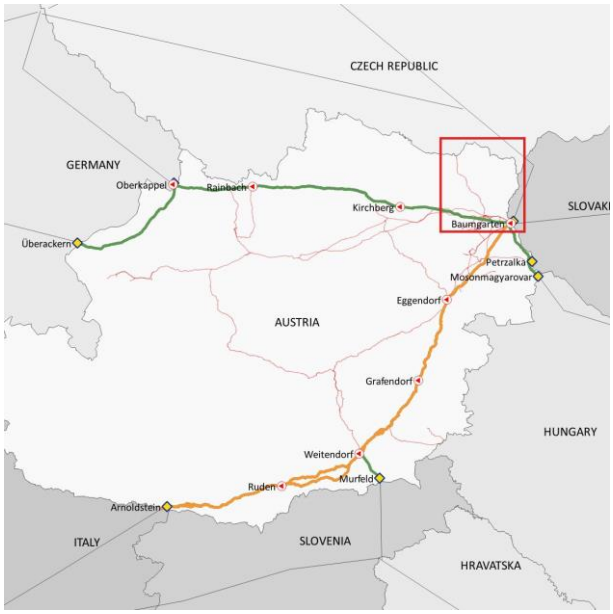
*) continuation Continued and approved project without amendments
amendment Continued and approved project with amendments
new New project

Project name:	**GCA 2015/01a Bidirectional Austria Czech Interconnector**		
Project number:	GCA 2015/01a		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	4	**Date:**	31.08.2019
Project type:	Project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	4,5 years	**Performance audit according to CAM NC:**	Yes
Planned completion:			

Project objective:

The project aims to create technical bidirectional capacities on a freely allocable basis for the first time and to set up the Reintal entry and exit point between the Austrian market area and the Czech market.

Project description



The following investments are necessary for the project:

- New metering station at the handover station – Baumgarten (3x)
- New Baumgarten CS
- Transmission system connection between Baumgarten and Reintal
- New metering station at the handover station - Reintal

Project rationale:

This project is necessary to foster the north-south corridor, reduce market isolation, increase the security of supply in the Czech Republic and in Austria and provide transport routes for alternative gas sources.

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 2016/05 TAG Baumgarten interconnection capacity (BACI).

Technical data:

Following new freely allocable capacities (FZK) are planned to be available to the system uses after completion of the project.

Reintal entry point 750,000 Nm³/h (0°C)

Reintal exit point 750,000 Nm³/h (0°C)

Economic data:

Planned investment cost 176.345.685 € (Cost base 2017). The cost estimate may deviate by +/- 25% due to uncertainties in the first planning phase.

Capacity impact:

None

Project phase:

Identify & Assess

TYNDP: TRA-N-021	**PCI status:** 6.4	**CBCA decision:** No

Project modifications:

CNDP 2018: None

CNDP 2019: None

Project status:

CNDP 2015: Approved as a planning project

CNDP 2016: Approved including amendments

CNDP 2017: Approved including amendments

CNDP 2018: Further monitoring without amendments

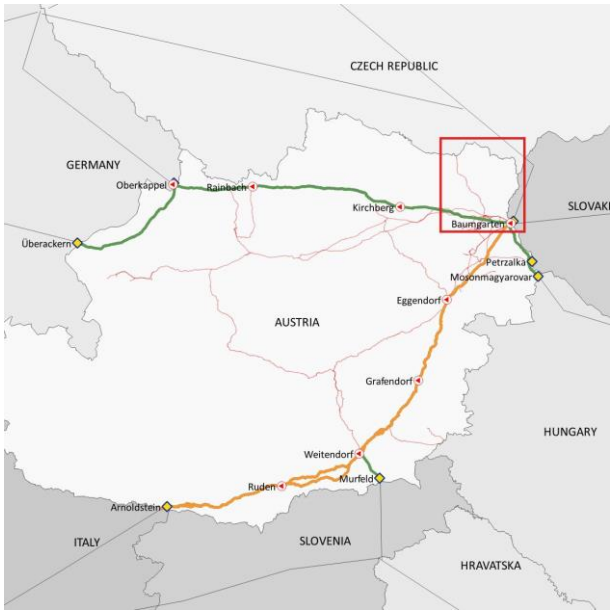
CNDP 2019: Further monitoring without amendments

Project name:	**GCA 2015/01b BACI DN 1200**		
Project number:	GCA 2015/01b		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Planning project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	4,2 years	**Performance audit according to CAM NC:**	Yes
Planned completion:			

Project objective:

The project aims to create technical bidirectional capacities on a freely allocable basis for the first time and to set up the Reintal entry and exit point between the Austrian market area and the Czech market.

Project description



The following investments are necessary for Project 1b:

- New metering station at the handover station – Baumgarten
- New Baumgarten CS
- Transmission system connection between Baumgarten and Reintal

New metering station at the handover station - Reintal

Project rationale:

This project is necessary to foster the north-south corridor, reduce market isolation, increase the security of supply in the Czech Republic and in Austria and provide transport routes for alternative gas sources.

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:

No

Technical data:

Following new freely allocable capacities (FZK) are planned to be available to the system uses after completion of the project.

Reintal entry point 1,480,000 Nm³/h (0°C)

Reintal exit point 1,480,000 Nm³/h (0°C)

Economic data:

Planned investment cost 215,009,600 € (Cost base 2015) The cost estimate may deviate by +/- 25% due to uncertainties in the first planning phase.

Capacity impact:

None

Project phase:

Identify & Assess

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

Project modifications:

CNDP 2018: None

CNDP 2019: None

Project status:

CNDP 2015: Approved as a planning project

CNDP 2016: Further monitored without amendments

CNDP 2017: Further monitored without amendments

CNDP 2018: Further monitoring without amendments

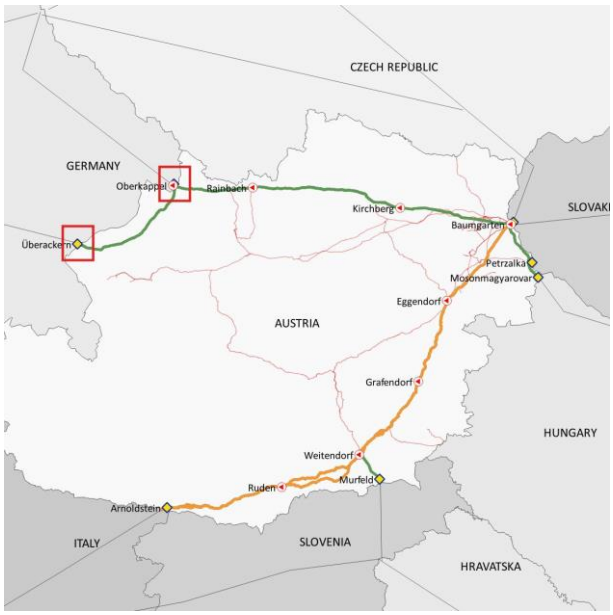
CNDP 2019: Further monitoring without amendments

Project name:	**GCA 2015/02a Entry Überackern**		
Project number:	GCA 2015/02a		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Planning project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	4,5 years	**Performance audit according to CAM NC:**	Yes
Planned completion:			

Project objective:

The project aims to increase technical capacity at the Überackern SUDAL entry point to cover projected demand for additional entry capacities at the Überackern SUDAL point. As the Überackern SUDAL, Überackern ABG and Oberkappel points are in competition, capacity at the Oberkappel entry point will also be adjusted.

Project description



The following investments are necessary for the project:

- Modification of the Überackern metering station at the handover station
- Überackern CS "New"
- WAG partial loop
- Modification of Oberkappel metering station
- Modification Baumgarten station

Project rationale:

In particular, this project becomes necessary to be able to cover the projected additional capacity demand at the Überackern SUDAL entry point.

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:

No

Technical data:

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

Freely allocable capacity (FZK) Überackern SUDAL entry point: 674,500 Nm³/h (0°C)

Freely allocable capacity (FZK) Oberkappel entry point: 1,175,000 Nm³/h (0°C)

Economic data:

Planned investment cost 163,995,900 € (Cost base 2017). 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 Überackern IP are covered by binding long-term bookings.

Capacity impact:

None

Project phase:

CNDP 2018: Identify & Assess

CNDP 2019: Identify & Assess

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

Project modifications:

CNDP 2018: None

CNDP 2019: None

Project status:

CNDP 2016: Approved as a project

CNDP 2017: Approved including amendments

CNDP 2018: Further monitoring without amendments

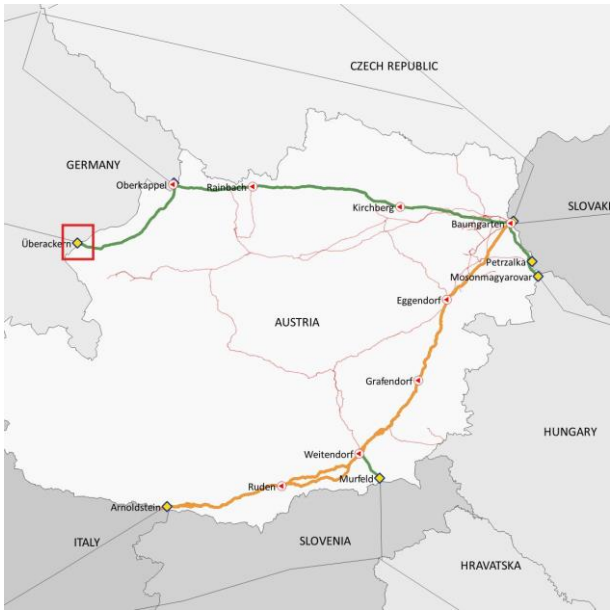
CNDP 2019: Further monitoring without amendments

Project name:	**GCA 2015/03 Entry/Exit Überackern - Maximum**		
Project number:	GCA 2015/03		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	6 years	**Performance audit according to CAM NC:**	Yes
Planned completion:			

Project objective:

The project aims at increasing technical capacity at the Überackern entry/exit point to present a possible maximum variant and analyse alternative routes for potential storage connections.

Project description



The following investments are necessary for the project:

- New Überackern CS
- Modification of the Überackern metering station at the handover station: Switch of the connection points of the border crossing pipelines of the SUDAL and ABG rails and installation of an additional filter separator on the future ABG rail.
- Penta West pipeline loop
- Modification of the Neustift metering and compressor stations
- WAG loop
- Modification of the Rainbach and Kirchberg compressor stations
- Piping at Baumgarten

Project rationale:

This project is being examined in order to present a possible maximum variant and to examine alternative routes for potential storage connections. It also increases security of supply in Austria and in Europe.

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:

No

Technical data:

Following additional freely allocable capacities (FZK) are planned to be available to the system uses after completion of the project.

Überackern SUDAL/ABG/7 Fields entry point 1,427,389 Nm³/h (0°C)

Überackern SUDAL/ABG/7 Fields exit point 1,580,440 Nm³/h (0°C)

Economic data:

Planned investment cost 562,444,600 € (Cost base 2015). 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 Überackern IP are covered by binding long-term bookings or binding long-term bookings by the storage system operator.

Capacity impact:

None

Project phase:

CNDP 2018: Identify & Assess

CNDP 2019: Identify & Assess

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

Project modifications:

CNDP 2018: None

CNDP 2019: None

Project status:

CNDP 2015: Approved as a planning project

CNDP 2016: Further monitored without amendments

CNDP 2017: Further monitored without amendments

CNDP 2018: Further monitoring without amendments

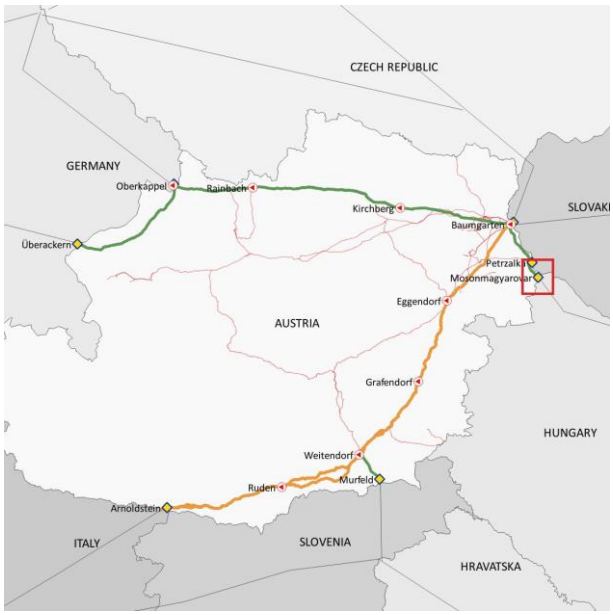
CNDP 2019: Further monitoring without amendments

Project name:	**GCA 2015/04 Entry Mosonmagyaróvár - Minimum**		
Project number:	GCA 2015/04		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Planning project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	1,5 years	**Performance audit according to CAM NC:**	No
Planned completion:			

Project objective:

The project aims to create technical capacity at the Mosonmagyaróvár entry point.

Project description



The following investments are necessary for the project:

- Modification HAG MS: Filter separator, metering routes, regulation, piping
- Extension of the Baumgarten node

Project rationale:

This project is being examined in order to cover the additional demand for capacity submitted at the Mosonmagyaróvár entry point. It also increases security of supply in Austria and in Europe and diversifies sources of natural gas and supply routes.

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:

No

Technical data:

The project-related analyses were carried out on the basis of the following additional capacities:

Freely allocable capacity (FZK) Mosonmagyaróvár entry point: 120,000 Nm³/h (0°C)

Economic data:
Planned investment cost 3,190,500 € (Cost base 2015) The cost estimate may deviate by +/- 25% due to uncertainties in the first planning phase. . The realization of the project depends on a pressure support by the upstream TSO at the entry point to realize the above mentioned FZK capacities.

Capacity impact:
None

Project phase:
CNDP 2018: Identify & Assess
CNDP 2019: Identify & Assess

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

Project modifications:
CNDP 2018: None
CNDP 2019: None

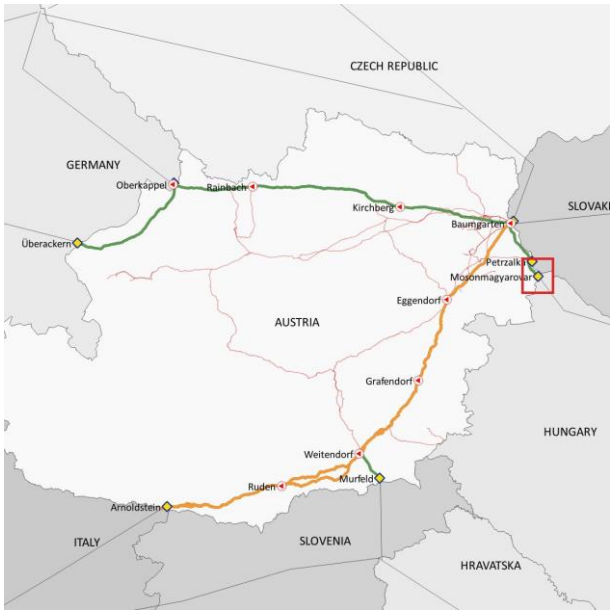
Project status:
CNDP 2015: Approved as a planning project
CNDP 2016: Further monitored without amendments
CNDP 2017: Approved as a project
CNDP 2018: Further monitoring without amendments
CNDP 2019: Further monitoring without amendments

Project name:	**GCA 2015/05 Entry Mosonmagyarovar**		
Project number:	GCA 2015/05		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	4	**Date:**	31.08.2019
Project type:	Planning project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	4,5 years	**Performance audit according to CAM NC:**	Yes
Planned completion:			

Project objective:

The project aims to create technical capacity at the Mosonmagyaróvár entry point to cover projected demand for additional entry capacities at the Mosonmagyaróvár point on a freely allocable basis.

Project description



The following investments are necessary for the project:

- Modification HAG MS: Filter separator, metering routes, regulation, piping
- New HAG CS

Extension of the Baumgarten node

Project rationale:

This project aims at covering the projected additional demand for capacity at the Mosonmagyaróvár entry point.

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 2016/04 TAG Baumgarten interconnection capacity (Mosonmagyarovar).

Technical data:

The project-related analyses were carried out on the basis of the following additional capacities:

Freely allocable capacity (FZK) Mosonmagyaróvár entry point: 570,000 Nm³/h (0°C)

Economic data:
Planned investment cost 75,297,000 € (Cost base 2017). 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 Mosonmagyaróvár IP are covered by binding long-term bookings.

Capacity impact:
None

Project phase:
CNDP 2018: Identify & Assess
CNDP 2019: Identify & Assess

TYNDP: TRA-N-423	**PCI status:** 6.24.3	**CBCA decision:** No

Project modifications:
CNDP 2018: None
CNDP 2019: None

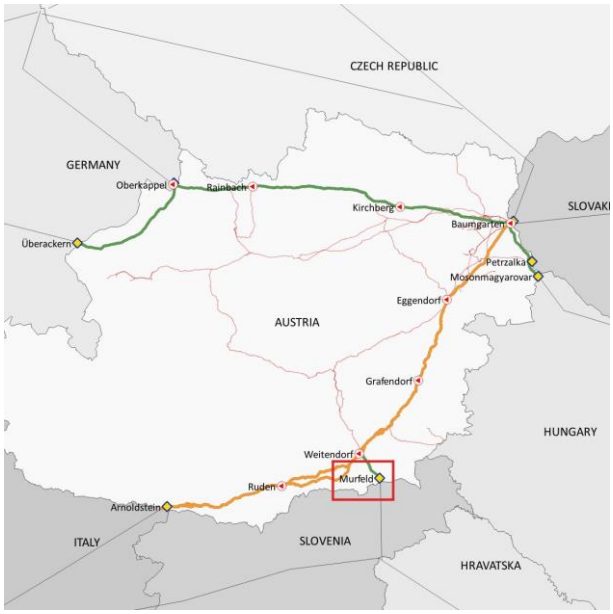
Project status:
CNDP 2015: Approved as a project
CNDP 2016: Approved including amendments
CNDP 2017: Approved including amendments
CNDP 2018: Further monitoring without amendments
CNDP 2019: Further monitoring without amendments

Project name:	**GCA 2015/08 Entry/Exit Murfeld**		
Project number:	GCA 2015/08		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Planning project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	4,5 years	**Performance audit 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:

This project aims at covering the projected additional demand for capacity at the Murfeld entry and exit points.

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)

Freely allocated capacity (FZK) Murfeld exit point: 810,620 Nm³/h (0°C)

Economic data:

Planned investment cost 100,311,300 € (Cost base 2017) 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:

CNDP 2018: Identify & Assess

CNDP 2019: Identify & Assess

TYNDP: TRA-N-361	**PCI status:** 6.26.4	**CBCA decision:** No

Project modifications:

CNDP 2018: None

CNDP 2019: 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 monitoring without amendments

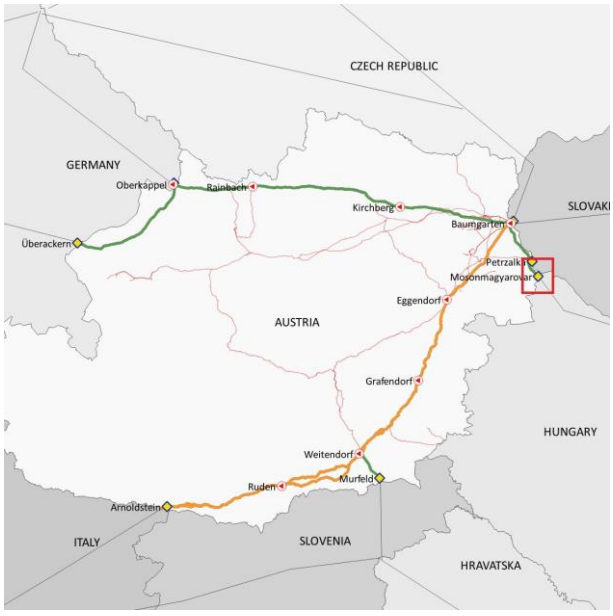
CNDP 2019: Further monitoring without amendments

Project name:	**GCA 2017/01 Entry Mosonmagyaróvár Plus**		
Project number:	GCA 2017/01		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Planning project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	4,5 years	**Performance audit according to CAM NC:**	Yes
Planned completion:			

Project objective:

The project aims to create technical capacity at the Mosonmagyaróvár entry point to cover projected demand for additional entry capacities at the Mosonmagyaróvár point on a freely allocable basis.

Project description



The following investments are necessary for the project:

- Loop of the HAG pipeline
- Extension of the Baumgarten node (Oversupply capacities WAG and TAG systems) including construction of new metering routes
- New compressor station

Project rationale:

This project is being examined in order to cover the projected additional demand for capacity at the Mosonmagyaróvár entry point. It also increases security of supply in Austria and in Europe and diversifies sources of natural gas and supply routes.

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 2017/01: TAG Baumgarten interconnection capacity (Mosonmagyaróvár) II

Technical data:

Following additional additional freely allocable capacity (FZK) shall be provided to system users after completion of the project:

Mosonmagyaróvár entry point: 1,000,000 Nm³/h (0°C)

Economic data:

Planned investment cost 161,600,000 € (Cost base 2017). 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 Mosonmagyaróvár IP are covered by binding long-term bookings.

Capacity impact:

None

Project phase:

CNDP 2018: Identify & Assess

CNDP 2019: Identify & Assess

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

Project modifications:

CNDP 2018: None

CNDP 2019: None

Project status:

CNDP 2017: Approved as a project

CNDP 2018: Further monitoring without amendments

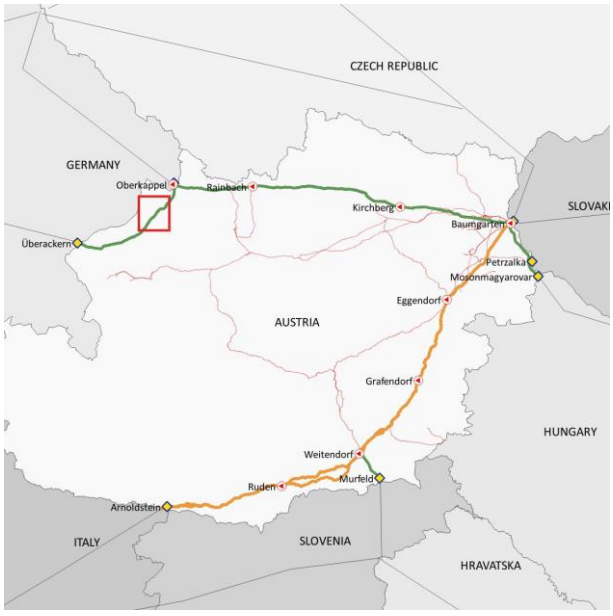
CNDP 2019: Further monitoring without amendments

Project name:	**GCA 2017/02 Penta West – Distribution Area**		
Project number:	GCA 2017/02		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	1,5 years	**Performance audit according to CAM NC:**	No
Planned completion:			

Project objective:

The aim of the project is to provide technical capacity along the Pent West pipeline at the station Andorf for an exit into the distribution area.

Project description



The following investments are necessary for the project:

- Adaptation and expansion of the station Andorf on the Pent West

Project rationale:

Project development due to the respective demand request by AGGM as a system user.

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:

Nein

Technical data:

Following new freely allocable capacities (FZK) shall be provided to the system users after completion of the project:

Andorf exit point (Penta West --> Distribution area): 5,000 Nm³/h (0°C)

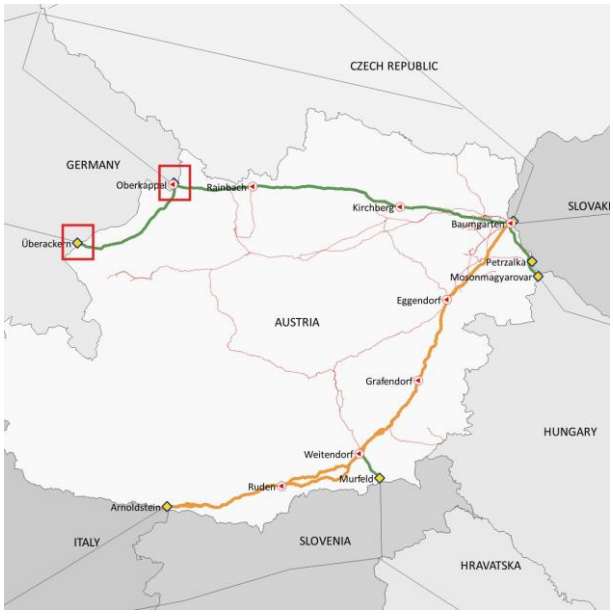
<table>
<tr><td colspan="3">Economic data:
Planned investment cost 300,000 € (Cost base 2017). The cost estimation has an accuracy of +/- 25%, which represents the uncertainty in the first planning phase. The realization of the project is achieved when the costs allocated to the point are covered by binding long-term bookings.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2018: Identify & Assess
CNDP 2019: Identify & Assess</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 2018: None
CNDP 2019: None</td></tr>
<tr><td colspan="3">Project status:
CNDP 2017: Approved as a planning project
CNDP 2018: Further monitoring without amendments
CNDP 2019: Further monitoring without amendments</td></tr>
</table>

Project name:	**GCA 2018/01 Überackern - Oberkappel**		
Project number:	GCA 2018/01		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Planning project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	4,5 years	**Performance audit according to CAM NC:**	Yes
Planned completion:			

Project objective:

The aim of this project is increase the technical entry/exit capacity in Überackern SUDAL and Oberkappel in order to fulfill possible additional capacity demands between these points.

Project description



Following investments are necessary for the implementation:

- Modification "MS Überackern"
- CS Überackern "New"
- Modification of MS Oberkappel

Project rationale:

Market feedback indicates the interest in new additional capacities between the entry/exit points Überackern and Oberkappel.

Please note in particular:

-

Connection to other projects:

No

Technical data:

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

Freely allocable capacity (FZK) Überackern SUDAL entry point: 674,500 Nm³/h (0°C)

Freely allocable capacity (FZK) Oberkappel entry point: 1,175,000 Nm³/h (0°C)

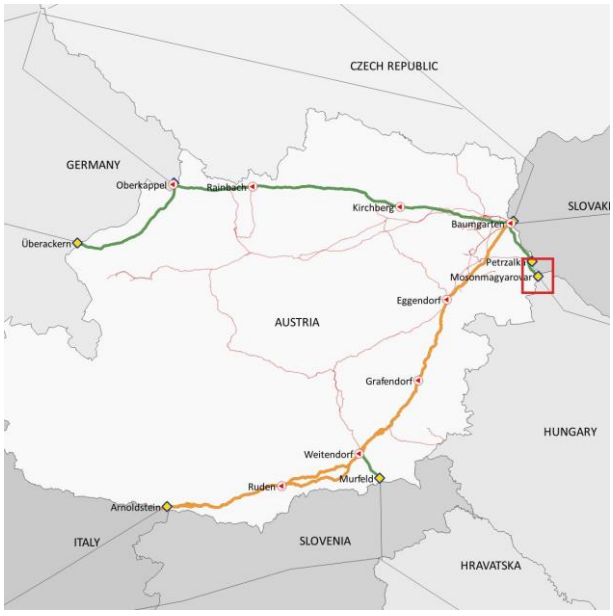
<table>
<tr><td colspan="3">Economic data:
Planned investment cost 69,196,900 € (Cost base 2018). The cost estimate may deviate by +/- 25% due to uncertainties in the first planning phase. The extension threshold for implementing the project is reached as soon as the costs allocated to the Überackern and Oberkappel IPs are covered by binding long-term bookings.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2018: Identify & Assess
CNDP 2019: Identify & Assess</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 2018: Approved as project
CNDP 2019: Further monitoring without amendments</td></tr>
</table>

Project name:	**GCA 2019/01 Exit Mosonmagyaróvár**		
Project number:	GCA 2019/01		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.08.2019
Project type:	Planning project for additional capacities	**Project category:**	New project
Implementation time frame:	4,5 years	**Performance audit according to CAM NC:**	No
Planned completion:			

Project objective:

Based on a request from the Austrian regulatory authority, the aim of the project is to investigate the production of additional technical capacity on the FZK basis at the exit point Mosonmagyaróvár.

Project description



The following investments are necessary for the project:

- Loop of the HAG line
- new building HAG MS
- Extensions in the Baumgarten node (over-capacity WAG and TAG systems) including the construction of new measuring sections

Project rationale:

Die Projektierung wird aufgrund einer Auffoderung der österreichischen Regulierungsbehörde durchgeführt.

Please note in particular:

The technical analysis of the normal flow already took place within the framework of the technical studies ("confidential enclosures") for the project GCA 2017/01 Entry Mosonmagyaróvár Plus and remain unchanged and valid in accordance with the Network Development Plan 2017 of Gas Connect Austria.

Connection to other projects:

The project is directly related to the complementary project TAG 2017/01: TAG Baumgarten Interconnection Capacity (Mosonmagyaróvár) II

Technical data:

The following freely allocable capacities (FZK) shall be available to the network users from the completion of the project and its complementary project:

Exit point Mosonmagyaróvár: 1.000.000 Nm³ / h (0 ° C)

Economic data:

CNDP 2019: Planned investment costs € 91.6 million (cost base 2017). The cost estimate is with an accuracy of +/- 25%, which represents the uncertainty in the first planning phase.

The realization of the project will be achieved if the costs allocated to the point Mosonmagyaróvár are covered by binding long-term bookings.

Capacity impact:

None

Project phase:

CNDP 2019: Assessment phase

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

Project modifications:

Project status:

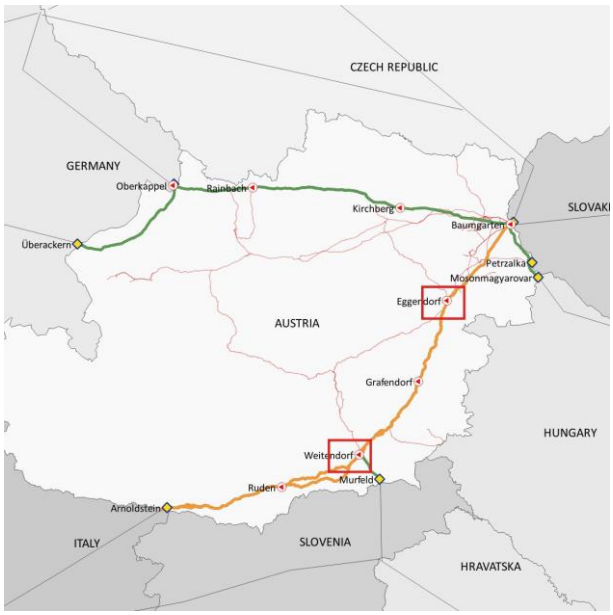
CNDP 2019: New Projekt

Project name:	**TAG 2016/01 TAG Reverse Flow Weitendorf/Eggendorf**		
Project number:	TAG 2016/01		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Planning project for additional capacities	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2020		

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 24") with corresponding valve and bypass
- Creation of a connection from the high-pressure side to TAG 2 (approx. 20 meters of DN 24") 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

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

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 Nm³/h (0°C)

Economic data:

CNDP 2016: Planned investment cost XX € (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 XX € (Cost base 2017) The cost estimate underlies in this project phase an accuracy of +/- 25%.

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

CNDP 2019: Planned investment cost XX € (Cost base 2019). 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: minimum +1.000.000 Nm³/h (0°C)

Murfeld entry point: +614.388 Nm³/h (0°C)

Project phase:

CNDP 2016: Planing phase

CNDP 2017: Planing phase

CNDP 2018: Planing phase

CNDP 2019: Planing phase

TYNDP: TRA-N-954	**PCI status:** No	**CBCA decision:** No

Project modifications:

CNDP 2017: Planned completion

CNDP 2018: None

CNDP 2019: Timeline

Project status:

CNDP 2016: Approved as a project

CNDP 2017: Approved including amendments

CNDP 2018: Further monitoring without amendments

CNDP 2019: Submission for approval including amendments.

The project is in the planning phase, and the budget. For reasons of rescheduling and procurement, the current completion is planned for 2020. Procurement will start in the second quarter of 2019. Project implementation is scheduled for 2020. The project finalization is planned for Q4 / 2020 .

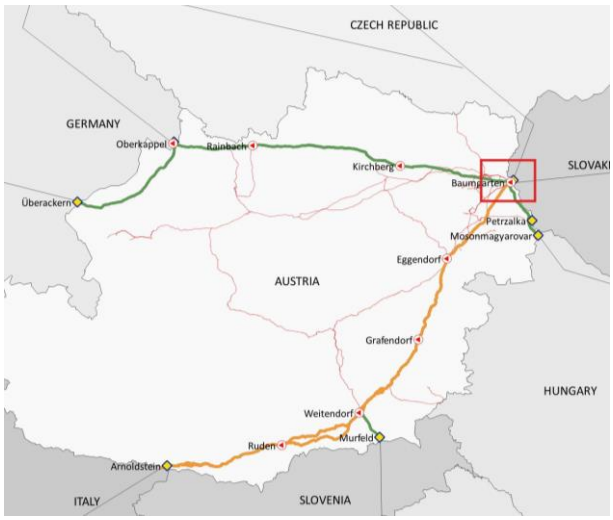
The specified change of the project will be submitted for approval under the conditions stated in the economic data.

Project name:	**TAG 2016/04 TAG Baumgarten interconnection capacity (Mosonmagyaróvár)**		
Project number:	TAG 2016/04		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2021		

Project objective:

The project objective is to create an additional interconnection capacity on freely allocable basis (FZK) in Baumgarten with guaranteed access to the VTP, based on additional FZK capacities at the GCA entry point Mosonmagyaróvár. The project ensures the modification of the TAG Baumgarten station in order to allow an increased gas flow into the TAG system.

Project description



The following activities are foreseen:

- Extension of interconnection facilities in Baumgarten

Project rationale:

Increase of interconnection capacity and liquidity of the market in order to increase the Austrian and European security of supply and to enable alternative transport routes for alternative gas supply sources.

Please note in particular:

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

Connection to other projects:

This project is in direct connection with the corresponding project GCA 2015/05 Entry Mosonmagyaróvár.

Technical data:

Following additional additional freely allocable interconnection capacity (FZK) shall be provided in Baumgarten:

Additional entry capacity: +570,000 Nm^3/h (0°C).

Economic data:

CNDP 2016: Planned investment cost XX € (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%, which reflects the uncertainty in the first planning phase.

CNDP 2017: Planned investment cost XX € (Cost base 2017). The cost estimate is to be understood with an accuracy of +/- 25%.

CNDP 2018: Planned investment cost XX € (Cost base 2018). The cost estimate is to be understood with an accuracy of +/- 25%.

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

The realization of the project is subject to the economic feasibility to be proven by binding long-term booking at the Mosonmagyaróvár entry point.

Capacity impact:

This project enables following proposed freely allocable capacity (FZK), created by its corresponding project:

Mosonmagyaróvár entry point: +570.000 Nm^3/h (0°C)

Project phase:

CNDP 2016: Planning phase

CNDP 2017: Planning phase

CNDP 2018: Planning phase

CNDP 2019: Planning phase

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

Project modifications:

CNDP 2017: None

CNDP 2018: None

CNDP 2019: None

Project status:

CNDP 2016: Approved as planning project

CNDP 2017: Further monitored without amendments

CNDP 2018: Further monitoring without amendments

CNDP 2019: Further monitoring without amendments

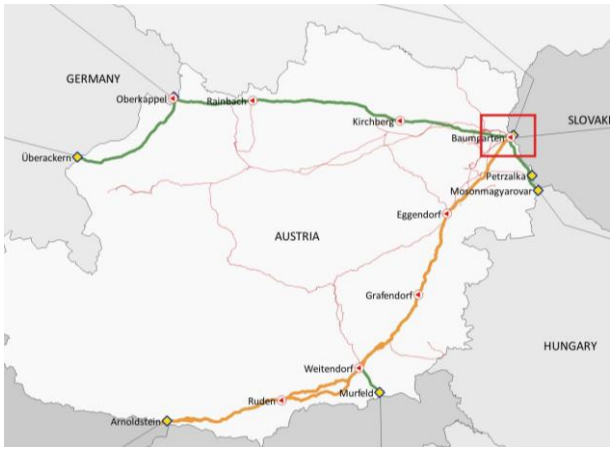
The first setup study of the project was completed in Q4/2016. The next steps depend on the next steps of the corresponding GCA's project GCA 2015/05. The project is currently on schedule and in the budget.

Project name:	**TAG 2016/05 TAG Baumgarten interconnection capacity (BACI)**		
Project number:	TAG 2016/05		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Planning project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	4,5 years	**Performance audit according to CAM NC:**	No
Planned completion:			

Project objective:

The project objective is to create an additional interconnection capacity on freely allocable basis (FZK) from/into the TAG system going to/coming from the Czech market (entry/exit point Reintal) with guaranteed access to the VTP, based on additional FZK capacities at the new GCA point Reintal. The project ensures the modification of the TAG Baumgarten station in order to allow an increased interconnection gas flow.

Project description



The following activities are foreseen:

- Extension of interconnection facilities in Baumgarten

Project rationale:

Increase interconnection capacities and market liquidity in order to foster the north-south corridor, reduce market isolation, increase security of supply in the Czech Republic and Austria and provide alternative transport routes for alternative sources of supply.

Furthermore, guaranteed access to the VTP shall be ensured.

Please note in particular:

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

Connection to other projects:

The project is in direct connection with the corresponding project GCA 2015/01a: Bidirectional Austria Czech Interconnector.

Technical data:

Following additional additional freely allocable interconnection capacity (FZK) shall be provided in Baumgarten:

Additional entry capacity: +750,000 Nm³/h (0°C)

Additional exit capacity: +750,000 Nm³/h (0°C)

Economic data:

CNDP 2016: Planned investment cost XX € (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%, which reflects the uncertainty in the first planning phase.

CNDP 2017: Planned investment cost XX € (Cost base 2017). The cost estimate is to be understood with an accuracy of +/- 25%.

CNDP 2018: Planned investment cost XX € (Cost base 2018). The cost estimate is to be understood with an accuracy of +/- 25%.

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

The realization of the project is subject to the economic feasibility, to be proven by binding long-term booking at the future Reintal entry/exit point.

Capacity impact:

This project enables following proposed freely allocable capacity (FZK), created by its corresponding project:

Reintal entry point: +750.000 Nm³/h (0°C)

Reintal exit point: +750.000 Nm³/h (0°C)

Project phase:

CNDP 2016: Planning phase

CNDP 2017: Planning phase

CNDP 2018: Planning phase

CNDP 2019: Planning phase

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

Project modifications:

CNDP 2017: Planned completion, project type

CDNP 2018: None

CDNP 2019: None

Project status:

CNDP 2016: Approved as a planning project

CNDP 2017: Approved as a project with amendments

CNDP 2018: Further monitoring without amendments

CNDP 2019: Further monitoring without amendments

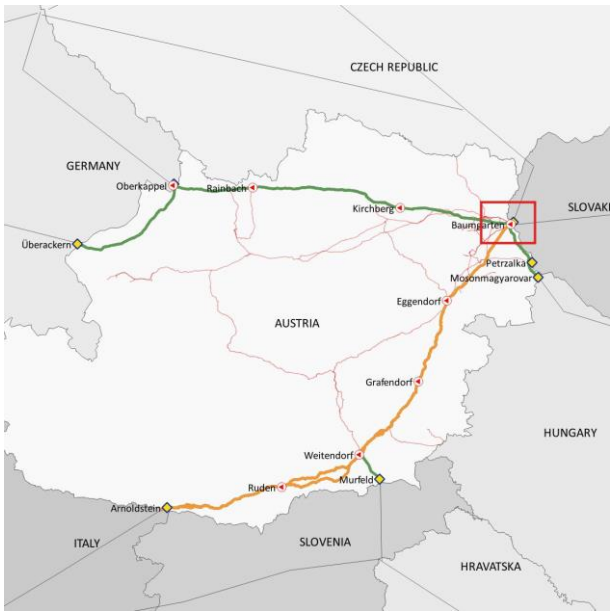
The first Setup-Study of the project was completed in Q4/2016. The next steps depend on the next steps of the corresponding GCA's project GCA 2015/01a. The project is currently on schedule and in the budget.

Project name:	**TAG 2017/01 TAG Baumgarten interconnection capacity (Mosonmagyaróvár) II**		
Project number:	TAG 2017/01		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Planning project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	4,5 years	**Performance audit according to CAM NC:**	No
Planned completion:			

Project objective:

The project objective is to create additional FZK capacity at the GCA Mosonmagyaróvár entry point and additional interconnection capacity on an FZK basis at Baumgarten with guaranteed access to the VTP. The project provides for modification of the TAG Baumgarten station to enable increased gas flow into the TAG system.

Project description



The following activities are planned:

- Installation of a 32'' pipeline connection between the GCA and TAG pipeline systems, including valves and instruments
- Pipeline connection can be used in both directions
- Integration into the TAG process control system

Project rationale:

Increase of interconnection capacity and liquidity of the market in order to increase the Austrian and European security of supply and to enable alternative transport routes for alternative gas supply sources.

Please note in particular:

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

An impact on availability of connection capacity on the MS4 connection during execution is possible, depending on the technical concept.

Connection to other projects:

This project is in direct connection with the corresponding project GCA 2017/01 Entry Mosonmagyaróvár plus.

Technical data:

Following additional additional freely allocable interconnection capacity (FZK) shall be provided in Baumgarten:

Additional entry capacity: 1,000,000 Nm³/h (0°C), possible as TAG normal flow (SK=>AT) and TAG reverse flow (IT=>AT).

Economic data:

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

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

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

The realization of the project is subject to the economic feasibility to be proven by binding long-term booking at the Mosonmagyaróvár entry point

Capacity impact:

This project enables following proposed freely allocable capacity (FZK), created by its corresponding project:

Mosonmagyaróvár entry point +1.000.000 Nm³/h (0°C)

Project phase:

CNDP 2017: Planning phase

CNDP 2018: Planning phase

CNDP 2019: Planning phase

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

Project modifications:

CNDP 2018: None

CNDP 2019: None

Project status:

CNDP 2017: Approved as a project

CNDP 2018: Further monitoring without amendments

CNDP 2019: Further monitoring without amendments

The project is in the budget and timeline.

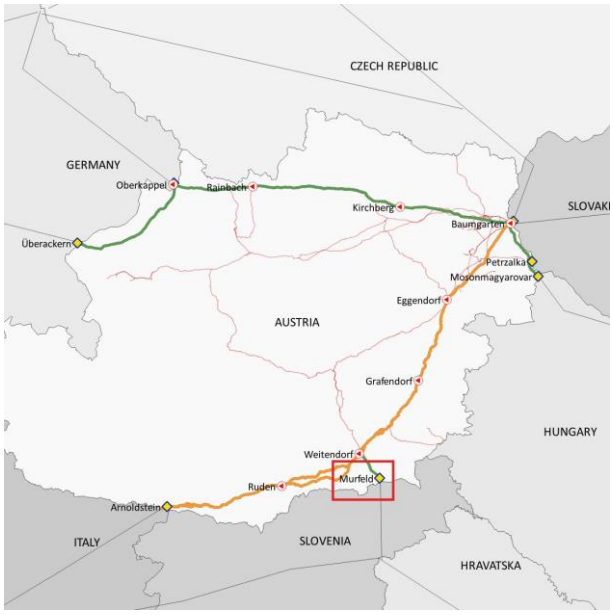
Project name:	**TAG 2018/01 Murfeld Exit Capacity Increase**		
Project number:	TAG 2018/01		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Project for additional capacities	**Project category:**	Continued and approved project without alterations
Implementation time frame:	4,5 years	**Performance audit according to CAM NC:**	No
Planned completion:			

Project objective:

The objective of this project is to enable the fore-seen additional technical free allocable capacity of 391,620 Nm³/h (0°C) created by the project GCA 2015/08 "Entry/Exit Murfeld" at the Exit Interconnection Point Murfeld toward Slovenia.

The project ensures the modification and extension of the TAG system from Baumgarten station to Weitendorf compressor station in order to allow an increased gas flow into the TAG system.

Project description



The following investments are required for the project TAG 2018/01:

- One additional compressor unit in CS Baumgarten and related equipment
- One additional compressor unit in CS Eggendorf and related equipment
- One additional compressor unit in CS Grafendorf and related equipment
- One additional compressor unit in CS Weitendorf and related equipment

Project rationale:

Satisfy market capacity demand corresponding to the capacity demand expressed by the Slovenian TSO Plinovodi to GCA in the framework of the capacity demand survey of the CNDP 2016.

Please note in particular:

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

Connection to other projects:

The project is in direct connection with the corresponding project GCA 2015/08 "Entry/Exit Murfeld"

The realization of the project is amongst other, subject to a positive result of the corresponding economic viability test.

Technical data:

The project-related analyses were carried out on the basis of the following additional capacities:

Total technical marketable capacity Murfeld exit point 810,620 Nm³/h (0°C)

Economic data:

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

CNDP 2019: Planned investment cost XXX € (Cost base 2019). The cost estimate underlies in this project phase an accuracy of +/- 40%.

The realization of the project is subject to the economic feasibility to be proven by binding long-term booking at the Murfeld Exit point.

Capacity impact:

This project enables following proposed freely allocable capacity (FZK), created by its corresponding project:

Exitpoint Murfeld +391,620 Nm³/h (0°C)

Project phase:

CNDP 2018: Planning phase

CNDP 2019: Planning phase

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

Project modifications:

CNDP 2019: None

Project status:

CNDP 2018: Submission for approval as a planning project

CNDP 2019: Further monitoring without amendments

The project realization is subject to the outcome of the economic test related to the project GCA 2015/08.

Replacement investment projects

Project-sponsor	Project-number	Project name	Implement-ation time frame [years]	Planned completition [date]	Development compared to 2018 CNDP
GCA	2016/E1	110 kV Overhead Power Line		Q4 2021	continuation
GCA	2016/E2	MS3 Reverse Flow		Q3 2020	amendment
GCA	2016/E5	Revamp Oberkappel		Q1 2021	amendment
GCA	2017/E5	Replacement of Process Control System at the Rainbach Compressor Station		Q4 2019	continuation
GCA	2018/E01	Incident Baumgarten		Q3 2022	continuation
GCA	2019/E1	New office and crew building Rainbach		Q3/2020	new
GCA	2019/E2	VS Rainbach renewal machine control		Q4/2020	new
GCA	2019/E3	HAG renewal low-voltage switchgear		Q4/2019	new
GCA	2019/E4	VS WAG renewal emergency generato		Q4/2020	new
GCA	2019/E5	GCA 2019/E5 MS Neustift Compilation		Q4/2021	new
GCA	2019/E6	GCA 2019/E6 UW Baumgarten power quality		Q4/2020	new
TAG	2016/R09	Exchange leaking valves St. Paul / Ruden / Arnoldstein		Q4 2019	continuation
TAG	2016/R11	Replacement of Gashydraulic Actuators, CS-Baumgarten, Grafendorf and Ruden		Q4/2023	amendment
TAG	2016/R12	SCS Replacement, CS Baumgarten-Grafendorf-Ruden		Q4 2022	amendment
TAG	2017/R01	MS2 Refurbishment		Q4 2019	continuation
TAG	2017/R02-B	Major Overhaul Valve Station, Wielfresen 1		Q4 2022	continuation
TAG	2017/R02-C	Major Overhaul Valve Station, Ettendorf		Q4 2021	amendment
TAG	2017/R03-A	Major Overhaul Valve Station Lanzenkirchen		Q4 2019	amendment
TAG	2017/R03-B	Major Overhaul Valve Station Sulmeck-Greith		Q4 2019	continuation
TAG	2017/R03-C	Major Overhaul Valve Station St. Paul		Q4 2019	continuation
TAG	2017/R03-D	Major Overhaul Pigging Station Ruden		Q4 2019	amendment
TAG	2017/R03-E	Major Overhaul Pigging Station Arnoldstein		Q4 2019	amendment

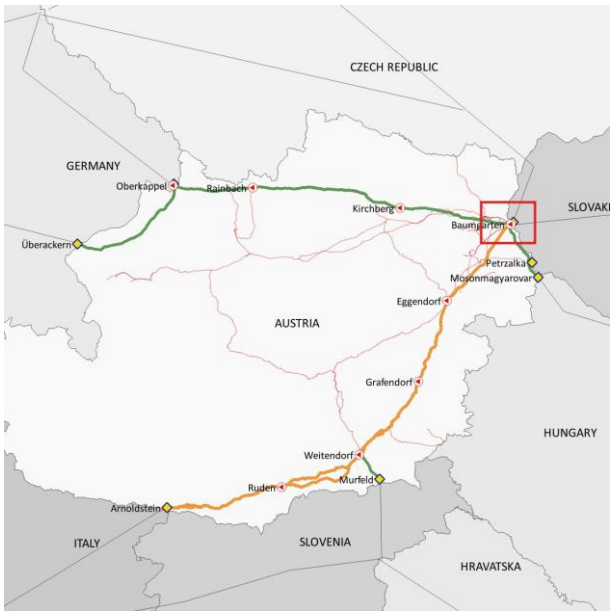
TAG	2017/R04	Substitution Gas Hydraulic Actuators TUCO, CS Baumgarten Grafendorf Ruden	Q4 2023	amendment
TAG	2017/R05	Replacement E-Actuators Filter Separators & Metering Station MS2 CS-Baumgarten	Q4 2020	amendment
TAG	2017/R08	Gas Generator RC600 in CS-Ruden	Q4 2019	continuation
TAG	2018/R01	SCS Replacement, CS Eggendorf-Weitendorf	Q4 2021	amendment
TAG	2018/R02	Major Overhaul Valve Station Ebenthal	Q4 2021	amendment
TAG	2018/R04	Major Overhaul Valve Station Weitendorf	Q4 2025	amendment
TAG	2018/R05	Major Overhaul Pigging Station Weitendorf	Q4 2020	continuation
TAG	2018/R07	Major Overhaul Valve Station Zöbern	Q4 2021	amendment
TAG	2018/R09	Sec.1/Sec.2/Sec.3: Corrosion Refurbishment and Repair	Q4 2019	continuation
TAG	2018/R10	DLE 1.5 + 72 hole PT module BC700 in CS-Baumgarten	Q4 2020	continuation
TAG	2018/R12	Shut Off Valve MS2, CS Baumgarten	Q4 2019	continuation
TAG	2018/R13	Major Overhaul AZ3-AZ3L Eggendorf	Q4 2020	continuation
TAG	2019/R01	Major Overhaul Valve Station CS Weitendorf	Q4 2020	new
TAG	2019/R04	Replacement ball valves GOV 502 & 504 CS Baumgarten	Q4 2019	new
TAG	2019/R06	Exchange of Leaking Valve CS Eggendorf	Q4 2020	new
TAG	2019/R07	Exchange of Leaking Valve CS Ruden	Q4 2021	new
TAG	2019/R09	DLE 1.5 + 72 hole PT module BC500 in CS Baumgarten	Q4 2021	new
TAG	2019/R10	DLE 1.5 hole PT module BC600 in CS Baumgarten	Q4 2022	new
TAG	2019/R11	Sec.1/Sec.2/Sec.3: Corrosion Refurbishment and Repair 2019-20	Q4 2020	new

Project name:	**GCA 2016/E1 110 kV Overhead Power Line**		
Project number:	GCA 2016/E1		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2021		

Project objective:

Construction of a substation and a 110kV overhead line to increase the security of supply

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

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:

No

Technical data:

There is no change in existing technical transport capacities.

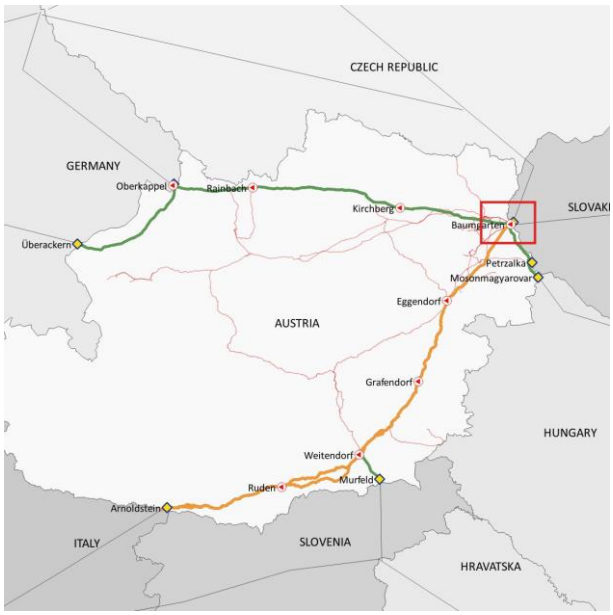
<table>
<tr><td colspan="3">Economic data:
CNDP 2018: Planned investment cost XX € (Cost base 2017). The cost estimate may deviate by +/- 25% due to uncertainties in the first planning phase
CNDP 2019: Planned investment costs XXX € (cost basis 2019). The cost estimate is an accuracy of +/- 10%, which represents the uncertainty in the implementation phase.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2018: Identify & Assess
CNDP 2019: 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:
CNDP 2018: None
CNDP 2019: None</td></tr>
<tr><td colspan="3">Project status:
CNDP 2016: Approved as a project
CNDP 2017: Approved including amendments
CNDP 2018: Further monitoring without amendments
CNDP 2019: Further monitoring without amendments</td></tr>
</table>

Project name:	**GCA 2016/E2 MS3 Reverse Flow**		
Project number:	GCA 2016/E2		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q3/2020		

Project objective:

Operational correction of MS3 for reverse flow to SK

Project description



The WAG reverse flow should be corrected taking into account the following criteria:

- A fitting of valves should be avoided, the switching between normal flow and reverse flow should be automated
- The fuel gas withdrawals must always take place within the GCA system
- The linepack must be clarified by full bidirectionality of the measuring sections
- Possibility of gas flow control in normal flow and reverse flow
- The condensation in Baumgarten in reverse flow should be possible (only as a future option, not realized) -
- Replacing of the aperture metering in the measuring station MS3 in Baumgarten and measuring station Oberkappel with ultrasonic counters

Project rationale:

The WAG reverse flow is currently possible, but problematic, as a special procedure via an outcrossing of the station WAG Baumgarten. An operational correction of the reverse flow into the SK is necessary.

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:

See technical data

Technical data:

Implementation of projects GCA 2015/07b, GCA 2015/10 and GCA 2016/E4 as specified in the 2016 CNDP will provide additional freely allocable exit capacities at the Baumgarten WAG entry/exit point.

Economic data:

CNDP 2019: Planned investment cost XX € (Cost base 2017). The cost estimate may deviate by +/- 10% due to uncertainties in the implementation phase.

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

Capacity impact:

See technical data

Project phase:

CNDP 2018: Execution phase

CNDP 2019: Execution phase

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

Project modifications:

CNDP 2018: Planned completion due to the prioritization of measures due to the Baumgarten incident of 12 December 2017.

CNDP 2019: Planned completion due to the prioritization of measures due to the Baumgarten incident of December 12, 2017.

The replacement of the aperture metering in the measuring station MS3 in Baumgarten and measuring station Oberkappel with ultrasonic counter was originally shown in the project GCA2016 / E4. For better implementation, the project budget from the project GCA2016 / E4 was split between the two projects GCA2016 / E2 and GCA 2016 / E5.

Project status:

CNDP 2016: Approved as a project

CNDP 2017: Further monitored without amendments

CNDP 2018: Further monitoring without amendments

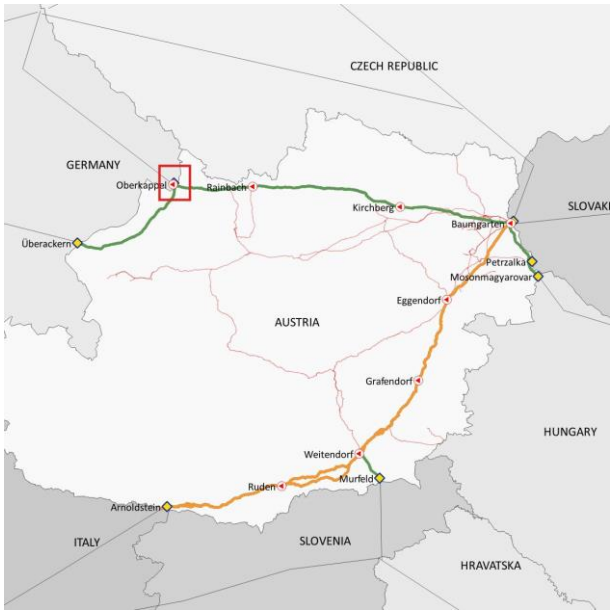
CNDP 2019: Further monitoring with amendments

Project name:	**GCA 2016/E5 Revamp Oberkappel**		
Project number:	GCA 2016/E5		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	4	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q1/2021		

Project objective:

To enable controlled, metered and filtered transport of the capacity of 1,400,000 Nm³/h based on the N-1 operating principle.

Project description



The existing transfer measuring station "ÜMS Oberkappel" (ÜMS OK) serves the secure gas transport and the measurement between WAG1 (Austria) and the WAG800 (Germany) pipeline system.

- Capacity for Oberkappel at 49 barg overpressure:

o Entry OKP: max. 1,400,000 Nm³ / h

o Exit OKP: max. 1,400,000 Nm³ / h

o Minimum quantity: 15,000 Nm³ / h

- Design pressure for control 49 bar to design pressure, total volume range

- Only the marketed capacities should be taken into account for the restructuring of the scheme.

- The conversions concern the entire gas high-pressure system including its auxiliary equipment such as process control system, gas analysis, LKS, fire protection and gas warning systems as well as the blow-out system.

- Replacing the aperture measurement in Oberkappel to ultrasonic counter

Project rationale:

This project is required because the technical gas equipment currently used is no longer considered state of the art and does not comply with safety requirements.

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:

No

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

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.

Capacity impact:
None

Project phase:
CNDP 2018: Execution phase

CNDP 2019: Execution phase

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

Project modifications:
CNDP 2019: Planned completion due to the prioritization of measures due to the Baumgarten incident of December 12, 2017.

The replacement of the aperture metering in the measuring station MS3 in Baumgarten and the measuring station Oberkappel for ultrasonic meters was originally shown in the project GCA2016 / E4. For better implementation, the project budget from the project GCA2016 / E4 was split between the two projects GCA2016 / E2 and GCA 2016 / E5.

Project status:
CNDP 2016: Approved as a project

CNDP 2017: Approved including amendments

CNDP 2018: Further monitored without amendments

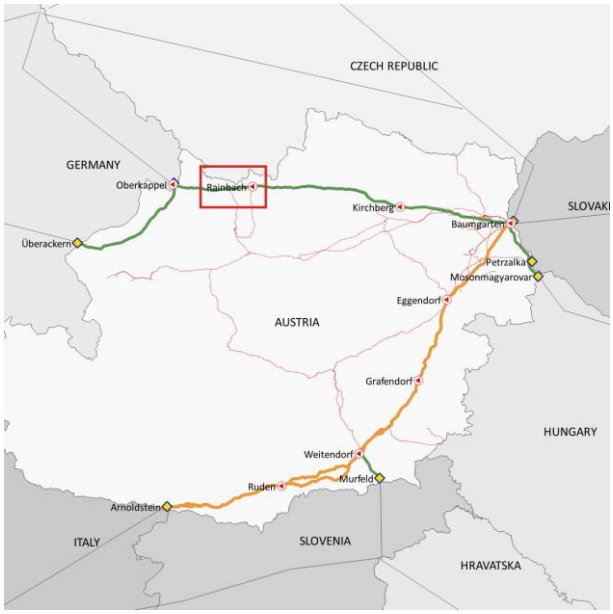
CNDP 2019: Further monitored with amendments

Project name:	**GCA 2017/E5 Replacement of Process Control System at the Rainbach Compressor Station**		
Project number:	GCA 2017/E5		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2020		

Project objective:

Replacement of the process control system at the Rainbach compressor station.

Project description



The existing process control system (PCS) at the station has reached the end of its service life. The system, a Siemens PCS7, was originally installed in 2004. The industry standard for the service life of a PCS is 10 years, while systems at GCA manage up to 15 years. System availability can no longer be guaranteed because some (hardware and software) components are no longer produced.

Commercial availability of structurally identical replacement parts are limited. In some cases, later models require modification of the system, leading to increased cost and risk. This also means that it will in future be difficult or impossible to ensure that the system design complies with applicable standards.

Replacement involves the entire PCS, which mainly includes all servers, clients, redundant and fail-safe CPUs, input and output level equipment, as well as network and remote control components. The marshalling cabinets will remain in place for the most part and only be modified.

The user software will be adapted to the new configuration, with basic functions remaining the same. Systematic requirements will be implemented, as will be the new GCA standards introduced since the system was originally built.

Project rationale:

The project is specifically necessary because the existing process control system (PCS) at the station has reached the end of its service life and the availability of the compressor and metering station is no longer ensured.

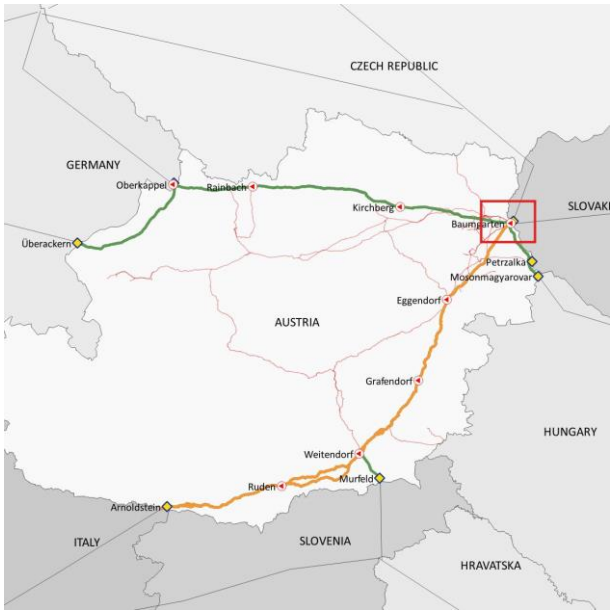
Please note in particular: The contents of the technical studies of the project ("confidential supplements") remain unchanged and valid in accordance with the Network Development Plan 2017 of Gas Connect Austria.		
Connection to other projects: No		
Technical data: There is no change in existing technical transport capacities.		
Economic data: CNDP 2018: Planned investment cost XX € (Cost base 2016). 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.		
Capacity impact: None		
Project phase: CNDP 2018: Define CNDP 2019: Execution phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications: CNDP 2018: None CNDP 2019: None		
Project status: CNDP 2017: Approved as a project CNDP 2018: Further monitoring without amendments CNDP 2019: Further monitoring without amendments		

Project name:	**GCA 2018/E01 Incident Baumgarten**		
Project number:	GCA 2018/E01		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q3/2022		

Project objective:

The aim of this replacement investment is to completely rebuild the gas hub Baumgarten to its original and fully operational state after the gas fire incident on the 12 December 2017.

Project description



Following investments are required for the implementation:

- TAG AZ reconstruction
- Repair of pipeline system G00-018

(in planning - new construction is realized with PVS node)

- Repair of electric substation (executed)
- Repair of transportation routes MS5 - VSOGG - G00-050 (executed)
- Repair of transportation route BOP13 middle-pressure (executed)
- Exchange of VSOGG equipment (Q4/2019 executed)
- New construction MS1 (planinng phase)
- New construction operations building(Q1/2019 executed)

Project rationale:

- Recovery of the total interconnection capacity from PVS2 to PVS1 and all downstream transmission systems
- Recovery of the full automation of process control
- Recovery of the flexibility and possibility to optimize operation modes in the gas hub Baumgarten
- Optimizing the flexibility of the gas hub Baumgarten
- Reducing the risks of restrictions due to maintenance measures

Please note in particular:

The contents of the project technical studies ("Confidential Supplements") remain unchanged and valid in accordance with Network Development Plan 2018 of Gas Connect Austria.

Connection to other projects:

No

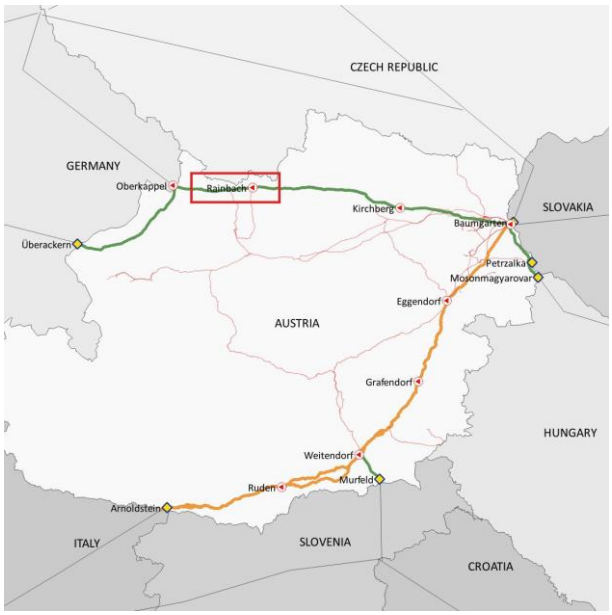
Technical data: There is no change in the existing technical transport capacities.		
Economic data: CNDP 2018: Planned investment cost XX € (Cost base 2018). The cost estimate may deviate by +/- 25% due to uncertainties in the first planning phase. CNDP 2019: Planned investment costs XXX € (cost basis 2019). The cost estimate is with an accuracy of +/- 25%, which represents the uncertainty in the first planning phase.		
Capacity impact: None		
Project phase: CNDP 2018: Execution phase CNDP 2019: Execution phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications: -		
Project status: CNDP 2018: Submitting for approval as a replacement investment project CNDP 2019: Further monitoring wthout amendments		

Project name:	**GCA 2019/E1 New office and crew building Rainbach**		
Project number:	GCA 2019/E1		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q3/2020		

Project objective:

Construction of an office and crew building in VS Rainbac

Project description



The company building in the maintenance center Rainbach has existed for 38 years. With the construction of further branch stations, a compressor station in Rainbach and the current WAG Loops, the demand for personnel at the service location Rainbach has risen. In the mentioned network extensions, the operating building for the growing crew had never been enlarged.

In addition, there is space for work assignments of GCA employees from other locations and contractors, such as turbine mechanics or fitters. For this staff are currently no cloakrooms, lounges and sanitary facilities available.

Separate changing and washing rooms for ladies and gentlemen are also missing.

Project rationale:

New construction of an office and crew building for the VS Rainbach due to acute lack of space.

Please note in particular:

-

Connection to other projects:

None

Technical data:

There is no change in existing technical transport capacities.

Economic data:

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.

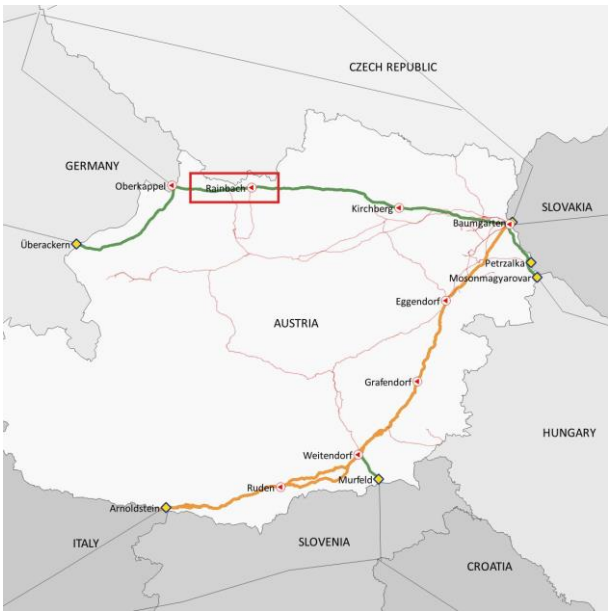
Capacity impact: No		
Project phase: CNDP 2019: Execution phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications:		
Project status: CNDP 2019: Submission for approval		

Project name:	**GCA 2019/E2 VS Rainbach renewal machine control**		
Project number:	GCA 2019/E2		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2020		

Project objective:

Renewal of the machine control system of VS Rainbach.

Project description



This project involves the adaptation of the unit control and all the unit parts to be adapted for the compressor units.

The entire compressor control system is replaced, which essentially includes all servers, clients, redundant and fail-safe CPUs, as well as the network components.

The machine controls are partly integrated in the station control, in this project these signals have to be outsourced from the station control (PLS).

The application software is adapted to the new configuration, the basic functionality remains unchanged.

Project rationale:

The project is necessary because the current machine control system is at the end of its life cycle

Please note in particular:

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

Connection to other projects:

No

Technical data:

There is no change in existing technical transport capacities.

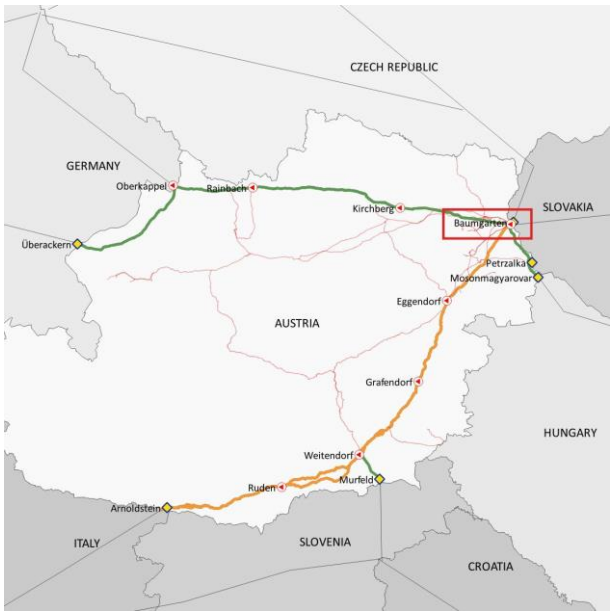
<table>
<tr><td colspan="3">Economic data:
CNDP 2019: Planned investment cost XXX € (Cost base 2019). The cost estimation is to be understood with an accuracy +/- 25%, which represents the uncertainty in the planning phase.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2019: Preparation 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 2019: Submission for approval</td></tr>
</table>

Project name:	**GCA 2019/E3 HAG renewal low-voltage switchgear**		
Project number:	GCA 2019/E3		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2019		

Project objective:

Renewal of low-voltage system in HAG Station Baumgarten

Project description



The existing low-voltage system is already approx. 30 years old. The design lifetime of a NSHV system is approx. 25 years. Spare parts are available on the market only to a limited extent.

Therefore, the low-voltage switchgear is to be replaced in the project.

In the course of the renovations, structural adjustments in the e-room and an extension for the UPS system with the associated batteries have to be carried out.

The switchgear must be replaced both from a safety point of view and from the point of view of the availability of the measuring station.

Project rationale:

The project is required as the existing low-voltage switchgear has arrived at the end of its life cycle.

Please note in particular:

-

Connection to other projects:

No

Technical data:

There is no change in existing technical transport capacities.

Economic data:

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

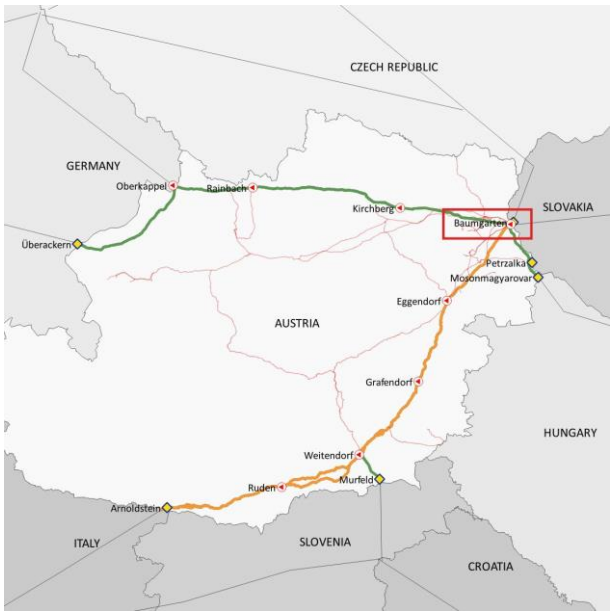
Capacity impact: None		
Project phase: CNDP 2019: Execution phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications:		
Project status: CNDP 2019: Submission for approval		

Project name:	**GCA 2019/E4 VS WAG renewal emergency generato**		
Project number:	GCA 2019/E4		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2020		

Project objective:

Renewal of the emergency generator of VS WAG, Baumgarten

Project description



The currently installed emergency generator is "initial equipment" since the construction of the WAG compressor station Baumgarten (late 70s). Due to the age of the emergency power system and the beginning of technical problems (engine / diesel engine) a renewal is required. A high-availability emergency generator is of vital importance for the availability of the WAG compressor station.

In the Definephase a gas engine net replacement system with a kinetic UPS (flywheel) closer to the implementation is considered. The emergency power system should be able to replace the existing diesel replacement plant equivalent or better (from the ramp-up time and technical characteristics such as frequency stability).

Project rationale:

The project is required as the existing emergency generator of VS WAG has arrived at the end of its life cycle.

Please note in particular:

-

Connection to other projects:

No

Technical data:

There is no change in existing technical transport capacities.

Economic data:

CNDP 2019: Planned investment costs XXX € (cost basis 2019). The cost estimate is with an accuracy of +/- 25%, which represents the uncertainty in the first planning phase.

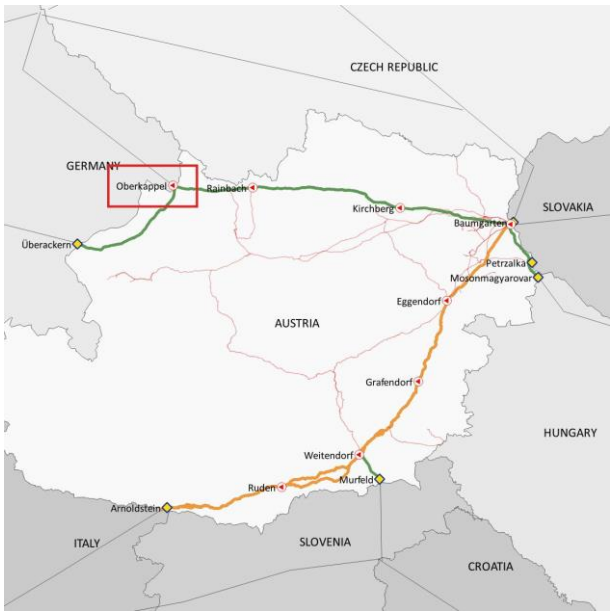
Capacity impact: None		
Project phase: CNDP 2019: Preparation phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications:		
Project status: CNDP 2019: Submission for approval		

Project name:	**GCA 2019/E5 MS Neustift Compilation**		
Project number:	GCA 2019/E5		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2021		

Project objective:

Realization of necessary the state of the art adaptations in the measuring station Neustift.

Project description



During the course of the project Revamp Oberkappel, the station Neustift was also evaluated.

From the resulting necessary adaptations, a program for implementation was designed.

Main points of the program are:

*) at the new blower tower in the MS Oberkappel blow-out sections are raised

*) existing EOVs must be equipped with the necessary safety equipment (2 "fittings)

*) Condensate line (double jacket version) is integrated into the condensate system of the MS Oberkappel

*) The UPS of the MS Neustift should be combined with the VS Neustift UPS

*) The station control of the MS Neustift (year 1999) should be exchanged

*) A merger of the three individual GWA and BMA plants into one common one is being investigated

Project rationale:

Necessary state of the art adaptation of measuring station Neustift

Please note in particular:

-

Connection to other projects:

No

Technical data:

There is no change in existing technical transport capacities.

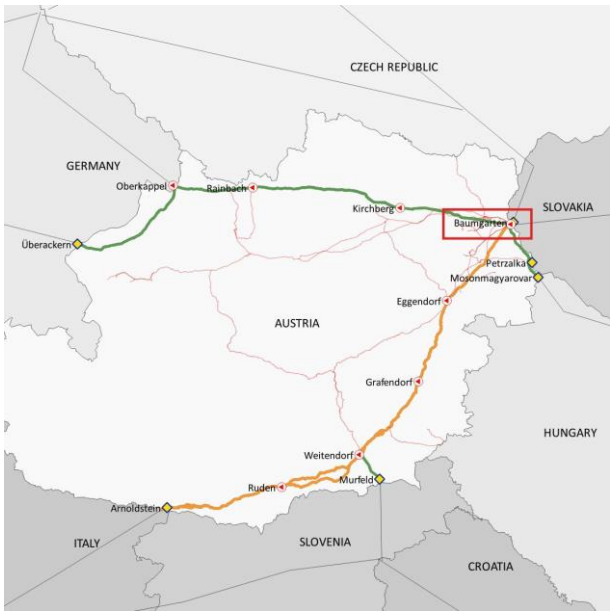
<table>
<tr><td colspan="3">Economic data:
CNDP 2019: Planned investment costs XXX € (cost basis 2019). The cost estimate is an accuracy of +/- 25%, which represents the uncertainty in the planning phase.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2019: Preparation 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 2019: Submission for approval</td></tr>
</table>

Project name:	**GCA 2019/E6 UW Baumgarten power quality**		
Project number:	GCA 2019/E6		
Project sponsor:	GAS CONNECT AUSTRIA GmbH		
Edition:	1	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2020		

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:

-

Connection to other projects:

No

Technical data:

There is no change in existing technical transport capacities.

Economic data:

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

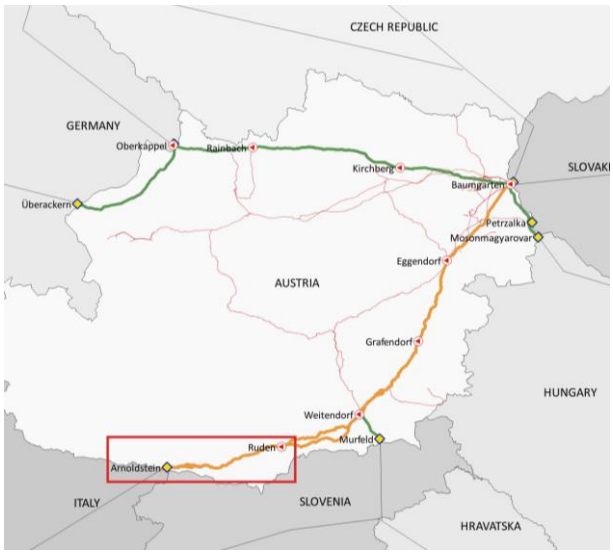
Capacity impact: None		
Project phase: CNDP 2019: Execution phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications:		
Project status: CNDP 2019: Submission for approval		

Project name:	**TAG 2016/R09 Exchange Leaking Valves St. Paul/Ruden/Ludmannsdorf/Arnoldstein**		
Project number:	TAG 2016/R09		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2019		

Project objective:

The installation of 7 new valves in the pipeline stations St. Paul, Ruden, Ludmannsdorf and Arnoldstein, in order to maintain the tightness in case of closing of the section (6 valves) and in order to dismantle the existing pig trap in Ludmannsdorf (1 valve).

Project description



- Degassing of the relevant pipeline sections through recompression
- Excavation and digging works, exposing of the piping system and valves.
- Exchange of the 6 leaking valves
- Dismantling of the existing pig trap in Ludmannsdorf
- Installation of a new section valve with bypass instead of the pig trap

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:

The project will be coordinated with the other projects TAG 2017/R02-XX (Major Overhaul of Valve Stations, Lichtenegg / Wielfresen 1 / Ettendorf / Ludmannsdorf) and TAG 2017/R03-XX (Major Overhaul of Valve Stations Lanzenkirchen / Sulmeck / St.Paul / Ruden / Arnoldstein) in order to carry out the activities in the valve station at the same time. Specifically, Ludmannsdorf in 2018 and St. Paul, Ruden and Arnoldstein in 2019.

Technical data:

SS 12 L – St. Paul: TAG Loop II (40“) – VEOR 1L (main valve)

MOS-5 Ruden: TAG 1 (36“) – KVA 10 (pig receiver)

SS 14 AL – Ludmannsdorf: TAG Loop – VEOR 1L (40“), VEOR 11L (36’’) and VEOR 12L (36’’)

MOS 7 Arnoldstein: TAG 1 (36“) – MVEO 10

There is no change in the existing technical transport capacities.

Economic data:

CNDP 2016: Planned investment cost XX € (Cost base 2016). The cost estimation is to be understood with an accuracy +/- 25% on the EPCM basis.

CNDP 2017: Planned investment cost XX € (Cost base 2017). The cost estimation is to be understood with an accuracy +/- 10%.

CNDP 2018: Planned investment cost XX € (Cost base 2018). The cost estimation is to be understood with an accuracy +/- 10%.

CNDP 2019: Planned investment cost XX € (Cost base 2019). The cost estimation is to be understood with an accuracy +/- 10%.

Capacity impact:

None

Project phase:

CNDP 2016: Planning phase

CNDP 2017: Execution phase

CNDP 2018: Execution phase

CNDP 2019: Execution phase

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

Project modifications:

CNDP 2017: Planned completion, project description, economic data

CNDP 2018: None

CNDP 2019: None

Project status:

CNDP 2016: Approved as a project

CNDP 2017: Approved including amendments

CNDP 2018: Further monitored without amendments

CNDP 2019: Further monitored without amendments

The project has been executed in Ludmannsdorf in Oktober 2018 . The Set-Up Phase has been completed in St. Paul, Ruden and Arndoldstein in May 2019 followed by the procurement process. From Juli 2019 the execution phase has started.

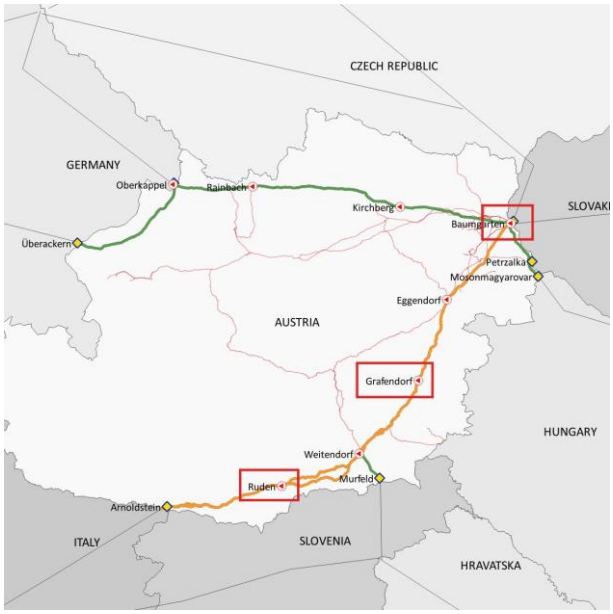
Project name:	**TAG 2016/R11 Replacement of Gas-Hydraulic Actuators CS-BGT, GFD, RUD**		
Project number:	TAG 2016/R11		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	To be defined		

Project objective:

Replacement of the existing gas hydraulic to electro hydraulic actuators in the compressor stations Baumgarten, Grafendorf and Ruden.

The drive concept will be switched from Gas-hydraulic to Electro-hydraulic, also ensuring substan-tial reduction of natural gas emissions.

Project description



- Exchange Gas-hydraulic actuators by Electro-hydraulic actuators
- Electrical connection of the actuator's gears to the switchboard
- Integration into SCS (station control system)

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: None

Connection to other projects:

No

Technical data:

There is no change to existing technical transport capacities, nor in operations nor processes.

Economic data:

CNDP 2016: Planned investment cost XX € (Cost base 2016). The cost estimation is to be understood with an accuracy +/- 25% on the EPCM basis.

CNDP 2017: Planned investment cost XX € (Cost base 2017). The cost estimation is to be understood with an accuracy +/- 25% on the EPCM basis.

CNDP 2018: Planned investment cost XX € (Cost base 2018). The cost estimation is to be understood with an accuracy +/- 25% on the EPCM basis.

CNDP 2019: Planned investment cost XX € (Cost base 2019). The cost estimation is to be understood with an accuracy +/- 25% on the EPCM basis.

Capacity impact:

None

Project phase:

Since CNDP 2016: Planning phase

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

Project modifications:

CNDP 2017: Planned completion

CNDP 2018: None

CNDP 2019: Planned completion, economic data, project scope

Project status:

CNDP 2016: Approved as a project

CNDP 2017: Approved including amendments

CNDP 2018: Further monitoring without amendments

CNDP 2019: Submission for approval including amendments

The technical implementation in the station control system is currently being evaluated together with the Station Control System corresponding project (TAG 2016/R12).

The inquiry package for the Engineering tender has been prepared, surveys of the engineering com-pany are ongoing.

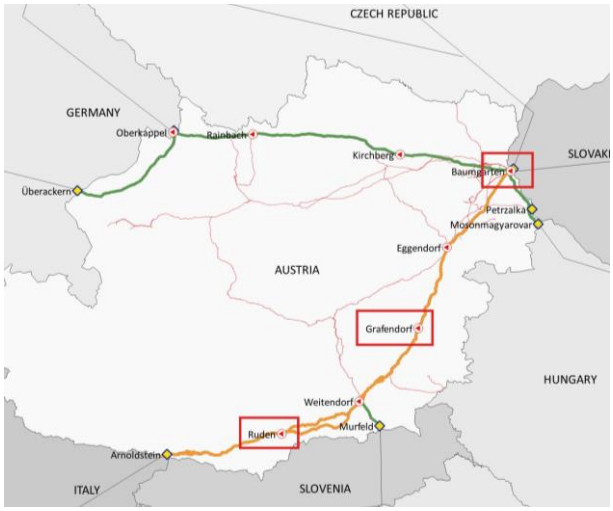
Project name:	**TAG 2016/R12 SCS Replacement, CS Baumgarten-Grafendorf-Ruden**		
Project number:	TAG 2016/R12		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2022		

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 project TAG 2015/R04 NOxER II vs. possible replacement of instruments and valves of those loops that need to be certified due to SIL (safety integrity level) assessment.

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.

Capacity impact:

None

Project phase:

KNEP 2016: Planing phase

CNDP 2017: Engineering phase

CNDP 2018: Engineering phase

CNDP 2019: Procurement 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

Project status:

CNDP 2016: Approved as a project

CNDP 2017: Approved including amendments

CNDP 2018: Further monitoring without amendments

The EPCM was assigned. The tender for the Engineering and the Site Supervision has been com-pleted. Engineering is currently ongoing.

CNDP 2019: Submission for approval including amendments

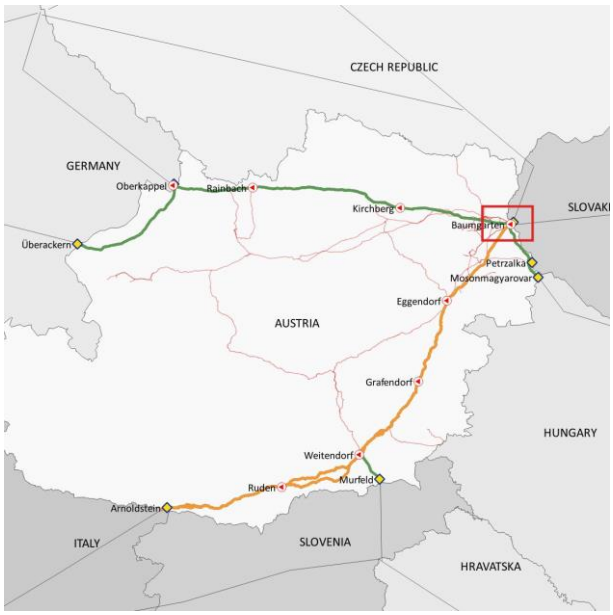
The inquiry documentation for the SCS-ESD tender has been prepared. Tender will be issued by the end of June 2019.

Project name:	**TAG 2017/R01 MS2 Refurbishment**		
Project number:	TAG 2017/R01		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2019		

Project objective:

Replacement of the six 30'' underground pipeline sections downstream the MS2 metering lines.

Project description



- Disassembly of the MS2 metering building including the existing measurement shaft/density measurements
- Disassembly and replacement of the six 30'' underground pipeline sections downstream the MS2 metering building up to the outlet valves of the metering lines
- Restoration of a new blow-off system on site

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:

No

Technical data:

There is no change in the existing technical transport capacities.

Economic data:

CNDP 2017: Planned investment cost XX € (Cost base 2017). The cost estimation is to be understood with an accuracy +/- 25% on the EPCM basis.

CNDP 2018: Planned investment cost XX € (Cost base 2018). The cost estimation is to be understood with an accuracy +/- 25% on the EPCM basis.

CNDP 2019: Planned investment cost XXX € (Cost base 2019). The cost estimation is to be under-stood with an accuracy +/- 25% on the EPCM basis

Capacity impact:

None

Project phase:

CNDP 2017: Planning phase

CNDP 2018: Planing phase

CNDP 2019: Execution phase

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

Project modifications:

CNDP 2018: None

CNDP 2019: None

Project status:

CNDP 2017: Approved as a project

CNDP 2018: Further monitoring without amendments

CNDP 2019: Further monitoring without amendments

The project is currently on schedule and in the budget. The Setup Study was finalized in 2017, the coordination of the time window for plant shut down/tie-in works for piping with further other TAG projects in progress. Civil works, renewal of piping, insulation and underground works are planned to be started and finished in 2019.

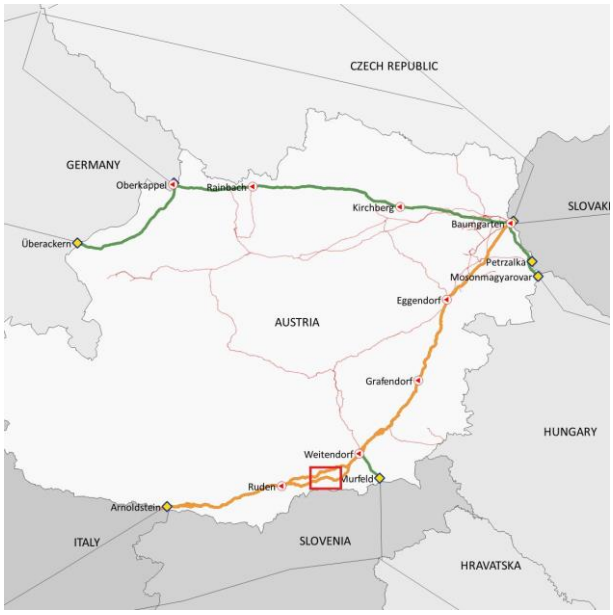
The project is currently on time and in the budget.

Project name:	**TAG 2017/R02-B Major Overhaul Valve Station Wielfresen 1**		
Project number:	TAG 2017/R02-B		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2022		

Project objective:

The scope of the project is to replace and/or renew instruments, coatings and underground insula-tions, CPS (cathodic protection system) and enclosures in the section valve station along the TAG-pipeline system at valve station Wielfresen 1.

Project description



- Renewing of coatings and insulation on valve and pipe installations (under/above ground)
- Renew cathodic protection system
- Exchange GOV (gas operated valves) to EOV/EHOV (electro hydraulic valves)
- Replacement of the E/I Container
- Renewing grounding and lightning protection system
- Renewal of pathways and surfaces
- Renewal of fence and gates

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: None

Connection to other projects:

No

Technical data:

So far, no reduction of the available transport capacity is foreseen.

Economic data:

CNDP 2018: Planned investment cost XX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

CNDP 2019: Planned investment cost XXX € (Cost base 2019) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

Capacity impact:

None

Project phase:

CNDP 2017: Planning phase

CNDP 2018: Planning phase

CNDP 2019: Planning phase

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

Project modifications:

CNDP 2018: Project scope, economic data, project name

CNDP 2019: None

Project status:

CNDP 2017: Approved as a project within the aggregate TAG 2017/R02

CNDP 2018: Submission for approval including amendments

CNDP 2019: Further monitoring without amendments

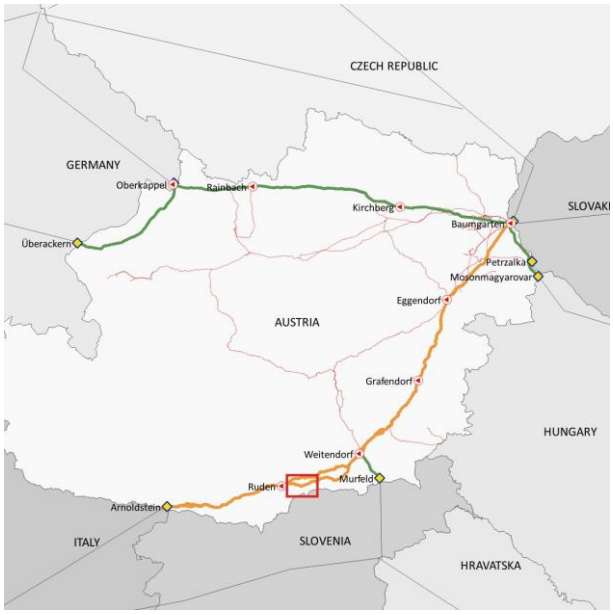
The set up phase will be finalized by end of the year 2021 and the project execution will be finished by end of 2022. The start of procurement is planned in October 2021.

Project name:	**TAG 2017/R02-C Major Overhaul Valve Station Ettendorf**		
Project number:	TAG 2017/R02-C		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2021		

Project objective:

The scope of the project is to replace and/or renew instruments, coatings and underground insula-tions, CPS (cathodic protection system) and enclosures in the section valve station along the TAG-pipeline system at valve station Ettendorf.

Project description



- Renewing of coatings and insulation on valve and pipe installations (under/above ground)
- Renew cathodic protection system
- Exchange GOV (gas operated valves) to EOV/EHOV (electro hydraulic valves)
- Replacement of the E/I Container
- Renewing grounding and lightning protection system
- Renewal of pathways and surfaces
- Renewal of fence and gates

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: None

Connection to other projects:

No

Technical data:

So far, no reduction of the available transport capacity is foreseen.

Economic data:

CNDP 2018: Planned investment cost XX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

CNDP 2019: Planned investment cost XX € (Cost base 2019) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

Capacity impact:

None

Project phase:

CNDP 2017: Planning phase

CNDP 2018: Planning phase

CNDP 2019: Planning phase

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

Project modifications:

CNDP 2018: Project scope, economic data, planned completion, project name

CNDP 2019: Economic data

Project status:

CNDP 2017: Approved as a project within the aggregate TAG 2017/R02

CNDP 2018: Submission for approval including amendments

CNDP 2019: Submission for approval including amendments

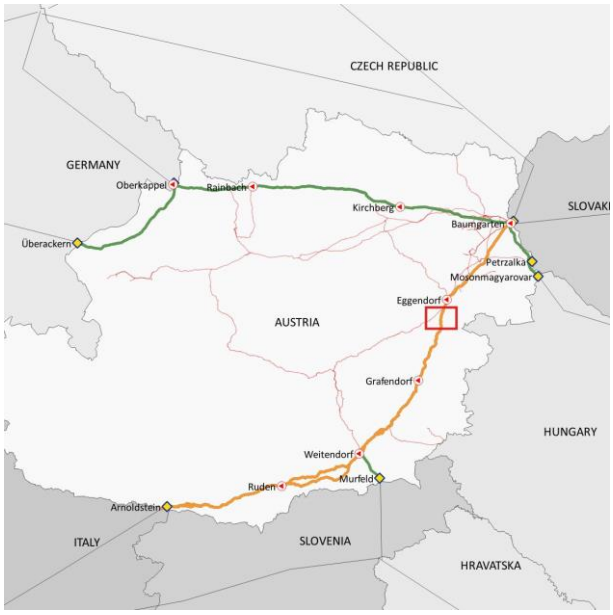
The set up phase will be finished end of the year 2018. The project execution is planned for 2021. The start of procurement is foreseen for October 2020.

Project name:	**TAG 2017/R03-A Major Overhaul Valve Station Lanzenkirchen**		
Project number:	TAG 2017/R03-A		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	4	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2020		

Project objective:

The scope of the project is to replace and/or renew instruments, coatings and underground insula-tions, CPS (cathodic protection system) and enclosures in the section valve station Lanzenkirchen along the TAG-pipeline system.

Project description



- Renewing of coatings and insulation on valve and pipe installations (under/above ground)
- Renew cathodic protection system
- Exchange GOV (gas operated valves) to EOV/EHOV (electro hydraulic valves)
- Renewing grounding and lightning protection system
- Renewal of pathways and surfaces
- Renewal of fence and gates

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: None

Connection to other projects:

This project is linked up with the project "TAG 2016/R09: Exchange leaking valves St. Paul / Ruden / Arnoldstein / Ludmannsdorf", which foresees the replacement of leaking valves in the valve sta-tions of St. Paul, Ruden and Arnoldstein (2019).

Technical data:

There is no change in the existing technical transport capacities.

Economic data:

CNDP 2018: Planned investment cost XX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

CNDP 2019: Planned investment cost XXX € (Cost base 2019) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

Capacity impact:

None

Project phase:

CNDP 2017: Planning phase

CNDP 2018: Planning phase

CNDP 2019: Planning phase

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

Project modifications:

CNDP 2018: Project scope, economic data, project name, planned completion

CNDP 2019: Economic data

Project status:

KNEP 2017: Approved as a project within the aggregate TAG 2017/R03

KNEP 2018: Submission for approval including amendements

CNDP 2019: Submission for approval including amendments

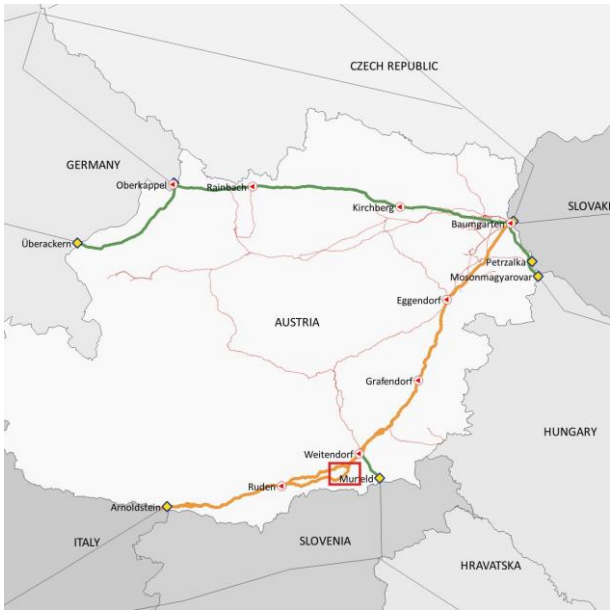
The set up phase will be finalized by end of the year 2019 and the project execution will be finished by end of 2020. The start of procurement is planned in October 2019.

Project name:	**TAG 2017/R03-B Major Overhaul Valve Station Sulmeck-Greith**		
Project number:	TAG 2017/R03-B		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2019		

Project objective:

The scope of the project is to replace and/or renew instruments, coatings and underground insula-tions, CPS (cathodic protection system) and enclosures in the section valve station Sulmeck-Greith along the TAG-pipeline system.

Project description



- Renewing of coatings and insulation on valve and pipe installations (under/above ground)
- Renew cathodic protection system
- Exchange GOV (gas operated valves) to EOV/EHOV (electro hydraulic valves)
- Renewing grounding and lightning protection system
- Renewal of pathways and surfaces
- Renewal of fence and gates

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: None

Connection to other projects:

This project is linked up with the project "TAG 2016/R09: Exchange leaking valves St. Paul / Ruden /Arnoldstein/Ludmannsdorf", which foresees the replacement of leaking valves in the valve stations of St. Paul, Ruden and Arnoldstein (2019).

Technical data:

There is no change in the existing technical transport capacities.

Economic data:

CNDP 2018: Planned investment cost XX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

CNDP 2019: Planned investment cost XX € (Cost base 2019) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

Capacity impact:

None

Project phase:

CNDP 2017: Planning phase

CNDP 2018: Planning phase

CNDP 2019: Execution phase

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

Project modifications:

CNDP 2018: Project scope, economic data, project name

CNDP 2019: None

Project status:

CNDP 2017: Approved as a project within the aggregate TAG 2017/R03

CNDP 2018: Submission for approval including amendments

CNDP 2019: Further monitoring without amendments

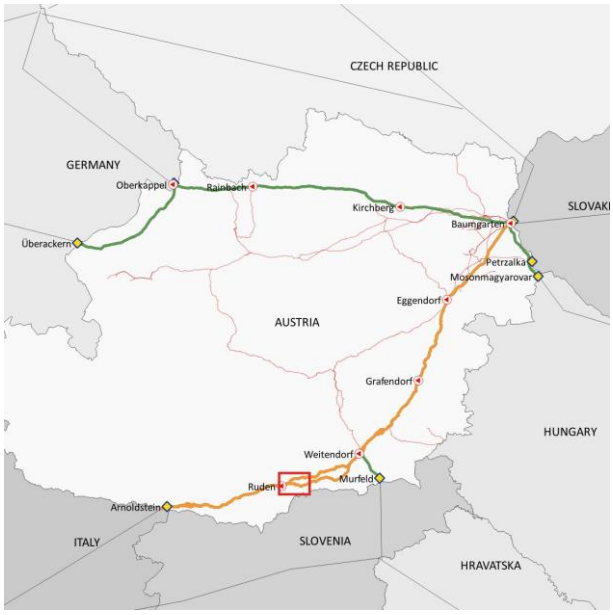
The set up phase was finished in May 2019 and the project execution starts in July 2019. The start of procurement was in May 2019. Civil works, renewal of coating and insulation of piping and under-ground works will start in August 2019 and will be finished in December 2019.

Project name:	**TAG 2017/R03-C Major Overhaul Valve Station St.Paul**		
Project number:	TAG 2017/R03-C		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2019		

Project objective:

The scope of the project is to replace and/or renew instruments, coatings and underground insulations, CPS (cathodic protection system) and enclosures in the section valve station St. Paul along the TAG-pipeline system.

Project description



- Renewing of coatings and insulation on valve and pipe installations (under/above ground)
- Renew cathodic protection system
- Exchange GOV (gas operated valves) to EOV/EHOV (electro hydraulic valves)
- Renewing grounding and lightning protection system
- Renewal of pathways and surfaces
- Renewal of fence and gates

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: None

Connection to other projects:

This project is linked up with the project "TAG 2016/R09: Exchange leaking valves St. Paul / Ruden / Arnoldstein / Ludmannsdorf", which foresees the replacement of leaking valves in the valve sta-tions of St. Paul, Ruden and Arnoldstein (2019).

Technical data:

There is no change in the existing technical transport capacities.

Economic data:

CNDP 2018: Planned investment cost XX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

CNDP 2019: Planned investment cost XX € (Cost base 2019) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

Capacity impact:

None

Project phase:

CNDP 2017: Planning phase

CNDP 2018: Planning phase

CNDP 2019: Execution phase

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

Project modifications:

CNDP 2018: Project scope, economic data, project name

CNDP 2019: None

Project status:

CNDP 2017: Approved as a project within the aggregate TAG 2017/R03

CNDP 2018: Submission for approval within amendments

CNDP 2019: Further monitoring without amendments

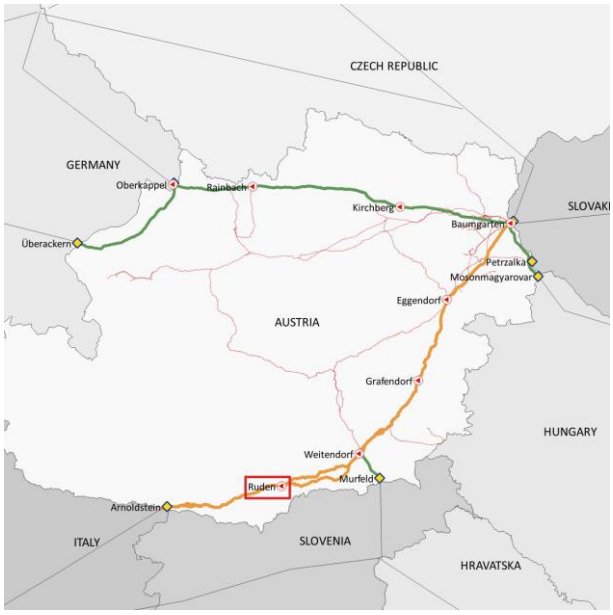
The set-up phase was finished in May 2019 and the project execution starts in July 2019. Start of procurement was in May 2019. Civil works, renewal of coating and insulation of piping and under-ground works will start in August 2019 and will be finished in December 2019.

Project name:	**TAG 2017/R03-D Major Overhaul Pigging Station Ruden**		
Project number:	TAG 2017/R03-D		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2019		

Project objective:

The scope of the project is to replace and/or renew instruments, coatings and underground insulations, CPS (cathodic protection system) and enclosures in the section pigging station Ruden along the TAG-pipeline system.

Project description



- Renewing of coatings and insulation on valve and pipe installations (under/above ground)
- Renew cathodic protection system
- Exchange GOV (gas operated valves) to EOV/EHOV (electro hydraulic valves)
- Renewing grounding and lightning protection system
- Renewal of pathways and surfaces
- Renewal of fence and gates

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: None

Connection to other projects:

This project is linked up with the project "TAG 2016/R09: Exchange leaking valves St. Paul / Ruden / Arnoldstein / Ludmannsdorf", which foresees the replacement of leaking valves in the valve sta-tions of St. Paul, Ruden and Arnoldstein (2019).

Technical data:

There is no change in the existing technical transport capacities.

Economic data:

CNDP 2018: Planned investment cost XX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

CNDP 2019: Planned investment cost XX € (Cost base 2019) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

Capacity impact:

None

Project phase:

CNDP 2017: Planning phase

CNDP 2018: Planning phase

CNDP 2019: Execution

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

Project modifications:

CNDP 2018: Project scope, economic data, project name

CNDP 2019: economic data

Project status:

CNDP 2017: Approved as a project within the aggregate TAG 2017/R03

CNDP 2018: Submission for approval including amendments

CNDP 2019: Submission for approval including amendments

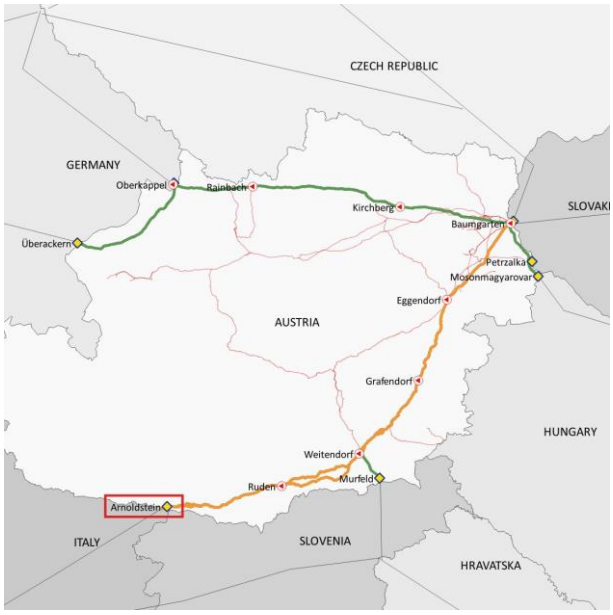
The set up phase will be finalized by end of the year 2018 and the project execution will be finished by end of 2019. The start of procurement is planned in October 2018.

Project name:	**TAG 2017/R03-E Major Overhaul Pigging Station Arnoldstein**		
Project number:	TAG 2017/R03-E		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2019		

Project objective:

The scope of the project is to replace and/or renew instruments, coatings and underground insulations, CPS (cathodic protection system) and enclosures in the section pigging station Arnoldstein along the TAG-pipeline system.

Project description



- Renewing of coatings and insulation on valve and pipe installations (under/above ground)
- Renew cathodic protection system
- Exchange GOV (gas operated valves) to EOV/EHOV (electro hydraulic valves)
- Renewing grounding and lightning protection system
- Renewal of pathways and surfaces
- Renewal of fence and gates

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: None

Connection to other projects:

This project is linked up with the project "TAG 2016/R09: Exchange leaking valves St. Paul / Ruden / Arnoldstein / Ludmannsdorf", which foresees the replacement of leaking valves in the valve sta-tions of St. Paul, Ruden and Arnoldstein (2019).

Technical data:

There is no change in the existing technical transport capacities.

Economic data:

CNDP 2018: Planned investment cost XX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

CNDP 2019: Planned investment cost XX € (Cost base 2019) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

Capacity impact:

None

Project phase:

CNDP 2017: Planning phase

CNDP 2018: Planning phase

CNDP 2019: Execution

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

Project modifications:

CNDP 2018: Project scope, economic data, project name

CNDP 2019: economic data

Project status:

CNDP 2017: Approved as a project within the aggregate TAG 2017/R03

CNDP 2018: Submission for approval including amendments

CNDP 2019: Submission for approval including amendments

The set up phase will be finalized by end of the year 2018 and the project execution will be finished by end of 2019. The start of procurement is planned in October 2018.

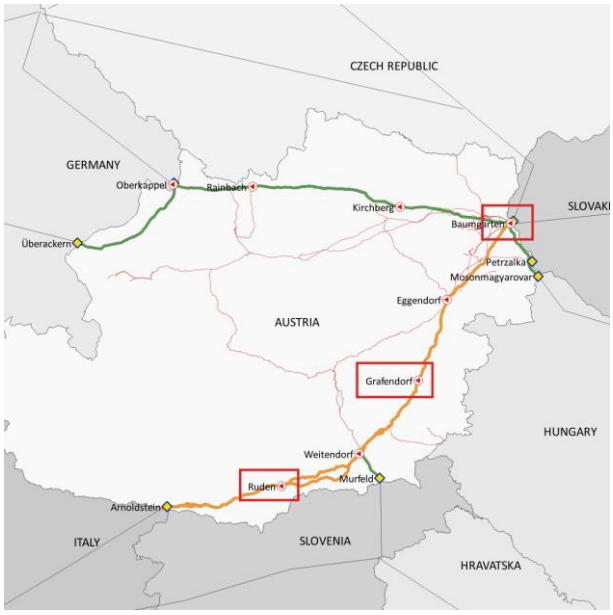
Project name:	**TAG 2017/R04 Substitution Gas Hydraulic Actuators TUCO, CS Baumgarten Grafendorf Ruden**		
Project number:	TAG 2017/R04		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	To be defined		

Project objective:

Replacement of the existing gas hydraulic to electro hydraulic actuators in the turbo compressors of the compressor stations Baumgarten, Grafendorf and Ruden.

The drive concept will be switched from Gas-hydraulic (GOV) to Electro-hydraulic (EHOV), also ensuring substantial reduction of natural gas emissions.

Project description



- Exchange Gas-hydraulic actuators (GOV) by Electro-hydraulic actuators (EHOV)
- E/MSR connection of the (EHOV) gears to the switchboard
- Integration to SCS (station control system)

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: None

Connection to other projects:

No

Technical data:

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

Economic data:

CNDP 2017: Planned investment cost XX € (Cost base 2017) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

CNDP 2018: Planned investment cost XX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

CNDP 2019: Planned investment cost XX € (Cost base 2019) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

Capacity impact:

None

Project phase:

CNDP 2017: Planning phase

CNDP 2018: Planning phase

CNDP 2019: Planning phase

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

Project modifications:

CNDP 2018: Planned completion

CNDP 2019: Planned completion, economic data

Project status:

CNDP 2017: Approved as a project

CNDP 2018: Submission for approval including amendments

CNDP 2019: Submission for approval including amendments

The inquiry package for the Engineering tender has been prepared, surveys of the engineering company are ongoing.

The First Feasibility Study was performed in 2017. After TAG internal review valuating the technical design strategy in Q2 2018, some potential changes were identified. The evaluation of this changes (scope, cost and time) is in process.

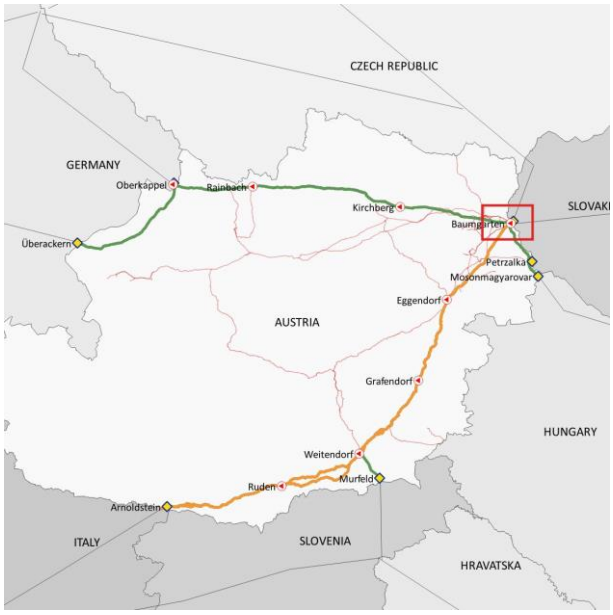
The technical implementation in the station control system is being evaluated together with SCS project TAG 2016/R12.

Project name:	**TAG 2017/R05 Replacement E-Actuators Filter Separators & Metering Station MS2 CS-Baumgarten**		
Project number:	TAG 2017/R05		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	4	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2020		

Project objective:

Replacement of the existing electrical actuators by new electrical actuators at the Baumgarten compressor station (in the filter separators and metering route 2)

Project description



- Exchange of the electric actuators by new electric actuators
- Integration to SCS (station control system)

Project rationale:

The investment is necessary to ensure the reliability and safety in operation of the TAG pipeline system.

Please note in particular:

Possible impact on availability of transport capacities during implementation (Yes/No): None

Connection to other projects:

No

Technical data:

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

Economic data:

CNDP 2017: Planned investment cost XX € (Cost base 2017) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

CNDP 2018: Planned investment cost XX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

CNDP 2019: Planned investment cost XX € (Cost base 2019) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.

Capacity impact:

None

Project phase:

CNDP 2017: Planning phase

CNDP 2018: Planning phase

CNDP 2019: Planning phase

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

Project modifications:

CNDP 2018: Economic data, planned completion

CNDP 2019: Economic data

Project status:

CNDP 2017: Approved as a project

CNDP 2018: Submission for approval including amendments

CNDP 2019: Submission for approval including amendments

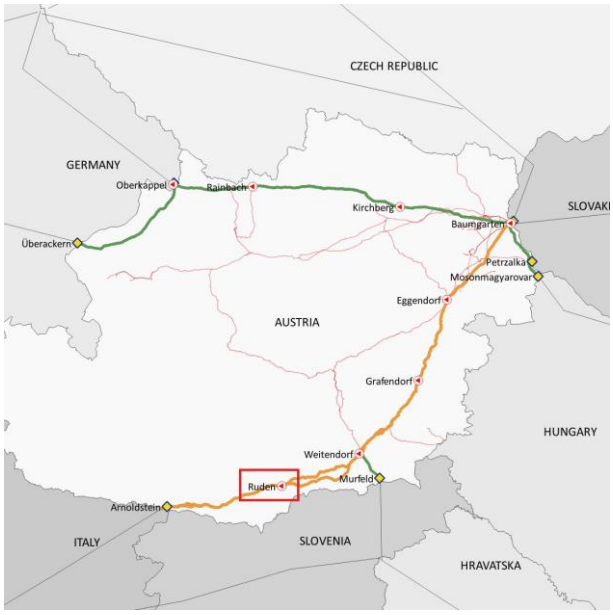
Basic engineering has been completed. Currently procurement of electric actuators is ongoing.

Project name:	**TAG 2017/R08 Gas Generator RC600 in CS-Ruden**		
Project number:	TAG 2017/R08		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2019		

Project objective:

In the year 2019 a Hot Section Inspection service (25,000 running hour service) on the unit C600 in Ruden is planned. The goal of this project is, instead to perform the above-mentioned services to perform a "minor" major overhaul and to upgrade the existing gas generator to the Xtend version.

Project description



- Gas Generator LM2500 Base DLE 1.5 XTend® conversion Kit
- HPT rotor assembly with Xtend Stage 1 and 2 blades
- HPT S1 Nozzle assembly with Xtend™ S1 nozzles
- HPT S2 Nozzle assembly with Xtend™ S2 nozzles, including
  - o stage 1 and 2 shrouds
  - o Interstage shield
  - o Cooling air tube
- Overhaul activities
- Service Bulletin implementation
- Gas Generator Work Shop Activities & Test

Project rationale:

Instead to perform the upcoming Hot Section Inspection (25,000 hours) it is foreseen to upgrade the gas generator to new technology DLE 1.5 XTend.

The upgrade of the gas generator to the XTend version will allow to skip the future 25,000 running hour service to 50,000 running hour service which will result in a reduction of maintenance costs and downtimes effected by maintenance

Please note in particular:

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

Connection to other projects:

No

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

Economic data:
CNDP 2017: Planned investment cost XX € (Cost base 2017). The cost estimation is to be understood with an accuracy of +/- 25%.

CNDP 2018: Planned investment cost XX € (Cost base 2018). The cost estimation is to be understood with an accuracy of +/- 25%.

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

Capacity impact:
None

Project phase:
CNDP 2017: Engineering phase

CNDP 2018: Engineering phase

CNDP 2019: Engineering phase

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

Project modifications:
CNDP 2018: None

CNDP 2019: None

Project status:
CNDP 2017: Approved as a project

CNDP 2018: Further monitoring without amendments

CNDP 2019: Further monitoring without amendments

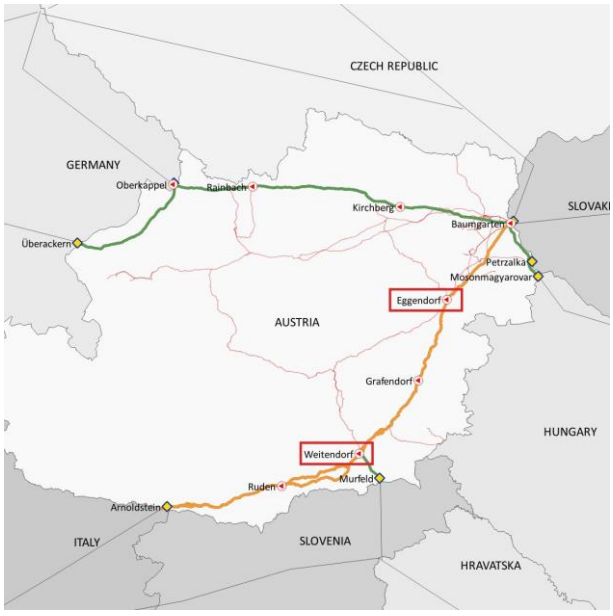
The project is currently on schedule and in the budget. The project is in the Engineering Phase. The purchase order has been issued to the supplier.

Project name:	**TAG 2018/R01 SCS Replacement, CS Eggendorf-Weitendorf**		
Project number:	TAG 2018/R01		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2021		

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 operating workstations and servers.

Project description



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

Project rationale:

Due to the low availability of spare parts, SIL upgrade and standardization of all compressor stations, TAG GmbH needs to replace the existing SCS by a new one in the compressor stations Eggendorf and Weitendorf.

Please note in particular:

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

Connection to other projects:

Possible synergies with the project "TAG 2016/R12 SCS Replacement CS Ruden-Grafendorf-Baumgarten. The cables now in operation will remain.

Technical data:

There is no change in the existing technical transport capacities.

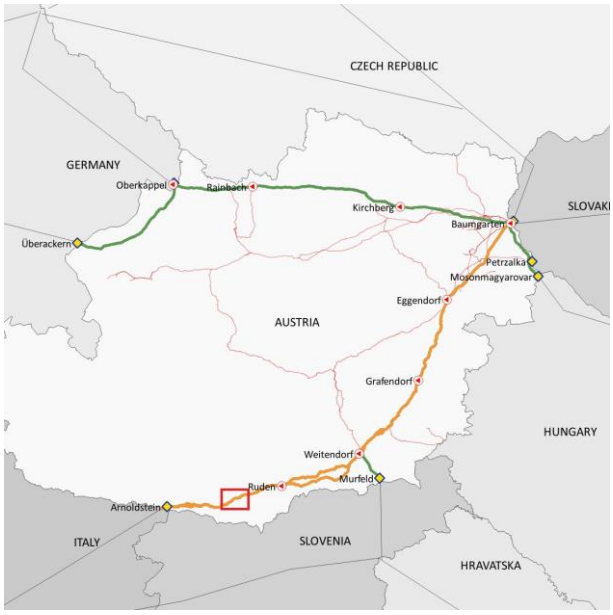
<table>
<tr><td colspan="3">Economic data:
CNDP 2018: Planned investment cost XX € (Cost base 2018) (excl. possible replacement of process instruments and valves). The cost estimation is to be understood with an accuracy +/- 25% based on internal estimation.
CNDP 2019: Planned investment cost XXX € (Cost base 2019) (excl. possible replacement of pro-cess instruments and valves). The cost estimation is to be understood with an accuracy +/- 25% based on internal estimation.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2018: Planning phase
CNDP 2019: 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 2019: Economic data</td></tr>
<tr><td colspan="3">Project status:
CNDP 2018: Submission for approval
CNDP 2019: Submission for approval including amendments
Timeline currently under evaluation due to interface with Replacement of SCS-ESD system in Baumgarten, Grafendorf, Ruden.</td></tr>
</table>

Project name:	**TAG 2018/R02 Major Overhaul Valve Station Ebenthal**		
Project number:	TAG 2018/R02		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2021		

Project objective:

The scope of the project is to replace and/or renew instruments, coatings and underground insulations, CPS (cathodic protection system) and enclosures in the section valve station along the TAG-pipeline system at valve station Ebenthal.

Project description



- Renewing of coatings and insulation on valve and pipe installations (under/above ground)
- Renew cathodic protection system
- Exchange GOV (gas operated valves) to EOV/EHOV (electro hydraulic valves)
- Replacement of the E/I Container
- Renewing grounding and lightning protection system
- Renewal of pathways and surfaces
- Renewal of fence and gates

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: None

Connection to other projects:

No

Technical data:

So far, no reduction of the available transport capacity is foreseen.

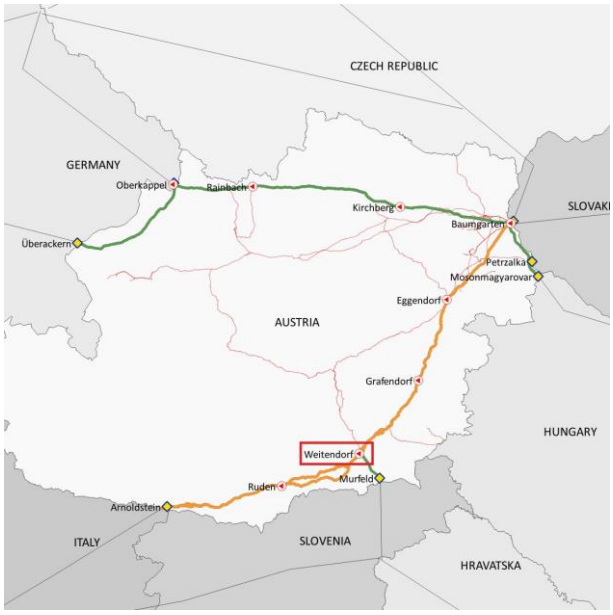
<table>
<tr><td colspan="3">Economic data:
CNDP 2018: Planned investment cost XX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.
CNDP 2019: Planned investment cost XXX € (Cost base 2019) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2018: Planning phase
CNDP 2019: 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 2019: Timeline, economic data</td></tr>
<tr><td colspan="3">Project status:
CNDP 2018: Submission for approval
CNDP 2019: Submission for approval including amendments
The set up phase will be conducted until the end of the year 2019 and the project execution is foreseen for the end of 2020. The start of procurement is planned for October 2019.</td></tr>
</table>

Project name:	**TAG 2018/R04 Major Overhaul Valve Station SS09 Weitendorf**		
Project number:	TAG 2018/R04		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2021		

Project objective:

The scope of the project is to replace and/or renew instruments, coatings and underground insula-tions, CPS (cathodic protection system) and enclosures in the section valve stations along the TAG-pipeline system at valve station Weitendorf.

Project description



- Renewing of coatings and insulation on valve and pipe installations (under/above ground)
- Renew cathodic protection system
- Exchange GOV (gas operated valves) to EOV/EHOV (electro hydraulic valves)
- Renewing grounding and lightning protection system
- Renewal of pathways and surfaces
- Renewal of fence and gates

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: None

Connection to other projects:

No

Technical data:

So far, no reduction of the available transport capacity is foreseen.

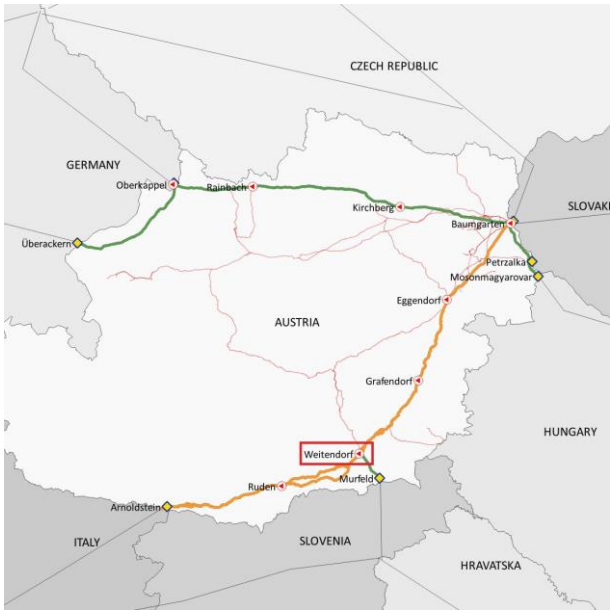
<table>
<tr><td colspan="3">Economic data:
CNDP 2018: Planned investment cost XX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.
CNDP 2019: Planned investment cost XXX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2018: Planning phase
CNDP 2019: 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 2019: Economic data</td></tr>
<tr><td colspan="3">Project status:
CNDP 2018: Submission for approval
CNDP 2019: Submission for approval including amendments</td></tr>
</table>

Project name:	**TAG 2018/R05 Major Overhaul Pigging Station Weitendorf**		
Project number:	TAG 2018/R05		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2021		

Project objective:

The scope of the project is to replace and/or renew instruments, coatings and underground insula-tions, CPS (cathodic protection system) and enclosures in the section valve stations along the TAG-pipeline system in the pigging station MOS4 Weitendorf.

Project description



- Renewing of coatings and insulation on valve and pipe installations (under/above ground)
- Renew cathodic protection system
- Exchange GOV (gas operated valves) to EOV/EHOV (electro hydraulic valves)
- Replacement of the E/I Container
- Renewing grounding and lightning protection system
- Renewal of pathways and surfaces
- Renewal of fence and gates

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: None

Connection to other projects:

No

Technical data:

So far, no reduction of the available transport capacity is foreseen.

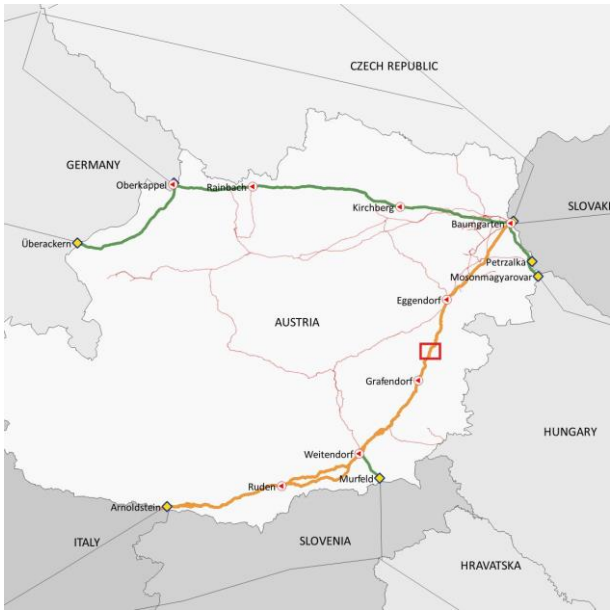
<table>
<tr><td colspan="3">Economic data:
CNDP 2018: Planned investment cost XX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.
CNDP 2019: Planned investment cost XXX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2018: Planning phase
CNDP 2018: 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 2019: None</td></tr>
<tr><td colspan="3">Project status:
CNDP 2018: Submission for approval
CNDP 2019: Further monitoring without amendments</td></tr>
</table>

Project name:	**TAG 2018/R07 Major Overhaul Valve Station Zöbern**		
Project number:	TAG 2018/R07		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project with alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2021		

Project objective:

The scope of the project is to replace and/or renew instruments, coatings and underground insulations, CPS (cathodic protection system) and enclosures in the section valve stations along the TAG-pipeline system at valve station Zöbern.

Project description



- Renewing of coatings and insulation on valve and pipe installations (under/above ground)
- Renew cathodic protection system
- Exchange GOV (gas operated valves) to EOV/EHOV (electro hydraulic valves)
- Replacement of the E/I Container
- Renewing grounding and lightning protection system
- Renewal of pathways and surfaces
- Renewal of fence and gates

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: None

Connection to other projects:

No

Technical data:

So far, no reduction of the available transport capacity is foreseen.

Economic data:

CNDP 2018: Planned investment cost XX € (Cost base 2018) based on the EPCM contract. The cost

<table>
<tr><td colspan="3">estimation is to be understood with an accuracy +/- 25%.
CNDP 2019: Planned investment cost XXX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2018: Planning phase
CNDP 2019: 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 2019: Economic data</td></tr>
<tr><td colspan="3">Project status:
CNDP 2018: Submission for approval
CNDP 2019: Submission for approval including amendments
The set-up phase will be conducted till the end of the year 2020. The project execution will be finished by the end of 2021. Start of procurement is planned for October 2020.</td></tr>
</table>

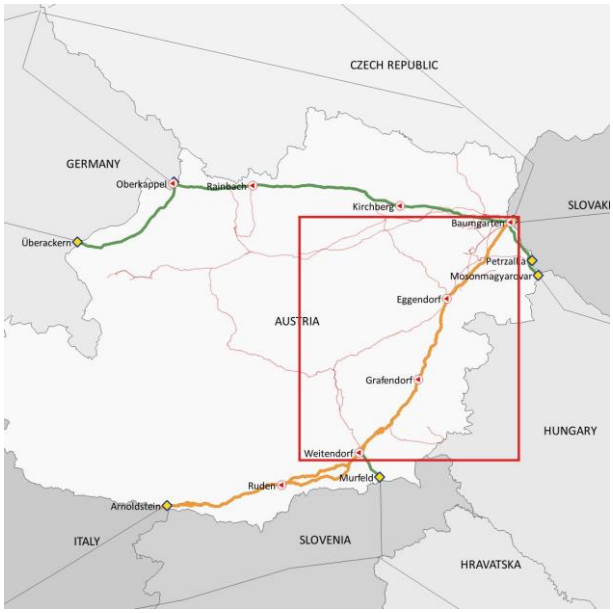
Project name:	**TAG 2018/R09 Sec.1/Sec.2/Sec.3: Corrosion Refurbishment and Repair**		
Project number:	TAG 2018/R09		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2019		

Project objective:

The last pigging campaign (realized during the summer 2016) indicated the presence of several corrosion damages located on the TAG I, TAG 2 and TAG Loop 2. The potential corrosion damages have been classified in two different classes of priority. The most urgent class of priority was investigated and repaired within 2017. The remaining points with lower priority will follow in 2018 and 2019.

If a repair is probably not mandatory for all the detected potential corrosion damages, it is highly likely that some of them should be repaired after further investigation on site. The technical solution to consolidate the section is to apply sleeves with injection of epoxy resin inside where the corrosion is located.

Project description



Following steps have to be executed:

- On-site investigation
- Evaluation of the investigation
- Take appropriate measures (reinforcement respectively repair)
- Renewal of pipeline insulation

Project rationale:

The last pigging campaign (realized during the summer 2016) indicated the presence of several corrosion damages located on the TAG I, TAG 2 and TAG Loop 2.

Please note in particular:

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

Connection to other projects:

No

<table>
<tr><td colspan="3">Technical data:
There is no change in the existing technical transport capacities.</td></tr>
<tr><td colspan="3">Economic data:
CNDP 2018: Planned investment cost XX € (Cost base 2018). The cost estimation is to be understood with an accuracy of +/- 10%.
CNDP 2019: Planned investment cost XXX € (Cost base 2019). The cost estimation is to be understood with an accuracy of +/- 10%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2018: Execution phase
CNDP 2019: 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:
CNDP 2019: None</td></tr>
<tr><td colspan="3">Project status:
CNDP 2018: Submission for approval
CNDP 2019: Further monitoring without amendments</td></tr>
</table>

Project name:	**TAG 2018/R10 DLE 1.5 + 72 hole PT module BC700 in CS-Baumgarten**		
Project number:	TAG 2018/R10		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2020		

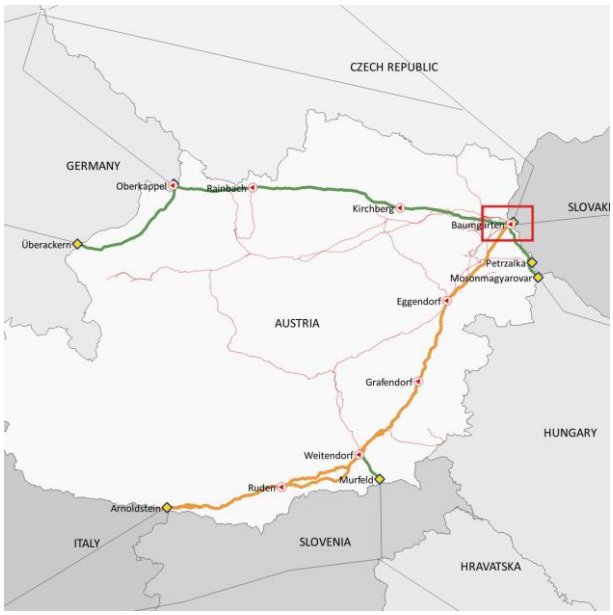
Project objective:

The project goal is to upgrade the existing gas generators of the C700 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 old 46 holes casing flange is obsolete. Therefore, the power turbine shall be upgraded to the new 72 holes casing flange type.

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.

The 46 holes casing flange for PGT25 gas turbines is obsolete and no longer in production. In or-der to guarantee the reliability of the compressor units, the PGT 25 gas turbines with 46 holes casing flange shall be upgraded with the new 72 holes casing flange.

Please note in particular: Potential impact on availability of transportation capacity during the execution: None		
Connection to other projects: No		
Technical data: There is no change in the existing technical transport capacity.		
Economic data: CNDP 2018: Planned investment cost XX € (Cost base 2018). The cost estimation is to be understood with an accuracy of +/- 25%. CNDP 2019: Planned investment cost XX € (Cost base 2019). The cost estimation is to be understood with an accuracy of +/- 25%.		
Capacity impact: None		
Project phase: CNDP 2018: Planning phase CNDP 2019: Engineering phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications: CNDP 2019: none		
Project status: CNDP 2018: Submission for approval CNDP 2019: Further monitoring without amendments		

Project name:	**TAG 2018/R12 Shut Off Valve MS2, CS Baumgarten**		
Project number:	TAG 2018/R12		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	2	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2019		

Project objective:

Currently there is no possibility to safely separate the meter lines MS2 in CS Baumgarten of TAGG by double block and bleed from the station bypass and therefore the rest of the compressor station. As consequent of it, in case of necessity of works on MS2 or its collector, the TAG Baumgarten station has to be currently put temporary out of operation.

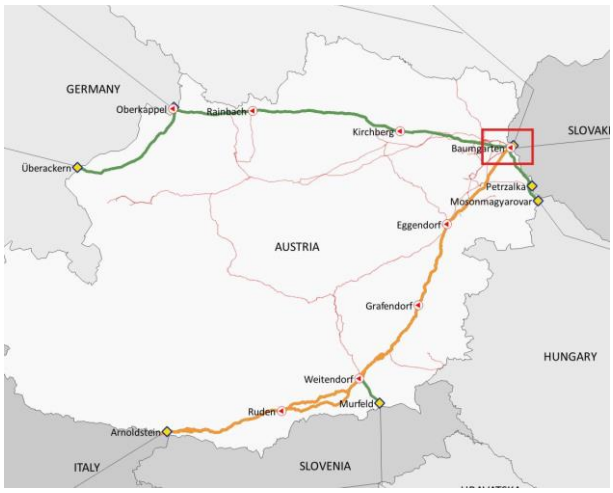
The goal of the project is to install a section valve downstream of the MS2 collector and upstream of the compressors, the TAG Baumgarten station by-pass and the interconnections btw. the GCA and TAG systems in Baumgarten (through AZ1, BOP13 and/or MS4).

The project enables:

- More secured works on MS2 as the MS2 collector can be independently fully depressurized through the project

- The continuation of gas transport from GCA system to TAG system, or vice-versa in TAG reverse flow, in case of works on MS2.

Project description



- Installation of a new 48” shut off valve downstream the MS2

- New routing of the street in the area around the new valve site

- In case of the low covering on the pipe, a new bridge construction in the street for line crossing

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:

No

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

Economic data:
CNDP 2018: Planned investment cost XX € (Cost base 2018) based on a setup study. The cost estimation is to be understood with an accuracy +/- 25%.

CNDP 2019: Planned investment cost XXX € (Cost base 2019) based on a setup study. The cost estimation is to be understood with an accuracy +/- 25%.

Capacity impact:
None

Project phase:
CNDP 2018: Planning phase

CNDP 2019: Execution phase

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

Project modifications:
CNDP 2019: None

Project status:
CNDP 2018: Submission for approval

CNDP 2019: Further monitoring without amendments

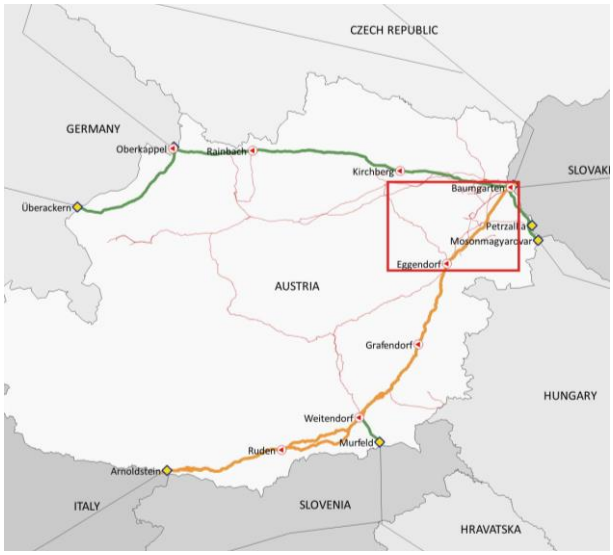
The Set up-Study was finished in 08/2018, the engineering phase started in 10/2018. The execution on site is planned for Q3 and Q4 2019.

Project name:	**TAG 2018/R13 Major Overhaul of Valve Stations AZ3-AZ3L Eggendorf**		
Project number:	TAG 2018/R13		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	3	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	Continued and approved project without alterations
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2020		

Project objective:

The scope of the project is to replace and/or renew instruments, coatings and underground insulations, CPS (cathodic protection system) and enclosures in the section valve stations AZ3 and AZ3L along the TAG-pipeline system in Eggendorf.

Project description



- Renewing of coatings and insulation on valve and pipe installations (under/above ground)
- Renew cathodic protection system
- Renewing grounding and lightning protection system
- Renewal of pathways and surfaces
- Renewal of fence and gates

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: None

Connection to other projects:

No

Technical data:

There is no change in the existing technical transport capacities.

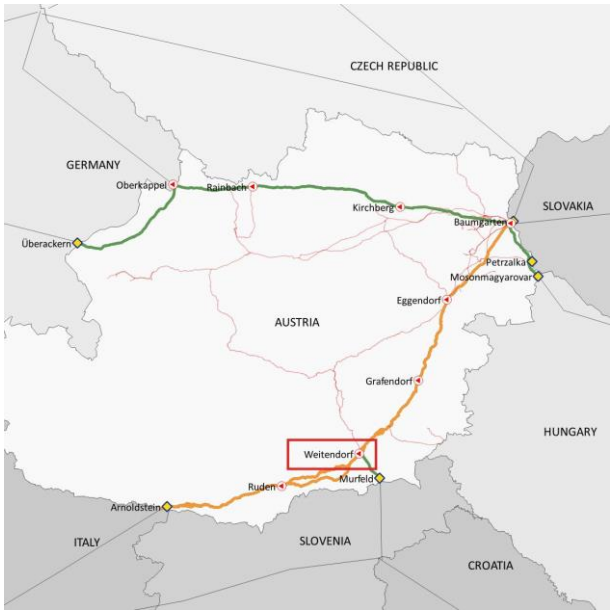
<table>
<tr><td colspan="3">Economic data:
CNDP 2018: Planned investment cost XX € (Cost base 2018) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.
CNDP 2019: Planned investment cost XXX € (Cost base 2019) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2018: Planning phase
CNDP 2019: 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 2019: None</td></tr>
<tr><td colspan="3">Project status:
CNDP 2018: Submission for approval
CNDP 2019: Further monitoring without amendments
The set-up phase will be conducted till the end of the year 2019 and the project execution is fore-seen for the end of 2020. The start of procurement is planned for October 2019.</td></tr>
</table>

Project name:	**TAG 2019/R01 Major Overhaul Valve Station CS Weitendorf**		
Project number:	TAG 2019/R01		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	1	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2020		

Project objective:

The scope of the project is to replace and/or renew instruments, coatings and underground insula-tions, CPS (cathodic protection system) and enclosures in the section valve stations along the TAG-pipeline system at valve station Weitendorf.

Project description



- Renewing of coatings and insulation on valve and pipe installations (under/above ground)
- Renew cathodic protection system
- Exchange GOV (gas operated valves) to EOV/EHOV (electro hydraulic valves)
- Renewing grounding and lightning protection system
- Renewal of pathways and surfaces
- Renewal of fence and gates

Project rationale:

The investment is necessary to ensure the reliability and safety in operation of the TAG pipeline sys-tem.

Please note in particular:

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

Connection to other projects:

No

Technical data:

So far, no reduction of the available transport capacity is foreseen.

<table>
<tr><td colspan="3">Economic data:
CNDP 2019: Planned investment cost XXX € (Cost base 2019) based on the EPCM contract. The cost estimation is to be understood with an accuracy +/- 25%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2019: 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 2019: Submission for approval</td></tr>
</table>

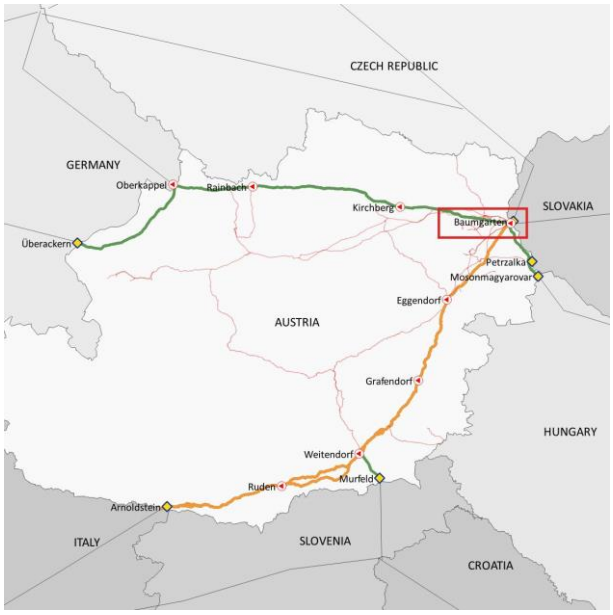
Project name:	**TAG 2019/R04 Replacement ball valves GOV 502 & 504 CS Baumgarten**		
Project number:	TAG 2019/R04		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	1	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2019		

Project objective:

During the last maintenance work on the ball valve GOV504 in Compressor Station Baumgarten it was found that the valve has a significant internal leakage. Hence working safely on GC500 is not guaranteed anymore and the ball valve GOV504 shall be replaced as soon as possible.

To take advantage of synergies, the ball valve GOV502 should be replaced in the same time, because of a duration of its operation life higher than its expected useful life.

Project description



- Replacement of two 30” ball valves GOV502 + GOV504 by two new one ball valves
- Installation of the ball valve with stem extension + existing GOV actuators and preparing for commissioning
- Adaption of the valve foundation, sliding plate + bottom casting (depending on the condition of reinforcement and concrete)
- Adaption of the valve shaft in case of the piping tie in works (for GOV504)

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:

No

Technical data:

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

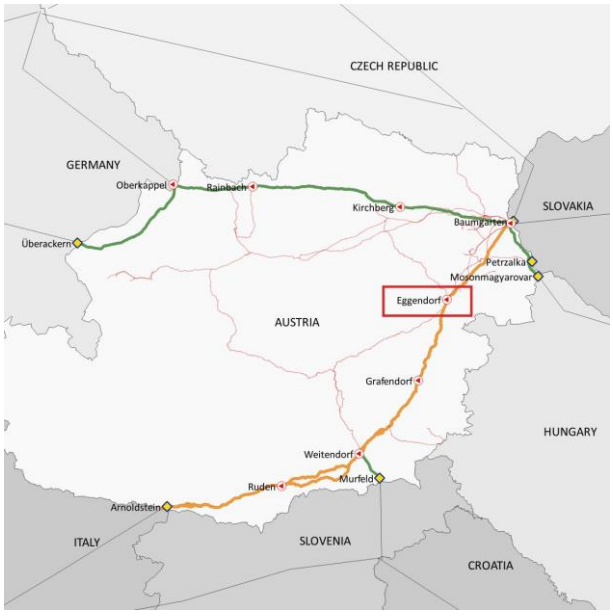
<table>
<tr><td colspan="3">Economic data:
CNDP 2019: Planned investment cost XXX € (Cost base 2019). The cost estimation is to be under-stood with an accuracy +/- 10 %.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
Status 2019: Execution phase</td></tr>
<tr><td>TYNDP: No</td><td>PCI status: No</td><td>CBCA decision: No</td></tr>
<tr><td colspan="3">Project modifications:</td></tr>
<tr><td colspan="3">Project status:
CNDP 2019: Submission for approval</td></tr>
</table>

Project name:	**TAG 2019/R06 Exchange of Leaking Valve CS Eggendorf**		
Project number:	TAG 2019/R06		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	1	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2020		

Project objective:

The suction valve EOV 202 of Compressor C200 at Eggendorf Compressor Station is leaking. This leaking valve including actuator (Biffi) needs to be replaced in the Station CS Eggendorf.).

Project description



- Excavation and digging works, exposing of the piping system and valve.
- Exchange of the leaking valve

Project rationale:

The investment is necessary to ensure the reliability and safety in operation of the TAG compressor station.

Please note in particular:

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

Connection to other projects:

The project will be coordinated with TAG 2016/01 Reverse Flow Weitendorf and Eggendorf.

Technical data:

There is no change in the existing technical transport capacities.

Economic data:

CNDP 2019: Planned investment cost XXX € (Cost base 2019). The cost estimation is to be under-stood with an accuracy +/- 40%.

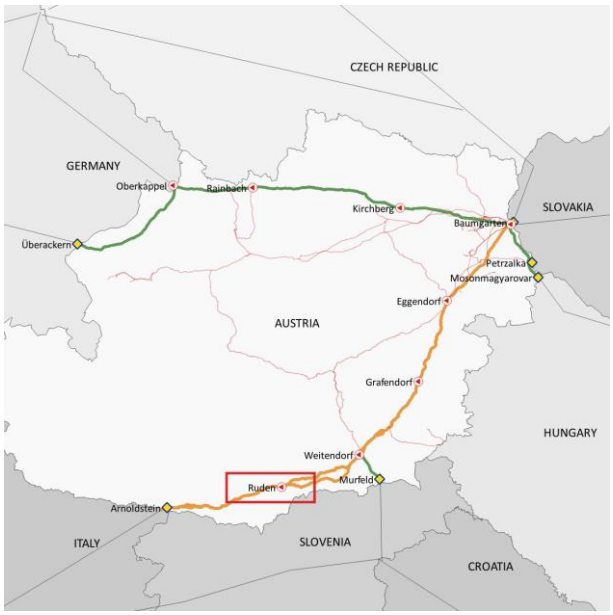
Capacity impact: None		
Project phase: CNDP 2019: Execution		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications:		
Project status: CNDP 2019: Submission for approval		

Project name:	**TAG 2019/R07 Exchange of Leaking Valve CS Ruden**		
Project number:	TAG 2019/R07		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	1	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2020		

Project objective:

Four gas cooler valves in CS-Ruden are leaking. Therefore, those leaking valves need to be re-placed.

Project description



- Excavation and digging works, exposing of the piping system and valve.
- Exchange of the leaking valves
  - Gas cooler E200
    - o HOV69
    - o HOV70
  - Gas cooler E400
    - o HOV73
    - o HOV74
- Renewing of coatings and insulation on valve

Project rationale:

The investment is necessary to ensure the reliability and safety in operation of the TAG compressor station.

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.

Economic data:

CNDP 2019: Planned investment cost XXX € (Cost base 2019). The cost estimation is to be under-stood with an accuracy +/- 40%.

Capacity impact: None		
Project phase: CNDP 2019: Planning phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications:		
Project status: CNDP 2019: Submission for approval		

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:	1	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2021		

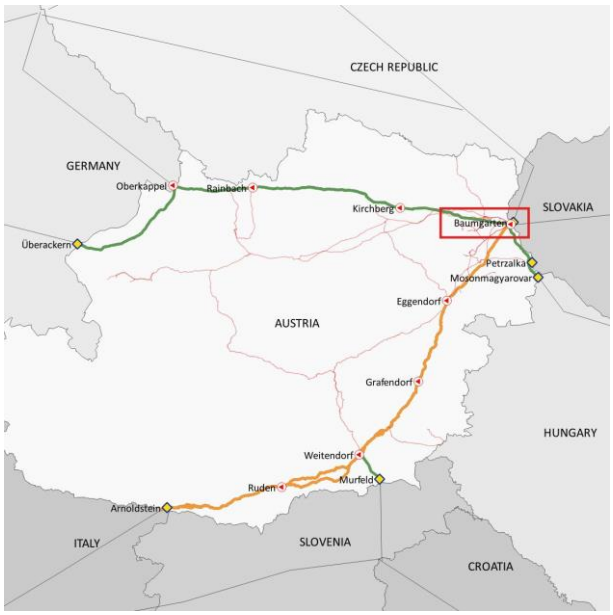
Project objective:

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: No		
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 under-stood with an accuracy of +/- 25%.		
Capacity impact: None		
Project phase: CNDP 2019: Planning phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications:		
Project status: CNDP 2019: Submission for approval		

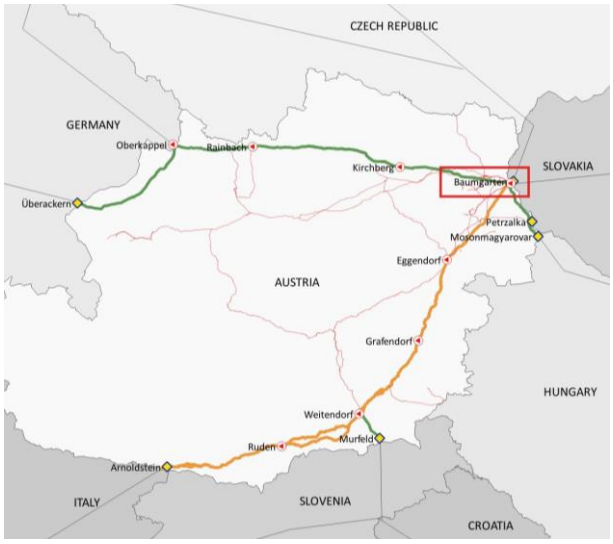
Project name:	**TAG 2019/R10 DLE 1.5 hole PT module BC600 in CS Baumgarten**		
Project number:	TAG 2019/R10		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	1	**Date:**	31.08.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2022		

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.

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.

Please note in particular:

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

Connection to other projects:

No

Technical data:

There is no change in the existing technical transport capacity.

<table>
<tr><td colspan="3">Economic data:
CNDP 2019: Planned investment cost XXX € (Cost base 2019). The cost estimation is to be under-stood with an accuracy of +/- 25%.</td></tr>
<tr><td colspan="3">Capacity impact:
None</td></tr>
<tr><td colspan="3">Project phase:
CNDP 2019: 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 2019: Submission for approval</td></tr>
</table>

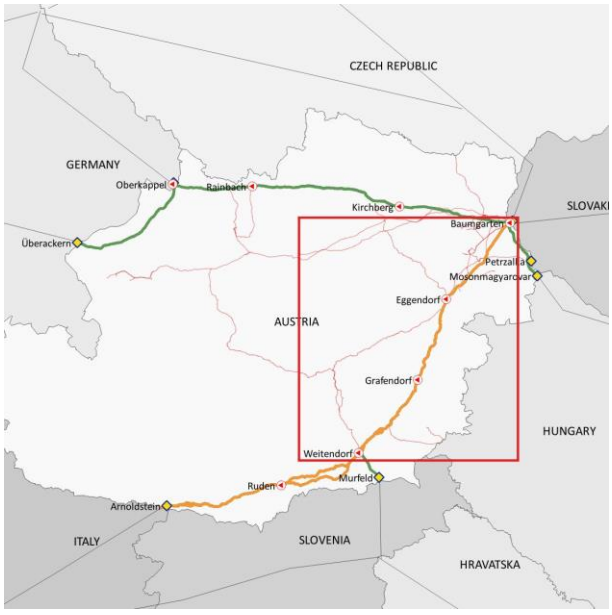
Project name:	**TAG 2019/R11 Sec.1/Sec.2/Sec.3: Corrosion Refurbishment and Repair 2019-20**		
Project number:	TAG 2019/R11		
Project sponsor:	Trans Austria Gasleitung GmbH		
Edition:	1	**Date:**	02.09.2019
Project type:	Replacement Investment (Re-Investment)	**Project category:**	New project
Implementation time frame:		**Performance audit according to CAM NC:**	No
Planned completion:	Q4/2020		

Project objective:

The last pigging campaign, executed in Summer 2016, revealed some corrosions points on the TAG1, TAG2 und TAG Loop2. The corrosion damages were classified in two different handling cate-gory according to priority. The highest priority level has been handled already in 2017 through the corresponding dispositions (See also project TAG 2018/R09). For the other identified places, showing corrosion with less priority, the handling takes place in 2018 and 2019.

While an identified corrosion point with less priority not mandatory means the necessity of a reparation, several of these corrosion points are assessed to be repaired after detailed inspection on-site. The technical solution used in order to consolidate the identified corrosion points is the injection of epoxy on the point.

Project description



Following steps have to be executed:

- On-site investigation
- Evaluation of the investigation
- Take appropriate measures (reinforcement re-spectively repair)
- Renewal of pipeline insulation

Project rationale:

The last pigging campaign (realized during the summer 2016) indicated the presence of several corrosion damages located on the TAG I, TAG 2 and TAG Loop 2.

Please note in particular:

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

Connection to other projects:

No

Technical data: There is no change in the existing technical transport capacities.		
Economic data: CNDP 2019: Planned investment cost XX € (Cost base 2019). The cost estimation is to be under-stood with an accuracy of +/- 10%.		
Capacity impact: None		
Project phase: CNDP 2019: Execution phase		
TYNDP: No	**PCI status:** No	**CBCA decision:** No
Project modifications:		
Project status: CNDP 2019: Submission for approval		