PREVENTIVE ACTION PLAN

required for removing or mitigating

identified risks for providing deliveries

of natural gas in the Czech Republic

pursuant to Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017

February 2019

MINISTRY OF
INDUSTRY AND TRADE

CONTENT:

General information:

The Preventive Action Plan to ensure gas supply to the Czech Republic was submitted to the European Commission firstly on December 3, 2012. Its first update affecting the security of gas supplies in the Czech Republic was in 2014, the next one in August 2015. The current update is in accordance with Articles 8 and 9 of the Regulation (EU) of the European Parliament and Council no. 2017/1938 of 25 October 2017 concerning measures to safeguard security of gas supply and repealing Regulation (EU) of the European Parliament and Council no. 994/2010 (hereafter the SoS Regulation).

Article 8 (2) of the SoS provides that the competent authority of each Member State, in consultation with ..., shall draw up a "Preventive Action Plan including the measures needed to eliminate or mitigate the identified risks, including the impacts of the energy efficiency and demand side measures referred to in joint and national risk assessments and in accordance with Article 9 ". According to Article 8 of the SoS Regulation "The competent authorities of the neighboring Member States shall consult each other on a timely basis to ensure the consistency of their Preventive and Emergency Plans." The Preventive Action Plan must be updated every four years (not later than 1 March 2023) under the Regulation.

The update accepts the requirements of Articles 8 and 9 of the Regulation and was prepared by the Ministry of Industry and Trade of the Czech Republic, which is the competent authority under Article 2, paragraph 2, of the SoS Regulation. The updating is also carried out on the basis of Act No. 458/2000 Coll., On Business Conditions and the Execution of State Administration in the Energy Sectors and on Amendments to Certain Acts (Energy Act), as amended, in cooperation with gas companies in the Czech Republic and after consultation with the Energy Regulatory Authority by the Office.

The basic legal regulation for the energy sector is in the Czech Republic Act No. 458/2000 Coll., On Business Conditions and on the Exercise of State Administration in the Energy Sectors and on the Amendment to Certain Acts (Energy Act), as amended. The last amendment of Act No. 131/2015 Coll., Effective as of 1 January 2016 Coll.

Emergency situations in the gas industry and the procedures for their solution are detailed in the Decree of the Ministry of Industry and Trade No. 344/2012 Coll., On Emergency Situations in the Gas Industry, as amended, which divides customers into eight groups according to the type of gas consumption and further specifies five consumption levels for limiting gas supply and five consumption levels to interrupt deliveries to the individual customer groups. In 2015 it was amended by Decree No. 215/2015 Coll., which more closely related the problems of emergency situations and their prevention and specified the data important for determining the level of security standard of supply and for checking its security.

At present (February 2019) negotiations are taking place on amendments to both the Energy Act No. 458/2000 Coll. And the Decree of the Ministry of Industry and Trade No. 344/2012 Coll.

Decree No. 349/2015 Coll., The Energy Regulatory Office on Gas Market Rules, as amended, stipulates, among other things, rules on access to the transmission system, the distribution system and the gas storage facilities, the scope of the information disclosed to allow access to the

transmission system, the distribution system and gas storage facilities and ways to address capacity shortages in the gas system. It also regulates the rules of trade compensation for imbalances in the prevention of emergency and emergency situations throughout the Czech Republic due to lack of gas.

Due to the quality, reliability and robustness of the Czech gas system and the diversification of transport routes and gas sources, it is not necessary to prepare a joint plan of preventive measures in cooperation with neighboring states. Reliability of supply and safe operation of the Czech gas system was demonstrated both during the gas crisis in January 2009 and in the very cold period in February 2012. In these cases, it was not necessary to limit supplies to consumers, the increased consumption being covered by extraction from domestic underground gas storage facilities. The security and reliability of gas supplies has also been demonstrated on the basis of the European Commission's request to carry out stress tests simulating the gas supply disruption from the Russian Federation for the winter period 2014/2015 in predefined scenarios S1 to S4. By confirming the abovementioned capabilities of the Czech gas system, the operator of the transmission system was examined by the operator of the transmission system by simulating emergency prevention and declaration of emergency on the gas system of the Czech Republic on 31 October 2014.

In the preparation of the Preventive Action Plan, gas market participants, in particular transmission system operators, relevant organizations representing the interests of households and industrial gas customers, including electricity generators, electricity transmission system operators, as well as the national regulatory authority, participated in the preparation of the Preventive Action Plan by providing the data and supporting documents necessary for the preparation of some parts of this document.

Regional cooperation

Article 3 (7) of the SoS provides: "In accordance with Article 7 (2), the main transnational risks to the security of gas supply in the Union need to be identified and risk groups established on this basis. These risk groups serve as a basis for enhanced regional cooperation with a view to enhancing the security of gas supply and allowing for an agreement on appropriate and effective cross-border measures of all Member States concerned within the risk groups or outside the risk groups in emergency supply corridors.

Risk groups have been identified and the Czech Republic is involved in 3 risk groups. A thorough analysis of work in risk groups and compliance with the infrastructure standard for the Czech Republic can be found in the national risk assessment for the Czech Republic and in the joint risk assessment for risk groups.

The Czech Republic is a member of these risk groups: the Baltic Sea, Ukraine, Belarus

Regional Gas Group

According to Annex I - Regional Cooperation of Regulation No 2018/1937, Member States' risk groups are the basis for risk-based cooperation. In accordance with Article 7 (2), significant transnational risks to the security of gas supply in the Union are identified and risk groups should be identified on this basis. These risk groups serve as a basis for enhanced regional cooperation with the aim to increase the security of gas supply and allow all Member States concerned to agree on

appropriate and effective cross-border measures within or outside these groups alongside emergency corridors.

The composition of risk groups does not prevent any other form of regional cooperation contributing to security of supply.

The Czech Republic is a member of three risk groups that are dependent on supplies from the East.

Baltic Sea Risk Group

Member states:

Germany, Czech Republic, Austria, Belgium, Denmark, France, Luxembourg, the Netherlands, Slovakia, Sweden

Risk group Ukraine

Member states:

Ukraine, Bulgaria, Germany, Czech Republic, Greece, Croatia, Italy, Luxembourg, Hungary, Austria, Poland, Romania, Slovenia, Slovakia

Risk group Belarus

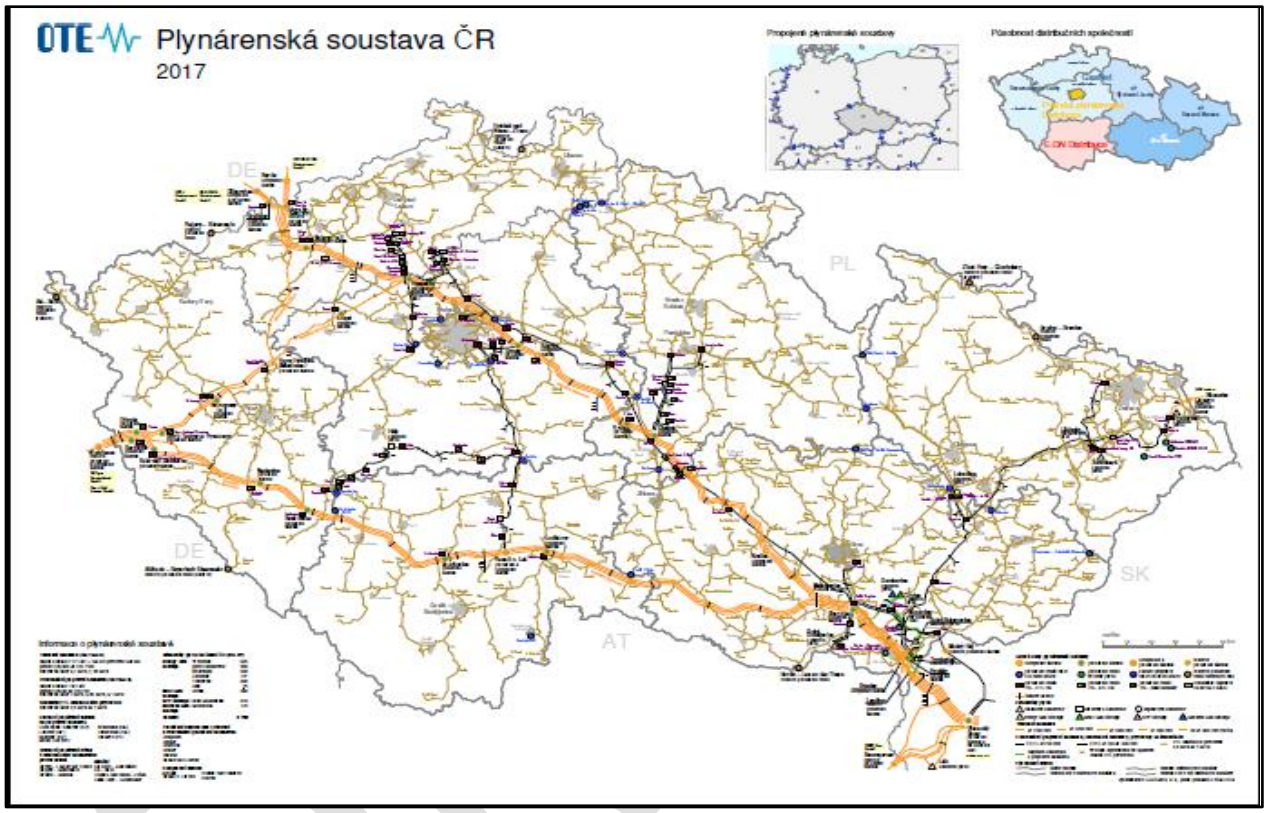
Member states:

Belgium, Czech Republic, Germany, Estonia, Latvia, Lithuania, Luxembourg, the Netherlands, Poland, Slovakia.

1. Gas System of the Czech Republic - overview:

The gas network of the Czech Republic consists of an interconnected set of equipment for the production, transport, distribution and storage of gas, including a system of control and signaling technology and equipment for transfer of information for the activities of computer technology and information systems used to operate these devices.

Fig. No.1 - Gas system of the Czech Republic



Source: OTE

The gas system of the Czech Republic consists of:

A) Transit pipelines of the transmission system: total length of 2 637 km, DN 800 - DN 1 400, nominal pressures 6,1 MPa; 7.35 MPa;

B) Domestic gas pipelines of the transmission system: total length of 1 181 km, pipelines DN 80 to DN 700, nominal pressures 4 MPa; 5.35 MPa and 6.1 MPa;

C) Compression stations on the transmission system: Břeclav, Veselí nad Lužnicí, Kralice nad Oslavou and Kouřim;

D) Border transmission stations on the transmission system: Lanžhot (CZ), Hora Svaté Kateřiny (CZ), Brandov (CZ), Waidhaus (SRN), Olbernhau (SRN), Mokrý Háj (SR) and Cieszyn (PL);

E) Transmission stations between transit and domestic transmission systems: Hrušky, Uherčice, Olešná, Limuzy, Hospozín and Veselí nad Lužnicí.

F) Innogy GasNet, EON and PPD distribution pipeline systems: pipelines DN 25 to DN 700, nominal pressures from 2.5 MPa to 4 MPa, with a total length of approximately 73.4 thousand. km (with connections).

G) Underground storages:

- innogy Gas Storage - Tvrdonice, Dolní Dunajovice, Štramberk, Lobodice, Třanovice, Háje;

- MND Gas Storage - Uhřice, Uhřice South;

- Moravia Gas Storage - Damborice;

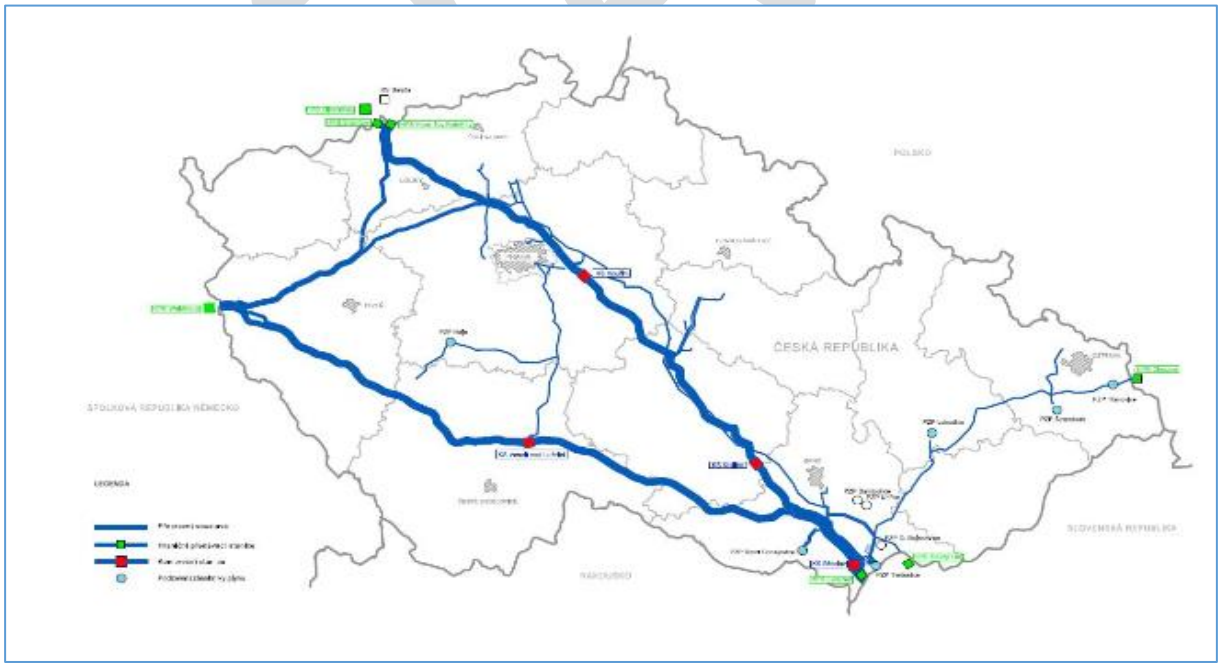
- SPP Storage - Dolní Bojanovice (so far connected only with the transport system of the Slovak Republic)

H) Border transfer points in distribution systems: Vejprty - Bärenstein, Aš - Selb, Alzbetin - Eisenstein, Hevlin - Laa an der Thaya, Úvalno - Branice, Zlaté Hory - Glucholazy, Hrádek nad Nisou - Zittau.

Transmission system

The transport system is defined according to the Energy Act as a mutually connected set of high-pressure gas pipelines and compressor stations and related technological objects, including a system of control and signaling technology and information transmission equipment for computer and information systems activities connected to gas systems abroad, the gas shipment license holder. The transport system is established and operated in the public interest.

Fig. No 2: NET4GAS transmission system



Source: NET4GAS

Border transfer stations

Lanžhot (CZ), Hora Svaté Kateřiny (CZ), Brandov (CZ), Waidhaus (SRN), Olbernhau (SRN), Mokrý Háj (SR) a Cieszyn (PL).

Reverse gas flows in the transmission system

Transmission system technology allows bidirectional gas flow at all border stations and allows gas to be transported from east to west, but also from west to east. At the Cieszyn border station, the possibility of bi-directional flow of gas in crisis situations is ensured by reducing the pressure in the NET4GAS transmission system, yet in order to ensure consistency with the European Commission's assessment, NET4GAS filed an application in 2016 for an exemption from the two-way pipeline capacity obligation STORK I.

Fig. No. 3 – Current reverse gas flows in the transmission system

Key to the map:

HPS-border transfer station, **KS**-compression station

Distribution systems

The distribution system is defined according to the Energy Act as a mutually interconnected set of high-pressure, medium-pressure and low-pressure gas pipelines, gas pipelines owned by the distribution system operator and related technological objects including the control and signaling technology and information transfer facilities for computing and information systems is not directly connected to compressor stations and where the gas distribution license holder holds the gas distribution; the distribution system is established and operated in the public interest.

Licensed activity on gas distribution in 2017, according to the data of the Energy Regulatory Office, operated 256 entities in the Czech Republic, of which approximately 70 are active. The license for gas distribution is granted by the ERO. The dominant licensed distribution system operators in the Czech Republic include innogy GasNet, EON and PPD. The total length of the pipelines is 73 thousand. km. There are also dozens of local gas distribution license holders with fewer than 90,000 customer outlets. The total annual gas volume at the outflow from distribution grids to all customers reached 8.5 billion m3 (91 TWh) in 2017.

Underground gas storage

The total storage capacity of underground gas storage facilities in the Czech Republic as of 31 December 2017 amounted to 3.977 billion m3, without the Dolní Bojanovice gas storage of 3.401 billion m3, representing about 40% of the annual gas consumption in the Czech Republic.

PZP owned by innogy Gas Storage s.r.o .:

PZP Háje, PZP Třanovice, PZP Štramberk, PZP Lobodice, PZP Dolní Dunajovice, PZP Tvrdonice

Underground gas storage facility owned by MND Gas Storage, a.s .:

PZP Uhřice, PZP Uhřice Jih

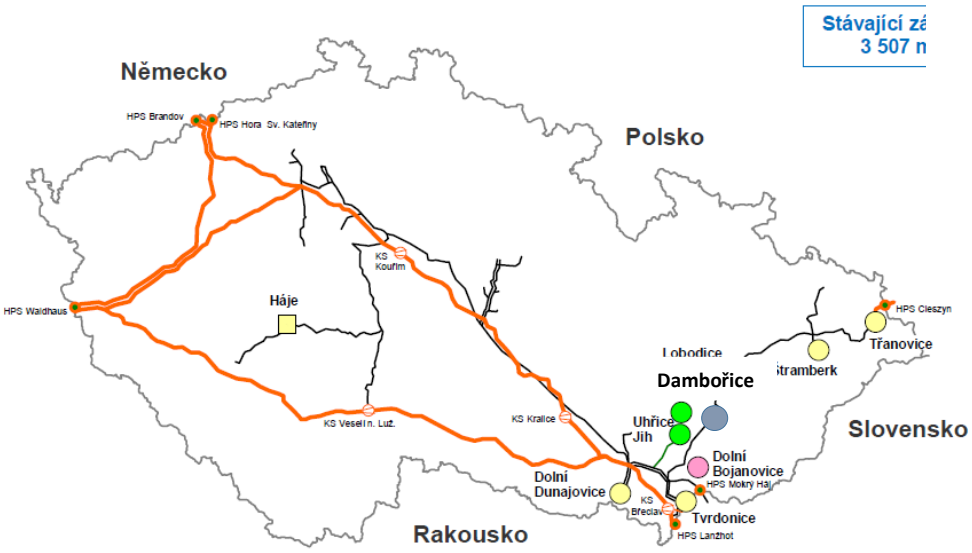
Underground gas reservoir owned by Moravia Gas Storage, a.s .:

PZP Dambořice

Underground gas storage facility owned by SPP Storage:

Dolni Bojanovice - up to now connected only to the gas system of the Slovak Republic.

Fig. No. 4 – Underground gas storages



Tab. No. 1: Storage capacity of the individual UGS

UGS / OWNER	**Storage capacity (mil. m3)**	Maximum daily withdrawal (mil. Nm³/day)	Maximum daily injection (mil. Nm³/day)
UGS Dolní Dunajovice / innogy GS	900	21,3	12
UGS Tvrdonice / innogy GS	525	8	8,5
UGS Háje / innogy GS	75	6	6
UGS Lobodice / innogy GS	177	5	3
UGS Štramberk / innogy GS	500	7	7
UGS Třanovice / innogy GS	530	8	6,5
The group of these six underground gas storages is operated as a single virtual storage.	**TOTAL** 2 707	**TOTAL** 41,5	**TOTAL** 35,7
UGS Dambořice / Moravia GS	298 (315 in 2020)	7,5	4,5
UGS Uhřice / MND Gas Storage	280	10,1	5,4

Natural gas is taken over and transferred at the entry and exit from the Czech Republic, ie. measured in volume and quality at the border transfer stations (BTS) between the Czech Republic and Slovakia:

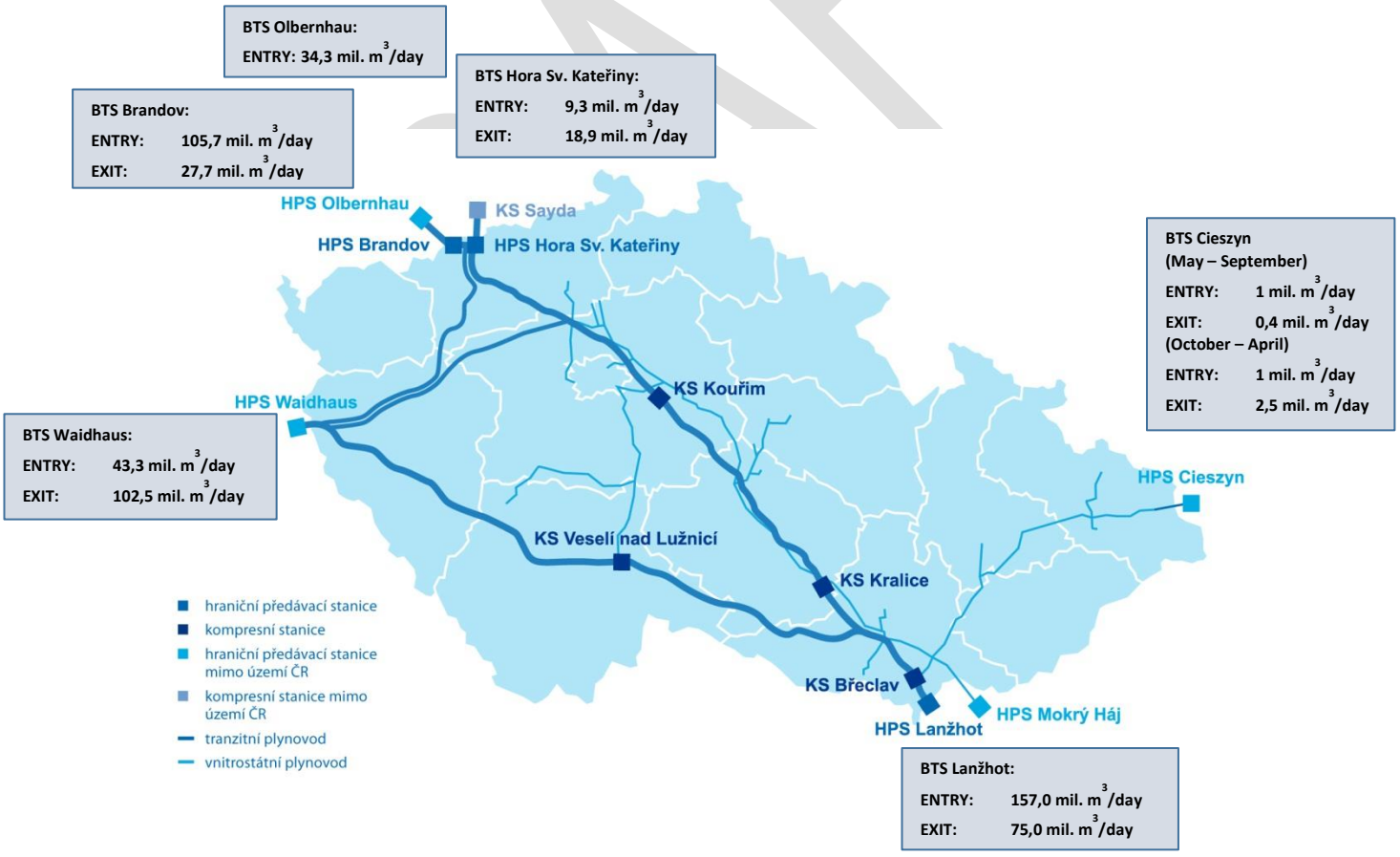
Lanžhot and Lanžhot - Mokrý Háj, between the Czech Republic and Germany: at Hora Svaté Kateřiny - KS Sayda, Brandov - KS Olbernhau, KS Waidhaus and between the Czech Republic and Poland at the Cieszyn transfer station.

Capacities for the physical flow of gas at the entry and exit points of the transmission system, including reverse flow capacities at the border points of the transmission system and, where appropriate, the need to increase these capacities:

Figure 5 shows the individual technical capacities at the input and output points of the transmission system. These capacities also represent the possibility of reverse flow at the given inlets and outlets.

In 2012-2014 there was an increase in transmission system capacities due to the increase in injecting and extraction capacity of several underground gas storage facilities. These values are presented in Table 2. Furthermore, in 2013, the input capacity was increased at the Brandov point after the Gazela pipeline was connected.

Fig. No. 5 – Capacities on entry and exit points of the transmission system (at 20ºC)



Note:

The normal operating mode does not allow reverse flow from Poland to the Czech Republic, but under pressure adjustments on both the Polish and Czech side it is possible to supply about 1.0 million Nm3 / day.

From the transmission system, natural gas is further transferred over 94 transmission stations to distribution systems, underground gas storage facilities and directly connected customers. All gas delivery stations have a commercial gas quantity measurement. The quality of gas (combustion heat) is measured at 23 nodes in the system.

Supplies (commercial) from sources and domestic production:

Total supplies of natural gas are provided for the Czech Republic from abroad and only to a small extent from domestic sources. Total imports of natural gas reached 8 890 million m3 in 2017 (source OTE, a.s.)

In 2017, natural gas was imported from the Russian Federation - 5 783 million m3, ie 61 655 GWh (65.1%), Norway - 72 million m3 ie 772 GWh (0.8%) and the European Union - 3 035 million, ie 32,357 GWh (34.1%).

Total deliveries from domestic gas in 2017 amounted to 146.2 million m3 / year, representing only 1.7% of domestic consumption.

Tab. No 2: Statistics on natural gas imports into the Czech Republic - trade data by allocations.

Year	Import Russia			Import Norway			Import EU			Import total	
	(mil. m3)	(GWh)	Ratio (%)	(mil. m3)	(GWh)	Ratio (%)	(mil. m3)	(GWh)	Ratio (%)	(mil. m3)	(GWh)
2016	**5 176**	**55 173**	**63,7**	**2**	**24**	**0,0**	**2 946**	**31 581**	**36,3**	**8 123**	**86 778**
2017	**5 783**	**61 665**	**65,1**	**72**	**772**	**0,8**	**3 035**	**32 357**	**34,1**	**8 890**	**94 794**

Source: OTE,a.s.

Evaluation of natural gas in the transmission system

Climate conditions in the Czech Republic result in a large difference in natural gas consumption in the summer and winter. The lowest total monthly consumption in the Czech Republic in 2017 was reached in August at 325.8 million m3 (3 471 GWh), the highest in January of 1 456 million m3 (15 543 GWh).

Increased natural gas requirements in the winter are covered by supplies from underground gas storages.

Role of gas in power generation

The share of natural gas in the production of electricity is not significant. Dropouts of gas supply will not significantly affect the overall production and supply of electricity. Only about 6% of consumed natural gas is used to generate electricity.

Between 2016 and 2017, the production of electricity from natural gas was 3.4 TWh, accounting for only 4% of total gross electricity production.

In the Czech Republic there is only one natural gas-fired power plant - Počerady 2 (845 MW),

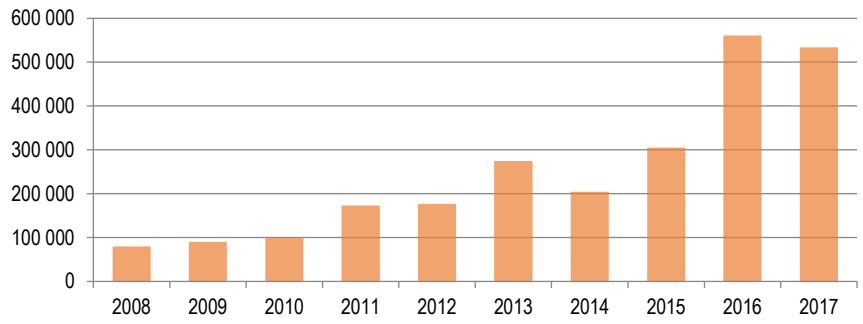
Furthermore, about 700 natural gas plants are installed, mainly equipped with piston cogeneration units with a capacity of about 280 MW.

Natural gas also serves as a stabilizing and supporting fuel in conventional steam power plants. In total, natural gas is 6% of the electricity installed.

Tab. No. 3: Total consumption of ZP for electricity generation in the Czech Republic in the years 2015-2017

Period	Number of power generators	Total consumption in ´000 m^3	Total consumption in GWh	Ratio consumption / production of Total consumption in ČR	Year on Year change of consumption for electricity generation
2015	597	305 150	3 253 519	4,0%	49,3%
2016	625	561 179	6 001 740	6,8%	83,9%
2017	681	533 903	5 697 088	6,3%	-4,9%

Graph 1 – NG consumption on EE generation in the last 10 years (th. m^3)



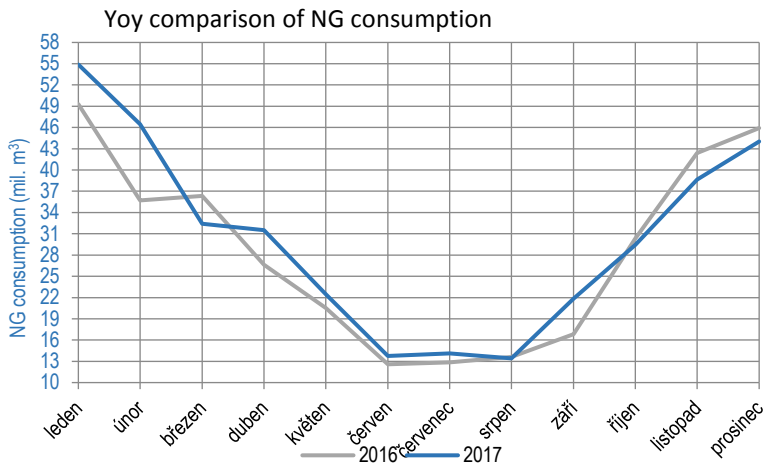
Tab. No.4: Ratio of individual customer categories on total consumption in 2017

	in 000 m³						in GWh					
period	VO	SO	MO	DOM	OP	Celkem	VO	SO	MO	DOM	OP	Celkem
Jan	495 768	154 957	267 890	514 245	22 990	1 455 850	5 292 214	1 653 992	2 860 041	5 491 177	245 636	15 543 060
Feb	368 840	109 809	175 913	350 405	16 207	1 021 174	3 935 626	1 171 595	1 877 079	3 739 444	173 017	10 896 761
Mar	330 401	85 545	128 635	245 275	13 770	803 625	3 526 721	913 118	1 373 115	2 618 282	146 566	8 577 801
Apr	286 370	71 231	98 046	195 019	11 285	661 951	3 060 760	761 271	1 047 895	2 084 415	120 646	7 074 988
May	246 807	47 581	41 638	82 435	7 284	425 746	2 637 472	508 484	444 968	880 964	77 774	4 549 663
Jun	251 232	33 799	14 237	34 482	7 423	341 173	2 684 900	361 257	152 157	368 549	79 437	3 646 299
Jul	262 298	31 092	13 461	33 413	6 974	347 238	2 799 031	331 890	143 684	356 677	74 575	3 705 856
Aug	237 561	33 261	13 061	33 381	8 489	325 753	2 531 155	354 415	139 178	355 704	90 623	3 471 075
Sep	276 836	47 719	42 686	84 121	9 291	460 653	2 956 290	509 592	455 848	898 365	99 299	4 919 394
Oct	322 290	73 600	84 507	163 182	13 765	657 344	3 434 026	784 253	900 496	1 738 894	146 725	7 004 395
Nov	390 519	103 158	152 126	284 713	16 535	947 051	4 162 684	1 099 510	1 621 527	3 034 983	176 448	10 095 152
Dec	378 824	114 059	206 559	406 598	-26 115	1 079 925	4 037 870	1 215 694	2 202 076	4 334 661	-278 523	11 511 778
I. quarter	1 195 009	905 810	572 437	1 109 925	52 967	3 280 649	12 754 561	3 738 705	6 110 235	11 848 902	565 219	35 017 622
II. quarter	784 410	152 611	153 921	311 936	25 992	1 428 870	8 383 132	1 631 012	1 645 021	3 333 929	277 857	15 270 950
III. quarter	776 695	112 072	69 208	150 915	24 754	1 133 644	8 286 476	1 195 897	738 709	1 610 745	264 497	12 096 325
IV. quarter	1 091 633	290 817	443 192	854 492	4 186	2 684 320	11 634 580	3 099 456	4 724 100	9 108 538	44 650	28 611 324
I. half-year	1 979 419	502 922	726 357	1 421 861	78 960	4 709 519	21 137 692	5 369 717	7 755 256	15 182 831	843 076	50 288 573
II. half-year	1 868 327	402 889	512 400	1 005 407	28 940	3 817 964	19 921 056	4 295 353	5 462 809	10 719 284	309 148	40 707 649
year	3 847 746	905 811	1 238 757	2 427 269	107 900	8 527 483	41 058 748	9 665 069	13 218 066	25 902 115	1 152 224	90 996 222

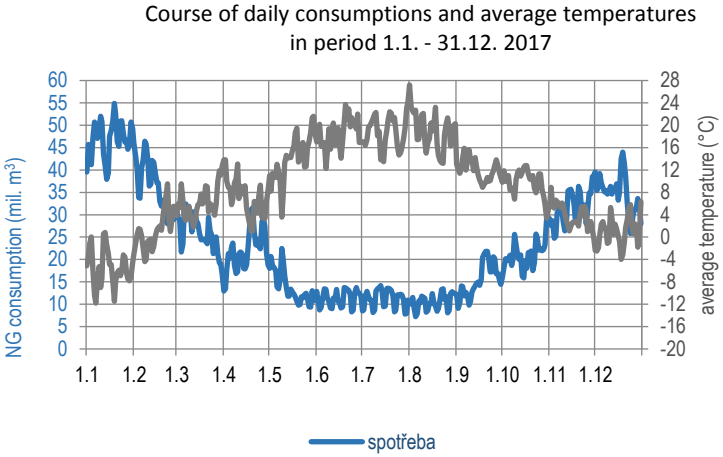
Tab. No. 5: Evaluation of daily consumption of NG in the ČR

	Maximum daily consumption						Maximum daily consumption					
	2017			**2016**			**2017**			**2016**		
period	mil. m³	GWh	Temp °C	mil. m³	GWh	Temp °C	mil. m³	GWh	Temp °C	mil. m³	GWh	Temp °C
Jan	54,886	585,938	-11,5	49,289	525,638	-8,8	37,926	404,953	-1,4	27,285	291,102	5,5
Feb	46,446	495,562	-4,4	35,692	380,711	1,6	27,993	298,738	9,5	25,607	273,173	10,2
Mar	32,408	345,877	3,0	36,339	388,343	-0,3	16,664	177,897	12,8	20,577	219,934	6,3
Apr	31,529	336,970	1,1	26,636	285,012	2,7	12,914	138,045	13,8	15,161	162,233	15,1
May	22,469	240,087	3,6	20,526	220,055	7,7	9,397	100,434	18,7	8,863	95,048	19,9
Jun	13,755	146,977	19,3	12,584	135,261	15,6	8,288	88,600	21,4	8,618	92,599	17,7
Jul	14,139	150,936	13,8	12,845	137,581	12,4	7,806	83,328	19,5	7,149	76,604	21,0
Aug	13,420	142,965	13,2	13,608	145,933	15,5	7,225	77,011	22,7	7,348	78,739	16,4
Sep	21,829	233,096	9,8	16,828	180,270	11,9	9,046	96,628	12,1	8,356	89,571	20,2
Oct	29,443	313,725	4,7	30,334	323,757	6,0	15,859	169,010	12,5	13,717	146,437	15,9
Nov	38,630	411,788	0,0	42,397	452,777	-1,9	24,772	264,073	5,2	25,171	268,866	7,6
Dec	44,007	469,055	-3,2	45,924	491,100	-4,4	25,849	275,558	5,8	28,077	300,385	5,7
year	54,886	585,938	-11,5	49,289	525,638	-8,8	7,225	77,011	22,7	7,149	76,604	21,0

Graph 2: Yoy comparison of maximum daily consumptions of NG



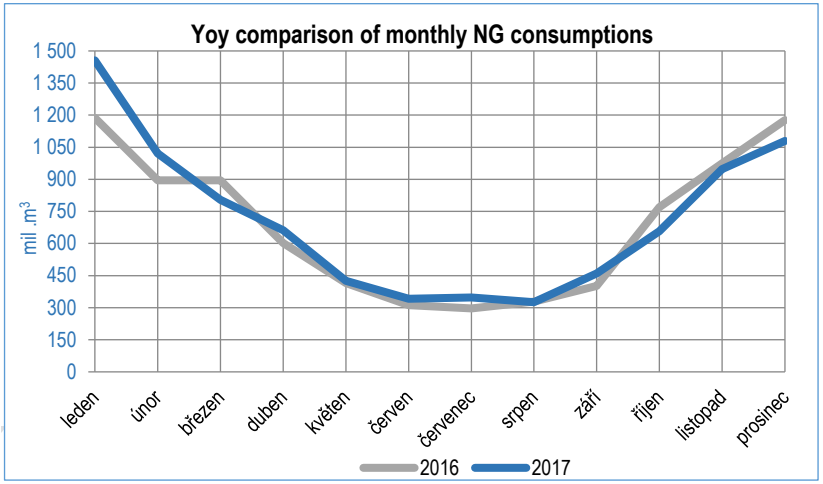
Graph No 3: Course of daily consumptions and average temperatures



Tab. No 6: NG consumption in the ČR in years 2016-17

	Actual (mil.m3)		Yoy change	Recalculation (mil.m3)		Yoy change	Actual (GWh)		Recalculation (GWh)	
period	2017	2016		2017	2016		2017	2016	2017	2016
Jan	1 455,9	1 187,3	22,6%	1 334,1	1 214,8	9,8%	15 543,1	12 664,4	14 243,5	12 957,7
Feb	1 021,2	895,0	14,1%	1 083,7	963,6	12,5%	10 896,8	9 546,8	11 563,7	10 278,9
Mar	803,6	894,9	-10,2%	907,8	916,0	-0,9%	8 577,8	9 564,3	9 690,1	9 789,3
Apr	662,0	602,7	9,8%	643,9	614,0	4,9%	7 075,0	6 448,9	6 881,7	6 569,8
May	425,7	415,7	2,4%	445,8	426,6	4,5%	4 549,7	4 457,6	4 764,3	4 573,9
Jun	341,2	311,8	9,4%	352,9	313,8	12,5%	3 646,3	3 350,6	3 771,7	3 371,4
Jul	347,2	296,6	17,1%	351,4	301,4	16,6%	3 705,9	3 178,1	3 750,7	3 228,9
Aug	325,8	327,9	-0,7%	337,2	326,2	3,4%	3 471,1	3 513,1	3 593,4	3 494,3
Sep	460,7	402,0	14,6%	441,6	435,6	1,4%	4 919,4	4 308,0	4 715,8	4 667,6
Oct	657,3	769,6	-14,6%	712,5	761,9	-6,5%	7 004,4	8 214,4	7 592,6	8 132,6
Nov	947,1	974,7	-2,8%	994,5	980,8	1,4%	10 095,2	10 409,8	10 600,6	10 474,3
Dec	1 079,9	1 176,9	-8,2%	1 127,6	1 178,2	-4,3%	11 511,8	12 587,2	12 020,1	12 601,7
I. Q	3 280,6	2 977,2	10,2%	3 325,6	3 094,4	7,5%	35 017,6	31 775,4	35 497,3	33 025,9
II. Q	1 428,9	1 330,2	7,4%	1 442,6	1 354,3	6,5%	15 271,0	14 257,2	15 417,7	14 515,1
III. Qí	1 133,6	1 026,6	10,4%	1 130,3	1 063,1	6,3%	12 096,3	10 999,2	12 059,9	11 390,7
IV. Q	2 684,3	2 921,2	-8,1%	2 834,6	2 920,9	-3,0%	28 611,3	31 211,4	30 213,4	31 208,7
I. half	4 709,5	4 307,4	9,3%	4 768,2	4 448,7	7,2%	50 288,6	46 032,6	50 915,0	47 541,0

Graph 4: Yoy comparison of monthly NG consumptions



II. half	3 818,0	3 947,7	-3,3%	3 964,9	3 984,0	-0,5%	40 707,6	42 210,6	42 273,2	42 599,4
Y	8 527,5	8 255,1	3,3%	8 733,1	8 432,7	3,6%	90 996,2	88 243,2	93 188,2	90 140,4

2. Risk assessment results

2.1 Safeguarding the N-1 standard at the regional level

2.1.1 Baltic Risk Group

The single largest infrastructure of this region is the Slovakian entry point Velke Kapusany. The analysis conducted further focuses on the entry point Greifswald which is slightly smaller than Velke Kapusany. The Calculation of N-1 will be performed for both Entry points.

N – 1: Single largest infrastructure

N-1 for region with failure of:	EP_{VK} [GWh/d]	P_m [GWh/d]	S_m [GWh/d]	LNG_m [GWh/d]	I_m [GWh/d]	D_{max} [GWh/d]	D_{eff} [GWh/d]
Velke Kapusany	9.168,1	2.478,2	15.245,4	2.190,6	3.804,0	16.187,8	0,5

$$N-1\,[\%] = \frac{11.372{,}9 + 2.478{,}2 + 15.245{,}4 + 2.190{,}6 - 2.028{,}0}{16.187{,}8 - 0{,}5} * 100 = 203\%$$

N – 1: Second single largest infrastructure

N-1 for region with failure of:	EP_G [GWh/d]	P_m [GWh/d]	S_m [GWh/d]	LNG_m [GWh/d]	I_m [GWh/d]	D_{max} [GWh/d]	D_{eff} [GWh/d]
Greifswald	9.596,9	2.478,2	15.245,4	2.190,6	3.804,0	16.187,8	0,5

$$N-1\,[\%] = \frac{11.372{,}9 + 2.478{,}2 + 15.245{,}4 + 2.190{,}6 - 1776{,}0}{16.187{,}8 - 0{,}5} * 100 = 206\%$$

N – 2: the two single largest infrastructures

N-1 for region with failure of:	EP_{VK+G} [GWh/d]	P_m [GWh/d]	S_m [GWh/d]	LNG_m [GWh/d]	I_m [GWh/d]	D_{max} [GWh/d]	D_{eff} [GWh/d]
Velke Kapusany + Greifswald	7.568,9	2.478,2	15.245,4	2.190,6	3.804,0	16.187,8	0,5

$$N-2\,[\%] = \frac{11.372{,}9 + 2.478{,}2 + 15.245{,}4 + 2.190{,}6 - (2.028{,}0 + 1.776{,}0)}{16.187{,}8 - 0{,}5} * 100 = 193\%$$

The infrastructure of the common risk group consists of several performative facilities. Even with the failure of the two largest infrastructures the figure of the N-1 formula remains distinctly above 100%. This proves that the security of gas supplies doesn't depend on a few large facilities because the comprehensive infrastructure provides more possibilities to distribute gas.

2.1.2 Belarus Risk Group

It will be supplemented

2.1.3 Ukrainian Risk Group

It will be supplemented

Regional N-1 CEE GRIP 2017 (last issue edition) was prepared for cases of supply disruptions to the region via Belarus and Ukraine. In any of the periods under review, the Czech Republic should not have security problems when supply is interrupted via Belarus or Ukraine. More in chapter 4 CEE GRIP 2017.

(https://www.entsog.eu/publications/gas-regional-investment-plan-grips/2017#CENTRAL-EASTERN-EUROPE).

2.2 Infrastructure standard and calculation of the N-1 formula

Under Article 1 (5) of Regulation (EC) No 2017/1938, Member States or, where the Member State so provides, the competent authority shall ensure that the necessary technical measures are taken to ensure that, in case of disruption of the single largest gas infrastructure, the technical capacity of the remaining infrastructure, N - 1 set out in point 2 of Annex II, was able, without prejudice to paragraph 2 of this Article, to satisfy the overall demand for gas in the calculation area on the day of exceptionally high demand for gas occurring statistically every twenty years.

The obligation laid down in the first subparagraph of this paragraph shall be without prejudice to the obligation of transmission system operators to make the corresponding investments or obligations of the transmission system operators laid down in Regulation (EC) No 715/2009 and Directive 2009/73 / EC.

2. The obligation to ensure that the **remaining infrastructure** has the technical capacity to meet the overall demand for gas as referred to in paragraph 1 of this Article shall also be deemed to have been met if the competent authority in the Preventive Action Plan demonstrates that the gas supply disruption can be offset sufficiently and timely appropriate market measures on the demand side. For this purpose, the formula N - 1 shall be calculated in accordance with point 4 of Annex II.

2.3 Determination of the single largest gas infrastructure

The largest gas infrastructure in the Czech Republic with the highest gas supply capacity is the Lanžhot entry point with an input transmission capacity of 156.4 million m^3 / day (1 640.413 428 GWh), at a temperature of 0ºC and a pressure of 101.325 kPa. Following virtualization of border points (VIPs), under the condition of putting into operation the EUGAL gas pipeline and other downstream infrastructure will become the only major gas infrastructure of VIP Brandov. This situation should occur when the infrastructure is put into operation during the gas year 2019/2020.

2.4 Description of standard N-1 security

The calculation model is governed by the following formula N-1 according to Annex II Regulation:

$$N-1\,[\%]=\frac{EP_m+P_m+S_m-I_m}{D_{max}}\times 100, \quad N-1\geq 100\%$$

Definition of the parameters of the formula:

D_{max} = total daily gas demand (million cubic meters per day) in one-day calculation with exceptionally high demand, with statistical probability of 20 years.

EP_m = technical entry point capacity (in millions of m^3 / day) other than the gas withdraval capacity, LNG and storage capacities covered by P_m, LNG_m and S_m, ie the sum of the technical capacities of all border entry points capable of supplying the calculation area natural gas.

P_m = maximum technical withdraval capacity (in million m^3 / day), ie the sum of the maximum possible daily withdraval volumes of all gas withdraval equipment that can be delivered to input points in the computation area.

S_m = maximum technical storage capacity (in million m^3 / day), ie the sum of the maximum daily technical usable capacity of all storage facilities that can be delivered to the entry points in the calculation area, taking into account their physical properties

I_m = the technical capacity of the single largest gas infrastructure (million m^3 / day) with the highest gas supply capacity in the calculation area. If several gas infrastructures that are not capable of stand-alone operation are connected to a common supply or drainage gas infrastructure, they are considered to be the only gas infrastructure.

All parameters of the formula are reported in millions of m3 / day.

2.5 N-1 capability at national level

According to the requirements of Annex I to the Regulation, the calculated results of the N-1 formula should be greater or equal to at least 100%.

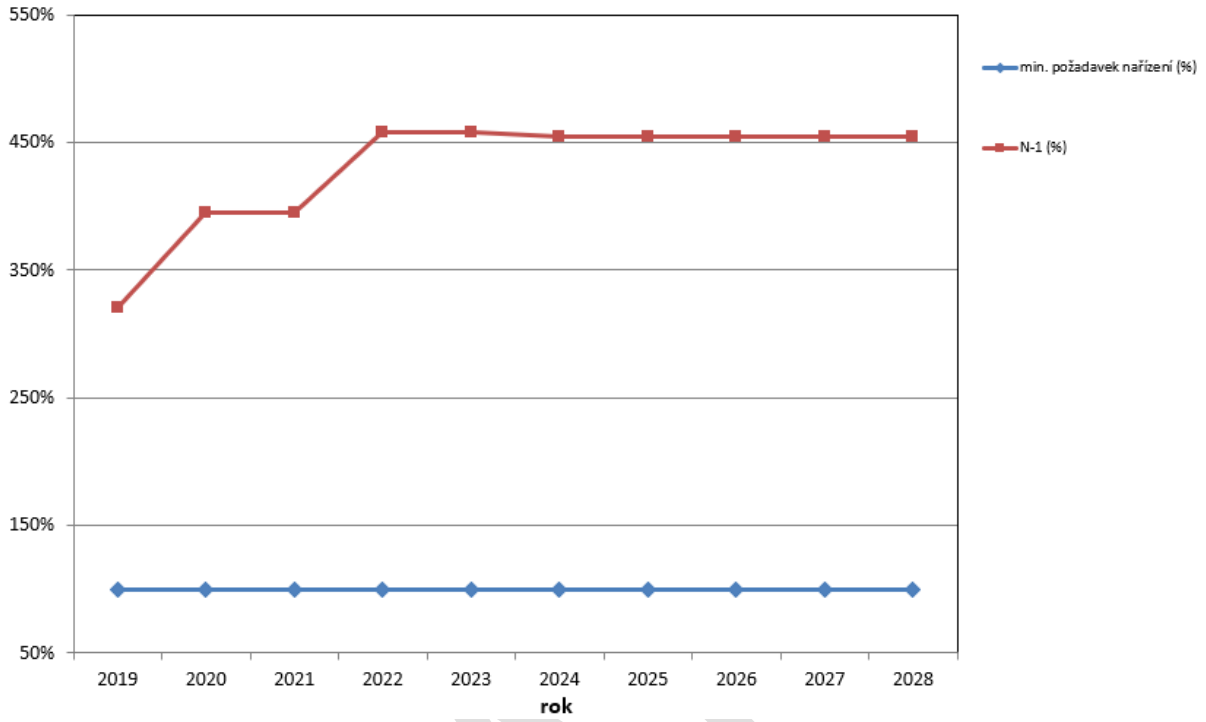
Between 2019 and 2028, the Czech Republic fulfills the minimum requirement of the Regulation and exceeds it by more than three times. It follows that security of supply according to the infrastructure standard defined by the Regulation is ensured in the Czech Republic.

Table No 7: Security of gas supplies for the Czech Republic in 2019-2028 according to N-1 formula

Security of supply (mil. m^3/d at 0°C)	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Pm	0,5	0,6	0,6	0,6	0,6	0,5	0,5	0,4	0,4	0,4
Sm při 30% volume	57,6	58,6	58,6	58,6	58,8	59,0	59,0	59,0	59,0	59,0
EPm	296,8	344,3	344,3	384,9	384,9	384,9	384,9	384,9	384,9	384,9
Im (Lanžhot)	146,6	146,6	146,6	146,6	146,6	146,6	146,6	146,6	146,6	146,6
Dmax	65,0	65,0	65,0	65,4	65,5	65,5	65,5	65,5	65,5	65,5
Min. requirement. (%)	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
N-1	320,7	395,2	395,1	457,6	457,5	454,3	454,3	454,2	454,2	454,2

Source: TSO, gas producers, UGS operators and OTE (Market operator)

Graph No 5: Security of gas supplies for the Czech Republic in 2019-2028 according to N-1 formula



2.6 Description of the values used for all parameters in the N-1 formula, including the intermediate values used to calculate them

Parameter EPm is the sum of all technical capacities (in millions of m3 / day) of entry points other than withdrawal capacity, LNG capacity and storage capacity, namely entry transport capacities at Brandov, Waidhaus, Cesky Tesin and Lanžhot.

Parameter Pm is the maximum technical withdrawal capacity (million m3 / day) and was determined on the basis of data from the largest gas producers in the Czech Republic.

The individual input values of the Sm parameter represent the maximum technical storage capacity (in millions of m3 / day), ie the sum of the maximum daily technical capacity of all storage facilities in the Czech Republic by innogy Gas Storage, MND Gas Storage and Moravia Gas Storage.

The Im parameter as the infrastructure with the highest capacity for gas supply was determined by the Lanžhot entry point.

The Dmax parameter was determined based on historic consumption data in the Czech Republic over the last 20 years. The highest consumption day was identified on 23 January 2006 with a value of 65 million m3 / day (0 ° C).

2.7 Calculation of formula N-1 using demand side measures

The Czech Republic, based on the decision of the competent authority (MIT), does not include the N-1 formula using demand side measures.

2.8 Bidirectional capacity

2.8.1 Interconnection points equipped with bi-directional capacity and maximum bi-directional flow capacity for the gas year 2018/2019

The table below shows the individual technical capacities at entry and exit points to / from the transmission system for the gas year 2018/2019.

Table No 8 - Technical capacities on entry/exit points of the transmission system between Member States (gas year 2018/2019)

VIP/IP	Capacity to ČR/from UGS [GWh/d]	Capacity to ČR/from UGS [GWh/d]
Brandov	1560,8	487,7
Waidhaus	120,0	1071,5
Lanžhot	1640,4	913,7
Cieszyn	-[1]	28,4[2]

Source: 10 year NDP 2019-28

2.8.2 Arrangements governing the use of bi-directional flow capacity

The bi-directional flow is treated in interconnection agreements with individual neighboring transmission system operators. These agreements include, for example, information on gas quantity measurement, gas quality measurement or minimum and maximum transfer pressures for a given direction. In addition, the agreements include a division of powers between the transmission system operators concerned, a description of the cooperation between the dispatchers concerned and the rules on the exchange of information.

2.8.3 Exemptions of interconnection points from bidirectionality

On the basis of the decision of the Ministry of Industry and Trade of 6 October 2017 from the obligation of Article 6 (5) of Regulation (EU) No 994/2010 of the European Parliament and of the Council, the Stork I pipeline was exempted from allowing bidirectional capacity at the cross-border point of Cieszyn for the high pressure gas pipeline DN 500, PN 63 STORK I for a definite period of time until 31 December 2022, ie until the operation of the bidirectional high pressure gas pipeline STORK II DN 1000 PN 73.5.
The reason for granting an exception is a few facts. After bidirectional capacity there is currently no market demand and the realization of a reverse flow to the Czech transmission system at the Cieszyn interconnection point would represent significant and disproportionate costs on both sides of the border compared to negligible benefits for security and reliability of gas supplies to the Czech Republic. Last but not least, NET4GAS, s.r.o. and GAZ-SYSTEM, S.A. jointly prepare the Czech-Polish gas pipeline project, whose expected year of commissioning 2022, the bi-directional flow between the Czech Republic and Poland should be secured via the new Hať border point (PCI projects 6.2.10 and 6.2.12).

3. Scenarios

3.1 Scenarios of exceptionally high gas demand

a) Consumption of the customers portfolio of gas traders in the Czech Republic - annual for the last two years, average daily winter for last two years and maximum daily for the last 20 years (for new gas traders for as long as they have been operating):

Table No 9: Consumption of natural gas in the CR

Year	Annual consumption [mil. m³]	Yoy change	Annual consumption [GWh]
2016	8 255,1	-	88 243,2
2017	8 527,5	3,3%	90 996,2

Maximum historical daily consumption on 23 January 2006 at -16.9°C: 67.6 million m³, (713 GWh)

b) Customer consumption in the households category to which a gas trader supplies gas - annual for the last two years, maximum daily for the last two years and maximum daily for the last 20 years (for new gas traders for as long as they have been operating):

Tab 10 – Consumption of natural gas for household customers in years 2015 - 2017

PERIOD	Number of customers at the end of period	Total consumption		Share on total consumption %	YoY change of total consumption %
		Th. m3	MWh		
2015	2 636 189	2 171 136	23 123 104	28,5%	8,6%
2016	2 632 037	2 368 461	25 309 234	28,7%	9,1%
2017	2 632 599	2 427 269	25 902 115	28,5%	2,5%

c) Interruption of supplies through the main transmission infrastructures or from underground gas storages used by a gas trader in different seasons (summer, winter)

In relation to the value of the N-1 coefficient for the Czech Republic of 373%, the failure of any individual transmission infrastructure would not substantially affect the supply of natural gas to end customers as was verified during the January 2009 crisis followed by a simulation training in November 2009. The following mechanisms for securing the natural gas supply would be used if a failure occurred:

- Increased gas withdrawal from underground gas storages
- Use of reverse flow of the northern branch of the transmission system

If these steps are not sufficient, the transmission system operator would limit gas supplies to a group of customers according to the decree on gas industry emergencies.

d) The frequency and length of interrupted supplies and a historical description of supply interruptions including the duration, volume of gas, impact on customers:

Historically, the Czech Republic has recorded two cases of a serious breach in the supply of natural gas. The first case dates back to January - March 2006 where the deviation between the nominal value and the actual gas supply from Russia ranged from 10 to 30%, which meant that of 23.25 million m^3/day up to 7 million m^3/day was not delivered and on January 9 – January 17 and then January 30 – February 1 and February 20 – February 22 no supplies were recorded.

The second case dates back to January 2009 when no gas from Russia was supplied from January 7 to January 19. The operator of the transmission system reversed the flow of natural gas from West to East and 18 million m^3 was supplied to the Czech Republic via BTS Sayda and withdrawal from underground gas storages was increased up to 34 million m^3/day to cover the demand of the Czech Republic which was slightly over 50 million m^3/day at that time. The worst situation was reported on January 12, 2009 when the consumption increased to 57.3 million m^3 and the withdrawal from the underground gas storage was increased to the maximum. The Czech Republic also transmitted 33 million m^3 of gas daily from Olbernhau to Waidhaus for Bayerngas. None of these supply disruptions affected customers in the Czech Republic because increased gas withdrawal from the underground gas storages and reverse flow of natural gas from Germany via the border trasnfer station Hora Sv. Kateřiny was successfully arranged to supply all customers and no one had to be limited in any way.

e) A potential future supply disruption by gas producers in third countries affecting gas traders with regard to their occurrence in the past and likelihood:

Considering the high N-1 coefficient, continued expansion of capacity of the underground gas storage and prepared construction of new underground gas storage as well as the Gazela gas pipeline to supply natural gas from NordStream and OPAL gas pipelines, the impact of a serious supply disruption will further minimize. The Gazela gas pipeline is in several points interconnected with the transmission system of the Czech Republic so if there is insufficient gas, customers will also be supplied from this gas pipeline. Also, the reverse flow of the northern branch of the gas transmission system must be mentioned, it can be used in emergencies to supply Slovakia with a daily capacity of up to 75 million m^3/day (in place from September 2014 as a consequence of russian-ukrainian conflict). Last but not least, is a project for constructing a north-south gas pipeline corridor, connecting LNG terminals in Swinoujscie (Poland) and Krk (Croatia) and finally the assumed interconnection of the Břeclav compression station with the virtual trade point Baumgarten in Austria.

f) Description of the potential consequences of the disruptions by the individual scenarios (for this year and the next two years):

For the above reasons our opinion is that terminating supplies from the main transmission infrastructures or underground gas storage as defined in Regulation (EU) No. 2017/1938 on

measures to safeguard the security of gas supply would not cause serious problems in supplying customers.

3.2 Gas supply disruption scenarios

Terminating supplies from the main transmission infrastructure (particularly gas flow termination via BTS Lanžhot, Hora Svaté Kateřiny, Brandov, Waidhaus, Cieszyn) or the impossibility of using one or more underground gas storages in the Czech Republic in different seasons (summer, winter):

The main transmission infrastructures of the Czech Republic are BTS Lanžhot, HPS Hora Svaté Kateřiny, BTS Brandov, BTS Waidhaus in Germany and BTS Cieszyn in Poland. Each scenario of exceptionally high gas supply demand considered an interruption of natural gas supply from one of these border transfer stations.

To analyze the consequences of the impossibility of using one or more underground gas storage during exceptionally high natural gas demand, scenarios for the failure of individual underground gas storages connected to the transmission system of the Czech Republic (UGS Uhřice, UGS Dolní Dunajovice, UGS Háje, UGS Lobodice, UGS Štramberk, UGS Třanovice, UGS Tvrdonice) as well as a scenario of the combined failure of multiple underground gas storages affecting gas supplies in the Czech Republic (UGS Lobodice, UGS Štramberk and UGS Třanovice) were considered.

The European Commission regulation for performing **stress tests of the transmission system at the most critical variant of supply disruptions from Russian Federation to the EU for a period of 6 months (September 2014 - February 2015)** showed that the gas supply to domestic customers from storages (UGS) can be used without any other import only if regulation of gas consumption is announced at the consumption level no. 10, i.e. a gas supply for household applied from the beginning of the period and only in the case that the mentioned period is with average temperatures.

Even in a possible gas imports from non-Russian sources then would be necessary to regulate the consumption of customers although at a lower level. Such a situation should have a considerable negative impact on the Czech economy.

3.3 Description of the probable consequences of the above failures by individual scenarios

The failure of the individual border points has no impact on the natural gas supply in the Czech Republic but affects the supply to Germany or Poland. The only possible natural gas supply risk in the Czech Republic would be the concurrent failure of supplies via BTS Lanžhot and BTS Hora Svaté Kateřiny. However, this scenario is highly unlikely.

Table No. 11 – Interruptions of the infracture and the consequences

Interruption of infrastructure	Consequence
BTS Lanžhot	No danger to the natural gas supply in the Czech Republic even in winter
BTS Hora Svaté Kateřiny	No impact on the natural gas supply in the Czech Republic
BTS Brandov	No impact on the natural gas supply in the Czech Republic, impact on natural gas transit to Germany only
BTS Waidhaus	No impact on the natural gas supply in the Czech Republic, impact on natural gas transit to Germany only
BTS Český Těšín	No impact on the natural gas supply in the Czech Republic, impact on natural gas transit to Poland only
UGS Uhřice	No impact on the natural gas supply in the Czech Republic
UGS Dolní Dunajovice	No impact on the natural gas supply in the Czech Republic
UGS Háje	No impact on the natural gas supply in the Czech Republic
UGS Lobodice	No impact on the natural gas supply in the Czech Republic
UGS Štramberk	No impact on the natural gas supply in the Czech Republic
UGS Třanovice	No impact on the natural gas supply in the Czech Republic
UGS Tvrdonice	No impact on the natural gas supply in the Czech Republic

According to this table, the failure of a single underground gas storage will have no impact on the natural gas supply in the Czech Republic both in the summer and winter. Problems could arise only if concurrent failures of UGS Lobodice, Štramberk and Třanovice occur. If this combined failure occurs, the natural gas supply to Northern Moravia would be impaired (in the case of the highest winter consumption, up to 38% of the daily consumption could be missing in this region). **However, this situation is almost impossible.**

In relation to the interruption of natural gas supplies in January 2009 and to prepare the gas industry of the Czech Republic for a possible repeating of the natural gas supply termination from Ukraine to the Western Europe, a review of the preparedness of new mechanisms of declaring and the activities of the Competent Authorities during emergencies in the gas industry according to decree No. 344/2012 Coll. on emergencies in gas industry was requested.

3.4 Simulated Emergency Exercise

Upon the announcement of the seventh consumption level for the interruption of gas supply on 31 October 2014, 62% of natural gas savings were achieved in the Czech Republic.

4. Measures, volumes and capacities required to comply with the infrastructure and supplies standards and their schedule

4.1 Preventive measures for mitigation of identified risks

The identified risks are highly unlikely because they would have to occur concurrently to affect supply to customers. The analysis shows that at least three adverse circumstances would have to occur at the same time, i. e. failure of the highest infrastructure, substantial withdrawal reduction from underground gas storages and bad weather conditions for a long time. The potential, but still very low likelihood, can be further decreased in several ways.

With regard to the risk of concurrent failures of BTS Lanžhot and BTS Hora Svaté Kateřiny, the following measures could be taken:

- increase the operational volume and withdrawal capacities of the underground gas storages in the Czech Republic;
- reverse gas flow throug BTS Waidhaus;
- or a combination of mentioned options.

One way of reducing the potential risk of a concurrent failure of UGS Lobodice, Štramberk and Třanovice would be constructing a "Moravia" gas pipeline to northern Moravia (see "Ten-year development plan in the Czech Republic 2019 - 2028" published on the website of the transmission system operator, http://www.net4gas.cz). Also the construction of new UGS Dambořice was completed and put in operation in July 2016. The risk was removed.

Disruption of supplies via Slovakia (BTS Lanžhot):

Considering the actual gas flows, this interruption would only affect supplies to Germany and France, however, these countries have other sources available and therefore, disruption of the natural gas supply would not seriously affect the natural gas supply in these countries. The situation will substantially improve after the Gazela gas pipeline was commissioned in 2013 when substantial volume of natural gas for Germany is supplied via this new gas pipeline via BTS Brandov and BTS Waidhaus and any disruption of the supply via BTS Lanžhot will be marginal for supplies to Germany.

Disruption of supplies to Poland via BTS Cieszyn:

Considering the 0.5 billion m^3/year supplied, daily supplies from the Czech Republic to the Polish transmission system are not substantial and limitations applicable to some Polish customers can only occur if the natural gas supply is long-term terminated.

Disruption of supplies to Germany via BTS Waidhaus

Significant volume of natural gas is transmitted to southern Germany and then to France via BTS Waidhaus partially from BTS Lanžhot, substantially from HPS Brandov and partially from BTS Hora Sv. Kateřiny. In an infrastructure failure, there could be some problems with the natural gas supply to customers in these countries, particularly if the termination lasts for a long time.

Disruption of natural gas supplies via BTS Hora Sv. Kateřiny to Germany

Historically, BTS Hora Sv. Kateřiny was very important in supplying natural gas to the Eastern part of Germany when Germany was separated. Over time the situation has changed and today the gas pipelines between BTS Hora Sv. Kateřiny and the Olbernhau compression station as well as BTS Hora Sv. Kateřiny and the Sayda compression stations are used bi-directionally and enable to supply natural gas to the Czech Republic.

4.2 Measures and volumes to safeguard the security of supply (SoS) pursuant to Art. 6, para 1 of the Regulation of EP and C 2017/1938

a) under extraordinary temperature conditions over a seven-day period of peak demand occurring with a statistical probability of once in 20 years

Because switching from town gas to natural gas took place in the Czech Republic from 1990 to 1995, natural gas consumption statistics are only available from 1995. The daily value for a seven-day period of peak demand in January 2016 according to the security standard of supplies for the Czech Republic, was 41 294 thousand m^3, or 440 476 MWh.

b) During an extraordinary high gas demand period of at least 30 days occurring with a statistical probability of once in 20 years

A period of extraordinary high gas demand only occurs for a short time and has never lasted for more than 10 days. During this period, the daily consumption was about 50 - 57 million m3 for approx. 10 days in January 2009. As the consumption of protected customers accounts for about 35% of the total natural gas consumption during winter, the security standard would have to be 19.95 million m3/day. This volume can be secured for 30 days when all cross-border supplies are interrupted by withdrawal from underground gas storages only. For January 2016 SoS was set in the level of 986 818 th. m3 or 10 526 253 MWh respectivelly.

c) During a disruption of the single largest gas infrastructure for at least 30 days under average winter conditions

Such period has never occurred in the Czech Republic, however, the experience of the interruption of the natural gas supply in January 2009 followed by the simulation trainings has shown that supplies from underground gas storages would be sufficient to supply the natural gas to protected customers under average winter conditions, see also clause b).

Determination of SoS standard pursuant to Annex 3 of the Decree No 344/2012 Coll. is stated in Annex to this document.

4.3 The options to safeguard the security of supply in the Czech Republic are as follows

a) <u>diversification of natural gas sources</u>
The original scheme of 75% natural gas supplies from Russia and 25% natural gas supplies from Norway significantly changed after liberalization. Even more the short-term contracts on the

EU spot market are used which in 2017 made 34,1% of import, whereas Russian delivery shared 65,1% and Norwegian gas 0,8%, respectively. The Nord Stream and OPAL gas pipelines have greatly contributed to the diversification of transmission routes and connected Gazela gas pipeline constructed in the Czech Republic for transmitting about 30 billion m^3 of gas each year and is linked to the Czech transmission system at several connection places.

b) storage of natural gas in underground gas storages
Storing natural gas in underground gas storages is the second most important measure for the ensuring of security of supply because the capacity of all underground gas storages in the Czech Republic (without UGS Dolní Bojanovice which is connected with Slovak gas system) is 3.077 billion m^3, which is about 40% of total annual consumption.

c) long-term natural gas supplies contracts
At present, the Czech Republic is not supplied with natural gas under any active contract. There is only one long-term natural gas supply contract, which is not currently active.

d) increasing gas production
Increasing gas withdrawal is not effective for the Czech Republic to ensure the security of supply because national gas withdrawal share is just 2 % of the annual natural gas consumption.

e) the use of alternative fuels combined with contracts under which the natural gas supply can be interrupted
Because of the reliable natural gas supply to date, this possibility is not widely used in the Czech Republic.

4.4 Proof of safeguarding the security standard with the energy market operator (OTE) and the Energy Regulatory Office to which supervision was delegated:

In the period from 1 October to 31 March, security standard is safeguarded by a minimum of 30% of gas storage in UGS in the European Union and the gas trader supplying gas to protected customers provides written evidence about how to safeguard security of supply standard for the upcoming season to the Energy Regulatory Office up to 31 August of current year. Information about the extent of the security standard and its manner of its safeguarding the gas trader submitted on the form no later than the 15th day of the following month to the market operator and the Energy Regulatory Office. Safeguarding of security standard is demonstrated:

a) for gas stored in underground gas storages in the Czech Republic by confirmation of the volume of stored gas from the underground gas storage operator;

b) for gas stored in underground gas storages **outside** the Czech Republic, confirmation in writting form of the amount of stored gas from the underground gas storage operator and simultaneously a document that proves the ensuring of the fixed transmission capacity to the Czech Republic;

c) for diversified gas sources, confirmation in writting form of the amount of gas from the supplier and simultaneously a document in writting form that proves the ensuring of the fixed transmission capacity to the Czech Republic;

d) for gas production, that is demonstrably withdrew, by contract or its verified copy or writting document from the relevant gas producer; gas production is equivalent alternative to safeguard security of supply standard;

e) by writting document of protected customer concerned that he has an option to use an alternative fuel and by copy of gas supply which enables the supply interruption;

f) by writting document about the safeguarding of security of supply standard by another gas market participant.

4.5 Definition of a protected customers according to Article 2, clause 1, paragraph a) and b) of the Regulation (EU):

This group belongs to the decision of the Competent Authority, which is mentioned in § 2 of the Decree on the Emergency Situations in Gas, Groups C1, D and F (see Annex).

4.6 Definitions of solidarity-protected customers under Article 2, paragraph 6 Regulation (EU) 2017/1938 of the European Parliament and of the Council

At present, work is under way on the revision of the Energy Act No. 458/2000 Coll., which will be followed by an implementing document - a revised Decree 344/2012, which will specify the principle of solidarity, in terms of process, time, financial and defined customers of solidarity protection.

4.7 Quantification of 20% threshold for protected customers

The definition of **protected customers** in the European Commission Regulation includes households connected to the natural gas distribution network, primary s**ocial service providers** and **district heating equipment** to the extent that they supply heating to households and entities mentioned above.

Under Article 2 paragraph 5 of Regulation 2017/1938, the extension of the definition of protected consumers to bodies providing key social services and SMEs should not represent more than 20% of final gas consumption. Statistical data obtained from the Czech Statistical Office show that these groups of protected consumers did not exceed 20%. Consumption of natural gas for households was 19.5% in 2017.

Consumption in 2017	Households	Small and middle undertakings	Basic soc. services (code NACE 10,11,21)	District heating
90 625 = 100 %	29,9 %	13,2 %	6,3 %	3,3 %

5. Obligations imposed on gas companies and other relevant entities including obligation related to safe operation of gas systems, emergency plans and maintenance obligations:

The basic assumption for being prepared for a crisis is a reliable, safe, economic and thoroughly maintained gas system. The rights and obligations of the transmission system operator, the distribution system operator, the underground gas storage operator, the gas producer and the gas trader are specified in Act No. 458/2000 Coll. on the business conditions and public administration in the energy sector and on amendments of other laws (the "Energy Act"), as amended.

The Act defines the liability of the operators to provide the Ministry of Trade and Industry and the Energy Regulatory Office with an annual report on the quality and maintenance level and to prepare, send to the Ministry and annually review the emergency plan.

In addition, the Act 458/2000 Col. stipulates the following obligations:

(a) For the transmission system operator

b) For gas distributors

(c) For gas storage operator

(d) For gas producers

e) For a gas trader (Ensuring the security standard of gas supply pursuant to Section 11 of the Emergency Ordinance)

5.1 General obligations of the gas market participant

§ 3 of the Decree No 344/2012 sets out the activities in preventing emergency for transmission system operators, distribution system operators, gas storage operators, gas traders, and the Market Operator.

For preventive measures, consumption levels are used (see Annex).

6. Other preventive measures

6.1 Improved interconnection with neighbouring countries:

<u>STORK gas pipeline and its reinforcement:</u>

On 14 September 2011, the connection of the Czech and Polish gas systems by the DN500, 6.3 MPa Třanovice - Cieszyn - Skoczów (STORK) pipeline with a capacity of 0.5 billion m^3 / year was put into operation. The project was implemented under the EEPR program and is currently only used in the direction CZ => PL. Reverse flow is possible but not used. As part of the implementation of the North-South Gas Corridor, the capacity is expected to increase to 5 - 6.5 bil. m^3 / year and this capacity will be bi-directional (future STORK II project). The planned construction of the Moravia gas pipeline also relates to this action.

HPS Brandov and Gazela gas pipeline

The Brandov border transfer station (commissioned on 1 October 2011) was constructed in the Czech Republic because of the construction of the Nord Stream gas pipeline from Vyborg (Russia) to Greifswald (Germany) linked to the OPAL pipeline in Germany, which significantly improved the security of natural gas supplies to the Czech Republic. The Gazela gas pipeline is connected to this border transfer station. Currently, the Capacity for Gas project is being prepared, which should copy the Gazela gas pipeline and increase the volume of gas transported to both the Czech Republic and Bavaria in connection with the already deployed Nord Stream II gas pipeline.

BACI pipeline

Construction of the Baumgarten to Břeclav gas pipeline - the BACI gas pipeline - would not only contribute to increasing the security and reliability of gas supplies to the Czech Republic but also to Poland, Slovakia, Germany and Austria. This gas pipeline is included in PCI projects.

The BACI pipeline should have a length of about 62 km (of which 12 km in the Czech Republic and 49 km in Austria), capacity of up to 7 billion m3 / year and would represent synergy of several transnational projects, the North-South Gas Corridor project and the Southern Gas Corridor projects. **At present (from 1 October 2018) a replacement Region Trading Unit project is being tested, which uses Slovak transport capacity to transport gas from the Czech Republic to Austria.**

6.2 Diversification of gas transport sources and routes

One of the possibilities of diversification of the routes is the supply of Russian gas through Belarus and Poland (the Yamal gas pipeline) to Germany and via HPS Svatá Kateřina to the Czech Republic and subsequently using a reverse flow to the whole territory of the Czech Republic. This method was used in January 2009 during the interruption of natural gas supplies via Ukraine.

The construction of the Nord Stream II gas pipeline from UstLuga, RF to Greifswald (Germany), and followed the EUGAL gas pipeline in Germany, will strengthen the security of gas supply to the Czech Republic (further diversification of the route).

The Gazela pipeline, with a capacity of 30 billion cubic meters per year, connected German transmission stations Olbernhau and Waidhaus across the Czech Republic.

It has contributed not only to safeguarding supplies of natural gas from the Nord Stream pipeline to southern Germany, but also in the event of a gas supply disruptions in Ukraine territory to the Czech Republic. The gas pipeline was put into operation on 02/2013 and is connected to the transport system of the Czech Republic at 4 locations.

At present, the connection of the Czech and Polish gas pipelines to the DN500 pipeline, 6,3MPa Třanovice - Ciescyn - Skoczów (STORK) with a capacity of 0,5 mil.m3 / year is being put into operation. The project was implemented within the framework of the EEPR program and the reverse flow is not used in the ordinary course of trade (supply of gas only from the Czech Republic to PL, the opposite direction is possible only in crisis situations). The importance of this interconnection has been increased by the completion of the extension of the UGS Tranovice capacity within the EEPR program. It will be possible to use this UGS for deliveries to Poland.

As part of the implementation of the North-South Gas Corridor, it is expected to increase the interconnection capacity between the Czech Republic and Poland through the STORK II project (The planned transmission capacity is up to 6.5 billion m3 / year from the Czech Republic to the Poland and up to 5 billion m3 / direction from the Poland to the Czech Republic) with expected commissioning in 2022.

Another alternative for diversification of sources and routes is the planned North-South gas corridor in Central and Eastern Europe. This gas pipeline will ensure the interconnection of the LNG terminal of Swinoujscie with the LNG terminal on the island of Krk in Croatia. The pipeline will lead through Poland, the Czech Republic, Slovakia, Hungary and Croatia.

Construction of BACI pipeline - from Baumgarten to Břeclav - will not only contribute to increased security and reliability of gas supplies to the Czech Republic, but also to Poland, Slovakia and Germany.

6.3 Cross-border access to storage facilities

The gas trader can supply natural gas from UGS Třanovice where the capacity has been increased from 240 million m3 to 530 million m3 by means of the EEPR programme, to Poland if Poland expresses its request for capacity.

The underground gas storage in Dolní Bojanovice, owned by SPP Storage, is connected only to the gas system of Slovakia and supplies gas to Slovakia only.

The Czech Republic does not have any direct cross-border access to underground gas storage abroad but gas traders can store gas in underground gas storages in neighbouring countries provided that gas transmission to the Czech Republic is contractually guaranteed.

7. Infrastructure projects

7.1 Description of future infrastructure projects, including PCIs in relevant risk groups

Table 12 - Projects that ensure the adequacy of the transmission system and / or affect the security of gas supply for the Czech Republic according to the formula N-1 under Regulation (EU) 2017/1938

Project category	Project code	Project name	**Status**	Gas pipeline technical data	Approximate compressor power (MW)	Transmission system interconnection point	Approximate capacity increase (GWh / d)	Estimated year of commissioning	Project impact on gas supply security for the Czech Republic according to formula N-1	Purpose of project	PCI Status
Connecting power plants and heating plants	E-2-001	Connecting power plants	non-FID	cca 5,2 km DN 200 PN 63	N/A	X domestic	5,3	2023	YES (negative impact on calculation)	Connecting power plant/ heating plant	NO
Increase output capacity to home zone	DZ-3-003	Connection of directly connected customer	FID	cca 0,3 km DN 100 PN 63	N/A	X domestic	0,3	2019	YES (negative impact on calculation)	Connection of directly connected customer	NO
	DZ-3-004	Connection of directly connected customer	FID	cca 0,3 km DN 80 PN 73,5	N/A	X domestic	0,7	2022	YES (negative impact on calculation)	Connection of directly connected customer	NO
Connecting new storage capacities	UGS-4-003	Connection of UGS	non-FID	cca 0,1 km DN 500 PN 73,5	N/A	E,X ZP	withdrawal: 94 injection: 73	SSO: not stated[a)] TSO: 2022[b)]	YES (positive impact on calculation)	Connection of UGS	NO
Projects increasing cross-border capacity	TRA-N-133	Bidirectional Austrian-Czech Interconnection (BACI)	non-FID	cca 12 km (on CZ side) DN 800 PN 85 (Břeclav-Reintal)	N/A	E,X CZ/AT (Reintal)	At least 201	2024	YES (positive impact on calculation)	New interconnecting pipeline between CZ and AT.	YES

	TRA-N-136	Czech-Polish interconnecting pipeline (CPI)	non-FID	Cca 207,4 km (on CZ side) DN 1000 PN 73,5 (Tvrdonice-Hať)	18 + 6	E,X CZ/PL (Hať)	PL>CZ: 153 CZ>PL: 219	2022	YES (positive impact on calculation)	New interconnecting pipeline between CZ and PL.	YES
	TRA-F-752	Capacity4Gas - DE/CZ	FID	Cca 152 km (on CZ side) DN 1400 PN 63-100 (VIP Brandov-Přimda)	25	E DE/CZ (VIP Brandov)	Phase 1: 665	2019	YES (positive impact on calculation)	Extension of interconnection between DE (system Gaspool) and CZ.	NO
	TRA-F-918	Capacity4Gas - CZ/SK	FID	N/A	N/A	X CZ/SK (Lanžhot)	333	2020	NO	Extension of interconnection between CZ and SK.	NO
	DZ-3-002	Project Moravia	non-FID	cca 157 km) DN 1000a) PN 73,5a) (Tvrdonice-Libhošť)	12 + 6c)	X domestic	134-157d)	2022	NO (However the project has impact on security of gas supply in North and Middle Moravia regions)	Increasing exit capacity in North Moravia region and increase of security supply for region	NO
	DZ-3-005	Moravia Capacity Extension	non-FID	cca 85 km DN in *solution with ERÚ* PN *in solution with ERÚ* (Tvrdonice - Bezměrov)	*v řešení s ERÚ*	X domestic	158[d)]	2022	NO (However the project has impact on security of gas supply in North and Middle Moravia regions)	Increasing exit capacity in North Moravia region and increase of security supply for region	NO

Note:

a) The gas storage operator only stated that the use of the storage facility depends on the connection to the Czech Republic's transmission system.

b) The anticipated year of putting into operation according to the transmission system operator can be considered on the assumption of signing the contract for connection up to and including 1Q / 2019.

c) The above mentioned technical solution and the expected length of the gas pipeline are connected with the implementation together with the project of the Czech-Polish interconnection pipeline.

d) This is a planned increase in output capacity to the home zone. The current output capacity of the existing transmission system (approx. 101-134 GWh / d) is not included in this value.

Source: Ten-year transmission system development plan in the Czech Republic 2019-2028

8. Public service obligations relating to the security of gas supply

see Annex

9. Consideration of the ENTSO-G's ten-year network development plan

The Transmission System Operator (hereinafter TSO) in the Czech Republic, NET4GAS, s.r.o. developed the "Ten-Year Plan for the Development of the Transmission System in the Czech Republic 2019-2028" (hereinafter referred to as the "Development Plan"). The results of this plan were used to develop this Preventive Action Plan.

In developing the Development Plan, TSO took into account the development of gas production, storage, consumption and supply, and took into account its investment plans and the plans of distribution system operators, gas storage operators and the EU-wide TYNDP.

In the its Development Plan, it was given an overview of the individual projects implemented in previous years and defined the newly prepared investment projects that will lead to an increase in the capacity of the Czech transmission system over the next 10-year period.

For the purposes of this plan, transmission system operator used the so-called worst-case scenario – i.e. the highest possible demand - to determine consumption in the Czech Republic. Based on this scenario, TSO analyzed the adequacy of the input and output capacity of the system and found that all technical input and output capacities of the transmission system in all Czech regions and in the South Moravia region adequately cover the expected development of maximum daily gas consumption. Only the North Moravia region is sensitive to the increase in the maximum daily consumption and therefore TSO is preparing a project that would increase the transmission capacity in that region from 2021. This project also has a follow-up to the planned North-South gas corridor of the V4 countries. The ten-year plan for the development of the transmission system in the Czech Republic 2019-2028 is thus compatible with the needs of both the Czech Republic and the EU.

10. Impact of preventive measures

10.1 Economic impact, effectiveness and efficiency of the measure

In view of the above, preventive measures have almost no economic impact and their effectiveness in maintaining the proper operation of the Czech gas system and in supplying natural gas to customers is very good.

10.2 Impact on the functioning of the internal gas market

The above preventive measures do not have a serious impact on the functioning of the gas market in the Czech Republic.

10.3 Impact on the customers

As mentioned in Chapter 5.1 The general obligations of a gas market participant are used as a preventive measure for the proclamation of consumption levels 1-5:

Consumption level 1 has an impact on Group A customers

Consumption level 2 has an impact on Group A and B1

Consumption level 3 has an impact on Group A, B1, and B2 customers

Consumption level 4 has an impact on Group A, B1, B2 and C2 customers

Consumption level 5 has an impact on Group A, B1, B2, C2 and E customers

In any case, these measures will not affect protected customers within the meaning of the SoS Regulation, which are in the Czech Republic customers with supply points classified as groups C1, D and F.

10.4 Impact on the environment

The environmental impact can only be the case for switching to fuel other than natural gas. This solution, however, is only used in the Czech Republic for off-take points of Group A, ie for customers with an expected annual consumption of more than 630 MWh with the possibility of a complete or partial switch to substitute fuel.

10.5 Discussion with relevant authorities of neighboring countries

to be completed

10.6 Results of consultations with competent authorities

to be completed

11. Conclusion

Tasks and obligations of natural gas undertakings for emergencies are defined both in the Act No. 458/2000 Coll., On Business Conditions and the Execution of State Administration in the Energy Sectors and on Amendments to Certain Acts (Energy Act), as amended, and in the Decree about Emergency in the gas industry and on the way of safeguarding the safety standard No. 344/2012 Coll., as amended.

The obligations of the gas entrepreneurs resulting from the Energy Act and the Decree are continuously controlled by the Ministry of Industry and Trade of the Czech Republic as well as by the Energy Regulatory Office.

At the level of preventive measures, market-based measures on the supply side mainly make use of increased import flexibility, increased gas withdrawal and reverse flows in the transmission system, and the use of interruptible contracts on the demand side. Non-market measures are not used in preventive measures.

The transmission system of the Czech Republic is robust, high quality and carefully maintained and ensures no problem of meeting the N-1 standard, this standard is even higher in the Czech Republic than the requirement of regulation 2017/1938.

Gas storage, which accounts for about 40% of the annual gas consumption in the Czech Republic, significantly helps to secure gas supplies to end customers in the event of a gas supply disruption or limitation. Storage capacities are expanding at present and, after completion, total storage capacity will account for approximately 45% of annual consumption. The Czech Republic with the share of storage capacity in annual gas consumption ranks among the leading EU countries.

The Czech Republic is taking advantage of the diversification of gas supplies from Russia, Norway and the European Union, thus removing the former dependence on one source of gas, ie Russia.

Reverse flows were implemented in the Czech Republic's transmission system to ensure in case of disruptions of Ukrainian routes supply not only to Czech customers but also to customers in Slovakia.

Furthermore, the diversification of the routes has already been implemented, where the gas is supplied to the Czech Republic by the Nord Stream gas pipeline, the OPAL and HPS Brandov gas pipelines.

These deliveries were reinforced by the Gazela pipeline in 2013, which connected HPS Brandov across the Czech territory with the BTS Rozvadov - Waidhaus and was connected to the Czech transmission system in several places.

Electricity production is not undermined by the gas supply failure, as the production of electricity in gas power plants represents only about 6% of the total electricity production.

The risk analysis shows that supply restrictions or disruptions across Ukraine will not threaten gas supplies to customers in the Czech Republic. Cumulation of failures such as the disruption of gas supplies across Ukraine and the failure of supply over BTS Svatá Kateřina is highly unlikely as well as the failure of several underground gas storage facilities.

The gas system of the Czech Republic fully complies with the requirements of Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 on measures to safeguard security of gas supply and repealing Regulation 994/2010.