Environmental Report

DEVELOPMENT PROGRAM OF THE NATIONAL GAS TRANSPORT SYSTEM FOR THE PERIOD 2021 – 2030

Beneficiary: European Investment Bank (EIB)

Plan holder: SNTGN Transgaz SA MEDIAȘ

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**MINISTRY OF ENVIRONMENT,
WATERS AND FORESTS**

REGISTRATION CERTIFICATE
No. 315 from 04.08.2020

In accordance with the provisions of the Government Emergency Ordinance no. 195/2005 on environmental protection, approved with amendments and completions by Law no. 265/2006, with subsequent amendments and completions, and of the Order of the Minister of Environment, Waters and Forests no. 1134/2020 regarding the approval of the conditions for elaboration of environmental studies, of the attestation criteria of natural and legal persons and of the composition and Regulation of organization and functioning of the Attestation Commission, following the analysis of the documents submitted by:

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**MINISTRY OF ENVIRONMENT,
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In accordance with the provisions of the Government Emergency Ordinance no. 195/2005 on environmental protection, approved with amendments and completions by Law no. 265/2006, with subsequent amendments and completions, and of the Order of the Minister of Environment, Waters and Forests no. 1134/2020 regarding the approval of the conditions for elaboration of environmental studies, of the attestation criteria of natural and legal persons and of the composition and Regulation of organization and functioning of the Attestation Commission, following the analysis of the documents submitted by:

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ABBREVIATIONS

AA	Appropriate Assessment
AEI	Assessment of the Environmental Impact
AEP	Agency for Environmental Protection
CNHS	Culture and National Heritage Strategy
CPP	Cathodic Protection System
ESA	Environment Strategic Assessment
ESR	Energetic Strategy of Romania
EU	European Union
FID	Transgaz projects for which the final investment decision was taken
FWD	Framework Water Directive
GCS	Gas Compression stations
GD	Government Decision
GGE	Greenhouse Gas Emissions
GMS	Gas Measurement System
GOS	Gas Odorization System
GUP	General Urban Plan
HFC	Hydrofluorocarbons
IMDP	Investments modernization and development plan
LIOP	Large Infrastructure Operational Plan
LULUCF	land use, land use change and forestry
MAS	Measurement Adjustment System
NAEP	National Agency for Environmental Protection
NAER	National Authority for Energy Regulations
NAPEE	National Action Plan for Energetic Efficiency
NCNGT	National Company for Natural Gas Transportation
NAPNA	National Agency for Protected Natural Areas
NIPA	National Research and Development Institute for Pedology, Agrochemistry and Environmental Protection
NIHWM	National Institute for Hydrology and Water Management
NNAQM	National Network for Air Quality Monitoring
non-FID	Transgaz projects for which the final investment decision was NOT taken
NSAPPB	National Strategy and Action Plan for Preservation of Biodiversity
NGTNS	Natural Gas Transportation National System
NSI	National Institute of Statistics
NSIAMAQ	National System of Integrated Assessment and Management of Air Quality
NTDS	National Territorial Development Strategy
NTMP	National Territory Management Plan

NWMP	National Waste Management Plan
NWMS	National Waste Management Strategy
OPAS	Office of Pedological and Agrochemical Studies
PFC	Perfluorocarbons
REO	Relevant Environment Objective
RES	Renewable Energy Sources
SCI	Community Importance Site
SOER	The European environment — state and outlook
SPA	Avifauna Special Protection Site
TOE	Ton of Oil Equivalent
TYNDP	DEVELOPMENT PLAN FOR THE NATIONAL NATURAL GAS TRANSMISSION SYSTEM 2021 - 2030
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Valve control station
WMO	World Meteorological Organization

1. GENERALITIES

1.1 PREAMBLE

The present work represents the Environmental Report for the Strategic Environmental Assessment of the **DEVELOPMENT PLAN FOR THE NATIONAL NATURAL GAS TRANSMISSION SYSTEM 2021- 2030**, hereinafter referred to as TYNDP. The plan has been conceived for the observance of the requirements of the European Directive CE/73/2009 art. 22, on the requirement to annually submit a 10-year Development Plan for all the natural gas transportation systems' operators in the European Union.

The Strategic Environmental Assessment is a tool which is systematically used at the highest decision-taking level, facilitating the integration of the environmental reasons, before taking the final decision regarding the promotion of the proposed plan. Thusly are taken durable decisions reducing to a

minimum the negative impact on the environment, are identified specific measures to improve the effects and is established a framework for the subsequent assessment of projects from an environmental protection point of view.

According to the Directive 2001/42/CE on the assessment of the effects of certain plans and programs on the environment (the ESA Directive), transposed in the Romanian law by GD 1076/2004, all the plans and programs which may have significant effect on the environment must be subjected to a systematic environmental assessment.

The owner of the plan is SNTGN Transgaz S.A.

SNTGN Transgaz SA Mediaș is the technical operator of the National Transport System (NTS) for natural gas and ensures the efficient, transparent, safe, non-discriminatory and competitive fulfillment of the national strategy regarding national and international transportation of natural gas, dispatching of natural gas, as well as research and design in its specific field of expertise, with the observance of the European and national laws, as well as of the quality, performance, environmental and durable development standards.

NTGN "TRANSGAZ" SA (Transgaz) performs its activity in the following locations:

- Transgaz headquarters: Mediaș, Piața C.I. Motaș str. , no. 1, Sibiu County, postal code 551130;
- Usage and Maintenance Department: Mediaș, George Enescu str., no. 11, Sibiu County, postal 551018;
- Design and Research Department: Mediaș, Unirii str., no. 6, Sibiu County, postal code 550173;
- PVT Operation Directorate: Municipiul București, Calea Dorobanți nr. 30, sector 1, postal code 010573;
- Transgaz–Romania agency: Bucharest, Bld. Primăverii, no. 55;
- Transgaz Brussels – Belgium agency: Brussels, 23 Luxembourg St.
- European Funds Accessing and International Relations Department: Bucharest, Calea Victoriei, no. 155, District 1, postal code 010073;
- Design and Research Workshop in Brasov, Nicolae Titulescu str., no. 2;
- "EUROTRANSGAZ" Limited Liability Company MD–2004, Bd. Ștefan cel Mare și Sfânt, 180, of. 506, Chișinău, Republic of Moldavia;
- Transgaz secondary headquarters: Mediaș, I.C. Brătianu str., no. 3, bl. 3, app. 75, Sibiu County; company's website: https://www.transgaz.ro

Transgaz also includes 9 territorial usage units and a branch:

- Territorial usage unit in Arad, Poetului str., no. 56, Arad city, Arad county, postal code 310369;
- Territorial usage unit in Bacău, George Bacovia str., no. 63, Bacău city, Arad county, postal code 600238;
- Territorial usage unit in Brăila, Ion Ghica str., no. 5, Brăila city, Arad county, postal code 810089;
- Territorial usage unit in Brașov, Grigore Ureche str., no. 12A, Braşov city, Arad county, postal code 500449;
- Territorial usage unit in Bucharest, Lacul Ursului str., no. 24, 6th district, Bucharest, postal code 060594;
- Territorial usage unit in Cluj, Crişului str., no. 12, Cluj-Napoca city, Arad county, postal code 400597;

- Territorial usage unit in Craiova, Arhitect Ioan Mincu str., no. 33, Craiova city, Arad county, postal code 200011;
- Territorial usage unit in Mediaş, Ion Ghica str., no. 29, Brăila city, Sibiu county, postal code 551027;
- Territorial usage unit in Constanţa, Albastră str., no. 1, Constanţa city, Sibiu county, postal code 900117;
- Branch in Mediaş, Şoseaua Sibiului no. 59, Mediaş town, Sibiu county.

The author of the Environmental Report is Fundatia Pronatura, in collaboration with SC NATURALNET SRL, both companies registered in the LIST OF EXPERTS ELABORATING ENVIRONMENTAL STUDIES, established pursuant to the provisions of the MEWF (Ministry of the Environment, Waters and Forests) Order 1134/20.05.2020, under item 244 and respectively 315.

1.2 THE METHODOLOGY USED IN THE ELABORATION OF ESA FOR TYNDP 2021 – 2030

The strategic environmental assessment for TYNDP has been drawn up according to the provisions of the Directive 2001/42/EC of the European Parliament and of the Council, transposed in the Romanian law by GD 1076/2004, *regarding the establishment of the elaboration procedure for environmental assessment for plans and programs* (published in the Official Journal, part I, no. 707 of August 5th 2004).

The methodology on which the strategic environmental assessment was based also envisaged, in addition to the previously mentioned regulatory instruments, the guidelines in the following documents:

- "Textbook on the Application of the Performance Procedure for the Environmental Assessment for Plans and Programs", approved by Order 117/2006;
- "Generic Guide on Environmental Assessment for Plans and Programs", elaborated as part of the PHARE Project 2004/016 - reinforcement of the institutional capacity to implement and apply the ESA Directive and the Reporting Directive.
- Guide on the environmental assessment for plans and programs for development in the energetic field, project: reinforcement of the institutional capacity to implement and apply the ESA Directive and the Reporting Directive, Beneficiary: Ministry of the Environment and Durable Development, 2007.

Stages of the strategic environmental assessment procedure:

In order to initiate the environmental assessment procedure, in accordance with the provisions of GD 1076/2004 on implementation of the procedure of environmental assessment for plans and programs, the owner notified the Ministry of Environment, Waters and Forests and informed the public on the initiation of the development process of the plan and of making the first version (address SNTGN Transgaz SA registered at MEWF – Ministry of the Environment, Waters and Forests - under no. 53271/10/09.2019).

Follow up to the received notification, MEWF replies with addresses no. 35520/2.10.2019 and no. 43114/29.11.2019 stating that the plan falls under the objective of art. 5(2), letter A), respectively is subject to a mandatory environmental assessment, the proper assessment study and the implementation of the crossborder procedure being necessary.

For the development of the finalization phase of the draft plan and the making of the environmental report, the work group (WG) has been established. The members of the WG and their contact data are listed in Annex 1 to the present ER. The purpose of the WG is that of setting the detail lever of the

information included in the ER for the TYNDP, as well as the analysis of the significant effects of the plan.

During this phase, the WG has reunited on 20.11.2019, 15.10.2020, 3.12.2020 and 22.02.2021– meeting during which modifications on the developed documentations were agreed, based on the points of view expressed by the WG members.

The ER synthesizes all the results and conclusions of the environmental assessment and integrates the conclusions of the appropriate assessment.

The TYNDP 2021-2030 is subject to public consultation on the entire procedure of the environmental assessment, immediately after the notification sent to MEWP. The public can send comments with regards to the plan until the date of the public debate, even during the public debate. The Environmental Report and the Appropriate Assessment Study make the subject of the public debate once they are finalized in the WG and have been posted on the web pages of the MEWF and of the owner of the Plan.

The public debate of these documents will held on 25 May, as a videoconference.

TYNDP 2021 – 2030, the Environmental Report and the Appropriate Assessment Study have been the subject of the environmental assessment in a crossborder context during the period……

The analysis phase of the Environmental Report and the decision making was performed by the MEWF, based on points of view expressed by the members of the WG, based on the results of the public debates performed on national level and in crossborder context and, last but not least, based on the effective legal provisions on the completeness of the elaborated documentation.

The monitoring program proposed in the Environmental Report is an integral part from the TYNDP 2021-2030. The effects on the environment generated by the TYNDP 2021-2030 must be monitored and registered. If adverse effects are identified, appropriate measures will be proposed to eliminate / reduce them.

The finalization of the environmental assessment procedure is confirmed by the issuance of the environmental permit for the TYNDP 2021-2030, while the owner of the TYNDP must issue the Declaration foreseen at art. 33, paragraph (1), letter b), from the GD 1076/2004.

The elaboration of the present Environmental Report has followed the stages below:

- Analysis of the present condition of the environmental factors (with a stress on the present influence of the natural gas transportation system on the environment);
- Identification of the relevant environmental aspects in the relationship with TYNDP;
- Establishment of the relevant environmental goals of TYNDP;
- Analysis of the probable evolution of the environmental condition in case of non-deployment of TYNDP (the Do-Nothing scenario);
- Assessment of the effects on the environment caused by the deployment of TYNDP, by analyzing the manner in which the goals of the Plan and the proposed measures contribute in reaching the relevant environmental goals;
- A cumulative assessment is drawn up, based on the assessment, providing an overall image of the possible future evolution of the environment's status in the circumstances of TYNDP's implementation;
- The indicators proposed for the monitoring of TYNDP's effect on the environment are identified;

- Based on the performed analyses, is proposed a set of recommendations on the prevention, reduction and compensation of any potential adverse effect on the environment, associated with the implementation of TYNDP.
- The conclusions of the Appropriate Assessment shall be included in the Environmental Report.

2. PRESENTATION OF THE CONTENTS AND OF THE MAIN GOALS OF TYNDP 2021-2030, AS WELL AS THOSE OF THE RELATIONSHIP WITH OTHER RELEVANT PLANS AND PROGRAMS

2.1 GENERALITIES

TYNDP 2021-2030 presents the development pathways of the Romanian natural gas transportation network and of the major projects that SNTGN Transgaz S.A. desires to implement in the next 10 years.

The natural gas transportation activity is performed by SNTGN Transgaz based on the License Agreement regarding the pipelines, installations, equipment and fittings afferent to NGTNS, publicly owned by the Romanian state, concluded with the National Agency for Mineral Resources (NAMR), approved by GD 668/2002, published in the OJ 486/July 8th 2002, valid until 2032.

The operation by SNTGN Transgaz S.A. Medias of the NGTNS mainly includes the following activities:

- Commercial balancing
- Contracting the natural gas transportation services
- Dispatching and technological regimes
- Measuring and monitoring the quality of natural gas
- Natural gas odorization and natural gas international transportation
- Research and design in the field of natural gas.

TRANSGAZ is a member of ENTSO-G (European Network of Transmission System Operators for Gas), a body within which the company cooperates with all the natural gas transportation systems' operators in the European Union, in order to create a common regulatory framework and common development strategies and visions in the European Union, for the creation of an integrated energetic market. In this context, during the elaboration of NGNTDSP for 2021-2030, it was envisaged the coordination with the 10-year development plans of the other operators in the region.

NGNTDSP is submitted for approval of the National Authority for Energy Regulations (NAER).

By the Natural Gas National Transport System Development Plan (NGNTSD) for the next 10 years, Transgaz proposes major investments projects for the strategic and durable development of the natural gas transportation infrastructure in Romania, concurrently observing its conformity with the requirements of the European Regulations in the field and with those of environmental protection.

2.2 Contents and main objectives of TYNDP

2.2.1 Goal and objectives of TYNDP

The goal of TYNDP is to reach a maximum degree of transparency regarding the development of the Natural Gas National Transportation System, to provide the players in the market the opportunity to get timely information on the existing and planned transportation capacities so that, by public consultations, the decisions regarding the investment in the natural gas transportation network would address the market's requirements.

The Natural Gas National Transport System Development Plan (NGTNS) in the period 2021-2030, elaborated according to the provisions of Law 123/2012 of electricity and natural gas, with its subsequent alterations and additions, with the objectives proposed in the Energetic Strategy of Romania 2019-2030 with the perspective of year 2050, observes the requirements of the European Energetic

Policy regarding:

- To ensure a safe supply of natural gas;
- To increase the degree of interconnectivity of the natural gas national transportation network to the European network;
- To increase the natural gas transportation network's flexibility;
- The liberalization of natural gas' market;
- To create an integrated natural gas market at the level of the European Union;
- To ensure the connection of third parties to the transportation system, according to specific regulations, within the transportation limits and with the observance of technological requirements;
- The expansion, until December of 2021, of the pipeline network, up to the entrance in the localities attested as resorts of national, respectively local interest, when these localities are located within a distance of maximum 25 km from the connection points of the transportation and system operators;
- To ensure the connection to the natural gas network to new investments, thusly creating new jobs.

A durable development of the natural gas transportation infrastructure in Romania supposes a broad investment program, which would allow the observance of NGTNS of the transportation and operation requirements, according to the European environmental protection standards. To this end, Transgaz proposes:

- The promotion of investment projects which would contribute in the performance of a durable natural gas transportation system, under the safety conditions set forth by the law in force, with the limitation of its impact on the environment and on the population;
- The elaboration of projects in such a manner that their impact on the natural and entropic environment is minimal;
- The elaboration of projects in such a manner that their impact on biodiversity is minimal;

2.2.2 Present situation of the National Company of Natural Gas Transport

2.2.2.1 Description of the Natural Gas Transportation National System

The natural gas internal transportation activity is performed by Transgaz based on the natural gas transportation system Operating License no. 1933/20.12.2013, issued by the National Authority for Energy Regulations (NAER), valid until 08.07.2032.

The natural gas transportation is performed via pipelines and gas supply connections with diameters between 50 mm and 1.200 mm, at pressures between 6 bars and 63 bars.

The main components of the Natural Gas National Transportation System on 31.12.2020 were the following:

Table 1. The main components of the Natural Gas National Transportation System on 31.12.2020

Objective name / NGTNS component	M.U.	Value
Transportation mains and natural gas supply connections, out of which -international transportation pipelines (Transit II, Transit III) - BRUA	km	13.925 369 479
Measurement Regulation Systems (MAS) in use	pcs	1.128 (1.233 measuring directions)
Valve control station (VCS, NT)	pcs	58
Imported gas measurement systems (GMS) (Giurgiu, Horia, Isaccea import, Negru Vodă IV, Medieșu Aurit, Isaccea Transit I, Negru Vodă I)	pcs	7
Measurement systems located on gas transit pipelines (GMS) (Isaccea Transit II, Isaccea Transit III, Negru Vodă II, Negru Vodă III)	pcs	4
Gas compression stations(GCS) (Șinca, Onești, Siliștea, Jupa , Podișor)	pcs	6

Objective name / NGTNS component	M.U.	Value
Cathodic Protection Systems (CPS)	pcs	1.041
Gas Odorization Systems	pcs	982

These components of NGTNS ensure the takeover of the natural gas from the producers / suppliers and its transportation to consumers / distributors or to storage facilities.

The national and international natural gas transportation capacity is provided by the pipelines and gas supply connections network, with diameters between 50 mm and 1,200 mm.

The compression capacity is provided by 5 gas compression systems, located on the main transportation pathways, boasting an installed power of about 61 MW.

NGTNS is presently using 1,041 cathodic protection systems. The cathodic protection considerably reduces the pipeline's material corrosion speed, thusly increasing the usage safety and, implicitly, the lifespan of the underground metallic pipes.

In what the usage age is concerned, the main objectives of NGTNS are presented below in short.

Table 2. Technical condition of the main objectives belonging to NGTNS

Operating period	Pipelines (km)	Supply connections (km)	Number of Directions MAS
>40 years	7.056,17	356,55	150
30<D≤40	1.675,13	163,50	59
20<D≤30	720,12	374,74	308
10<D≤20	1.407,16	841,38	549
5<D≤10	639,40	40,10	117
≤ 5 years	623,29	27,47	50
TOTAL	**12.121,28**	**1.803,75**	**1.128 SRM-uri (1.233 direcții de măsurare)**
	13.925,03		

One can notice that, in what the pipelines and the natural gas transportation connections are concerned, out of the 13.925,03 km under usage, about 74% have an effective operating period greater than 20 years, close to their normal functioning duration. Nonetheless, their technical condition is maintained at an adequate level, due to the fact that the usage activity is performed in the context of a basically preventive, planned and corrective maintenance system, and is supported by annual development and upgrade investment programs.

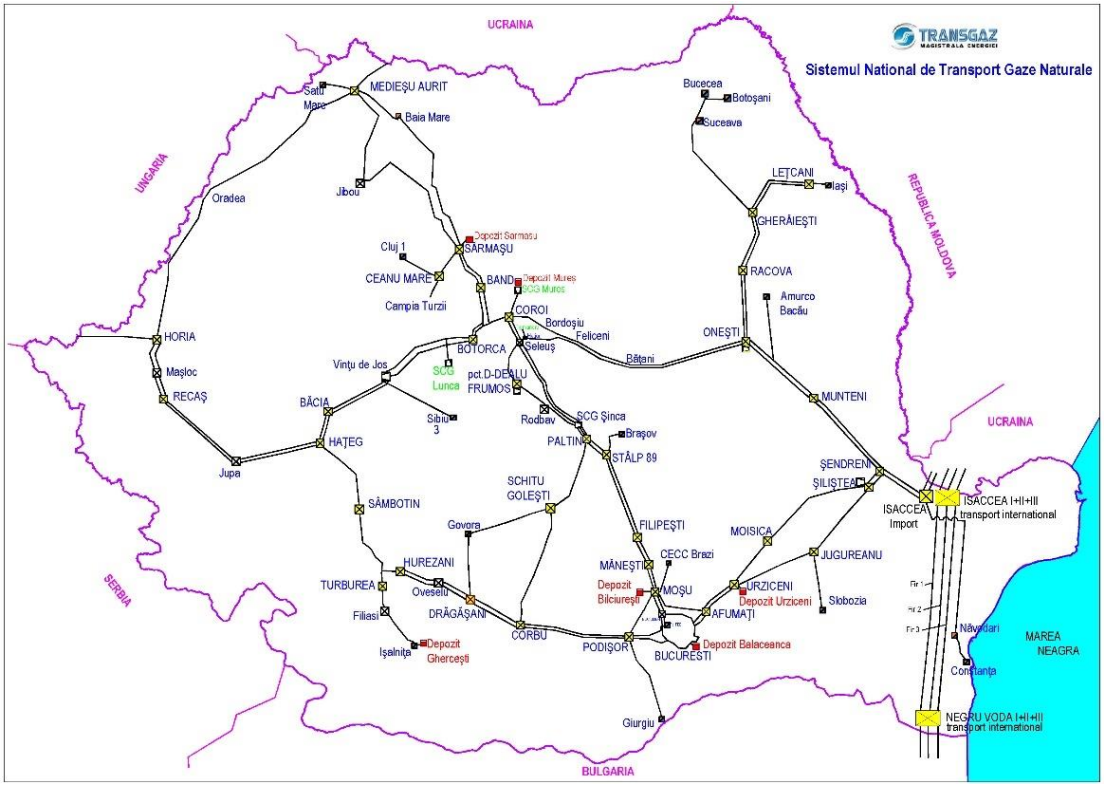


Fig 1. Map of the present natural gas transport system

2.2.2.2 Natural gas international transport

The natural gas internal transportation activity is performed by Transgaz based on the natural gas transportation system Operating License no. 1933/20.12.2013, issued by the National Authority for Energy Regulations (NAER), valid until 08.07.2032, based on Energy and Natural Gas Law 123/2012, with its subsequent alterations and additions, as well as based on the specific regulations in force.

Presently, the natural gas international transport activity takes place in the South-Eastern part of the country (Dobrogea), where the Romanian pipeline sector located between Isaccea and Negru Vodă localities is included in the Balkan corridor for natural gas international transport of the Russian Federation towards Bulgaria, Turkey, Greece and Macedonia.

On the aforementioned pathway, North of Isaccea locality, there are 3 interconnections with the similar natural gas international system from Ukraine, crossing the Danube underground with 5 pipelines, and South of Negru Vodă there are 3 interconnections with the similar natural gas international transport system from Bulgaria.

2.2.2.3 Technical capacities of NCNGT as of 31.12.2020

The technical capacities of NCNGT as of 31.12.2020 were:

- Total technical capacity of the entry/exit points from NGTNS is of 150.984 thousands mc/day (55,11 bil. mc/year) at entry and of 276.018 thousands mc/day (100,75 bil. Mc/year) at exit.
- The total technical capacity of the interconnection points placed on the natural gas international transport pipelines T2 and T3 is of about 55,018 thousands mc/day (19.3 bil. mc/year, with an usage factor of 0.959), both when entering and when exiting the country.

2.2.3 Development directions of the national transport system (NTS) natural gas

2.2.3.1 Previsions of natural gas quantities

For the period between 2021 and 2030 is envisaged an increase of the quantities of transported natural gas, of those destined for underground storage and of technological consumption:

Table 3. Previsions of transported natural gas quantities, including those destined for underground storage (without natural gas international transport) and technological consumption, in the period between 2021 and 2030

Year	M.U.	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Transported natural gas, including the quantities destined for underground storage (without natural gas international transport)	bil. mc	13,471	13,605	20,775	20,775	20,775	20,775	20,775	20,775	20,775	20,775
Natural gas transported for internal consumption	bil. mc	13,387	13,521	20,691	20,691	20,691	20,691	20,691	20,691	20,691	20,691
NTS gas consumption, including the technological consumption and NTS balance non-closures	bil. mc	0,084	0,084	0,084	0,084	0,084	0,084	0,084	0,084	0,084	0,084
Weight of the TNS gas consumption in total of natural gas transported, including those destined for underground storage	%	0,63	0,62	0,41	0,41	0,41	0,41	0,41	0,41	0,41	0,41

In short, the annual increase of the natural gas quantity is foreseen o be at 1% for the period between 2021-2022, and from 2023 is foreseen an increase by 8.17 bil. mc from the Black Sea source.

The physical structure of the Natural Gas National Transportation System provides the possibility to identify and create certain natural gas transportation channels, answering both the needs of natural gas supply of various consumption area in the country, as well as the needs regarding the transfer, using the Romanian system, of certain quantities of natural gas between the neighboring countries' systems, as a requirement imposed by the liberalization of the natural gas markets and by the European Regulations.

2.2.3.2 Structure of the natural gas transport system

The Romanian natural gas transportation system mainly consists in the following transport channels:

Southern Channel 1 - East-West

Presently, by the pipelines used as part of this channel, is ensured:

- natural gas import and export, using the interconnection point Csadpalota with Hungary, at a capacity of 2,2 bil. mc/year;
- natural gas import and export, using the interconnection point Giurgiu with Bulgaria at a capacity of 1,5 bil. mc/year
- Takeover of the internal natural gas production from sources in Oltenia;
- Natural gas supply to consumers in the Western and Southern areas - Bucharest.

The development of this natural gas transportation channel envisages the increase of the transportation

capacity of the crossborder interconnection point with Hungary, at 4.4 bil. Mc/year, towards Csanapalota-Horia, and ensuring the natural gas transportation from the Black Sea towards the internal consumption areas and towards the crossborder interconnection points of this channel (Hungary, Bulgaria).

This development will involve the construction of new pipelines and the placement in certain locations (Podișor, Bibești, Jupa) of compression stations.

Central Channel 2 - East-West

Presently, by the pipelines used as part of this channel, is ensured:

- natural gas import, using the interconnection point Csadpalota with Hungary, at a capacity of 2,2 bil. mc/year;
- natural gas import, using the interconnection point Isaccea with Ukraine, at a capacity of 8.6 bil. mc/year;
- Takeover of the internal natural gas production from sources in Ardeal;
- Natural gas supply to consumers in the Eastern and Western areas.

The development of this natural gas transportation channel envisages the increase of the transportation capacity of the crossborder interconnection point with Hungary, to 8.8 bil. mc/year in the direction Csanapalota-Horia and the supply of the bidirectional natural gas transportation.

To this end, the rehabilitation of certain existing pipelines in this channel, the building of new pipelines and the setting up of compression systems or the amplification of some of the existing ones must take place.

Channel 3 North-South

Presently, by the pipelines used as part of this channel, is ensured:

- natural gas import, using the interconnection point Medieșu Aurit with Ukraine, at a capacity of 4.0 bil. mc/year;
- Takeover of the internal natural gas production from sources in Ardeal;
- Storage of natural gas in internal storage areas;
- Natural gas supply to consumers in the Northern, Central and South-East areas - Bucharest.

Interconnector 4 North-West

Presently, by the pipelines used as part of this interconnection channel, is ensured:

- Natural gas supply to consumers in the Western area - Oradea.
- Interconnection of channels 1, 2 and 3 (please refer to Figure 1 - Map of the present natural gas transport system

Interconnector 5 South-East

Presently, by the pipelines used as part of this interconnection channel, is ensured:

- Transportation of imported gas from the interconnection point Isaccea with Ukraine towards the Bucharest consumption area and this area's storage facilities (Bilciurești, Urziceni, Bălăceanca);
- Natural gas supply to consumers in the South-Eastern area;
- Interconnection of channels 1, 2, 3 and 6 (please refer to Figure 3 - Fig 2. Natural gas transportation channels in NTS

Eastern Channel 6

Presently, through this channel's pipelines is ensured the transportation of natural gas from the production areas located in the Eastern part of the country and the interconnection point Isaccea

towards Moldova de Nord consumption area.

The development of this natural gas transportation channel envisages to ensure the operation within the designed technical parameters of the physical bidirectional interconnection with the Republic of Moldavia (commissioned since 2014, between Iași and Ungheni).

To this end, the rehabilitation of certain existing pipelines in this channel, the building of new pipelines and the setting up of two compression systems must take place.

Channel 7 - International Transport

Through the pipelines in this channel is presently performed the international transport of natural gas from Russia, via Ukraine, by Isaccea I+II+III interconnection point towards Bulgaria, Greece and Turkey, by Negru Vodă I+II+III interconnection point.

The development of this natural gas transportation channel envisages the performance of the physical interconnection with the national natural gas transportation system in Romania and the insurance of bidirectional flow in the crossborder interconnection points Isaccea and Negru Vodă by upgrading the measurement systems GMS Isaccea I and GMS Negru Vodă I.

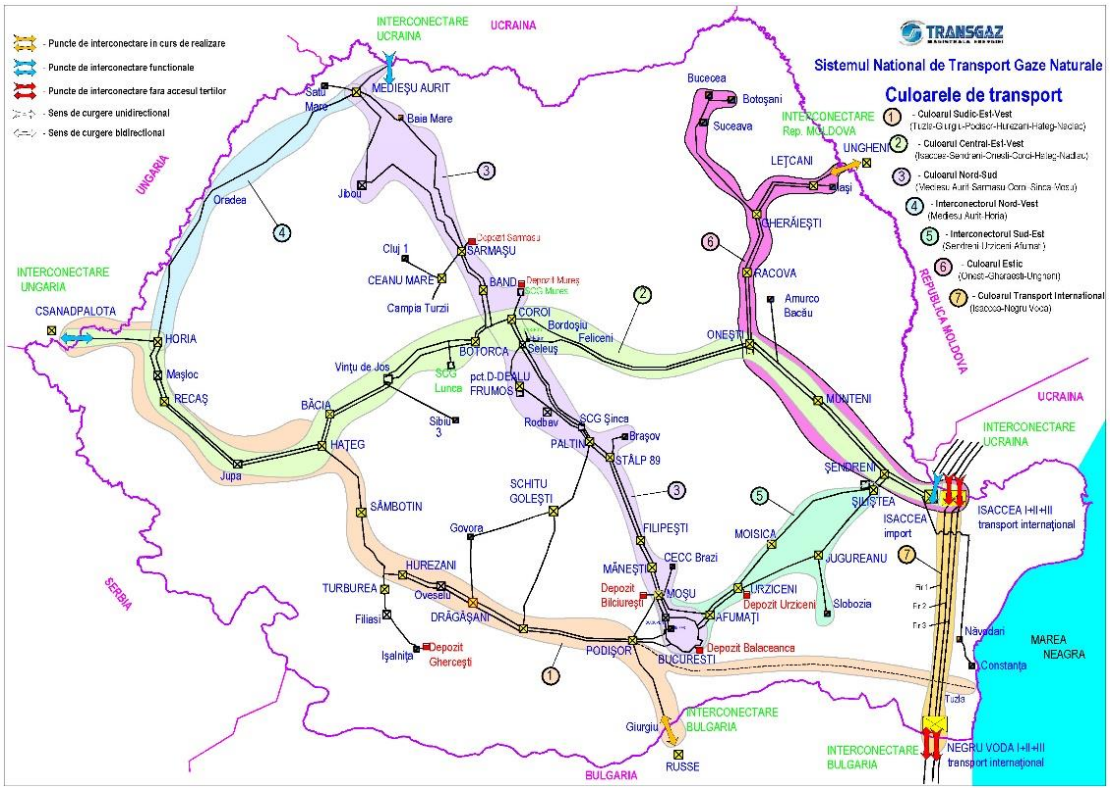


Fig 2. Natural gas transportation channels in NTS

The aforementioned developments are corroborated with the development of the storage system, which plays a complementary role in assisting the security, stability, optimization and flexibility of the National Natural Gas Transportation System.

The increase of the storage capacities also has an indirect effect on NTS, the indirect effect consisting in the assurance of the natural gas quantities necessary to cover the consumption peaks and the necessary system pressures for the supply of consumers in the respective geographic areas, allowing the relief of the storage facilities in the Southern Romania.

2.2.3.3 Strategic projects of TYNDP

The development directions for TYNDP state a large-scale development of the natural gas transportation network, meant to reconfigure the natural gas transportation network which, although wide-spread and complex, was conceived in a period when the emphasis was on the supply of natural gas to large industrial consumers and the creation of their access to resources crystallized in the Center of the country and in Oltenia, as well as to the only source of import.

Identification of the projects which must be developed in the national gas transportation system began with the main requirements which it must ensure in the actual dynamics of the regional natural gas market (access to new natural gas supply sources - the natural gas in the Caspian Sea and Black Sea).

Thusly, the planned projects envisage:

- The provision of an adequate degree of interconnectivity with the neighboring countries;
- The creation of natural gas transportation routes at a regional level, to ensure the transportation of natural gas coming from new supply sources;
- The creation of the infrastructure necessary for the takeover and transport the natural gas from off-shore perimeters, to capitalize it on the Romanian market and on other markets in the region;
- Expansion of natural gas transport infrastructure for the improvement of natural gas supply of lacking areas;
- To create an unique integrated market at the level of the European Union.

By the projects proposed for the development and upgrade of the natural gas transport infrastructure, by implementing smart network control, automation, communication and management systems, Transgaz envisages the maximization of energetic efficiency along the entire chain of performed activities, as well as the creation of a smart, efficient, reliable and flexible natural gas transport system.

The list of the main projects proposed by Transgaz SA by TYNDP 2021-2030 is presented in the table below.

Table 4. List of the main projects proposed by Transgaz SA by TYNDP 2021-2030

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
7.1.	**The development in Romania of the Natural Gas National Transportation System on Bulgaria - Romania - Hungary - Austria channel (BRHA)**	• Provides the adequate natural gas transportation capacity between the crossborder interconnection points RO-BG and RO-HU, to increase the interconnection degree to an European level; • Provides natural gas transportation capacities for the capitalization of natural gas from the Black Sea on the Central-European markets. • The project has been included in the updated list of common interest projects, published in November 2017 as appendix to Regulation 347/2013.	• Envisages developments of the natural gas transportation capacities between the Romanian natural gas transportation system and the similar Bulgarian and Hungarian systems, consisting in building new natural gas transportation pipelines, connecting the Podișor Technologic Junction and GMS Horia.	
7.1.1	**Stage I**	The result of the implementation of BRHA Project - Stage I is the assurance of the physical capacity of a permanent, bidirectional flow between the interconnections with Bulgaria and Hungary, ensuring the following natural gas transportation capacities - transportation capacity to Hungary of 1.75 bil. mc/year, respectively 1.5 bil. mc/year to Bulgaria. Project BRHA Stage I is a Supply Safety project. Project's classification in international plans • PCI project (first list): 7.1.5; • PCI project (second list): Stage I: 6.24.2; • PCI project (third list): Stage I: 6.24.1–2; • PCI project (fourth list): Stage I: 6.24.1 - 1 part of the "Group of projects providing for the stage-by-stage increase of the capacity of the bidirectional transport channel Bulgaria-Romania-Hungary-Austria (presently known as ROHUAT/BRHA), which will allow 1.75 bil. mc/year during the first stage, and 4.4 bil. mc/year during the second stage, with the possibility to takeover even new resources from the Black Sea during the second stage". • TYNDP ENTSOG 2020: TRA-F-358	BRHA project phase I includes the following objectives: • 32" x 63 bar Podișor–Recaș pipeline, 479 km in length; • Three gas compression stations (GCS Podișor, Bibești and Jupa) each system fitted with two compression aggregates (one functioning and one reserve), with the possibility to ensure the bidirectional gas flow	Finalised

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
7.1.2.	**Stage II**	The result of the implementation of BRHA Project - Stage II is the assurance of the physical capacity of a permanent, bidirectional flow between the interconnections with Bulgaria and Hungary, ensuring the following natural gas transportation capacities - transportation capacity to Hungary of 4.4 bil. mc/year, respectively 1.5 bil. mc/year to Bulgaria. Project BRHA Stage II is a commercial project. Project's classification in international plans: • PCI project (first list): 7.1.5; • PCI project (second list): Stage II: 6.24.7; • PCI project (third list): Stage II: 6.24.4-4; • PCI project (fourth list): Stage II: 6.24.4 - 2 part of the "Group of projects providing for the stage-by-stage increase of the capacity of the bidirectional transport channel Bulgaria-Romania-Hungary-Austria (presently known as ROHUAT/BRHA), which will allow 1.75 bil. mc/year during the first stage, and 4.4 bil. mc/year during the second stage, with the possibility to takeover even new resources from the Black Sea during the second and third stage". • TYNDP ENTSOG 2020: TRA-A-1322	Stage II consists in the achievement of the following objectives: • 32" x 63 bar Recaș–Horia pipeline, 50 km in length; • The increase of the three compression stations (Podișor, Bibești and Jupa) by mounting on each system an additional compression aggregate; • Increase of the gas measurement system existing in GMS Horia.	The final implementation decision will be made only if the project is commercially viable.
7.2.	**Development on Romanian l territory of the Southern Channel for the takeover of natural gas from the Black Sea shore**	The project proposes the development on Romanian territory of a natural gas transportation infrastructure, from the Black Sea shore up to the Romanian-Hungarian border. Project's classification in international plans • PCI project (second list): 6.24.8: • PCI project (third list): 6.24.-5: • PCI project (fourth list): 6.24.4 - 3 "Pipeline Black Sea shore - Podișor (RO) to takeover the natural gas in the Black Sea", part of the "Group of projects providing for the stage-by-stage increase of the capacity of the bidirectional transport channel Bulgaria-Romania-Hungary-Austria (presently known as ROHUAT/BRHA), which will allow 1.75 bil. mc/year during the first stage, and 4.4 bil. mc/year during the second stage, with the possibility to takeover even new resources from the Black Sea during the second and third stage". • The list of conditioned priority projects, elaborated as part of CESEC; • TYNDP ENTSOG 2020: TRA-A-362	The main objective of this investment is the building of a natural gas transportation telescopic pipeline between Tuzla and Podisor, 308.3 km long, connecting the natural gas resources available on the Black Sea shore with the BULGARIA-ROMANIA-HUNGARY-AUSTRIA channel, thusly ensuring the possibility of natural gas transport towards Bulgaria and Hungary using the existing Giurgiu-Ruse (with Bulgaria) and Nădlac–Szeged (with Hungary) connections. The pipeline consists in: • Section I, Black Sea shore - Amzacea, 32.4 km long, will have a Ø 48" (DN1200) diameter and technical capacity of 12 bil mc/year; • Section II, Amzacea - Podișor, 275.9 km long, will have a Ø 48" (DN1000) diameter and technical capacity of 6 bil mc/year;	The building permit was obtained. TRANSGAZ has taken the Decision for the investment. Starting the execution depends on the Final Investment Decision taken by the Concesionaires of the perimeter of Neptun Apa Adanca (Neptun Deep Waters) from the Black Sea. .

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
7.3.	**Interconnection of the national transportation system with the international natural gas transportation pipelines T1 and reverse flow Isaccea**	• Creates a natural gas transportation channel between the markets in Bulgaria, Romania and Ukraine, in the situation where the new interconnection between Greece and Bulgaria is performed; • The transportation agreement afferent to the capacity of Transit I pipeline has expired on October 1st 2016; as of gas year 2016-2017, the transportation capacity of Transit 1 pipeline is sold by public sale, according to the European code on allocation mechanisms of capacities in the crossborder interconnection points and on NAER Order 34/2016; • Physical reversible flows will be able to be supplied in Negru Vodă 1 point, according to the requirements of Regulation (EU) 1938/2017; • Creates the possibility to takeover in the Romanian transportation system of natural gas found in the Black Sea, to capitalize them on the Romanian and on regional markets. Project's classification in international plans • PCI project (second list): 6.15; • PCI project (third list): 6.24.10 - 1 the "Group of projects providing for the stage-by-stage increase of the capacity of the bidirectional transport channel Bulgaria-Romania-Hungary-Austria (presently known as ROHUAT/BRHA), which will allow 1.75 bil. mc/year during the first stage, and 4.4 bil. mc/year during the second stage, with the possibility to takeover even new resources from the Black Sea during the second and third stage". • TYNDP ENTSOG 2020: TRA-F-139.	***Stage I*** • Isaccea interconnection, location A.T.U. Isaccea; • Restoration of DN 800 Onești-Cosmești pipeline	• Finalised
			Stage II • Upgrading of the existing Siliștea Gas Compression Station, including the Technological Junction (TJ) Siliștea, located in the Administrative and Territorial Unit (A.T.U.) Siliștea, Brăila county; • Works at the existing Șendreni Technological Junction, located in A.T.U. Vădeni, Brăila county; • Upgrading of the existing Onești Gas Compression Station, including the Technological Junction (TJ) Onești, located in the Administrative and Territorial Unit (A.T.U.) Onești, Bacău county	• Finalised
7.4.	**TNS developments in North-Eastern Romania, for the improvement of the natural gas supply of the area, as well as to ensure transportation capacities to the Republic of Moldavia**	The performance of this project will improve the supply with natural gas in North-Eastern Romania, the necessary pressure and the natural gas transportation capacity of 1.5 bil mc/year will be ensured in the interconnection point between the natural gas transportation systems of Romania and of Republic of Moldavia. Project's classification in international plans • TYNDP ENTSOG 2020: TRA-F-357	• The building of a new natural gas transportation pipeline DN 700, Pn 55 bar, in the direction Onești–Gherăești, 104.1 km long; the layout of this pipeline will be largely parallel to the existing pipelines DN 500 Onești–Gherăești • The building of a new natural gas transportation pipeline DN 700, Pn 55 bar, in the direction Gherăești–Letcani, 61.05 km long; this pipeline will replace the existing pipelines DN 400 Gherăești–Iași in the Gherăești–Letcani section; • The building of a new Gas Compression System in	For the construction, the foreseen completion deadline is the year 2021.

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
			Onești, with an installed power of 9.14 MW, 2 compressors of 4.57 MW each, one active and one reserve; • The building of a new Gas Compression System in Gherăești, with an installed power of 9.14 MW, 2 compressors of 4.57 MW each, one active and one reserve;	
7.5.	**Amplification of bidirectional transport channel Bulgaria-Romania-Hungary-Austria (BRHA stage 3)**	In the hypothesis where the transportation capacities necessary for the capitalization of the natural gas from the Black Sea on the Central-Western European markets exceed the transportation potential of the BRHA Phase II channel, TRANSGAZ has planned the development of the central channel, which practically follows the layout of some pipes from the actual system, but which presently function at inadequate technical parameters for a main pipeline. The projects are collected on the updated list (List 3/2017) of the common interest projects, as an Appendix to Regulation 347/2013, included in position 6.24. 10.-2 under the name "Group of projects providing for the stage-by-stage increase of the capacity of the bidirectional transport channel Bulgaria-Romania-Hungary-Austria (presently known as ROHUAT/BRHA), which will allow 1.75 bil. mc/year during the first stage, and 4.4 bil. mc/year during the second stage, with the possibility to takeover even new resources from the Black Sea during the second and third stage".	The development of this natural gas transportation channel supposes the following: • Restoration of existing pipelines belonging to NTS; • Replacement of existing pipelines belonging to TNS with new pipes or building new pipelines, installed in parallel to the existing ones; • The development of 4 or 5 new compression systems, with a total installed power of about 66-82,5MW; • Increase of natural gas transportation capacities towards Hungary by 4.4 bil mc/year. For optimization and efficacy purposes, the channel has been divided in two projects: *1. The provision of reversible flow on the Romania-Hungary interconnection*, which states: • New natural gas transportation pipeline Băcia–Hațeg–Horia–Nădlac, of about 280 km in length • Two new natural gas compression systems, located along the pathway. *2. TNS development between Onești and Băcia:* • Rehabilitation of pipeline sections; • Replacement of existing pipelines with new ones, with greater diameters and operating pressure; • Two or three new natural gas compression systems	The accomplishment of this project depends on the evolution of the capacity requirement, respectively on the results of the exploration processes / exploitation of the natural gas deposits in the Black Sea or in other on-shore perimeters, and a final investment decision will only be made when the additional capacities requirement is confirmed by reservation agreements and contracts.
7.6.	**New developments of NTS in order to takeover of natural gas from the Black Sea shore.**	The goal of the project is the creation of an additional point to takeover the natural gas supplied by the submarine exploitation perimeters in the Black Sea. Project's classification in international plans • PCI project (third list): 6.24.10 - 3 part of the "Group of projects providing for the stage-by-stage increase of the capacity of the	• Natural gas transportation pipeline, of about 25 km in length and DN 500 in diameter, from the Black Sea shore and up to the existing international natural gas transportation pipeline T1. • Transportation capacity - 1.23 bil mc/year	The building permit has been obtained. Execution works are in progress. Estimated completion date: year 2021

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
		bidirectional transport channel Bulgaria-Romania-Hungary-Austria (presently known as ROHUAT/BRHA), which will allow 1.75 bil. mc/year during the first stage, and 4.4 bil. mc/year during the second stage, with the possibility to takeover even new resources from the Black Sea during the second and third stage". • TYNDP ENTSOG 2020: TRA-F-964		
7.7	**Interconnection Romania-Serbia - interconnection of the Natural Gas National Transportation System with the similar Serbian natural gas transportation system**	Reinforcement of the degree of interconnectivity between the natural gas transportation systems in the EU member states and the increase of the energetic security in the region. Project's classification in international plans • TYNDP ENTSOG 2020: TRA-N-1268	The analyzed option to export natural gas to Serbia is to take the natural gas from the future BRHA pipeline (Stage I). The project presumes to build a new natural gas transportation pipeline, which will ensure the connection between the main natural gas transportation pipeline 'BRHA' and the Mokrin Technological Junction in Serbia. The project will include the following: • Building a new interconnection pipeline on the direction Recaș–Mokrin, of about 97 km in length, out of which about 85 km on Romanian territory and 12 km on Serbian soil, with the following features: o Pressure in BRHA pipeline Recaș area: 50-54 bar (PN BRHA–63 bar); o Diameter of the interconnection pipeline DN 600; o Transportation capacity: max. 1 bil. Smc/an (115 000 Smc/h), press. in Mokrin: 48,4- 52,5 bar; o Transportation capacity: max. 1.6 bil. Smc/an (183 000 Smc/h), press. in Mokrin: 45,4- 49,9 bar; • Erection of a natural gas measurement system (located in Romania).	In process of obtaining the building permit. Estimated term for commissioning: year 2023
7.8	**Upgrading of GMS Isaccea I and GMS Negru Vodă 1**	• The project is undertaken to fulfill the requirements of the Interconnection Convention for Isaccea I Interconnection Point, concluded with PJSC Ukrtransgaz, Ukraine, on 19.07.2016 and the Interconnection Convention for Negru Vodă 1 Interconnection Point, concluded with Bulgartransgaz, Bulgaria, on 19.05.2016	Building of two new natural gas measurement systems replacing the existing ones. In the case of GMS Isaccea I, the system will be built within the existing system, and in the case of GMS Negru Vodă 1, in a location close to the existing system.	GMS Isaccea 1 – finalised Estimated term for commissioning GMS Negru Voda 1 – year 2021

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
		Project's classification in international plans • TYNDP ENTSOG 2020: TRA-N-1277		
7.9	**Interconnection of the natural gas national transportation system with the Ukrainian natural gas transportation system, on the direction Gherăești – Siret**	• The project offers the increase of the degree of interconnectivity of the natural gas national transportation network to the natural gas European network, by the interconnection of the TNS with the Ukrainian natural gas transportation system, on the direction Gherăești – Siret. Project's classification in international plans • TYNDP ENTSOG 2020: TRA-N-596	• The building of a natural gas transportation pipeline, 130 km in length, and its afferent installations, on the direction Gherăești – Siret; • The building of a crossborder gas measurement system; • The amplification of the Onești and Gherăești compression systems, if necessary	Transgaz has elaborated the pre-feasability study. The project is subjected to the performance of the strategic project 7.4. The foreseen completion deadline - year 2026, but is subject to the establishment of the parameters for the interconnection point and on the implementation diagram of the project on Ukrainian territory.
7.10	**Development / Upgrading of natural gas transportation infrastructure in North-Western Romania**	The goal of the project is to create new natural gas transportation capacities or to increase the existing ones	• The building of a natural gas transportation pipeline and its afferent installations, on the Horia–Mediașu Aurit direction; • The building of a natural gas transportation pipeline and its afferent installations, on the Sărmășel–Mediașu Aurit direction; • The building of a natural gas transportation pipeline and its afferent installations, on the Huedin–Aleșd direction; • The building of a natural gas compression system in Mediașu Aurit	The project is in an incipient stage, only the Feasibility Study being completed. The project will be developed considering the major importance projects already running, which will be performed on Romanian territory (BRHA gasoduct (7.1.), Marea Neagră–Podișor pipeline (7.2), the Romanian interconnection pipeline with the Republic of Moldavia (7.4.).
7.11	**Increase of the natural gas transportation capacity of the Romania-Bulgaria interconnection, on Giurgiu-Ruse direction**	The project is performed in order to fulfill the obligations undertaken by the Memorandum on the cooperation for the performance of the Vertical Corridor, concluded between SNTGN Transgaz SA, Bulgartransgaz, DESFA SA, FGSZ Ltd. and ICGB AD.	• The building of a natural gas transportation pipeline and its afferent installations; • The building of a new undercrossing of the Danube; • Amplification of GMS Giurgiu.	The project is in an incipient stage, only the Feasibility Study being completed, the capacities to be developed part of this project will be set out subsequently, based on which the final technical solution being elaborated.

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
7.12	**Eastring–Romania**	The EASTRING project, promoted by EUSTREAM, is a bidirectional flow pipeline for Central and South-Eastern Europe, with the purpose of connecting the natural gas transportation systems in Slovakia, Hungary, Romania and Bulgaria, to gain access to the natural gas deposits in the Caspian region and in the Middle East. EASTRING will offer the most profitable, direct transportation route between the gas platforms in the West of the European Union and the Balkan Region / Eastern Turkey - an area with a very high potential to provide gas from various sources. With this possibility to diversify the transportation routes, as well as the supply sources, the safe supply of the entire region will be ensured, mainly to the South-East European countries. Project's classification in international plans • PCI project (third list): 6.25.1: • TYNDP ENTSOG 2020 (Eastring–Romania): TRA-N-655	Interconnection bidirectional flow gasoduct, with an annual capacity between 225.500 GWh and 451.000 GWh (about 20 bil mc and up to 40 bil mc), which connects Slovakia to the external EU border by Bulgaria, Hungary and Romania. • Stage I - will ensure a maximum capacity of 20 bil mc/year; • Stage II- will ensure a maximum capacity of 40 bil mc/year.	Feasibility study elaborated. Foreseen completion deadline: year 2027 for Stage 1 year 2030 for Stage 2.
7.13	**Monitoring, control and data acquisition system for cathodic protection systems afferent to the Natural Gas National Transportation System**	The implementation of the acquisition, command and monitoring system for the cathodic protection system will provide an increase durability and safety in the exploitation of transport pipelines, a simple operation of a complex protection system of the pipelines, with reduced maintenance expenses. The system will provide information on the pipeline's electrical safety, as well as for the intrinsic cathodic protection (without external cathodic current source), providing information in certain points or sections, for a restrictive rectification of the dispersion currents to alternative current induced in the pipeline.	The centralized cathodic protection system will provide the opportunity to setup, monitor and clear and precise remote operation of the system's interest points, will eliminate data reading costs, will avoid situations where, due to adverse weather, data reading is impossible and human errors, will allow assigned control of locations, will reduce operating and maintenance costs and will considerably reduce the configuring times.	Transgaz has elaborated and endorsed the Feasibility Study. Foreseen commissioning deadline: year 2023.
7.14	**Development of SCADA system for the Natural Gas National Transportation System**	The upgrading of the natural gas transportation infrastructure must be supported, in the following years, by the development of a top of the range, flexible SCADA system, by the upgrading of the hardware and software architecture, migrating towards a decentralized architecture, with the control distributed on organizational administrative units, according to the SNTGN TRASGAZ S.A. structure.	The project will include the following: • Analysis of the possibilities to optimize the SCADA system's architecture; • Upgrading/replacing, at national/territorial SCADA control rooms of morally and physically obsolete hardware equipment; • The provision of a hardware / software capacity reserve, at the level of national/territorial SCADA control rooms; • The additional integration of about 170 MAS (Measurement Adjustment Systems), functional at TNS level; • The provision of a continuous transmission and	Feasibility study - pending completion. Foreseen commissioning deadline: year 2023.

Project code	Name of TYNDP project	Reasoning / Project importance	Summary of technical features	Project's development stage
			monitoring in real time to the national and territorial SCADA dispatch rooms of the relevant and necessary technological parameters as part of TNS objectives, for the monitoring and operation of TNS under safety, efficiency and environmental protection conditions; • The integration of new local automations, which will be commissioned by 2022; • The installation of systems of the SCADA Intrusion Detection System LAN SCADA type; • The installation of a simulation and PMS (Pipeline Monitoring Software) system or a NSM (Network Software Management) system; • The identification and provision of technical solutions regarding the security of industrial data network where the data acquisition and control systems are installed; • The analysis of technical opportunities regarding the designing and creation of an emergency dispatch room.	
7.15	**Upgrading of GMS Isaccea 2 and GMS Negru Voda 2 to achieve the bidirectional flow on pipeline T2**	To provide the bidirectional flow at the border with Ukraine and Bulgaria on the transit pipeline T2, the upgrading of natural gas measurement systems GMS Isaccea 2 and GMS Negru Vodă 2 is a must.	The GMS Isaccea 2 will be fitted with a separation/filtration installation and with a measurement installation. The GMS IsacceaNegru Vodă 2 will be fitted with a separation/filtration installation and with a measurement installation.	The projects will be developed depending on the market demand assessment results for the interconnection points located on T2 and T3 pipelines, on transportation direction Bulgaria-Romania-Ukraine (the trans-Balkan channel)
7.16.	**Upgrading of GMS Isaccea 3 and GMS Negru Voda 3 to achieve the bidirectional flow on pipeline T3**	To provide the bidirectional flow at the border with Ukraine and Bulgaria on the transit pipeline T3, the upgrading of natural gas measurement systems GMS Isaccea 3 and GMS Negru Vodă 3 is a must.	The GMS Isaccea 3 will be fitted with a separation/filtration installation and with a measurement installation. The GMS IsacceaNegru Vodă 3 will be fitted with a separation/filtration installation and with a measurement installation.	
7.17.	**TNS interconnection to GNL Terminal, located at the Black Sea shore**	Will provide the takeover of natural gas from the Black Sea shore, using a GNL terminal.	The building of a natural gas transportation pipeline, of about 25 km in length, from the Black Sea shore and up to pipelines T1 and T2. The capacity and design pressure of this pipeline will be established depending on the natural gas quantities available at the Black Sea shore.	The project is in its incipient stage.

In addition to these strategic projects, TYNDP also envisages a number of projects included in the Upgrading and Investments Development Plan for the Natural Gas National Transportation System for 2018-2022, presented in Annex 2.

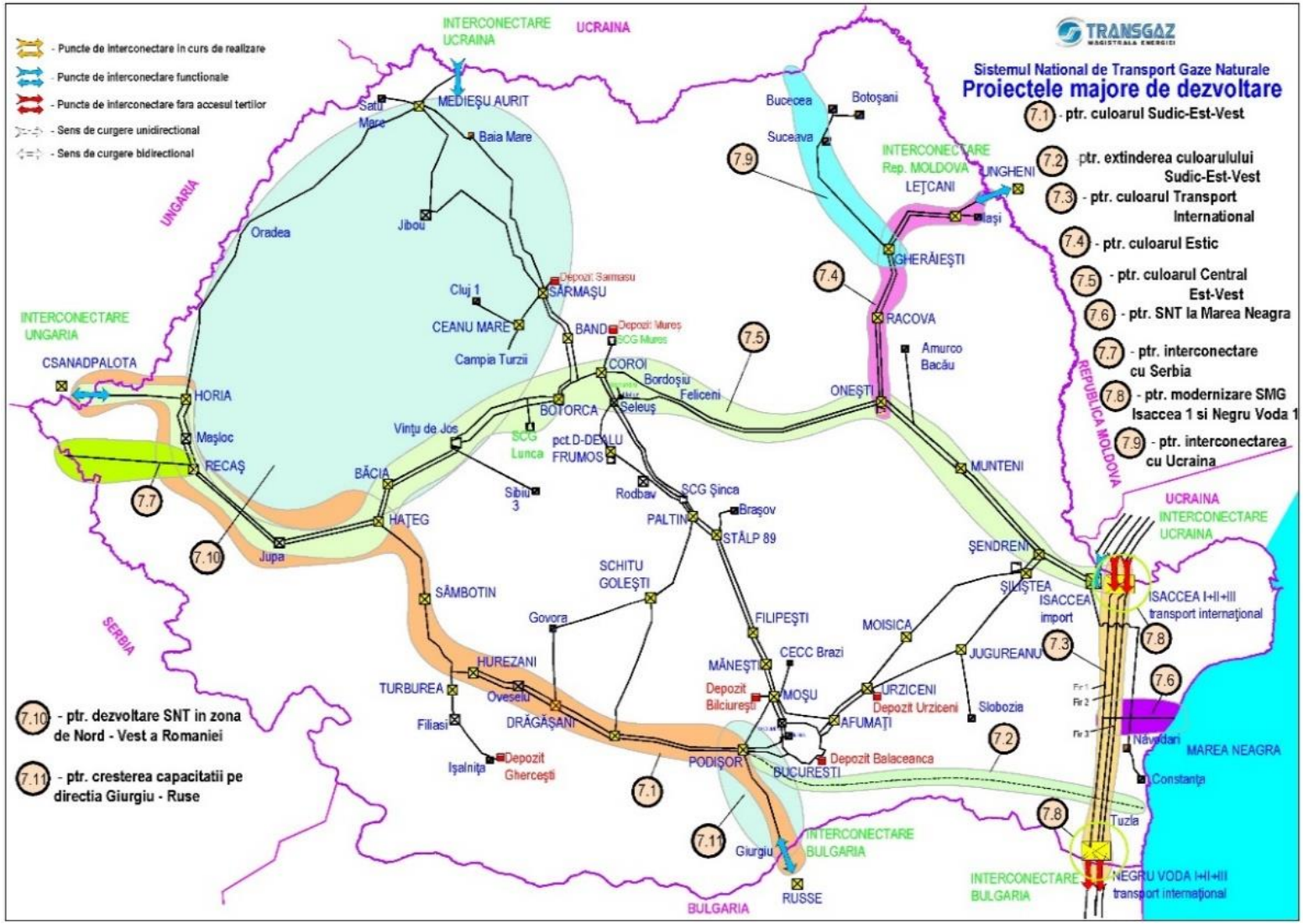


Fig 3. Map of the main NTS projects, 7.12 Eastring project excluded (source TYNDP 2021-2030)

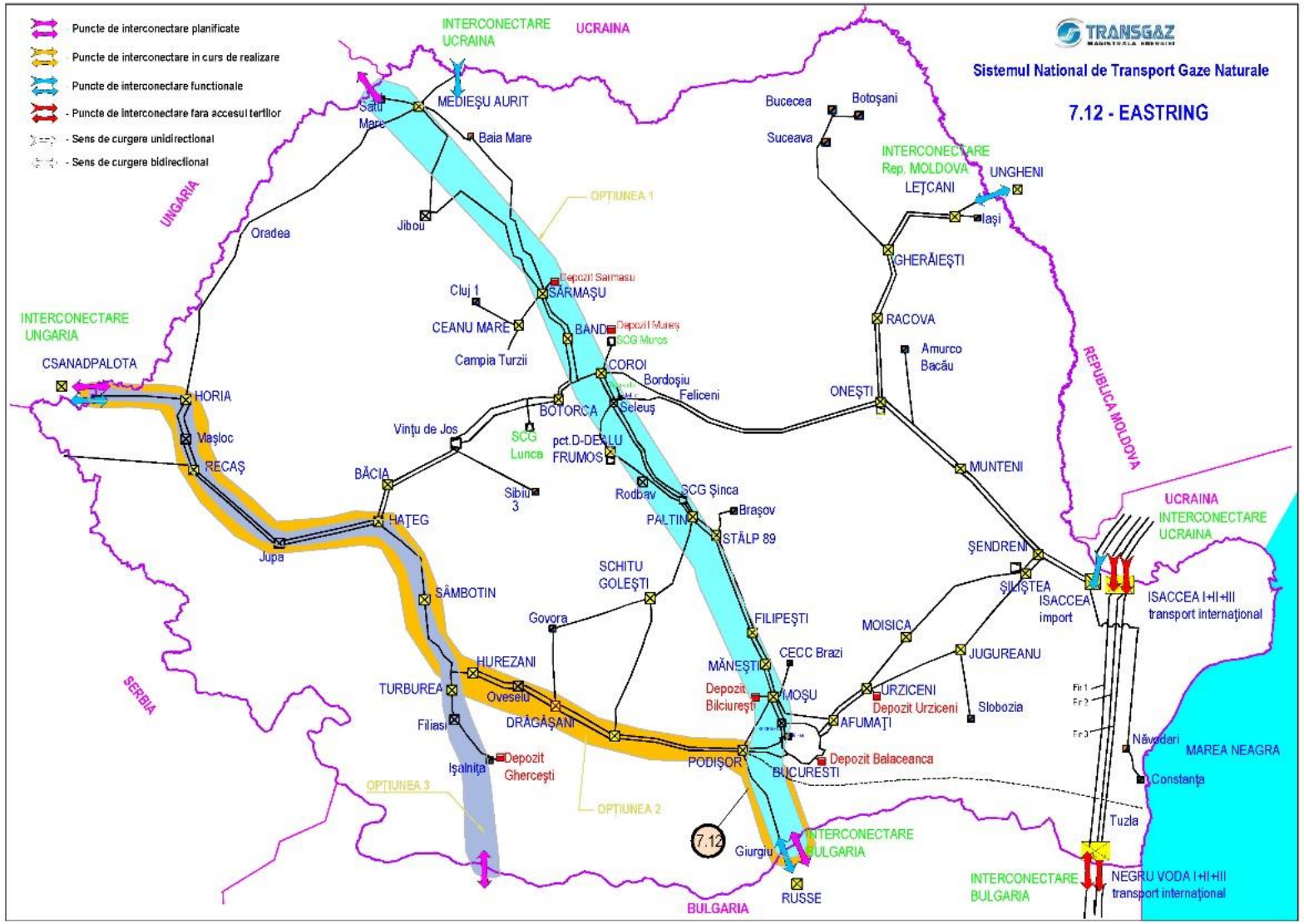


Fig 4. Map of the 3 itinerary options proposed for the strategic project 7.12. Eastring (source TYNDP 2021-2030)

In addition to these strategic projects, TYNDP also has foreseen a number of 75 projects included in the Plan for modernization and development of investments for the natural gas national transport system in the period 2020-2023, presented in Annex 2.

2.2.4. Underground storage of natural gas

Underground storage of natural gas plays a major role in ensuring a safe supply of natural gas, facilitating the balancing of the consumption-internal production-natural gas import, by covering the consumption peaks caused mainly by temperature variations, as well as the upkeeping of the optimal functioning features of the natural gas national transportation system, in order to obtain technical and economical advantages.

Underground storage facilities are used mainly to:

- Cover consumption peaks and demand's fluctuating regime;
- Operative recovery of functional parameters of the transportation system (pressures, yields);
- The control of deliveries in extreme situations (cessation of the sources, accidents, etc.).

Also, the underground storage of natural gas has the strategic role to provide the supply of natural gas from storage facilities, in cases of force majeure (natural disasters, earthquakes and other unforeseen events).

The activity of underground storage of natural gas is a regulated activity and can only be performed by NAER licensed operators. The General Emergency Ordinance 106/2020 for the amendment and completion of the Law on electricity and natural gas no. 123/2012, as well as for the amendment of some normative acts, eliminates this requirement starting with April the 1st, 2021.

The underground storage capacity of natural gas is provided in Romania by 6 underground natural gas storage facilities, with a total active capacity of 33.2758 TWh per storage cycle, respectively an injection capacity of 270.4450 GWh/day and an extraction capacity of 345.550 GWh/day, managed by two storage system operators:

- *SNGN ROMGAZ SA - natural gas storage branch DEPOGAZ Ploiești SRL*, which holds the license to operate 5 underground natural gas storage facilities, with the cumulated active capacity of 30.1213 TWh per cycle, respectively 90.6% of the total storage capacity and
- *SC Depomureș* SA operating the underground natural gas storage facility in Târgu Mureș, with the active capacity of 3.1545 TWh per storage cycle, representing 9.4% of the total storage capacity.

Table 5. Capacity of the underground storage facilities

Underground storage facility	Storage facility operator	Active Capacity	Extraction capacity	Injection Capacity
		TWh/cycle	GWh/day	GWh/day
Bălăceanca	Depogaz	0,5452	13,1760	10,9800
Bilciurești	Depogaz	14,3263	152,7820	109,1300
Ghercești	Depogaz	1,6343	21,4000	21,4000
Sărmășel	Depogaz	9,5987	79,0350	68,4970
Urziceni	Depogaz	4,0168	50,1570	33,4380
Târgu Mureș	Depomureș	3,1545	29,0000	27,0000
Total		**33,2758**	**345,5500**	**270,4450**

2.2.5 Development directions of the natural gas storage system

The list of the natural gas storage projects, proposed by TYNDP 2021-2030, is presented in the table below.

Table 6. List of the natural gas storage projects, proposed by TYNDP 2021-2030

Project code	Name of project / Operator	Project goal	Proposed upgrading actions	Development stage
Operated by N.G.N.S. ROMGAZ SA - natural gas storage branch DEPOGAZ Ploiești SRL				
8.1.	**Upgrading of the natural gas storage system's infrastructure in Bilciurești**	The goal of the project is to increase the daily supply capacity of natural gas from the storage in Bilciurești up to a yield of 20 million mc/day and to provide an increased degree of exploitation safety	The project will include the following: • Modernization of the Bilciurești groups separation, measurement and drying installations; • Systematization and modernisation of the natural gas aspiration / discharge pipeline system and upgrading of the cooling system in the Butimanu gas compression station; • Modernisation of 39 injection / extraction drills; • Boring of 4 new drills; • New natural gas transportation pipeline (11 km) between the storage in Bilciurești and Butimanu gas compression station.	The project is during its designing phase. Foreseen completion deadline: 2025
8.2.	**Increase of the natural gas underground storage capacity of the storage facility in Ghercești**	The goal of the project is the addition to the natural gas storage system's infrastructure in Ghercești, to provide operating conditions at the capacity of 600 million m3/cycle	The project will include the following: • Gas Compression Station; • Expansion of gas drying and measurement installations; • Upgrading of 20 injection / extraction drills; • Interconnection of Ghercești storage with TNS; • Gas inactive stock;	The project is in its incipient stage. Foreseen completion deadline: 2026
8.3	**New natural gas underground storage facility in Moldavia**	The goal of the project is to develop a new underground storage facility in North-Eastern Romania (the Moldavia region). Conversion into an underground storage facility of one or of several depleted fields amongst the following: Pocoleni, Comănești, Todirești or Davideni.	• Capacity of about 200 million m3/cycle; • Injection capacity of about 1.4 million m3/day; • Extraction capacity of about 2 million m3/day. The project will include the following: • Natural Gas Compression System; • gas drying and measurement installations; • Technological installations injection / extraction drills; • Boring of injection / extraction drills; • Storage facility interconnection to NTS; • Natural gas inactive stock;	The project is in its incipient stage. Foreseen completion deadline: 2029
8.4	**Increase of the natural gas underground storage capacity of the storage facility in Sărmășel**	The goal of the project is the development of the existing underground storage facility in Sărmășel, by increasing its capacity from 900 million m3/cycle to 1550 million m3/cycle (a 650 million m3/cycle increase), the increase of the injection capacity by 4 million m3/day, to a total of 10	The project will consist of: • 38 drills; • 48.6 km supply pipes; • 8 groups of drills; • 19.2 km of collecting pipes;	The project is in its incipient stage. Foreseen completion deadline: 2026.

Project code	Name of project / Operator	Project goal	Proposed upgrading actions	Development stage
	(Transilvania)	million m3/day, the increase of the extraction capacity by 4 million m3/day, to a total of 12 million m3/day, by increasing the compression capacity. From technical point of view, the project consists of drilling new wells, building a modern surface infrastructure, compliant with the requirements of European safety and control standards, expanding gas compression stations, modernizing and optimizing existing separation and fiscal measures	• 3 compression units; • 2 gas drying installations; • separation and measurement installation (SMI); • renewable energy production system; • connection to the National Natural Gas Transmission System (NGT). The development and modernization of the warehouse will be done in the current operation perimeter;	
Operated by SC Depomureș SA				
8.5	**Storing unit - Depomureș - re-engineering and development of natural gas underground storage facility in Târgu Mureș**	The goal of the project is to re-engineer and develop the natural gas underground storage facility in Târgu Mureș, to improve the storing technical conditions and to increase the performance of the supplied services, especially in the context of the actual dynamics of the natural gas market. The development project of Depomureș was declared in 2013 a Common Interest Project (CIP) by the European Committee. The project is included on the Common Interest Projects' list in force, in the NSI Gas corridor (Central and Eastern Europe region), bearing the reference no. 6.20.4.	This project's main objectives are: • To increase the storage facility's flexibility by increasing its daily injection and extraction capacity from the present average of about 1.7 million mc/day to about 3.5 million mc/day after the implementation of stage 1 of the project, respectively to about 5 million mc/day after the implementation of stage II of development, • The increase of the useful volume to 400 million during a first stage (Stage 1), respectively to 600 million mc during a subsequent stage (Stage 2). The project will mainly consist in the following: • Central gas plant (gas compression and drying units, bidirectional gas measurement commercial panel, adjacent facilities); • New storage collector; • upgrading;	The project is in the process of obtaining the final investment decision.Foreseen completion deadline for Stage I - year 2023. Stage 2 will start only after the completion of Stage 1 implementation.

2.2.6 **Benefits of the Projects**

Romania aims to become an energetic pole in Eastern Europe, from the point of view of creating a natural gas transportation network strongly interconnected with similar natural gas transportation networks in the region, as well as from the natural gas supply point of view.

The three main directions in which Romania must work and develop to achieve this status are:

- The interconnection of the natural gas and electricity networks and the creation of the physical and institutional infrastructure necessary for the operation of a liquid energy market;
- The development of new, endemic sources of natural gas and the integration on regional electricity markets;
- The observance of the European energetic policies, the increase of the negotiation capacity within the EU institutions and the collaboration with other member states in supporting the common strategic goals.

By its significant resources and by the opportunities offered by its geographic location, Romania is able to offer itself an elevated degree of energetic security and regional integration.

Today, the cross-border interconnection of the networks is a priority in Romania's energetic policy. To answer the requirements of the European Union's energy policy, based on three fundamental objectives: energetic safety, durable development and competitiveness, SNTGN Transgaz SA has provided in its management plan for the period 2017-2021 the increase of the level of adequacy of its natural gas transportation network, in order to ensure the interoperability with the neighboring systems, the development, rehabilitation and upgrading of natural gas transportation infrastructure, the improvement of efficiency and the interconnection with the natural gas transportation systems of neighboring countries.

Any natural gas and electricity production development or of diversification of external import sources needs an adequate transportation infrastructure. By achieving the objectives set forth in the 10-year Development Plan, 2021-2030, Transgaz wishes to become an important natural gas transportation operator on the natural gas international market, with a transportation system which is upgraded, smart and integrated at European level and with a modern management system, aligned to the international performance standards and laws.

Based on the significant dependence of the European energy market in the import of energetic resources from Russia and Middle East, the role of natural gas reserves discovered in the Black Sea is, undoubtedly, of major importance for Romania's energetic safety, for the reinforcement of Romania's role as an important EU player as energy producer and exporter, for the inclusion of the country in the main European gas transportation channels and for the increase of the economic well-being in the following decades.

Taking a peek in 2030, with the necessary interconnections, Romania will have several natural gas import options:

- Using the liquefied natural gas (LNG) regional terminals in Greece, Croatia and Poland, the Romanian market will be able to purchase gas from the Levantine Basin (Eastern Mediterranean);
- Using the Bulgaria-Romania interconnection, Caspian gas can be imported from the Southern Gas Corridor

To provide connections between the various natural gas supply sources and the European market, the investment projects proposed by TYNDP 2021-2030 contribute in the achievement of the European Union desiderata, the main benefits of their performance being summarized below:

- The integration of the natural gas market and the interoperability of the regional natural gas transportation systems;

- Convergence of the price of natural gas in the region;
- The increase of the European natural gas transportation system's flexibility by performing bidirectional flow interconnections;
- The opening of Romania and European Union's access to a new natural gas source - by the interconnection of BULGARIA-ROMANIA-HUNGARY-AUSTRIA with the Black Sea;
- The increase of the competition on the European natural gas market by diversification of sources, transportation itineraries and of active companies in this region;
- The increase of natural gas supply security;
- The reduction of the degree of dependence in natural gas imports from Russia;
- The impulsion of regional renewable energy production (especially wind and solar energy), considering the possibility to use natural gas as a second choice for renewable energies, a fact leading to the significant increase of the sustainability degree of proposed projects.

As an EU member state, Romania has chosen the path of natural gas market liberalization and the interconnection of TNS to neighboring states' transportation networks. This has allured significant Romanian and international investments in the exploitation and development of new deposits, which have consolidated a long-term elevated degree of availability of natural gas in the national economy.

The development in the natural gas sector is also privileged by market trends: the evolution towards the decarbonation of energetic sector, the flexibility in the production of electricity, complementarily with the renewable energy sources, geographical distribution, etc. But the importance o the energetic policies, of the legislative and regulatory decisions remains a deciding factor (the establishment of an equitable fiscal framework; the continuity of natural gas market liberalization; the development of essential gas infrastructure - TNS, underground storage, interconnections, inter-operable functioning rules of the natural gas system, etc.).

To these conditions is largely linked the capitalization, for at least the following decades, of a substantial natural resources potential, with a significant economic impact on the Romanian economy. On these depend well-paid jobs, substantial contributions in the state budget, the removal of energetic safety risks and the opportunity for Romania to achieve a prestigious and influential regional position in the energetic sector.

2.3 CONNECTION WITH OTHER PLANS AND PROGRAMS

The analysis presented in the table below has included going through a number of 15 strategies / plans / programs which are directly relevant to TYNDP, while identifying the correlation elements between them and TYNDP 2021-2030.

We mention that part of the plans, programs and strategies have taken the steps regarding the environmental strategic assessment procedure, some of them are pending deployment regarding the environmental strategic assessment procedure, and for some the environmental strategic assessment procedure was not initiated yet.

Table 7. TYNDP 2021-2030 relationship with other plans and programs

No.	Document name	Summary document presentation	Connection of the strategy / plan / program with TYNDP
1.	EU Energy Policy	EU Energy Policy is crystallized around a set of measures with the purpose of achieving an integrated energetic market and insuring the energy supply security and the durability of the energetic sector. Its main objectives are: • To ensure the internal energetic market's functionality and the interconnection of energetic networks; • To ensure the energy supply safety in the EU; • To promote energetic efficiency and energy preservation; • To decarbonize the economy and to make the transition towards an economy with low carbon dioxide emissions, according to the Paris Convention; • To promote the development of new types of renewable energy, for a better alignment and integration of the objectives on climate change, as part of the new market organization; • Promotion of research, innovation and competitiveness.	One of the prioritizing criteria of the projects proposed by TYNDP is the relationship with the EU's energetic policy. This indicates that the proposed TYNDP 2021-2030 observes the requirement observes the requirements of the European energetic policy and envisages the same objectives: • To ensure a safe supply of natural gas; • To increase the degree of interconnectivity of the natural gas national transportation network to the European network; • To increase the natural gas transportation network's flexibility; • The liberalization of natural gas' market; • To integrate the natural gas market at the level of the European Union;
2.	The EU strategy for liquefied natural gas and for gas storage, COM(2016) 49 final, February 16th 2016	Sets forth the following: • The supplementation of the missing infrastructure - the LNG infrastructure, storing infrastructures, connection to LNG markets and storage capacities, • Completion of gas internal market: commercial, legal and regulatory features Highlights the importance of using LNG as alternative fuel in transports and in the production of thermal and electrical energy and the role of natural gas storage to secure gas supply.	The proposed TYNDP 2021-2030 provides actions / expansion projects / upgrading of natural gas storage facilities and of the natural gas transportation infrastructure, by interconnecting the TNS with the LNG Terminal located on the Black Sea shore (strategic project 7.17.).
3.	Leading principles for the durable territorial development of the European Continent, Conference of the Council of Europe of	Principle no. 8 relates with the Proposed Plan: *The development of energetic resources to maintain security* (43) Spatial planning supports the promotion of renewable energy sources as coherent systems in the territory and environment-friendly, as well as the supplementation of energy transport networks at Pan-European level. Particularly, the organization of energy transportation networks (oil and gas) in the North Sea region, from the Caspian Sea and from Oriental Russia towards Europe, will be promoted.	TYNDP proposes the interconnection of TNS to the European transport system, as well as the access to the gas sources in the Caspian Sea and the Black Sea. Natural gas can be used as a second choice in the production of renewable energy (especially wind and solar energy).

No.	Document name	Summary document presentation	Connection of the strategy / plan / program with TYNDP
	Ministers responsible for Spatial Planning (CEMAT 2000)		
4.	Territorial Development Strategy of Romania (TDSR) polycentric Romania 2035 - territorial cohesion and competitiveness, development and equal chances for people	TDSR represents the Romanian Government and Parliament's vision on the development of the national territory for 2035 time frame: Romania of 2035 is a country with an efficiently managed, functional territory, providing attractive living and habitation conditions for its citizens, and plays an important role in the development of South-Eastern Europe.	The plan contributes in the achievement of the following objectives of NTDS by the proposals of expansion and rehabilitation of the natural gas transportation infrastructure, in order t provide an efficient connection of localities and the consolidation of the exportation capacity: • OG. 1 The provision of a functional integration of the national territory in the European space, by supporting the efficient interconnection of the energetic transportation and broadband networks • OS 1.3 Reinforcement of the energy transport infrastructure and its connection to regional and national impact Pan-European projects.
5.	National Strategy for Romania's Durable Development - Horizons (2010 - 2020 - 2030)	The National Strategy for Romania's Durable Development 2030 supports Romania's development on 3 main poles: economic, social and environmental. Objective no. 7 of the Strategy "Green Energy for Accessible Prices" is in connection with TYNDP 2021-2030. This objective is about ensuring all people with access to reasonably priced energy, in a safe, durable and modern manner; energetic infrastructure; energetic safety; access to energy; renewable energy and energetic efficiency. TARGETS for the year 2030: • Expansion of the electricity and natural gas transport and distribution networks, in order to ensure the access of domestic, industrial and commercial consumers to safe energy sources, for acceptable prices, • The provision of cybernetic security of natural gas and electricity production, transport and distribution networks' monitoring platforms. • Separation of the economic growth from the resources' depletion process and from environmental degradation by considerably increasing the energetic efficiency (with minimum 27% as compared to the status-quo scenario) and the extensive usage of the EU ETS schedule, under predictable and stable market conditions.	TYNDP 2021-2030 proposes investments contributing in the achievement of the targets set forth in the Strategy (expansion of natural gas transportation networks, provision of cybernetic security of the natural gas transport networks' monitoring platforms, the provision of the infrastructure necessary to increase the weight of the renewable energy sources and of low carbon content fuels in transportation).

No.	Document name	Summary document presentation	Connection of the strategy / plan / program with TYNDP
		• The increase of the weight of renewable energy sources and of low carbon content fuels in the transportation sector (electrical vehicles), including alternative fuels • The provision of a stable and transparent regulation framework in the field of energetic efficiency, to attract investments. • Strategic support of the electric energy weight in the total domestic, industrial and transportation consumption, by establishing performance standards for installations and devices	
6.	Large Infrastructure Operational Program 2014-2020	LIOP's main objective is to develop the transportation, environment, energy and risk prevention infrastructure, in economic growth and natural resources protection and efficient usage conditions. LIOP 2014-2020 sets forth in Priority Axis - PA 8 - Natural Gas and Electricity Transportation Intelligent and Sustainable Systems: OS8.2 - The increase of the interconnection degree of the natural gas national transportation system with other neighboring states and the achievement of the target regarding the transportation capacity of the natural gas national transportation system in interconnection points: target value until 2023: 20.0 bil. MC / year	TYNDP contributes in the achievement of the objective OS8.2 of LIOP. By performing the proposed projects is provided the achievement of the target regarding the natural gas transportation capacity in the interconnection points.
7.	National Integrated Plan in the Field of Energy and Climate Change (NIPFECC) 2021-2030 - version of April 2020	NIPFECC primarily integrates the objectives and directions set forth by the specific strategies in the energetic field, respectively those of climate change, in the same time being grounded on program documents also initiated by other ministries / authorities. The national integrated energetic and climate plans include national objectives, contributions, policies and measures for each of the five dimensions of the energetic union: • *Decarbonation*: - *GGE emissions and absorption* For Romania, the European Committee has set a reduction target by 2% in 2030 as compared to the level in 2005, whilst the average for EU is a 30% reduction. For the sectors object of the EU-ETS scheme, the main EU objective is to reduce the emissions amounting to about 44% until 2030 as compared to 2005. - *energy from renewable sources.* Considering that in 2017 the global weight of renewable energy in the final gross energy consumption has exceeded the 24% target assumed for the year 2020 (24,5% in 2017, acc. to Eurostat), as well as its expected evolution, the	The performance of the projects part of TYNDP directly contributes to the achievement of the PNIESC goals. In chapter 4.5.2.ii of PNIESC are included the *Provisions regarding the requirements for the expansion of electricity and natural gas networks at least by 2040 (including for 2030)*, the essential projects regarding the natural gas transportation infrastructure. TYNDP proposes the durable development of the entire TNS, by proposing massive investments in the rehabilitation and upgrading of the natural gas transportation network in the next 10 years, which will lead to the decrease of greenhouse gas emissions, the decrease of energy losses of the Transgaz network, the provision of energetic safety in Romania and in the region.

No.	Document name	Summary document presentation	Connection of the strategy / plan / program with TYNDP
		projections made based on the hypotheses used in the elaboration of PNIESC show the reach of a global weight of 30,7% RE by 2030. • *Energetic efficiency* - Romania's aim for 2030 is a primary energy consumption of 32.3 Mtep, respectively a final energy consumption of 25.7 Mtep. • Energetic safety - to ensure the energy consumption, the installed capacity will increase by about 35% in 2030 as compared to 2020, thanks to the installation of the new wind power capacities (of 2.302 MW by 2030) and solar power (of 3.692 MW by 2030), which will determine an increase of the internal energy production, thusly ensuring a higher degree or energetic independence. The reduction of the dependence on imports from third party countries, from a level of 20.8% foreseen in 2020, to 17.8% in 2030, representing one of the lowest levels of dependence on energy imports from the European Union • *Energy internal market* - interconnectivity of electrical networks; - energy's transportation infrastructure; - integration of markets. Romania's goal is to complete the electricity market liberalization process by the end of 2020, respectively that of the natural gas market by June 30th 2020. - energetic poverty. The reduction of the degree of energetic poverty and the protection of the vulnerable consumer, in order to guarantee the human rights, considering the achievement of the average level of EU member states of the year 2015 • *Research, innovation and competitiveness*.	
8.	DIRECTIVE 2014/94/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of October 22nd 2014 regarding the installation of the infrastructure for alternative fuels	The present directive creates a common framework of measures, set up for the installation of the alternative fuels infrastructure in the Union, in order to reduce to a minimum the oil dependence and to tame the impact of transport activities on the environment. Alternative fuels, according to the present directive, mean fuels or energy sources which serve, at least partially, as a substitute for fossil oil sources in the supply of energy for transport activities, and which have the potential to contribute in their decarbonation and to improve the environmental performance of the transports sector. They include, among others: electricity; hydrogen; biofuels; synthetic and paraffin fuels; natural gas, including	TYNDP, by its natural gas transportation projects, contributes in the achievement of this directive's objectives.

No.	Document name	Summary document presentation	Connection of the strategy / plan / program with TYNDP
	(adopted by GD 87/2018)	biomethane, in gaseous (compressed natural gas - CNG) and in liquid (liquefied natural gas - LNG) state, as well as liquefied petroleum gas (LPG).	
9.	ENERGETIC STRATEGY OF ROMANIA (ESR) FOR THE PERIOD 2020-2030 WITH A PERSPECTIVE ON YEAR 2050	The general objective of the Strategy is the growth of the energetic sector under sustainability conditions The objectives of the Energetic Strategy are: • Green energy and energetic efficacy; • To ensure the access to electrical and thermal energy for all consumers; • The protection of vulnerable consumer and the reduction of energetic poverty; • Competitive energy markets, based on a competitive economy; • Modernization of the energetic governance system; • Increase of education quality in the energy field and continuous training of the human resource; • Romania, regional supplier of energetic security; • The increase of Romania's energetic input on regional and European markets, by capitalization of the primary national energetic resources	To achieve its ESR objectives, TYNDP sets forth the performance of the following actions, spaced out in time: • The increase of the energy transport networks' interconnection capacities while establishing the gas transportation networks' channels, measures necessary to perform them and to ensure the financing sources for the development of bidirectional flow interconnection capacities and of the afferent components in the gas national transportation systems; • The provision of gas storage capacities; • The provision in due time of the infrastructure necessary for market access of the production from the new natural gas deposits.
10.	NATIONAL ACTION PLAN FOR ENERGETIC EFFICIENCY (NAPEE), approved by GD 122/2015	The objectives set forth in NAPEE IV regarding the improvement of energetic efficiency in natural gas networks are: • O1. Reduction of losses (technical and non-technical) • O2. Service quality • O3. Remote measurement; • O4. Management of the charge by a progressive introduction of actuations' automation and of remote controlling • O5. Interoperability By NAPEE IV, SNTGN TRANSGAZ SA has established a measures and investments program for a 5-year improvement of the energetic efficiency (2017-2021).	The increase of the energetic efficiency of the natural gas transportation network is set forth in NTSDP, by implementing measures to maximize the natural gas transportation network's energetic efficiency.
11.	National Strategy and action plan for the preservation of biodiversity 2014-2020 Approved by GD 1081/11.12.2013	By National Strategy and Action Plan for the Preservation of Biodiversity (NSAPPB), Romania undertakes, on average term 2014-2020, the following general strategic targets: • Target 1: To surcease the downfall of the biologic diversity, represented by genetic resources, species, ecosystems and landscape, and to restore the degraded systems by 2020. • Target 2: The integration of the policies on the preservation of biodiversity in all the sector's policies by 2020.	The projects proposed by TYNDP may have influences on protected areas. • During the selection process of the projects included in TYNDP, the Natura2000 component was considered, as well as the physical impact these projects might have on the preservation of the biodiversity and on the fragmentation of habitats. • The potential impact on biodiversity is analyzed during the

No.	Document name	Summary document presentation	Connection of the strategy / plan / program with TYNDP
		• Target 3: The promotion of innovative traditional knowledge, practices and methods and of green technologies as support measures for the preservation of biodiversity as a support of durable development by 2020. • Target 4: Improvement of communication and of education regarding biodiversity by 2020. The National Strategy and the Action Plan set forth specific actions for the TRANSPORT, ENERGY and EXPLOITATION OF NON-RENEWABLE RESOURCES: • Primary integration of biodiversity preservation when establishing energetic, transportation and exploitation of non-renewable resources policies and strategies (regarding transport); • The application of ESA, AEI and AA procedures in the transportation, energetic and exploitation of non-renewable resources infrastructure development projects.	feasibility study / project stage, and impact diminution / reduction measures are integrated (while stating elements which would allow the maintenance of natural habitats) and adequate monitoring programs for the projects proposed to be developed. • Each of projects proposed by TYNDP which can have influence on the protected areas is submitted to an adequate assessment.
12.	Culture and National Heritage Strategy 2016-2022	The Culture and National Heritage Strategy 2016-2022 (CNHS 2016-2022) is an average term document of public policies, mainly defining the Romanian Government's policy in the field, highlighting an horizon of the public activity for a balanced, durable and smart cultural development, to the benefit of all directly involved in cultural and social activities in their whole. General objectives • Capitalization of the cultural resources - local and regional identity elements - for a durable territorial development and a better quality of life • A better protection of the cultural heritage, based on knowledge of the situation and the creation of efficient partnerships (local-central and public-private).	During the analysis procedure of the projects included in TYNDP are taken into account the heritage elements which may exist along the designed transportation routes and their avoidance is attempted even since project stage.
13.	National Waste Management Strategy 2014-2020, approved by GD 870/2013	This document sets forth the policy and Romania's strategic objectives in the field of short (year 2015) and average (year 2020) term waste management . The approach in the field of waste management is based on 4 major principles: • To prevent the creation of waste - an extremely important factor of any waste management strategy, directly linked to the improvement of the production methods, as well as to determine the consumers to change their demand regarding products (to redirect towards green products) and to approach a greener lifestyle, thusly creating less waste; • Recycling and re-purposing - to encourage high levels of recovery of composing materials, preferably by recycling. In this sense, are mentioned a few waste flows for which recycling is a priority: packaging waste, obsolete	TYNDP does not have any specific objectives for the management of waste produced by the gas transportation sector. The building / upgrading works for the gas transportation infrastructure create waste. Such projects are also included on the investments list proposed by TYNDP. Even since the concept phase, opportunities for the prevention and reduction of the waste quantity being created during the entire life cycle of the projects have been considered.

No.	Document name	Summary document presentation	Connection of the strategy / plan / program with TYNDP
		vehicles, battery waste, electrical and electronic equipments waste; • Capitalization by other operations of non-recycled waste; • Final removal of waste - when waste cannot be capitalized, they must be removed in a safe manner for the environment and for the human health, using a strict monitoring program.	
14.	National Waste Management Strategy -2025-2020, approved by GD 942/2017	The NWMP provisions add to the provisions of NWMS as a main manner of approach, by which Romania would become a recycling society, to apply waste hierarchy for all types of waste subject of the planning.	
15.	The EU Regulation 2017/1938 from October 25th 2017 regarding the measures set forth to guarantee the gas supply safety, adopted by GD 32/2019 on the approval of the preventive actions plan regarding the guarantee of the natural gas supply security and of the Emergency Plan	• The Regulation sets forth provisions envisaging the guarantee of natural gas supply security, by ensuring the proper and continuous functioning of the internal natural gas market and by setting out certain exceptional measures which will be enforced when the market is no longer able to supply the necessary quantities of gas, setting out the clear definition and assignment of responsibilities, as well as the coordination of the answers at the level of the enterprises in the gas sector, of the member states and of the Union, in terms of preventive action, as well as regarding the reaction to actual cessations of supply. • The regulation makes available transparent mechanisms, for solidarity reasons, for the coordination of plans in case of emergency situations and the reaction to it at the level of member state, at regional or at Union level.	TYNDP observes the requirements of EU Regulation 2017/1938 of October 25th 2017. Transgaz must fulfill all the necessary measures so that, in the case where the natural gas "main structure" becomes faulty, the capacity of the remaining infrastructure has the capacity to satisfy the natural gas demand necessary for the calculated area for a day of maximum consumption demand (maximum daily consumption demand in the last 20 years).
16.	National Territory Management Plan (NTMP)	• NTMP is the support of complex and sustainable development, including of regional development of the territory and represents the specific contribution of our country to the development of the European space and the premise of enrollment in the dynamics of European economic and social development. • The National Territory Management Plan has a guiding character and substantiates the sectorial strategic programs on medium and long term and determines the dimensions, meaning and priorities of development within the Romanian territory, in accordance with all European requirements.	TYNDP is elaborated taking into account the development directions of the national territory approved by NTMP.

No.	Document name	Summary document presentation	Connection of the strategy / plan / program with TYNDP
		• The National Territory Management Plan – PATN – is elaborated on specialized sections, which are approved by law by the Romanian Parliament. • NTMP comprises the following sections - Section I – TRANSPORTATION NETWORKS (Law no. 363 from 21st of December 2006) - Section II - WATER (Law no. 171 from 24th of November 1997) - Section III – PROTECTED AREAS (Law no. 5 from 6th of March 2000) - Section IV – LOCALITIES NETWORK - Section V - NATURAL RISK AREAS (Law no. 575/ 2001) - Section VI – TOURISTIC AREAS (Law no. 190 from 26th of May 2009)	
17.	Sustainable development operational program (SDOP) 2021-2027	• The Sustainable Development Operational Program falls under the Policy Objective 2 (PO 2). The main areas to be financed through SDOP are energy efficiency, water and waste water, waste management, biodiversity, air quality, risk management. • Specific objectives for the SDOP in relation to TYNDP - Promoting energy efficiency and reducing greenhouse gas emissions	The performing of the projects included in the TYNDP directly contributes to the achievement of the specific objective of SDOP. TYNDP proposes the sustainable development of the entire NTS, by providing massive investments in the rehabilitation and the modernization of the natural gas transport network for the following 10 years, which will lead to the decrease of greenhouse gas emissions and reducing energy losses on Transgaz network.
18.	Updated National Management Plan related to the national part of the international hydrographic basin of Danube River which is included in the territory of Romania, 2016-2021 approved by GD 859/2016	• The National Management Plan related to the national section of the International Basin of Danube River aims for a long term protection of the water resources, a balanced and sustainable use and management of waste resources, as well as protection of aquatic ecosystems. • The general objective of the plan refers to the achievement of the „good condition/good potential" (both ecological and chemical) of surface and underground waters.	The investments proposed in the TYNDP must have a minimal impact on the environment in general and on the water bodies, the uses / activities mentioned in the Framework Water Directive. TYNDP covers the time period 2021-2030, that is why all the changes and measures which will occur once with the revise of the Management Plans of the Hydrographic Basins will be considered.

3 RELEVANT FEATURES OF THE PRESENT CONDITION OF THE ENVIRONMENT AND OF ITS PROBABLE EVOLUTION IN CASE OF NON-DEPLOYMENT OF THE PLAN

3.1 GENERALITIES

The assessment of the present condition of the environment was conducted based on data and information regarding the plan's area of influence, available during the elaboration of the Environmental Report. The environment's present condition's analysis was performed for each relevant environmental feature: air, water, soil, climate change, biodiversity, preservation / effective use of natural resources, human population and health, environmental risks, natural landscape, cultural heritage, energetic efficiency, waste management.

For a proper assessment of the possible effects of TYNDP's deployment or of its alternatives, an analysis of the present situation of the environment in the plan's influence area was performed, in order to identify the sensitive receptors in the area, as well as for the subsequent evolution of the environment in both scenarios:

- that of TYNDP's deployment;
- that of non-deployment - the "zero" scenario, where the condition of the environment will evolve without any input from the plan.

The strategic projects proposed by TYNDP have national coverage, the routes of the gas transportation pipelines being designed to be laid out across the administrative territory of 33 counties. In this context, the plan's influence area is the entire national territory, and therefore the relevant features of the present environment's conditions will be presented nationwide.

3.2 AIR

3.2.1 Air quality condition[1]

Nationwide, the air quality may be estimated from the results of the measurements performed using the monitoring network and the annual inventory of pollutant emissions in the atmosphere.

The monitoring of air quality is provided by the National System of Integrated Assessment and Management of Air Quality (NSIAMAQ), using the National Network for Air Quality Monitoring (NNAQM).

Law 104/2011 on environmental air quality regulates the nationwide assessment of the environmental air quality, based on common methods and criteria, established at European level (article 2, letter b).

The National Network for Air Quality Monitoring (NNAQM) consists in 148 stations which continuously monitor air quality, spread nationwide, out of which:

- 30 traffic type stations - they assess the traffic's influence on air quality. These stations have a coverage radius of 10-100 km and monitor the following pollutants: sulfur dioxide (SO2), nitric oxides (NOx), carbon monoxide (CO), ozone (O3), volatile organic compounds (VOC), and suspended powders (PM10 and PM2.5).

1 Source - Report on the environmental condition in Romania, 2019, NAEP

- 58 industrial type stations - they assess the industrial activity's influence on air quality;
- 37 urban background type stations - they assess the "human settlements'" influence on air quality;
- 13 suburban background type stations - they assess the "human settlements'" influence on air quality;
- 7 regional background type stations - they are reference stations for the assessment of air quality, and the radius of the representative area is of 200-500 km;
- EMEP-type stations which monitor and assess the air pollution in a long-distance cross-border context[2].

The air quality monitoring program includes the measurement of the concentrations in air of the following pollutants:

- sulfur dioxide (SO2),
- nitric oxides (NOx),
- carbon monoxide (CO)
- benzene (CCH6), ozone (O3),
- suspended powders from aerosols (PM10 and PM2.5).
- heavy metals, lead (Pb), cadmium (Cd), arsenic (As), nickel (Ni), from suspended powders and deposits (PM10 and PM2.5).

From the assessments performed by NNAQM at the background, traffic and industrial stations in the year 2019, it was assessed that the limit annual value for NO2 was exceeded in 6 stations, and for ozone, the target value has been exceeded in 20 stations. For PM10, Benzene, Pb, As, Cd and Ni the limit annual values / target values were not exceeded.

Below is presented **the evolution of air pollutants nationwide, between 2007 and 2018**[3]:

Nitric oxides (NOx),

The nitric oxides are the result of burning fuels in stationary and mobile sources, or from biologic processes. The nitric monoxide is the most often encountered nitric oxide, resulting from the combination, at elevated temperatures, of nitrogen with oxygen.

The main generators of NOx emissions are: the energetic industry, transportation, burnings from the processing industry, but also production processes.

For the time lapse 2007-2018, out of the total quantity of nationwide NOx emissions, the greatest weight is that of the energetic consumption in the residential sector, followed by industry and transportation activities. The most important input is given by thermal power plants and other burning installations, with about 65,94%.

The NOx emissions have recorded a continuous drop as compared to 2007, in 2017 the recorded NOx emission having its lowest of values (42683 tons), with about 67.49% less than 2007, while in 2018 compared to 2017 an increase of approximately 5,42% can be observed.

Sulfur oxides (SOx),

The most important input is that of the energetic sector, as follows: about 88,44% by thermal power plants and other burning installations, about 2,1% by oil and gas refineries and about 1.25% by the cement and lime production industry.

The SOx emissions record a continuous drop as compared to 2007, the nationwide total in 2018 (40562

2 http://www.calitateaer.ro
3 Source: Environmental Report, year 2019, NAEP

tons) being about 91,83% lower than 2007.

Powders, PM10
The most important input is given by thermal power plants and other burning installations, with about 62,32% of the total of PM10 emissions.

The PM10 emissions, between 2007 and 2018, have had a constantly descending evolution, in 2018 registering the lowest reported value, 90,38% less compared to 2007.

Methane, CH4

The methane emissions record a continuous drop as compared to 2007, their lowest value being recorded in 2018 (46315 tons), being by about 69,84% lower than 2007, and by 21,08% lower than 20176.

The *heavy metals* emissions show a slight decrease as compared to those recorded in the previous years. From the repartition of emissions on activity sectors can be noticed that the greatest weight of the mercury emissions, in a percentage exceeding 65%, comes from the burnings in the energetic and heating production.

Carbon monoxide, CO, has recorded in 2018 a decrease of 37,54% as compared to 2007.

Evolution of air emissions in the energetic sector, between 2007 and 2018[4]:

The energetic sector contributes in air pollution with significant quantities of sulfur dioxide, carbon monoxide, carbon dioxide, nitric oxide and powders. Analyzing the nationwide evolution of these main pollutants released in the air, a general trend of decrease can be observed. The reduction of the energetic systems' impact on the environment was performed by restoration and modernization of the large burning installations, by performing desulfuration, de-noxation and de-powdering installations. The reduction of the SOx emissions in the energetic sector was achieved by ceasing the use of fuels with high sulfur contents (coal or HFO), but also by using fuels with reduced sulfur contents (natural gas). This abrupt fall of emissions was also caused by the closing of certain installations.

In total, in 2018 as compared to 2007, most of the emissions in the energetic sector were reduced, as follows: SOx by about 91,83%, NOx by about 66.6%, PM10 by 90,38%, and CO2 by about 44,34%.

3.2.2 The influence of the natural gas sector on air quality

The natural gas transportation system does not represent a source of significant pressure on air quality. From the conventional fuels used for heating (domestic or industrial), but also for producing electricity, natural gas is the fuel with the lowest level of emissions, the use of this resource on a wide scale remains, presently, the most friendly conventional solution as compared to the environmental factors. The natural gas is the cleanest of fossil fuels, with carbon emissions on energy unit 40% less than coal, as well as considerably lower emissions of atmospheric pollutants.

Although the burning of natural gas produces about 10% of the global NOx emissions, it produces almost no SO2 emissions, while fine particle emissions (PM2) are negligible. The use of coal is the cause of the greatest part of global SO2 emissions, while petrol fuels are the dominant source of NOx; the burning of wood and of other solid fuels generates more than half of the fine particles emissions, which are extremely harmful for people's health.

4 Source - (NAEP, 2018) - Report on the environmental condition in Romania, year 2018

3.3 WATER

At a European level, the environmental goals regarding the bodies of water are set forth by Framework Water Directive (FWD), these being the central element of the aforementioned regulation. The goal of the Directive is long-term protection, usage and durable management of waters.

Overall, the environmental goals regarding the bodies of water include the following elements:

- For the surface bodies of water: to reach a proper ecological and chemical condition, respectively of a proper ecologic potential and of a proper chemical condition for strongly modified and artificial bodies of water;
- For underground bodies of water: to reach a proper chemical condition and a proper quantitative condition;
- Progressive reduction of pollution with priority substances and the cessation or the gradual removal of emissions, releases and losses of dangerous priority substances to surface waters, by implementing the necessary measures;
- "prevention of limitation" of pollutants release in underground waters, by implementing the necessary measures;
- Reversing the trends of significant and durable increase of pollutants concentrations in underground waters;
- Maintaining the condition of surface and underground waters (art. 4.1.(a)(i), art. 4.1.(b)(i) of FWD;
- For the protected areas: to reach the objectives set forth in the specific legislation.

3.3.1 Condition of surface waters

Romania holds a complex hydrographic network, 79,567 km long, including the following categories of waters:

- Permanent rivers - 55,535 km (70% of the total of water streams);
- Periodic rivers - 23,370 km (30% of the total of water streams);
- Natural lakes - 116 with the surface greater than 0.5 km2, out of which 54% are in the Danube's Delta;
- Water accumulations - 242 with the surface greater than 0.5 km2;
- Transitional waters - 781.37 km2;
- Coastal waters - 571.8 km2;

Our country's surface water resources are supplied by two major categories: the Danube river and inner rivers, including natural lakes. In 2017, the resource corresponding to Danube river at its entrance in our country was of 71429 bil. m3, and the natural water resource supplied by inner rivers represented a streamed volume of 29228 x 106 m3, 28% less as compared to the average natural water resource between 2012 and 2016.

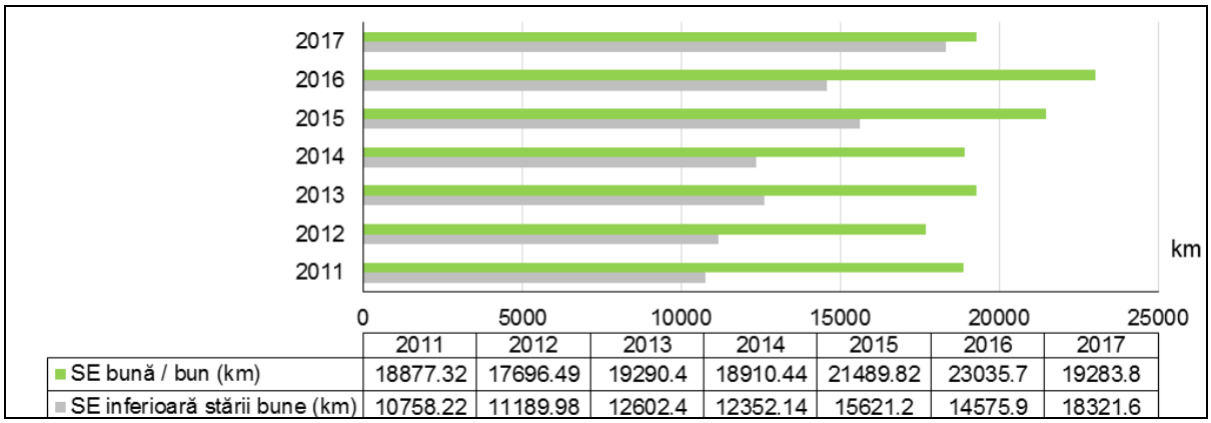
From the waters' management system administration's point of view, the Romanian territory was divided in the following 11 hydrographic basins:

Table 8. Hydrographic basins

No.	Hydrographic basin	Surface (km2)
1	Someș- Tisa	22380
2	Crișurile	17860
3	Mureș	28310
4	Banat	18393

No.	Hydrographic basin	Surface (km2)
5	Jiu	16713
6	Olt	24050
7	Argeș-Vedea	21479
8	Ialomița- Buzău	23874
9	Siret	28116
10	Prut- Bârlad	20267
11	Dobrogea- Seaside	20079

The qualitative and quantitative management of waters and the application of the national strategy and policy regarding waters are performed by the "Apele Romane" (Romanian Waters) National Administration and the Water Basins Administrations. From the information presented in the National Report on the condition of the environment, elaborated by the National Agency for Environmental Protection, the assessment of the ecologic condition / potential per hydrographic basins is the following:



	2011	2012	2013	2014	2015	2016	2017
SE bună / bun (km)	18877.32	17696.49	19290.4	18910.44	21489.82	23035.7	19283.8
SE inferioară stării bune (km)	10758.22	11189.98	12602.4	12352.14	15621.2	14575.9	18321.6

Fig 5. Evolution of ecologic condition / potential of monitored water streams (natural bodies of water, strongly modified, artificial - rivers) at national level in the period between 2011 and 2017 (km)

It can be noticed that the proper ecologic condition has a greater weight than the inferior condition but, in time, a reduction is noticed in the good ecologic condition category, in the year 2017, as compared to 2016 and 2015.

According to the data presented in the Romanian Waters Quality Synthesis Study in 2017, at national level were identified the following economic activity fields having a marked input in the construction of the polluting potential:

- Water harvesting and processing for population supply;
- Chemical processing:
- Electrical and thermal energy;
- Metallurgic and automotive industry;
- Extractive industry.

The greatest weight of the punctiform pressures is represented by human agglomerations, with about 45%, respectively the waste waters evacuated from water collection and purification systems of human agglomerations.

The bodies of water are significantly affected by hydromorphological alterations, but also by a significant number of projects with the goal of protecting against floods, production of electricity, navigation, in various stages of planning and implementation which contribute in the physical alteration of the bodies of water.

3.3.2 The quality of underground waters

In Romania have been defined 141 bodies of underground water, 17 out of which being cross-border. The definition of the underground water bodies was only performed for the areas where there are significant aquifers for water supply and namely, exploitable streams exceeding 10 m3/day. In the rest of the area, even though there are local conditions for underground water accumulation, they do not form bodies of water, according to the Framework Directive 2000/60/CE.

The assessment of the chemical condition of underground bodies of water is performed according to Waters Law 107/1996, with its subsequent alterations and additions, Decision no. 53/2009 for the approval of the National Plan for the protection of underground waters against pollution and deterioration and of Order 621/2014 regarding the approval of threshold values for Romanian underground waters. For underground waters, according to the preliminary methodology for the assessment of the chemical condition of the underground bodies of water, elaborated by NIHWM Bucharest, the following quality conditions have been established: proper chemical condition, locally weak chemical condition and weak condition.

In 2017, the situation of the 141 monitored underground bodies of water was the following:

- 113 bodies are in a proper chemical condition (80.14%)
- 28 underground bodies of water are in a weak chemical condition (19,86%)[5.]

According to the excerpt from the Romanian Waters Quality Synthesis in 2017, from the factors with a major pollution potential, which may affect the quality of underground water, are mentioned the following: chemicals used in agriculture, causing diffuse, difficult to trace and prevent pollution, waste products and zootechnics products, heavy metals, the lack of correlation of the increased production capacity and the urban development with the modernization of the sewage works and the performance of the water treatment plants, the improper exploitation of the existing water treatment plants, the lack of an organized collection, storage and management system of the waste and silt resulting from the treatment of industrial waste waters, oil products, products of the industrial processes.

From the analysis of the data obtained while monitoring the underground bodies of water can be noticed that most transgressions are recorded for the following indicators: nitrates, ammonia, chlorides, sulfates, lead, orthophosphates, phenols and arsenic.

Quality standard transgressions in the *nitrates* indicators were recorded for 13.40% of the total monitored drills. The transgressions are especially noticed in the areas where the soil is affected by the use of chemical fertilizers, in the areas of large chemical combines, of former plants, but these transgressions are generally local, mostly encountered inside and their bordering areas, but which may create a polluting danger of aquifers in the area, considering the hydrodynamic features and the hydraulic conductivity of water.

The alteration by pollution of the phreatic is often an almost irreversible phenomenon, with important consequences on the use of the underground reserve in the drinkable water supply, the decontamination of water sources in the phreatic layer being a very arduous issue.

3.3.3 The influence of the natural gas sector on water

From the significant pressures on the water resources in Romania, identified in the Annual Environmental Report regarding the condition of the Romanian environment, elaborated by NAEP, the natural gas transportation sector was not identified as being a source of significant pressure.

5 Source - Romanian Waters Quality Synthesis in 2017 (excerpt), Romanian Waters National Administration

3.4 SOILS

3.4.1 Present condition of soils

In the assessment of the present condition and of the influence of the natural gas transportation sector on soil, the following aspects were considered: the usage of soils, types of pollution influencing soil quality and critical areas under the aspect of soil degradation.

Usage of lands[6]

From the country's total surface of 238391 km2, in 2014[7] the main weight, just as in the foregoing years, was held by agricultural fields (61.37%), followed by forests and other forestry lands (28.24%). Other lands hold 10.4% of the country's surface (waters, ponds, yards, buildings, communication roads, unproductive lands).

As a result of the demographic index increase in the last 65 years, the arable surface per capita has decreased from 0.707 ha in 1930, to 0.511 ha in 2014, practically the resources part of this usage being exhausted.

Types of pollution affecting soil's quality:

- *Pollution (degradation) of soils by daily mining, ballast and quarry exploitations.* The deterioration of soil by various excavation works affect roughly 24,000 ha, this being the worst form of soil deterioration. The quality of the lands affected by this type of pollution has decreased by 1-3 classes, so that some of these surfaces have practically became unproductive.
- *The pollution with deposits, as well as that caused by mining dumps, decantation pools, sterile deposits from the flotation stations, waste storages, etc.* From the preliminary inventory data results that this type of pollution affects 6,639 ha in 35 counties, 5,773 ha out of which in an excessive manner. The largest surfaces are located in the Western areas (23,2%), North-East (20,5%), North-West (19,7%), Center (12,3%), South-West Oltenia (12,2%)
- *The pollution with inorganic waste and residues (mineral, inorganic matters, including metals, salts, acids, bases) from the industry (including the extractive industry).* This type of soil pollution affects roughly 0.9 bil. ha; particularly aggressive effects on soil are caused by heavy metal pollution (particularly with Cu, Pb, Zn, Cd) and sulfur dioxide, especially found in the critical areas of Baia Mare, Zlatna and Copsa Mica. The pollution with oil and saltwater from petrol, refining and transportation exploitation is present on about 50,000 ha.
- *Pollution with airborne substances/particles (hydrocarbons, ethylene, ammonia, sulfur dioxide, chlorides, fluorides, nitric oxides, lead compounds, etc).* 364,348 ha in total are affected by airborne particles pollution, 49,081 ha out of which in a strong-excessive manner and 99,498 ha in a moderate manner. Over 87.3% of the affected surfaces are located in the Center (43%), North-East (28.8%) and South-West Oltenia (15.5%) regions.
- *The pollution with radioactive matters is present in 5 counties (Arad, Bacău, Brașov, Harghita and Suceava)*
- *The pollution with waste and residues from food, light and other industries.* 348 ha are affected, of which excessively 287 ha. The largest areas are in the counties of Caraş-Severin (150ha) and Galați (101ha).
- *The pollution with agricultural and forestry wastes and residues* - is present on 1,140 ha, 948 ha out of which very strongly and excessively, and the largest such affected surfaces are located in

6 Source - Annual report on the environmental condition in Romania, 2018, NAEP
7 Until the completion of the country's surface measurement activity, performed by the National Land Title and Survey Office, the series of official data shall be those for 2014 (according to the specifications of the Romanian Survey Directory - 2017).

Bacău county, namely 626 ha.

- *The pollution with animal waste - consists in the alteration of the soil's chemical composition by enriching it with nitrates*, which may have harmful effects on underground waters. 4.973 ha are affected to various degrees, 1.097 ha out of which moderately strong-excessive.
- *The pollution with human waste* - is only noted in 4 counties, affecting 733 ha, 33 ha out of which excessively polluted, being present in all localities, particularly where there is no plumbing.
- *Pollution with pesticide*s - is only noted in several counties and totals 2.076 ha, 1.986 ha out of which in Bacău county, around the Chemcomplex plant; generally, the pollution level is mild to moderate.
- Pollution with contaminant pathogens - it is only noted in four counties, 617 ha, out of which moderately on 505 ha and excessively on 117 ha.
- *The pollution with salt waters (deposit waters) (from oil drills) or also associated with oil pollution.* This type of pollution affects the ecologic balance of the soil, of the underground and of the underground waters on 2.654 ha, 1.205 ha out of which in a strong-excessive manner. The most important reported surfaces are located in the South-Muntenia (30.3%), South-West Oltenia (29.1%) and North-East (27.9%) regions.
- *The oil pollution during drilling, transportation and processing activities.* In the 5 assessed counties (Bacău, Covasna, Gorj, Prahova and Timiș), 751 ha are affected, 278 out of which in a strong-excessive manner.

Critical areas of soil degradation

From the inventory performed by NIPA, in collaboration with OPAS, between 1994 and 1998, for 41 counties, on about 12 million hectares of agricultural land, 7.5 million hectares out of which arable land (about 80% of the arable surface), the soil quality is affected to a greater or to a smaller degree by one or more restrictions. Their harmful effects are reflected in the alteration of soil's features and functions, respectively in their bio-productive capacity but, that which is even worse, in affecting the quality of agricultural products and of food health, with serious consequences on human lives' quality.

These restrictions are determined either by natural factors (climate, shape of relief, edaphic features, etc), or by agricultural and industrial anthropic actions; in many cases, the aforementioned factors may act together in a negative manner and causing the decrease of soils' quality, even the annulment of their functions.

The synthetic situation in 2018 of the potentially contaminated sites, classified on economic sectors:

- 138 potentially contaminated sites in the mining and metallurgic industry;
- 565 potentially contaminated sites in the oil industry;
- 24 potentially contaminated sites in the chemical industry;
- 85 potentially contaminated sites in other activities (industry-specific activities: energetic, textiles, automotive, food, specific land transportation activities, zootechnics activities, etc)

3.4.2 The influence of the natural gas sector on soils

From the significant pressures on the soils, identified in the Annual Environmental Report elaborated by NAEP, the natural gas transportation sector was not identified as being a source of significant pressure.

3.5 BIODIVERSITY / PROTECTED NATURAL AREAS

3.5.1 Present condition of biodiversity preservation

Our country's biodiversity is one of the richest in Europe and is of particular interest globally, regionally, nationally and locally.

In Romania, natural and semi-natural ecosystems add up to about half of the country's surface, the other half being occupied by agricultural ecosystems, buildings and infrastructure. The types of ecosystems are included in the following main categories: forestry ecosystems, pastures ecosystems, sweet and salt water ecosystems, marine and coast ecosystems and underground ecosystems.

On our country's territory can be found five bio-geographic regions, the share of each of them from the country's surface being:

- continental (53%)
- alpine (23%)
- steppe (17%)
- Pannonian (6%)
- Pontic (1%)

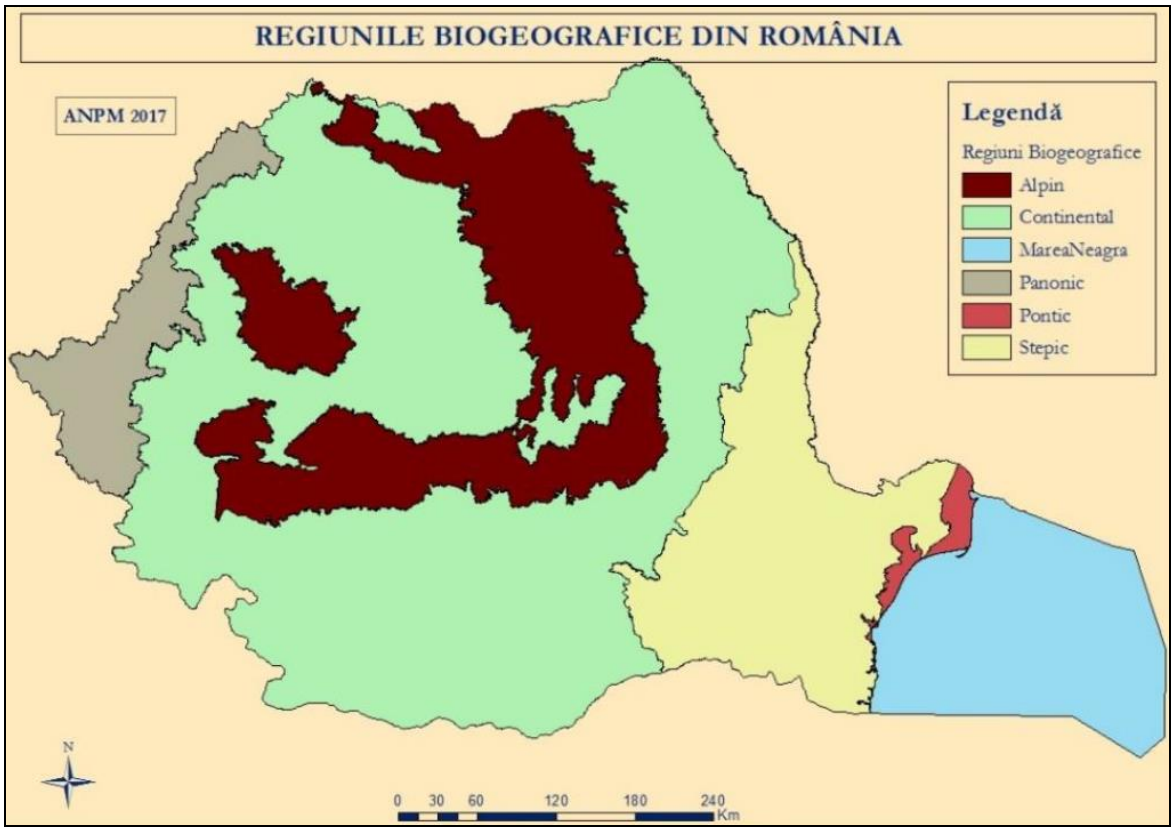


Fig 6. Bio-geographic regions in Romania

Thanks to its geographic location, Romania holds and contributes in Europe with a rich and unique biodiversity, at ecosystems' and species' level, as well as at genetic level, distributed between the 5 bio-geographic areas. The bio-geographic areas richest in European interest species are: continental, alpine and steppe.

As a whole, the habitats assessed in Romania are over 60% in a favorable preservation condition, while about 7% of them have been assessed as being in a "total unfavorable condition"[8].

According to the data reported to the European Committee, can be noticed that, in the alpine region are the most habitats with favorable preservation condition, followed by, in order, by the following bio-geographic regions: continental, Pannonian, steppe and Pontic.

8 Source- *Source: ibis.anpm.ro*

Regarding the species' preservation condition, it is estimated that 67% of the total species assessed show an inadequate, unfavorable preservation condition, while 5% have a totally unfavorable condition. Thusly, with a global value of 72% unfavorable preservation condition for the species of Communitarian interest, Romania is placed well above the European average (54% in the EU - 25 - SOER 2010). A18% of the assessed species have a favorable condition (as compared to 17% the EU average), and the percentage of the species not assessed in Romania is lower than the EU average.

According to the data reported to the European Committee, can be noticed that the situation in the Black Sea region is alarming, because none of the assessed and reported species had a favorable assessment. From amongst the assessed species, fish have the lowest favorable condition for survival, followed by amphibians and arthropods, then by reptiles, mollusks, mammals and plants.

3.5.2 The protected natural areas network

In Romania were created, in order to ensure the special in situ protection and preservation measures for the natural heritage assets, the following categories of protected natural areas:

- of national interest: scientific reservations, national parks, natural monuments, natural reservations and natural parks.
- of Communitarian interest or "Natura 2000" sites: Community Interest Sites (SCI) and Special Avifaunistic Protection Sites (SPA);
- of International interest: natural sites of the natural universal heritage, geoparks, wetlands of international importance and biosphere reservations;
- of county or local interest: only established in the public/private territory of the administrative and territorial units, according to the case.

The information regarding the total number and the surfaces in each protected natural area category for 2018 is presented in the tables below.

Table 9. Categories of natural protected areas in Romania in 2019[9]

Categories of protected natural areas	Number	Surface, ha
Scientific reservations, natural monuments, natural reservations	916	307973,06
National parks	13	317419,19
Natural parks	16	770026,52
Special Avifaunistic Protection Sites (SAPS)	171	3875297,58
Communitarian importance sites (SCI)	435	4650970,00
Biosphere reservations	3	661939,33
Wetlands of international importance (RAMSAR sites)	19	1096640,01
Natural sites of the natural universal heritage	1	311915,88

Natural protected areas at national level

The nationwide distribution of the national interest natural protected areas: reservations and natural monuments, natural and national parks, is presented in the images below.

9 Source - Annual report on the environmental condition in Romania, 2019, NAEP

Fig 7. Natural and national parks in Romania, 2019

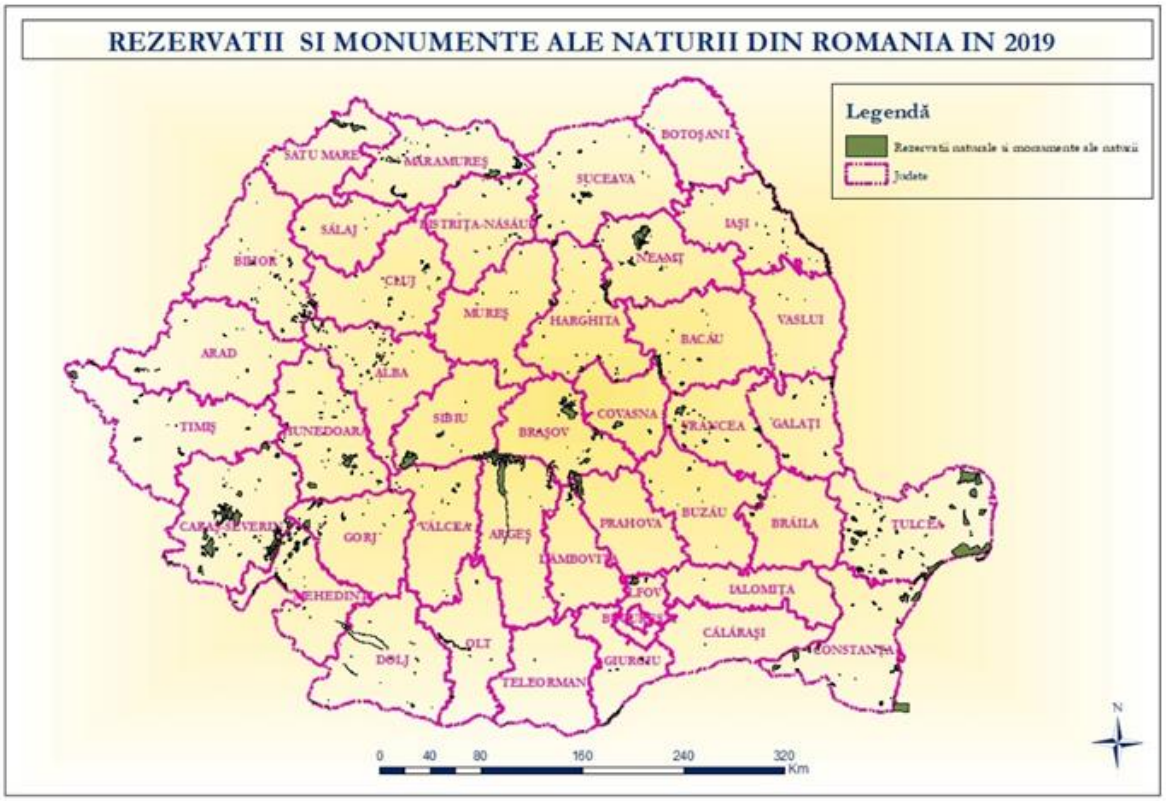


Fig 8. Reservations and natural monuments in Romania, 2019

COMMUNITARIAN INTEREST PROTECTED AREAS, CREATED ACCORDING TO THE HABITATS AND BIRDS DIRECTIVE

As a EU member state, Romania brings its input in the preservation of biodiversity at an European level by preserving the natural habitats, as well as wild flora and fauna. To this end, on Romanian territory was created the Natura2000 Ecological Network, which preserves the species and habitats considered to be of Communitarian interest, by designating the *Communitarian Interest Sites* - SCI - and the *Special Avifaunistic Protection Sites* (SPA). This network of sites is meant to maintain or to reestablish the types of natural habitats and of the species' habitats in a favorable preservation condition across their natural spreading areas.

There are 606 Natural 2000 sites in Romania: 435 SCI and 171 SPA.

The nationwide distribution of the SCI and SPA in the year 2018 is presented below.

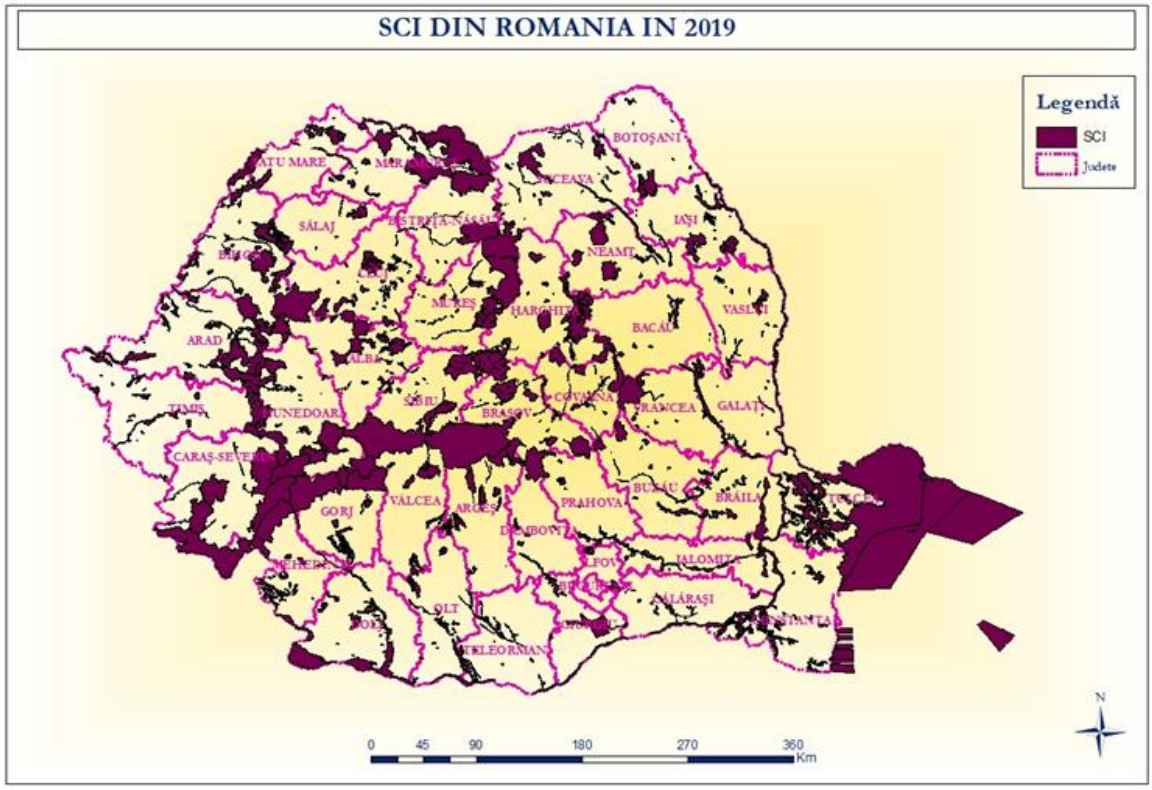


Fig 9. Natura2000 sites of SCI type in Romania, 2019

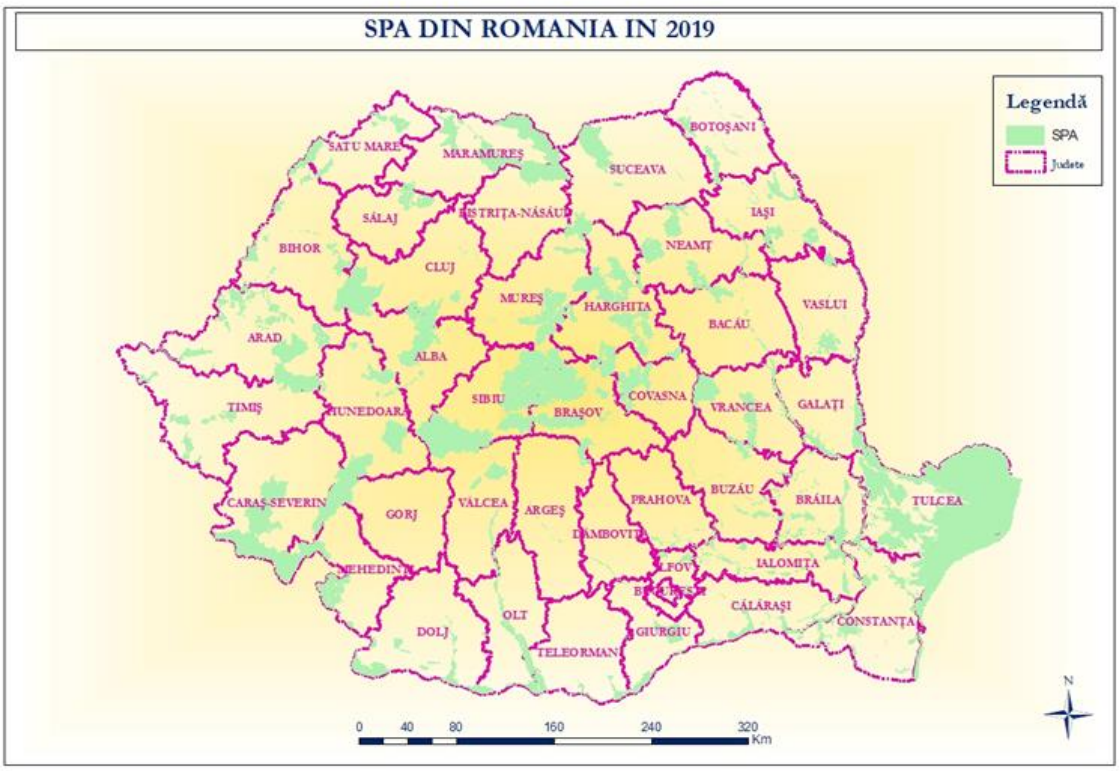


Fig 10. Natura2000 sites of SAPS type in Romania, 2019

The protected natural areas at international level are presented in the image below.

Fig 11. Natural areas of national interest, 2019

The management of natural protected areas is performed, as of May 2017, by the National Agency for Protected Natural Areas (NAPNA).

3.5.3 The influence of the natural gas transportation and storage sector on biodiversity

The possible impact the projects regarding the natural gas transportation and storage may have on biodiversity is reflected, for some situations, in their partial localization on the protected natural areas' territory or at a certain distance from them.

The consequences of natural gas transportation on the biodiversity are translated by alterations in the structure and functionality of the natural systems, leading to:
- Loss and fragmentation of habitats - for example, the conversion of lands in order to build new natural gas transportation routes or the expansion of the existing ones, represent a potential cause of biodiversity loss.
- Alterations regarding the density of certain flora or fauna populations;
- Fauna mortality (by involving it in various accidents)
- The alteration of the habitats' and flora and fauna species' preservation condition;

We must mention here that the greater part of the natural gas transportation infrastructure dates from a period of time precluding the emergence of the specific legislation for protected natural areas or Natura2000 sites.

3.6 WASTE

The evolution of non-harmful waste quantities produced by the main economic activities between 2014 and 2018, is presented in the table below[10].

Table 10. Non-harmful waste, generated by the main economic activities between 2014- 2018 (thousand tones)

Economic activity	2014	2015	2016	2017	2018
Extractive industry	152.576,73	154.487,69	153.675,84	204.157,76	178.357,24
Processing industry	6.572,24	6.881,92	6.743,23	6.303,41	7.799,53
Production, transportation and distribution of electricity, thermal energy, gas and water	7.090,85	7.444,84	6.725,16	7.638,69	6.820,78
Capture, treatment and distribution of water	71,76	29,01	59,52	41,02	54,31

It can be observed that the largest quantities of waste are produced by the extractive industry, the production, transportation and distribution of electricity, thermal energy, gas and water being, depending on the analyzed period, on 2nd on 3rd place, far behind the extractive industry.

In 2018, the waste quantities produced by the manufacturing, transportation and distribution of electricity, thermal energy, gas and water, represented 3.5% of the total quantity of harmless waste generated by economic activities.

Regarding the harmful waste, they cannot be found in the statistics regarding waste for the gas transportation sector, the quantities generated by this sector being negligible at national level.

The natural gas transportation activity cannot be deemed to be an important waste source as compared

10 Source - Report on the environmental condition in Romania, 2019, NAEP

to industrial-type activities.

3.7 HUMAN POPULATION AND HEALTH

According to the thematic Strategy for the urban environment, adopted in 2006 in Europe, most of the urban population faces a common set of basic issues, like poor air quality, increased traffic and traffic congestion, increase environmental noise, poor quality built environment, abandoned lands, greenhouse gas emissions, non-systematized areas, production of waste and used water.

Below we will analyze the environmental issues regarding human population and health in connection with the natural gas transportation system.

The quality of surrounding air is given by the saturation degree of air with various pollutants.

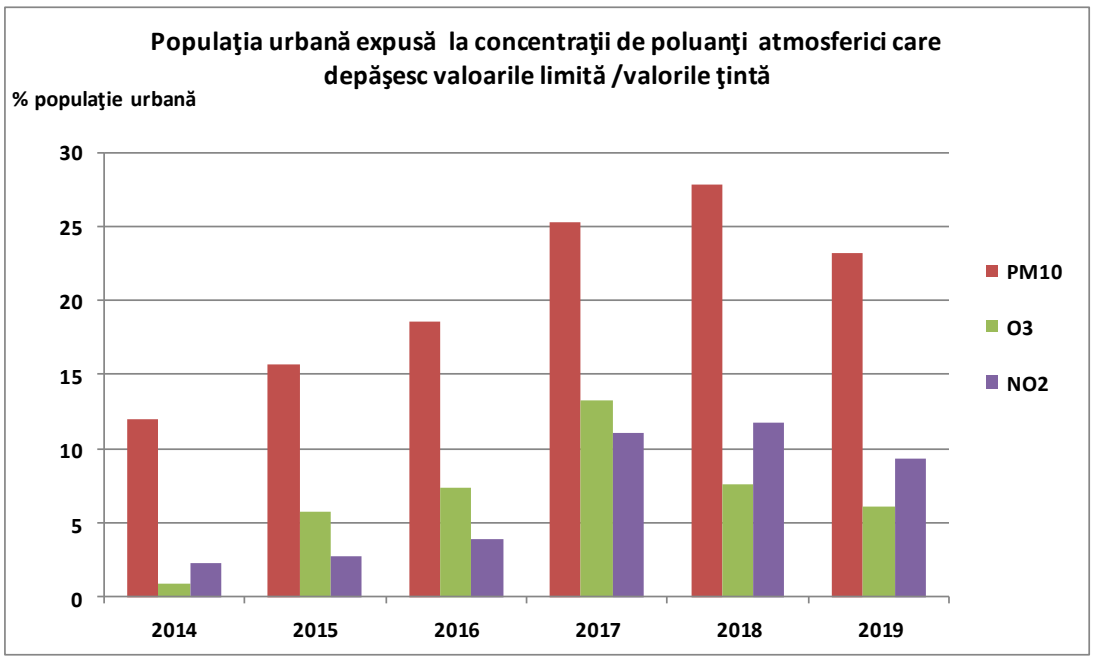


Fig 12. The evolution of the percentage of urban population exposed to health issues due to the exceeding of the limit values of air quality indicators (NO2, O3, PM10).[11]

In Romania, the main and the most important air pollutants are suspended particles PM10 and nitric oxides, mainly caused by traffic and burning processes in large thermo-electrical plants, or for residential heating. The lack of connection to the natural gas resource leads to the use of fossil fuels for to heat, cook or heat water, in individual installations which, most of the times, are not efficient and cause large levels of emissions.

Between 2013 and 2018 can be noticed an increase of the percentage of population exposed to PM10 powders concentrations exceeding the limit values. Regarding NO2 and ozone, the exposed population percentage is lower than in 2013, but higher than between 2014 and 2016.

There is a plethora of short or long term effects these pollutants have on human health, affecting the respiratory and cardiovascular systems, causing pulmonary diseases, ENT issues, allergies, cardiovascular diseases, etc. The most affected risk groups are the children, the elderly and people with

11 Source - Annual report on the environmental condition in Romania, 2019, NAEP

chronic diseases.

Noise pollution

Noise is an ever-present environmental factor, the discomfort caused by noise increasing as the urban agglomeration grows, as the automotive park grows, as the human agglomeration and density increases in the inhabitable areas.

From the analysis of the discomfort caused by noise, depending on the number of the human population, based on data and information in strategic noise maps, results the fact that the main source of noise pollution is road traffic, followed by air traffic. The natural gas transportation activity is not, under normal functioning condition, a source of phonic discomfort.

Olfactory pollution

Natural gas does not have a specific smell (it is odorless). TRANSGAZ S.A. does not use in its natural gas transportation installations any odorizers, these only being used in the NTS handover points.

The odorizers are used at a low olfactory perception limit, the requirement, according to the Technical Standard for Natural Gas Odorization of July 17th 2019 being to be perceptible to a lowest natural gas concentration in the air.

The natural gas odorization is performed strictly to avoid the intoxication and explosion dangers as a result of possible uncontrolled / controlled natural gas leaks and is not an olfactory discomfort factor for the population.

Issues on the standard of living and social inequalities:

- About half of the Romanian households use biomass, usually firewood, as a main source of heating (about 90% in the rural areas and 15% in the urban areas),
- Less than half of the Romanian households are connected to the natural gas supply network (44.2%), one third of Romanian habitations being directly heated with natural gas.
- The average natural gas consumption of the domestic Romanian consumer is below the EU average, just as the total gross energy consumption per capita, where Romania had the lowest level in the EU, of 1.8 tep (Eurostat 2017), as compared to the EU average of 3.2 tep and as compared to the maximum level recorded in Luxemburg, of 7.3 tep.
- In 2016, Romania had the lowest price in the EU of natural gas for domestic consumers (followed by Hungary, Estonia and Bulgaria). Nonetheless, in 2016, 13.8% of the Romanian population could not properly heat their habitation, the EU average being of 8.7%.[12]

3.8 ENVIRONMENTAL RISKS ASSOCIATED WITH THE NATURAL GAS TRANSPORTATION SECTOR

The risk is defined as the product between the probability of causing the human / material losses phenomenon and the value of the said damages.

Natural risks refer to events where the condition parameters can manifest themselves within variable limits, from normal to danger, caused by dangerous weather phenomena, like abundant rains and snowfall, temperature variations - freezing, drought, extreme heat - storms and geological destructive phenomena, namely earthquakes, landslides and land cavings.

Technological risks include all the negative event caused by the exceeding of the safety measures

12 SOURCE- Informative Chart–Energy Sparing in Romania, https://ec.europa.eu/romania

imposed by regulations, as a result of certain willing or unwilling human actions, faults of technical systems' components, failure of the protection systems, etc.

In the case of natural gas transportation systems, the risk situations may have natural or anthropic causes.

The natural gas transportation by pipelines involves a series or risks regarding exploitation safety. These risks are caused, generally, by methane gas leaks, caused by damages / destructions of the installations, due to external factors - natural risks (earthquakes, floods, landslides, vegetation fires, etc) or to anthropic factors (assaults, thefts, etc) The control over these risks is performed according to the standards in force.

The methane gas emissions resulted from unforeseen situations may cause local fires, affecting various receptors in the vicinity. Also, the uncontrolled methane gas emissions contribute in the increase of greenhouse effect.

In order to prevent any potential risks caused by the natural gas NTS, even from project phase are established the protection and safety distances from the NTS objectives. In these areas, to ensure the normal functioning of pipes and to avoid endangering individuals, assets and the environment, specific restrictions and interdictions are set in place. In the protection and safety area no works are performed without the prior approval of the licensed operator who exploits the pipe. No buildings, storage houses or depots will be built in the protection area, no trees will b planted and no activities which may endanger the pipeline's integrity will be performed.

Regarding the natural gas transportation pipelines and connections, out of the 13.925 km under commissioning, about 74% have an effective commissioning duration greater than 20 years, close to their normal commissioning duration. According to Transgaz statements, their technical condition is maintained at an appropriate level as a result of the fact that the exploitation activity is conducted within the context of a mostly preventive, planned, corrective maintenance system, and is supported by annual investment, development and modernization programs.

The natural gas storage activity is under the incidence of Directive 2012/18/EU regarding the control of major accidents dangers involving dangerous substances, transposed in the national law by Law 59/2016, *regarding the control over major accident dangers involving dangerous substances*, being mentioned in article 2 item 3 of the Law. The dangerous substance which may cause a major accident is methane gas. Natural gas is in the category of extremely flammable dangerous substances. According to the Safety Material Data Sheet, the methane gas's danger phrase is H220, H280, danger class P2 and 1st danger category, being extremely flammable, able to form explosive mixtures with air.

In all methane gas storages of the natural gas storage operators (Depogaz Ploiești and Depomureș Târgu Mureș) the storage capacity exceeds 200 tons, making all the methane gas storages' locations being of superior level. For each gas storage units safety distances have been established, calculated for each separate object in the storage, based on specific formulas and taking into consideration the legal provisions in force. The minimal safety distances for these objectives are established by Security Reports, elaborated pursuant to Law 59/2016 and based on the regulations in force (in this case, County Standard for the establishment of fire prevention distances between the composing elements of the technological installations in the extractive gas and oil extractive industry, issued and approved by the Ministry of Mines, Oil and Geology by Order 278/1986, respectively the Technical Standards for the designing and execution of upstream supply and natural gas transportation pipes, approved by NAER Chairman's Decision 1220/2006).

Specific restrictions and interdictions are imposed in these areas. In the safety area no works will be

performed without the prior approval of the operator exploiting the natural gas storage facility.

3.9 LANDSCAPE

According to the Emergency Governmental Ordinance 57/2007 on the protected natural areas regime, the preservation of natural habitats, of wild flora and fauna, approved with alterations and additions by Law 49/2011, the landscape is defined as "the area perceived by the population as having specific features as a result of the action and of the interaction of natural and/or human factors". The importance of landscape is highlighted by Law 451/2002, for the ratification of the European Landscape Convention, adopted in Florence on October 20th 2000, according to which landscape is an important part of the quality of life, contributing in the crystallization of local culture, and also being a basic component of the European natural and cultural heritage, with input in the consolidation of the European identity.

In the last decades, the Romanian natural conditions and landscape have been particularly influenced by the evolution of the economic activities, the economic growth in the last years, based on an excessive exploitation of the natural resources. Under these conditions, many plant and animal species are threatened by extinction, and the alteration of the landscape represents the first indicator of surrounding environment degradation.

The gas transportation sector contributes in landscape change by land clearing, erection of permanent structures, etc., but which occupy small surfaces and for which can be implemented, even since project phase, visual impact dampening measures.

3.10 CLIMATE CHANGES

3.10.1 **Climate characteristics of 2019**[13]

In 2019, the country's average annual temperature (10,9ºC) was 1,7º C higher than the standard climate normality, for the reference period between 1981 and 2010. The highest annual temperatures, over 12º C, were recorded in the Romanian Plane, Western Planes and in the lowlands of Dobrogea.

The average rainfall accumulated in 2019 in Romania (698,8 mm) was 10% greater than the standard climate normality (for the reference period between 1981 and 2010). Analyzing the classification in severity classes of annual rainfall anomalies, it can be assessed that the rainfall regime has been excessive in the South and West of Muntenia, in Oltenia, in the South of Banat, in almost the entire Northern half of Moldavia and in areas in Western and Eastern Transilvania, isolated, this being rather very excessive or extremely excessive.

In 2019 was recorded an increase in the number of snow days, as compared to 2017. The snow thickness tendency (excepting the mountain weather stations), recorded in March, for the reference period between 1981 and 2010, is one of significant decrease, consistent with the evolutions also recorded in Europe and in Asia, in line with the global warming signal.

(source - chapter VIII.1.1 OBSERVED CHANGES IN THE CLIMATE REGIME IN ROMANIA from the Annual Report on State of the Environment in Romania, 2019 NEPA)

3.10.2 Climate change and its consequences

From the WWO data (World Weather Organization), headquartered in Geneva, the world's average temperature has increased, in the period between 1901 and 2000 by 0.60º , which is very much. For Romania, according to NIWH (National Institute for Weather and Hydrology) in Bucharest, this increase

13 Source - Annual report on the environmental condition in Romania, 2019, NAEP

is 0.30º C higher in the Southern and Eastern regions (0.80º C) and lower in the intra-Carpathian regions (0.10º C). As a consequence, several areas in our country show a very elevated drought risk, and particularly those where the annual average temperature is higher, of 100 º C; the sum of the annual rainfall is below 350-550 mm; rainfall between April and October are below 200-350 mm and the water reserve in the soil 0-100 cm on March 31st is lower than 950-1500 mc/ha.

With the increase by 30º C of the average air temperature on Romanian territory, it is forecast that Dobrogea, South Moldavia, West Ardeal, Banat, South Oltenia and a good portion of the Southern Romanian Plain, respectively over 30% of the country, will undergo a desertification process, and the remainder of about 38%, to an accentuated aridity process, which will continue to include all our plains, up to 85% of the hills' surface and almost 20% of the country's lower altitude mountains.

(Source - chapter V.2.3. CLIMATE CHANGES from the Annual Report on State of the Environment in Romania, 2019 NEPA).

3.10.2.1. How NGTNS responds to the challenges of climate changes

Climate variables that can cause vulnerabilities of the NGTNS, both now and in the future, are represented by: rising extreme temperatures or changes in rainfall and flooding with side effects of landslides and soil erosion.

For these identified vulnerabilities, Transgaz SA foresees from the design phase specific measures to adapt and ameliorate the effects that climate changes and associated hazards have or may have on the specific works and objectives of the NTS, in order to minimize as far as possible the adverse effects caused by them.

Table 11. How NGTNS responds to climate change

Phenomenon caused by climate change	**Response**
Increase of average air temperature	The objective and operation of the natural gas transport system are not affected by the increase in the average air temperature because: - the major component – natural gas transport pipeline is buried on the entire length, in the majority of cases, including obstacles (watercourses, canals, communication routes); - the pipe is mounted at a depth of at least 1,1 m, except for the underpasses of the communications routes, cases in which it will be mounted in a protection tube at least 1,5 m. When crossing watercourses, the pipe will be concreted and laid at 2 m below the talweg. - the tubular material of the pipe is selected according to the particularities of the area where is placed.
Increase in extreme temperatures and heat waves	The natural gas transport pipeline and the technological elements that serve it are not affected by the temperature variations because they have equipment that is designed to operate in the temperature range of $+55^0$ and $-29^{0.}$

Phenomenon caused by climate change	**Response**
Changes in the values of average rainfall	The establishment of the route of the natural gas transport pipelines and of the NTS objectives is based on the conclusions of the hydrological and geotechnical studies, taking into account the geotechnical conditions of the foundation land. The hydrological data for the dimensioning of the works in the sections of crossing the watercourses refer to the maximum flows with a probability of exceeding 1% in natural flow regime on the riverbeds, in order to operate safely.
Changes in extreme rainfall values	- solutions adapted to the geotechnical category of the objective's locations are established in the project: ballasting the pipeline in the areas prone to floods and riverbeds erosions, laying the pipeline at +2.5 m from the maximum flow reported in hydrological studies for crossing watercourses; - the pipeline route is selected so as to avoid shallow groundwater areas, as well as any designated sanitary protection areas. - for cases where the surface groundwater has been intercepted at depths that may affect the project objectives, specific pipe laying materials and fillings made of local cohesive material or macrogranular material are used.
Flooding	The project objectives are located in the vast majority of them in non-floodable areas, according to the data from the hydrological studies, at the level that ensures the protection for flood risks of 1%. However, the natural gas transport pipelines cannot be located entirely outside areas at risk of flooding, given that depending on the route chosen or imposed by various environmental, economic and / or social considerations, watercourses are crossed. When choosing the underpass solution, the morphology of the area and the hydrology of the watercourse are taken into account to avoid erosion to the banks and damage to pipes. Periodically, the areas at risk of floods and the possible effects on the gas transit pipelines are analyzed in order to propose measures to reduce the risk of damage occurrence to them.
Soil erosion	The selection of NTS site locations takes into account the conclusions of Geological and Hydrotechnical studies for the identification of those categories of soils reported as being in relatively good condition, with fairly good cohesion and soil structure that ensures total stability , thus reducing the probability of soil erosion. For areas where the pipe is located on slopes, this is mounted perpendicular to the contour lines to avoid the phenomenon of soil erosion.
Soil instability / landslides / Avalanches	The selection of the site takes into account lands that are not located in areas with potential for landslides, identified according to the National Territory Management Plan Section V, respectively lands on which, as a result of specialized studies, there are no physical and geological processes and negative phenomena that jeopardize the stability of the project's objectives.
Average wind speed	The objectives of the natural gas transport system are not influenced by the average changes of the wind speed considering the underground location of the pipeline, and the compression stations are built respecting the regulations in force.
Maximum wind speed	The major component of the projects - the natural gas transport pipeline is not affected by the impact force of the wind, considering that it is designed underground. The superstructure of the technological installations is designed taking into account the predominant direction of action and the impact force of the winds.

Phenomenon caused by climate change	**Response**
Humidity	Air humidity does not affect the objectives and their operation.
Drought	Drought does not affect the objectives and the operation of the transport system. Process water is not used in the transportation of natural gas.
Sand storms	Not applicable, minimum probability.
Natural fires	The main component of the project – natural gas transportation pipeline – is not affected by spontaneous natural fires as it is located underground on almost the entire length The surface objectives are foreseen with fencing and fire detection and intervention installations compliant with the requirements of the specific norms.
Effect of the urban heat island	The effect of the urban heat island does not have an impact on the objectives of the project and the operation of the natural gas transportation system.
Solar radiation	Objectives and operation of the transport system are not affected by the solar radiation.
Cold periods	Operation and performance of the transport system are not affected by extreme cold; the pipeline is designed underground, below the frost level. The objectives have in their composition equipments that are designed to function in the temperature range of $+50^{0} \div -30^{0.}$

3.10.3 Greenhouse gas emissions

GGE, which are mainly responsible for the occurrence and increases of climate change, have as major emission sources in the atmosphere various branches of the economic sectors, with a great importance from a social and economic viewpoint:

- the burning of fossil fuels to produce energy;
- agriculture and usage of lands, particularly the alterations of lands, as in the case of land clearings;
- waste storage;
- the use of fluorinated industrial gas (HFC - hydrofluorocarbon, PFC - perfluorocarbon and SF6 - sulphur hexafluoride).

The greenhouse gas emissions (GGE) object of UNFCCC, are: carbon dioxide (CO2), methane (CH4), nitrogen protoxide (N2O), hydrofluorocarbon (HFC), perfluorocarbon (PFC), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3). The carbon dioxide (CO2) is the most important anthropogenic greenhouse gas.

In order to diminish the climate changes' effects, the global greenhouse gas emissions must be significantly decreased, and the policies necessary to do this must be quickly and completely enforced.

According to the national greenhouse gas emissions' inventory performed in 2017, the GGE afferent to the Energetic sector represent about 82% of the total, including LULUCF and 66.39% of the total, excluding LULUCF[14,] respectively the input of the sub-sectors assigned to the Energetic sector is the following:

- Energetic Industry 31.53%;
- Processing and Civil Engineering Industry 15.80%;
- Transports 23.94%;
- Fugitive emissions 11,83%;
- Other sub-sectors 15.91%.

14 Source - Annual report on the environmental condition in Romania, 2019, NAEP

(source chapter VIII.2.3. GREENHOUSE GAS EMISSIONS from the Annual Report on State of the Environment in Romania, 2019 NEPA).

3.10.4 The trend of greenhouse gas emissions

In the period between 1989 and 2018, the total of greenhouse gas emissions have recorded a decreasing trend due to the much reduced quantities of fuels used in the burning processes in the energetic sector and to the reduction of sulphur compounds in the contents of various types of fuels.

The decrease of CO2 emissions in 2018 by 63,12% as compared to 1989 is caused by the decrease of fossil fuels quantity burnt in the energetic sector (particularly in the electrical and thermal energy production, as well as in the processing and civil engineering industries), as a result of their activity's fall.

The methane emissions (CH4), mainly linked to fugitive emissions from the extraction and distribution of fossil fuels and of livestock farms, have decreased in 2018 by 61.95% as compared to 1989.

In Romania, the intensity of CO2 emissions in the electricity production sector exceeds the EU's average level. It is therefore necessary the increased use of highly efficient, low-carbon emissions energy sources, the natural gas being such a source.

(Source - chapter VIII.3. GREENHOUSE GAS EMISSIONS TRENDS from the Annual Report on State of the Environment in Romania, 2019 NEPA)

As compared to the other fossil fuels, natural gas has the following advantages:

- produce 40% less CO2 then coal and 20% less then oil
- produce almost no SO2 emissions
- file particles emissions are negligible

3.11 ENERGETIC EFFICIENCY AND SAFETY

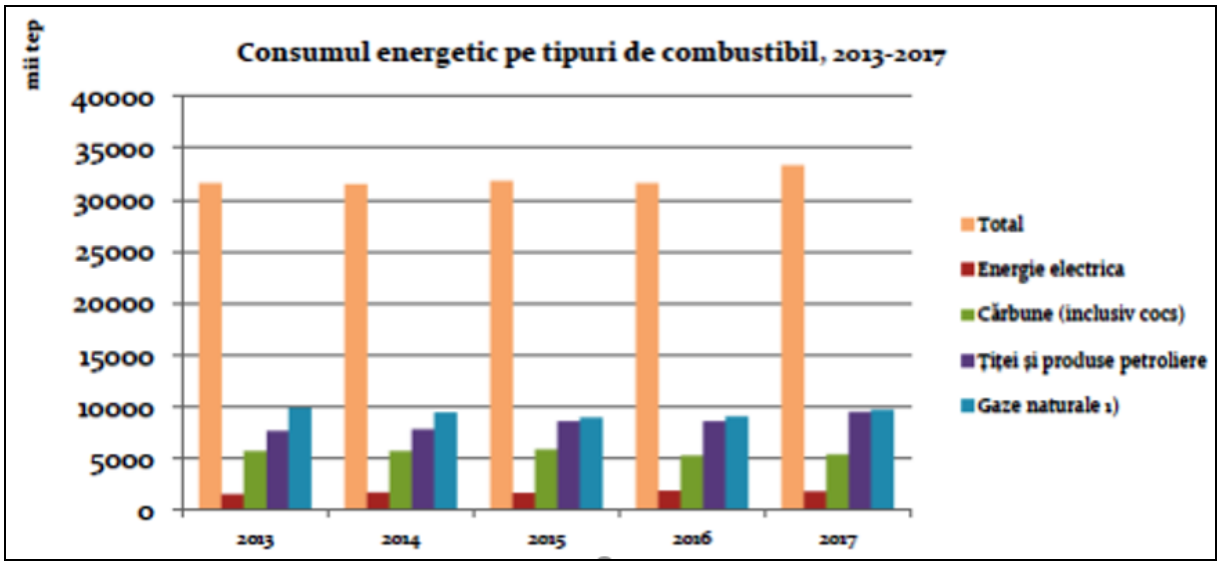
In Romania, natural gas holds for distinct market segments in the energetic sector: electricity production sector, domestic heating and cooking consumption (including the centralized thermal energy production for the population), industrial consumption (including chemistry and petrochemistry) and the transportation sector (GNC and GNL).

The energetic efficiency is directly linked to the energetic intensity, both being extremely important for a durable economic and energetic development. The energetic intensity represents the connection between the internal gross consumption and primary energy or the final energy consumption and the gross national product (GNP) at constant prices. Romania had and still has the highest value for energetic intensity at European level, this meaning that it produces energy at high costs and consumes it in an inefficient manner.

In Romania, the final energy consumption (the energy quantity supplied to the final consumer in the most various energetic purposes) per capita has recorded a progressive increase between 2013 and 2016. Thusly, the internal gross energy consumption per capita in 2017 was +6.1% higher than 2016, respectively an increase by +7.7% in the period between 2013 and 2017 (acc. to ENSI, Energetic Balance Report, 2017).

For the time lapse 2013-2017, regarding the energy consumption per activity sectors, the greatest weight is that of the energetic consumption in the residential sector, followed by industry and transportation activities.

For the time lapse 2013-2017, regarding the energy consumption per types of fuels, in figure below can be noticed that the greatest weight corresponds to the values afferent to natural gas, followed by that afferent to oil and oil by-products consumption.



1. Exclusively gasoline and ethane from drilling shafts, which are included in the oil category.

Fig 13. Energetic consumption on types of fuel between 2013 and 2017 (thousands TEP)[15]

Primary energy mix

Romania has a balanced and diversified mix of primary energetic resources in the electricity production.

In 2017, the weight of these primary energetic resources in the electricity production had the following structure:

- electricity produced from coal (brown coal and pit coal) 27,5% (17,3 TWh);
- electricity produced in hydroelectric power stations 23% (14,4TWh);
- electricity produced in the nuclear power plant in Cernavodă 18,3% (11,5 TWh);
- electricity produced from hydrocarbons (oil and gas) 17% (10 TWh);
- electricity produced by wind and photo-voltaic installations 13.5% (8 TWh);
- electricity produced from biomass 0,7% (0,4 TWh);

It is foreseen an increase tendency in the production of electricity from natural gas until 2050 by 4.8% and, equally, an increase of the weight of the natural gas resource in the electricity production by 1.1% until 2050 as compared to 2017.

The exploitation of hydrocarbons resources in the Black Sea will have a major input in ensuring the Romania's energetic safety. The quantitative levels cumulate from the conventional onshore and offshore production may have the potential to be in excess as compared to the presently estimated demand on the internal market, relatively linear. Our country's natural gas supply's safety, in the long run, depends on the development of the internal natural gas resources, onshore and offshore.

The complementarity of natural gas with the renewable energy sources

The development of wind and photovoltaic energy sources in the last years, based on support programs granted in many countries for the reduction of GGE in the energetic field faces structural constraints, linked to the variable nature of these energy sources (v-RES). On one hand, v-RES have led to the significant decrease of the gross price of electricity but, on the other hand, they need real-time adjustments at energetic system level for the continuous balance of electricity production and consumption. Thusly, as the v-RES weight increases in the electricity mix, the need for infrastructure,

15 - *Source: http://www.insse.ro*

balance costs and cost pressure that the renewable energies exercise on the conventional generation capacities - the so-called integration costs - increase as well.

For the increase of the electro-energetic system's flexibility and the facilitation of v-RES integration, Eurelectric (2011) recommends to simultaneously follow the below listed action pathways:

- The development of flexible capacities of dispatchable and balance generation;
- The management of energy consumption and cost;
- The increase of the interconnection degree;
- The use of market tools (e.g. coupling of markets or remuneration mechanisms for capacity).

The flexible generation and balancing capacities are units which can quickly react to system unbalances. The state-of-the-art natural gas plants are a very good candidate, being able to stop and start in a matter of minutes, which makes them a v-RES complement. Moreover, the natural gas based units hold a modularity feature, of relatively low capital investments, as well as of optimal geographic distribution, given the elevated degree of availability of natural gas on Romanian territory.

The determining factors for the investment decisions in electricity generation capacity based on natural gas are the following: long-term evolution of the price of natural gas, particularly as compared to the price of coal; the long-term evolution of carbon emissions price (EU ETS certificates and, eventually, additional measures to apply tax to carbon emissions); the support mechanisms of various forms of energy production (nuclear, coal, RES, co-generation); the evolution of capital cost (WACC) for investments in capacities based on natural gas.

3.12 CULTURAL HERITAGE

Section III - PROTECTED AREAS of the NTMP, approved by Law 5 of March 6th 2000, stating the list of national heritage values (historical monuments of exceptional national value).

According to the National Culture and Heritage Strategy 2016-2022, the total number of historical monuments in Romania in 2015 was of 30,136, more than half of them being architectural ones. Concurrently, the monuments are also classified in two major categories: monuments of national interest (6,875) and monuments of local interest (23,261).

According to the Lists of Historical Monuments (2015) afferent to each county, their localization at national level is represented in Fig 14. Number of historical monuments by Romanian counties, 2015

Out of the total number of monuments, 38% are located in Bucharest city and in Cluj, Dâmbovița, Prahova, Sibiu, Argeș and Mureș counties.

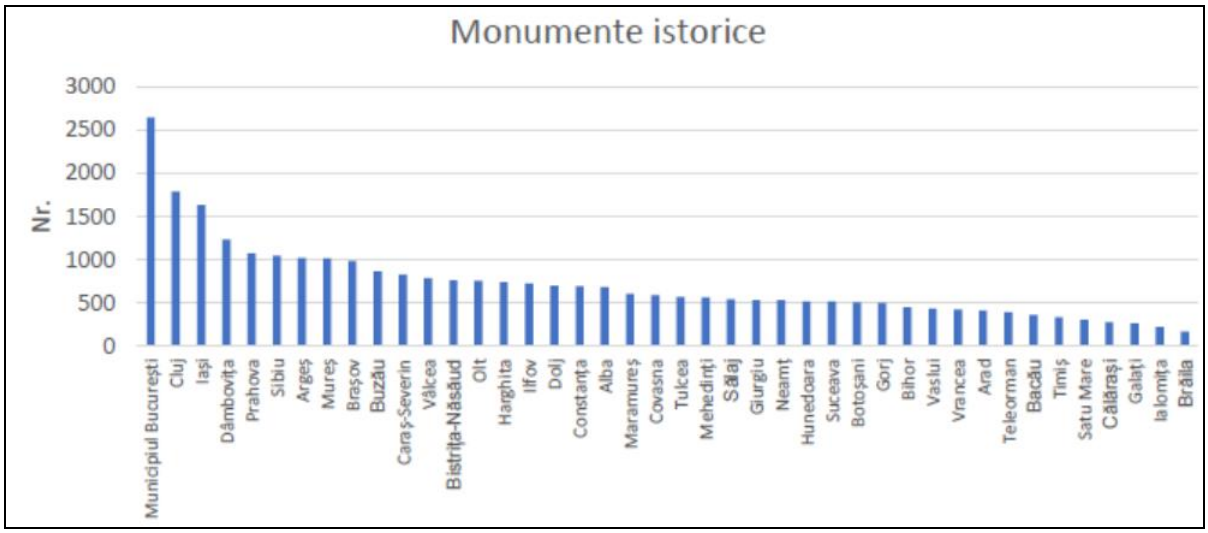


Fig 14. Number of historical monuments by Romanian counties, 2015

(source: Ministry of Culture)

The preservation condition of the historical monuments is presented in the National Culture and Heritage Strategy 2016-2022, as follows: unknown condition for 43% of them, bad preservation condition for 38% of them, average, good and very good preservation condition for 16% of them and 3% of them are in collapse and pre-collapse condition.

Law 422/2001 on the protection of historical monuments regulates the legal regime of historical monuments, republished in 2006, and establishes the measures to be taken to protect them. The historical monuments either belong to the public or private domain of the state, of the counties, cities or communes, either they are privately owned by natural persons or legal entities. For each historical monument is created its own protection area, limited based on topographic, geographic or town planning marks, depending on the street theme, relief and historical monument's features, according to the case, by which is provided an integrated preservation and the capitalization of the historical monument and its built or natural environment.

During the construction works for natural gas transportation infrastructure, just as for other major projects needing excavations, there is the risk of unearthing archaeological heritage objectives, which would need the creation of specific protection programs.

The endorsement of building works in the areas of archaeological heritage on the List of Historical Monuments or in the National Archaeological Repertoire is only approved based on and according to the endorsement of the Ministry of Culture and Cults.

3.13 PRESERVATION OF NATURAL RESOURCES

According to the NERA data, in 2015 the situation of geologic resources and of national free and associated natural gas reserves in Romania was the following[16]:

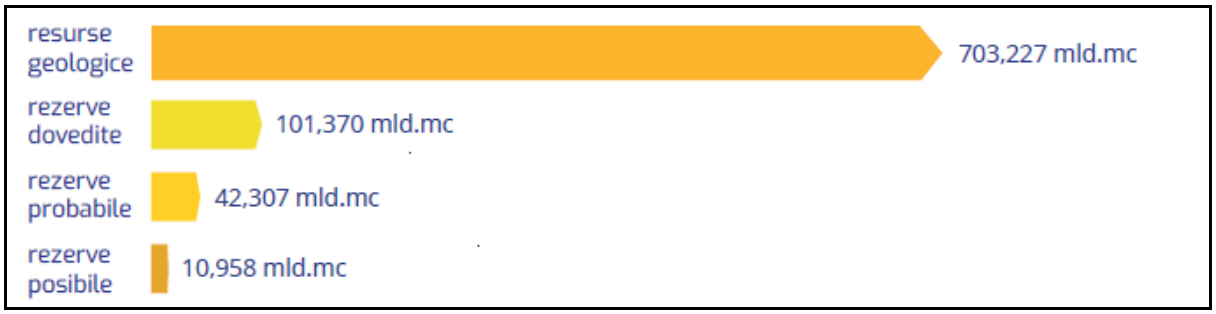


Fig 15. Situation of geologic resources and of national natural gas reserves

The weight of the natural gas in the internal consumption of primary energy is of about 30%. Their important share is explained by the relatively elevated availability of national resources, by the reduced impact on the environment and by their capacity to balance the electricity produced from independent RES.

The natural gas market's advantage is given by Romania's favourable position regarding the transportation capacities in the region and by the possibility of interconnection of the NTS with the central-European transportation systems and with the gas resources in the Caspian Basin, from Eastern Mediterranean Sea and from the Middle East, using the Southern Corridor.

In 2017, the total natural gas consumption was of 129.7 TWh, out of which the internal production

16 source - *Annual report on the activity of the National Energetic Regulation Authority (NERA) - 2015*

covering 89.4% and imports covering 10.6%.

Being the largest natural gas producer in Central and Eastern Europe, Romania holds a unique position in this region, by its limited dependence on external natural gas sources. Nonetheless, import is a necessity as a result of the reduced flexibility of internal natural gas production, corroborated with relatively great seasonal variations of the natural gas consumption.

Trends on international gas markets

The international markets record an increase in the natural gas economic weight, foreseeing a sustained increase of global demand by 45% more in 2040 as compared to 2016, according to IEA, doubled by a global growth in production, particularly from non-conventional sources.[17] A third of the volume will be consumed by the industry, followed closely by the production of electricity.

The global natural gas demand has had an aggregated increase of 1.5% per year between 2010 and 2016. In 2016, the European natural gas consumption has had a remarkable 6% increase, exceeding by 30 bill. mc that of 2015, mainly based on economic growth and on increased competitiveness of gas in the electricity production mix. Thusly, natural gas has become more competitive than coal in the generation mix.

The proposal of the Clean Energy for All Europeans Package (2016), to set the upper limit of CO2 emissions at 550g/kWh for the capacities allowed to enter capacity markets represents a firm step taken in the favour of natural gas in the electricity mix. The goal to reduce carbon emissions in the EU by 40% in 2030 as compared to their level in 1990 will cause numerous generation capacities based on coal to become obsolete in the following decade. The increase of the EU ETS emissions Certificates will support the partial replacement of coal with natural gas in the European electricity mix. The addition of v-RES to gas will also contribute in the reduction of emissions.

3.14 DURABLE TRANSPORTATION

In the Romanian transportation sector, natural gas represents a fuel in its incipient stage of market entry. The compressed natural gas technology (CNT) represents a road transportation development direction, also promoted by Directive 014/94/EU on the infrastructure of alternative fuels (bio-fuels, natural gas, hydrogen and electricity).

Alternative fuels, in the sense of Directive 014/94/EU, mean fuels or energy sources serving, at least partially, as substitute for fossil oil sources in the supply of energy for transportation, and which have the potential to contribute in their de-carbonation and in the improvement of the transportation sector's environmental performance. These include, amongst others: electricity; hydrogen; bio-fuels; synthetic and paraffin fuels; natural gas, including bio-methane, in gaseous state (compressed natural gas - CNG) and liquid state (liquefied natural gas - LNG) and liquefied oil gas (LOG).

The national policy framework for the development of alternative fuels' market in the transportation sector and for the deployment of the relevant structure in Romania, approved by the Romanian Government by GD 37/2018, states that by December 31st 2020, to be installed in our country a total of 23 CNG reload stations, out of a total of 42 designated urban agglomerations. By the end of 2025 is foreseen the installation of 1,000 reload and/or supply stations for public use, with electricity (85% of the total) and with NCG.

If in 2015 the weight of the natural gas was negligible in Romanian road transportation, in 2030 it will be, according to PRIMES projections, of about 1.5% (93,000 tep). Jointly, LOG and CNG will represent 2.3% of the energy consumed in road transportation (152,000 tep).

17 Source - "Perspectives of natural gas in Romania and methods for their superior capitalization" Report, 2018

The EU Directive on alternative fuels also states the support of liquefied natural gas infrastructure's development in the transportation industry. The LNG's potential is rather achievable in the maritime and river transportation segment. The engines' conversion towards LNG will be triggered by the NOX and/or greenhouse gas emissions control legislation. The MARPOL Convention of the International Maritime Organization limits the sulphur emissions, and natural gas has considerably lower sulphur emissions than the conventional maritime fuels.

3.15 PROBABLE EVOLUTION OF THE ENVIRONMENT IN CASE OF NON-DEPLOYMENT OF TYNDP

The SEA Directive (by art. 5 and appendix I-b), as well as G.D. 1076/2004 (by art. 15), request the performance of an analysis of the environmental condition, in the conditions of non-implementation of proposed plans and programs[18]. Usually, the analysis of a plan or of a program's impact on the environment is performed based on the analysis of several alternatives, the non-implementation alternative representing Alternative 0. Practically, Alternative 0 is the reference scenario, as compared to which it is established and assessed the plan's influence on the environmental factors.

The goal of the Alternative 0 analysis is to foresee and to assess the manner in which evolves the condition of the environment in the plan's influence area, under the conditions where TYNDP is not implemented.

The present condition of the environment (also including the influence of the TYNDP goals already completed or pending completion on analysis date) is the one presented in the previous chapters.

The results of the Reference Scenario assessment will be used as a reference point in the assessment of the development alternatives, Do minimum and Do maximum scenarios.

In what Alternative 0 is concerned, the following are mentioned:

- the non-deployment of the TYNDP provisions do not excuse the national operator from the observance of the provisions of EU Regulation 2017/1938 of the European Parliament and Council of October 25th 2017 on the measures regarding the guarantee of gas supply safety;
- the absence of TYNDP would lead to a non-fulfilment of the main objectives established as a result of Romania's adherence to EU, in what the natural gas supply safety is concerned, the diversification of imported natural gas supplies by access to sources from Western Europe, the interconnection of NGTNS to the European transportation system, as well as the access to natural gas sources in the Caspian Sea and Black Sea areas, difficulties in accessing European funding. The objectives and action directions of TYNDP are in close connection with the provisions of important national strategies/programs/plans (see chapter 0.3) and its non-deployment may lead to the so-called "downward spiral" (non-deployment of TYNDP may lead to the non-fulfilment of objectives and action measures established by other national strategies/programs/plans).

Below is presented the prognosis of the environment's condition evolution in case of non-deployment of TYNDP. For this forecast, the information available on national level on the present condition of environmental factors was considered.

18 Art. 5 and Appendix 1b - SEA Directive 2001/42/EC of the European Parliament and Council on the effects of certain plans and programs on the environment; Art. 15 - GD 1026/2004 on the setup of the environment assessment procedure for plans and programs

Table 12. The possible evolution of the environment's condition in case of TYNDP non-deployment (Alternative 0)

ENVIRONMENTAL ISSUE	The possible evolution of the environment's condition in case of TYNDP non-performance - Alternative 0
AIR	In case of TYNDP non-deployment, the following aspects are to be considered: • the population will keep using, in the areas not covered by the natural gas transportation systems, other, more polluting, sources of thermal energy (wood, coal, oil, etc) in their individual heating installations, in inefficient stoves with incomplete burning, lacking particle filters, leading to a local increase of air pollution in residential areas. • the non-performance of rehabilitation / modernization works for NGTNS's objectives (natural gas transportation pipes, gas compression stations, etc), 74% out of which already obsolete, may lead to uncontrolled gas emissions in the atmosphere (methane, burning gases), exceeding the allowed limits for network losses and/or the functioning of technically and morally severely worn equipment. • the non-performance of rehabilitation works envisaged by TYNDP may lead to damages of the NGTNS's objectives, with impact on air quality in the area, in case of fires caused by explosions. • the absence of natural gas supply for the functioning of industrial installations leads to their functioning using different types of fuel (coal, diesel, etc.), with a higher potential of air pollution.
WATER	The Natural Gas National Transportation System does not directly affect the water bodies quality. Under normal functioning conditions, natural gas transit through the pipe does is not a pollution source for the crossed bodies of water. The non-deployment of TYNDP will not have a direct impact on the quality of surface or underground bodies of water. Nonetheless, it must be states that the non-performance of the rehabilitation works may led to damages in the pipes sub-crossing water streams. To repair these damages, interventions must be performed in the river bed, leading to a local impact on the aquatic environment as follows: • the water's turbidity will increase in the area of the works; • an accidental pollution with hydrocarbons can take place, due to the absence of installations' maintenance activities.
SOIL	The non-deployment of TYNDP involves the following important aspects: • The non-performance of strategic interconnections with the neighbouring countries will involve the development of new exploitation sites on Romanian territory, with an impact on soil quality in the exploitation area • The non-supply of natural gas for the functioning of thermal energy plants / electricity plants / industrial installations leads to their functioning using other types of fuels (coal, diesel, etc), therefore causing the pollution of soil as a result of mining activities, the occupation of the soil with polluting raw materials, cinder and ash.
WASTE MANAGEMENT	• Presently, about 74% of the transportation networks are more than 20 years old, close to their normal functioning lifespan. Maintaining them in good functioning condition takes periodical maintenance and repair works from which constantly result quantities of waste caused by repair and maintenance works.
Use of natural resources	• In the absence of a development plan, it is possible that the development of natural gas transportation capacities, including by the interconnection of NGTNS's interconnection with the similar transportation systems in the neighbouring countries, to be performed in a chaotic manner. This will not ensure a safe natural gas supply, including in emergency cases. • In the absence of TYNDP's deployment will be necessary that, on one side, to develop new natural gas exploitations in the country, and on the other side, to expect an increase in the consumption of wood and of other solid and liquid fuels for heating,

ENVIRONMENTAL ISSUE	The possible evolution of the environment's condition in case of TYNDP non-performance - Alternative 0
	as well as for thermal energy and electricity production.
Biodiversity	• A high level of atmospheric pollutants will be maintained (sulphur dioxide, carbon monoxide, carbon dioxide, nitrogen oxides and powders) due to the use, for heating and electricity production, of fuels other than methane gas (coal, oil fuel, wood), which are more pollutant and which will indirectly affect the biodiversity's preservation condition. • The non-performance of rehabilitation / modernization works proposed by TYNDP may lead to damages to the natural gas transportation system, existing the risk of accidents, which may destroy flora and fauna elements holding an elevated degree of preservative value.
Environmental Risks	• The absence of NGTNS's maintenance works reduces its safety degree in case of natural disasters (e.g. earthquakes). • The non-deployment of TYNDP may lead to damages, resulting in sudden cessations of the gas supply (as a result of damages to transportation pipes) for economic objectives presenting explosion risks. This may cause immense economic damages, and eventually loss of human lives. • The transportation pipes and the supply connections, about 74% of them, have a functioning lifespan which exceeds 20 years, close to their normal functioning lifespan, which increases the risk of major accidents occurrence, with severe consequences on the population and generally on the environment. • The non-deployment of the TYNDP provisions do not excuse the national operator from the observance of the provisions of EU Regulation 2017/1938 of the European Parliament and Council of October 25th 2017 on the measures regarding the guarantee of gas supply safety.
CULTURAL HERITAGE	The non-deployment of TYNDP may have positive, as well as negative effects, if we consider the following aspects: • The non-performance of new transfer pipes eliminates the possible danger that certain artefacts or historical monuments become affected during the construction phase; • Continuing to use solid fuels as thermal and electrical energy production source will lead to an increased degree of air pollution, causing damage to certain historical and cultural values, as well as to certain archaeological sites. • The delayed rehabilitation of existing pipelines will lead to the increase of the risk of their damage, with potential explosions and fires.
HUMAN POPULATION AND HEALTH	• The non-deployment of TYNDP will lead to direct negative effects as a result of emissions in the atmosphere (see also the Air chapter), but also to indirect effects, as a result of the absence of natural gas supply during the cold season, of frequent cessations of natural gas supply or as a result of the impossibility to connect new consumers.
LANDSCAPE	• The non-performance of TYNDP will not cause any alterations of the present landscape • The NGTNS natural gas objectives will be kept in the same condition, needing modernization / repairs, with negative local influences on the landscape.
Climate changes	• The maintenance of the GGE at the actual level, while keeping up the use of elevated GGE emissions energy sources (coal, hydrocarbons, etc). • Keeping a low efficiency of the NGTNS, with losses of natural gas due to the exploitation wear of the natural gas transportation pipes and to joints' lack of tightness.
ENERGETIC EFFICIENCY AND SAFETY	• Keeping a low level of NGTNS efficiency. • The condition of the national gas transportation network, where 74% of the transportation network has an almost spent lifespan, the maintenance of inefficient systems within the gas transportation infrastructure, will not allow the increase of energetic efficiency in the natural gas transportation sector

ENVIRONMENTAL ISSUE	The possible evolution of the environment's condition in case of TYNDP non-performance - Alternative 0
	• There will still be dependence on the natural gas transportation pathways from the East towards the West, a fact compromising the energetic security of the European continent, in its entirety.
Durable transportation	• The expansion / development of the CNG and LNG network will not be possible, as alternative fuels in the field of transports, with emissions lower than those of conventional fuels
POPULATION'S AWARENESS	• Lack of public awareness regarding the natural gas transportation infrastructure's effects on the environment. • A low degree of involvement of the civil society in the decision-making regarding the development options for the natural gas transportation sector.

4 ENVIRONMENTAL CONDITIONS OF THE AREA POSSIBLY SIGNIFICANTLY AFFECTED

The TYNDP's complexity is obvious, because:

- it includes projects for natural gas transportation and storage;
- goals have been established regarding the performance of the natural gas transportation system, in close connection with the European policies and national strategies;
- it is a nationwide plan - the proposed projects will be deployed in areas with different environmental features;
- the reference period is of 10 years (2021-2030)
- it proposes 2 scenarios:
    - the reference "Do minimum" scenario, considering the present condition of SNP, including projects already under construction, with ensured financing;
    - the "Do maximum" scenario, considering the present condition of SNP, including projects already under construction, with ensured financing, as well as all the other projects proposed by TYNDP.

TYNDP includes, as a development area, the entire national territory. For some of the strategic natural gas transportation and storage projects proposed by TYNDP (included in the Do maximum scenario), the technical details are not yet known and the on-site studies have not yet been performed. No information is available which would allow for a precise spatial localization.

TYNDP proposes the performance of 17 strategic projects regarding the natural gas transportation activity, and 5 projects regarding the natural gas storage activity.

The plan also refers to 75 projects included in the Investments Modernization and Development Plan (IMDP) for NCNGT, period 2020-2023 (listed in chapter 10 of TYNDP 2021-2030). These projects mainly envisage repairs / punctual interventions on reduced areas, on existing objectives, with an insignificant impact on the environment. For most of the IMDP projects, the decision of the classification phase issued by the Environmental Protection Agencies state "Classification of the notice - it does not pertain to the assessment of the impact on the environment and it does not pertain to appropriate assessment". For this reason, the proposed development scenarios and the Environmental Report only analyze the deployment of projects classified as strategic projects.

In this chapter were analyzed the "Do minimum" and "Do maximum" development scenarios which, by the nature of the proposed investments (types of construction works specific for the proposed projects) may cause alterations of the present environmental features.

For the assessment of the effect's features and the areas where they could be affected by the deployment of TYNDP, the following aspects were considered:

- the type of proposed project (nature of the proposed investment and the sector it addresses - natural gas transportation OR storage),
- general features of the deployment areas which may become altered (sensible or vulnerable areas to air, soil, water pollution, valuable areas from a biodiversity and landscape point of view, areas of cultural value, densely populated areas),
- risks for human health and for the environment;
- the period during which the effects on the environment and on the human health will be present (project's execution phase or operational phase).

4.1 ENVIRONMENTAL FEATURES OF THE AREAS TO POSSIBLY BE SIGNIFICANTLY AFFECTED BY THE PROJECTS INCLUDED IN THE REFERENCE "DO MINIMUM" SCENARIO.

The projects included in the *"Do minimum"* scenario are projects with ensured financing, pending deployment / construction, in an advanced phase regarding making of the Final Investment Decision.

Table 13. List of major projects - *„Do minimum" reference project*

Project code	Project name	Project statute*
Natural gas transportation		
7.1.1	Development on Romanian territory of the Natural Gas National Transportation System on the Bulgaria-Romania-Hungary-Austria corridor - Phase I	FINALISED
7.1.2	Development on Romanian territory of the Natural Gas National Transportation System on the Bulgaria-Romania-Hungary-Austria corridor - Phase II	A non FID
7.2	The development on Romanian territory of the Southern Transportation Corridor for natural gas takeover from the Black Sea shore	FID
7.3	Interconnection of the natural gas national transportation system with the natural gas international transportation pipeline T1 and reverse flow Isaccea Phase I	FINALISED
	Interconnection of the natural gas national transportation system with the natural gas international transportation pipeline T1 and reverse flow Isaccea Phase II	FID
7.4	Project regarding developments of the NGNTS in the North-East of Romania, for the improvement of the area's supply with natural gas, as well as to ensure the transport capacities towards the Republic of Moldavia.	FID
7.6	Project regarding new developments of the NGNTS to takeover natural gas from the Black Sea shore	FID
7.7	Romania-Serbia Interconnection	A non FID
7.8	1.Modernization of GMS Isaccea 1	FINALISED
	2.Modernization of GMS Negru Vodă 1	FID
Natural gas storage		
8.1	Modernization of the natural gas storage system's infrastructure - Bilciurești	FID
8.4	Increase of the underground natural gas storage capacity in the Sărmășel (Transilvania) storage facility.	A non FID
8.5	Re-engineer and development of the underground natural gas storage facility in Târgu Mureș	A non FID

*) Depending on the Final Investment Decision (FID) the projects have been divided into two categories: FID projects - for which the final investment decision was made, and non-FID - for which the final investment decision was not made.
the main non-FID statute was divided into the following subcategories:
advanced non-FID (A non-FID);
less advanced non-FID (LA non-FID);

In the reference "Do minimum" scenario are included a number of 11 strategic projects. The following conclusions can be highlighted:

- 8 projects, classified as major strategic projects, involve construction works for gas networks. These projects have already been regulated from a environmental protection point of view and they are under performance. The exception is the modernization of GMS Negru Vodă 1, included in project 7.8., for which the environmental protection endorsement procedure was not yet initiated.
- 3 projects envisage modernization and storage capacity expansion works for 3 natural gas storage facilities (Bilciurești, Sărmășel and Târgu Mureș).

Table 14. Situation of the environmental impact / appropriate assessment analysis for the projects included in the reference Do minimum scenario

Project code	Project name	Assessment of the environmental impact / appropriate assessment
Natural gas transportation		
7.1.1.	**Development on Romanian territory of the Natural Gas National Transportation System on the Bulgaria-Romania-Hungary-Austria corridor - Phase I**	The project was submitted to the environmental impact assessment and to the appropriate assessment procedure. Environmental Endorsement no. 3/05.12.2016 was issued by the National Agency for Environmental Protection; The alterations to the project, performed subsequent to the issuance of the environmental endorsement and regulated by the Classification phase Decision no. 244/24.12.2017 and Classification phase Decision no. 167/09.12.2019 issued by the National Agency for Environmental Protection for the alterations in the project (Environmental Endorsement review no. 3/05.12.2016).
7.1.2.	**Development on Romanian territory of the Natural Gas National Transportation System on the Bulgaria-Romania-Hungary-Austria corridor - Phase II**	
7.2.	**The development on Romanian territory of the Southern Transportation Corridor for natural gas takeover from the Black Sea shore**	The project was submitted to the environmental impact assessment and to the appropriate assessment procedure Environmental Endorsement no. 1/10.05.2018 was issued by the National Agency for Environmental Protection;
7.3.	**Interconnection of the natural gas national transportation system with the natural gas international transportation pipeline T1 and reverse flow Isaccea:** ***Phase I:*** 1.1. Interconnection of the National Transportation System with pipeline T1 in the Isaccea Gas Measurement Station, Tulcea county 1.2. Repairs to the Dn 800 mm Onești-Cosmești pipeline, following the intelligent PIG inspection, which states punctual repairs in the existing pipeline, on the territory of Bacău, Vrancea and Galați counties	1.1. Classification Phase Decision no. 144/06.03.2018 issued by EPA Tulcea (it does not pertain to environmental impact assessment and it does not pertain to appropriate assessment) 1.2. Classification Phase Decision no. 27/16.05.2018 issued by the National Agency for Environmental Protection (it does not pertain to environmental impact assessment and it does not pertain to appropriate assessment)
	Stage II 2.1. Modernization of the existing Gas Compression Station in Siliștea, including of Technological Joint (TJ) Siliștea, Brăila county 2.2. Modernization of the existing Gas	2.1. Classification Phase Decision no. 5031/01.04. 2019 issued by EPA Brăila (it does not pertain to environmental impact assessment and it does not pertain to appropriate assessment) 2.2. Classification Phase Decision no. 20/28.01.2019

Project code	Project name	Assessment of the environmental impact / appropriate assessment
	Compression Station in Onești, including of Technological Joint (TJ) Onești, Bacău county 3. Works at the existing Technological Joint in Șendreni, Brăila county	issued by EPA Bacău (it does not pertain to environmental impact assessment and it does not pertain to appropriate assessment) 2.3. Classification Phase Decision 2907/09.03. 2018 issued by EPA Brăila (it does not pertain to environmental impact assessment and it does not pertain to appropriate assessment)
7.4.	**developments of the NGNTS in the North-East of Romania, for the improvement of the area's supply with natural gas, as well as to ensure the transport capacities towards the Republic of Moldavia**	The project was submitted to the environmental impact assessment and to the appropriate assessment procedure. Environmental Endorsement no. 3/06.07.2017 was issued by National Environmental Protection Agency; Subsequently was issued the Classification Phase Decision no. 2/09.01.2018 by the National Environmental Protection Agency for the alterations to the project (environmental endorsement review) and Environmental Endorsement Review Decision no. 2/09.01.2018, reviewed on 18.04.2018.
7.6.	**New developments of the NGNTS to takeover natural gas from the Black Sea shore**	The project was submitted to the environmental impact assessment procedure. The appropriate assessment procedure was not performed. Environmental Endorsement no. 31/24.11.2017 was issued by National Environmental Protection Agency Constanta;
7.7	**Romania - Serbia Interconnection**	Classification Phase Decision no. 142/25.06.2019 issued by EPA Timiș (it does not pertain to environmental impact assessment and it does not pertain to appropriate assessment)
7.8	**Modernization of Gas Measurement Station (GMS) Isaccea 1 and Negru Vodă 1**	Classification Phase Decision no. 715/24.08.2018 issued by EPA Tulcea for "Modernization of Gas Measurement Station Isaccea 1" project (it does not pertain to environmental impact assessment and it does not pertain to appropriate assessment) For "Negru Vodă 1 GMS Modernization" no environmental procedure was triggered.
Natural gas storage		
8.1	**Modernization of the natural gas storage system's infrastructure - Bilciurești**	The procedure to obtain the regulatory documents was not triggered.
8.4	**Increase of the underground natural gas storage capacity in the Sărmășel (Transilvania) storage facility.**	The procedure to obtain the regulatory documents was not triggered.
8.5	**Re-engineering and development of the underground natural gas storage facility in Târgu Mureș**	For project 8.5, Phase 1, Environmental Protection Agency Mures issued the Classification Phase Decision no. 602/26.02.2014 according to which the project "is not subject to an environmental impact assessment and is not subject to an adequate assessment". On 8th of May 2020, Environmental Protection Agency Mures issued The Declaration on the authority responsible for monitoring NATURA 2000 sites, confirming that" the project cannot have a significant impact on a NATURA 2000 site". For the 2nd phase of the project the procedure to obtain the regulatory documents was not triggered.

Analyzing the situation of the information on the environmental impact assessment procedure for the projects included in the "Do minimum" scenario, the following can be concluded:

- for a number of 5 projects (45%) was performed the environmental impact assessment procedure with the performance of the environmental impact study, and for 4 of them (36%) the appropriate assessment was also performed;
- for a number of 4 projects (27%) the endorsement procedure was ceased in the Classification Phase Decision issuance (it does not pertain to environmental impact assessment and it does not pertain to appropriate assessment). These projects regard the modernization of Gas Measurement Stations, Gas Compression Stations, punctual repairs on the pipes, interconnections and project 8.5, phase 1, underground gas storage.
- for projects 8.1, 8.4 and 8.5. phase 2 the procedures for obtaining the regulatory acts were not initiated (natural gas storage projects).

In order to determine the environmental features of the areas which could possibly be significantly affected, in the case of projects included in the "Do minimum" reference scenario, the information in the conclusions of the Environmental Impact Assessment Studies, the appropriate assessment studies and in the presentation memorandums were taken, where available.

In the table below are systematically presented the conclusions of the environmental documentations elaborated in the environmental impact assessment procedures and/ or appropriate assessment, of the classification phases decision, of the environmental endorsements, for the projects included in the reference scenario (Do minimum).

Only those projects were analyzed for which environmental information was available (to see table above).

The main causes for which the development of natural gas transportation infrastructure projects can be liable for the occurrence of negative effects on the environment are:

- location of projects in areas / or in the vicinity of sensible areas in what flora and fauna is concerned;
- definitive or temporary occupation of certain surfaces of land, in the execution as well as in the operation phase, leading to changes in the land's destination, massive scraping, deforestations, etc.
- pollutant emissions in the atmosphere during the performance of works in the areas with a great deal of works must be performed;
- potential of quantitative and qualitative alterations of underground, as well as surface water resources, during the performance of works;
- the lack of environmental management plans or their faulty application during the performance of works;
- the performance of environmental impact assessments, focused only on the analysis of the effects caused by these projects on limited areas, barring the cumulative impact;
- the occurrence, during the execution phase, of certain new aspects / elements which could not have been predicted during environmental endorsement phase and which have led to alterations of the projects and, therefore, to a re-analysis of the environmental impact and to the need to propose new additional measures for their reduction / minimization.

A common feature of the new gas transportation pipelines' construction projects is the fact that the potentially significant impact is recorded during the pipe's performance period, particularly as a result of the temporary/definitive occupation of land surfaces, but on limited corridors, localized along the pipeline, and less during these systems' functioning period.

Table 15. Environmental features possibly affected by the projects included in the reference Do minimum scenario - specific aspects for each assessed project

Environmental factors	Environmental features possibly affected by the projects included in the reference scenario resulting from the analysis of the environmental endorsements / classification phase decisions documents' conclusions.
7.1. Development on Romanian territory of the Natural Gas National Transportation System on the Bulgaria-Romania-Hungary-Austria corridor - Phase I and II	
Crossed or proximity natural protected area	Some of the project's parts cross the following protected natural areas: • Natura2000 sites: ROSCI0063 Defileul Jiului; ROSCI0129 Nordul Gorjului de Vest; ROSCI0138 Bolintin Forest; ROSCI0236 Strei-Haţeg; ROSCI0292 Rusca Montană-Ţarcu-Retezat Corridor; ROSCI0385 Timiș river between Rusca and Prisaca; ROSPA0106 Lower Olt river Valley. • Natural areas of national interest: ``Tara Haţegului`` Dinosaurs Geopark; Jiului Gorge National park. Located in the vicinity of the sites: • 30-50m from ROSCI0296 Drăgășaniului Hills • 670 m from site ROSCI0109 Lunca Timișului; • 109 m from site ROSPA0045 Grădiștea Muncelului – Cioclovina. • 63 m from ROSCI0087 Gradistea Muncelului - Ciclovina The impact over the biodiversity environmental factor is assessed to be within the allowed limits, just leading to the affectation of biodiversity on short term (during building phases), without affecting it on average and long term.
Noise and vibrations	Noise and vibrations occur during the performance period, being temporary and intermittent. During the functioning phase, the noise level is foreseen to be below admissible levels. Additional insulation works are proposed, using soundproofing panels for the enclosures (halls) safeguarding equipments and aggregates (particularly compression aggregates).
Emissions in the atmospher	No significant alterations are foreseen in what the air quality is concerned. The pollutants' emissions in the atmosphere during construction phase will be within the maximum allowed limits.
Impact on water streams	The performance of the project has a reduced hydromorphological impact, strictly local, and it does not influence waters' hydrodynamics in the project's surrounding areas. Water sources and aquatic ecosystems will not be affected. The impact on the "water" environmental factor is assessed to be within the allowed limits. The project does not lead to short/average/long term affectation of underground or surface waters, directly or indirectly, singularly or under conditions cumulated with other impact categories.
Soil / underground contamination risk	The impact on the "soil" environmental factor is considered to be within the allowed limits. The project only affects the soil on short term (the building phases), without affecting it on average and long term; the impact diminution and locations' restoration measures ensure the restart of productivity and the reintegration of affected surfaces in the natural / agricultural circuits. The impact on the "geology and underground" environmental factor is considered to be neutral.
Landscape alterations	The impact on the "landscape" environmental factor is considered to be within the allowed limits, only affecting it on short term (building phases), without affecting it on average and long term; the impact diminution and locations' restoration measures ensure the restoration of the local environmental conditions.
HUMAN POPULATION AND HEALTH	Will not have effects on population's health. Most of the BRHA (95.8%) is located outside the localities' built up area and only 4.2% is superposed with built-up perimeters, but with a low population density. The residential areas will not be affected The impact on the "social and economic" environmental factor is considered to be a positive one.

Environmental factors	Environmental features possibly affected by the projects included in the reference scenario resulting from the analysis of the environmental endorsements / classification phase decisions documents' conclusions.
Archaeology sites / historical monuments	The archaeology sites and historical monuments will not be affected.
Environmental Risks	The environmental risks associated with the BRHA project are assessed to be of low level, being easily removable following the deployment of response plans. The BRHA pathway superposes on risk areas regarding the nitrates pollution, implying the enforcement of adequate measures to limit any eventual pollution risks and any expansion of nitrates pollution basins. This aspect does not significantly influences the soils' condition.
7.2. The development on Romanian territory of the Southern Transportation Corridor for natural gas takeover from the Black Sea shore	
Crossed protected areas in the proximity	Some of the project's parts cross the following protected natural areas: - Natura2000 sites; ROSCI0043 Comana and ROSPA0022 Comana, ROSCI0131 Oltenița-Mostiștea partially superposing with ROSPA0105 Mostistea Valley, ROSCI0319 Bogs in Fetești superposing with ROSPA0012 Bratul Borcea in the area crossed by the pipeline, ROSCI0022 Danube's Canals superposing with ROSPA0039 Dunăre Ostroave in the area crossed by the pipeline. - natural areas of national interest: RONPA0928 Comana Natural Park - natural areas of international interest (RAMSAR sites): RORMS0008 Comana Natural Park, RORMS0014 Brațul Borcea, RORMS0017 Ostroavele Dunării-Bucgeac- Iortmac. The impact is assessed to be within the allowed limits, only affecting the biodiversity on short term (during building phase), without any average and long term effects; the impact diminution and locations' restoration measures ensure the restoration of local environmental conditions, the installation of a natural vegetation succession and rapid restoration (in less than 24 months) of the locations.
Noise and vibrations	Noise and vibrations are those produced by specific tools, during the performance period, being reduced in extent and of temporary and seldom occurrence. There are no sources with a potential impact of sound pollution during the functioning.
Emissions in the atmosphere	The air pollution sources are identified during the project's construction phase. During the functioning phase there are no sources of atmospheric pollutants. The diminution measures on the "air" environmental factor have mainly envisaged the limitation of powders emissions.
Impact on water streams	The impact on the "water" environmental factor is considered to be within the allowed limits, without affecting underground or surface waters.
Soil / underground contamination risk	The impact on the "soil" environmental factor is assessed to be within the allowed limits, only affecting it on short term (during building phase). The soil will not be affected on average and long term. The impact diminution and locations' restoration measures offer the restoration of the productivity and the reintegration of the affected areas within the natural / agricultural circuits. The impact on the "geology and underground" environmental factor is considered to be neutral.
Landscape alterations	The impact is assessed to be within the allowed limits, only affecting the biodiversity on short term (during building phase), without any average and long term effects; the impact diminution and locations' restoration measures ensure the restoration of local environmental conditions, the installation of a natural vegetation succession and rapid restoration (in less than 24 months) of the locations.
HUMAN POPULATION AND HEALTH	Will not have effects on population's health. The project is superposed on weakly populated areas. The impact on the "social and economic" environmental factor is considered to be punctually (locally) negative, due to fears regarding the facilities

Environmental factors	**Environmental features possibly affected by the projects included in the reference scenario resulting from the analysis of the environmental endorsements / classification phase decisions documents' conclusions.**
	which will be associated or developed after this project.
Archaeology sites / historical monuments	The archaeology sites are located in areas far from the pathway of the future natural gas pipeline, but their location is not precise.
Environmental Risks	The environmental risks associated with this project are assessed to be low, easily removable following the deployment of coherent answer plans, producing a significant reduction of risk calculation terms, acting on the probability of these risks' occurrence and on the severity of the caused effects. The pathway is superposed with risk areas in what nitrates pollution is concerned, without significantly affecting the condition of the soils. Nonetheless, this aspect implies the enforcement of adequate measures to limit any eventual pollution risks and any expansion of nitrates pollution basins.
7.3. Interconnection of the natural gas national transportation system with the natural gas international transportation pipeline T1 and reverse flow Isaccea: Phase I: 1. Interconnection of the National Transportation System with pipeline T1 in the Isaccea Gas Measurement Station, Tulcea county 2. Repairs to the Dn 800 mm Onești- Cosmești pipeline, following the intelligent PIG inspection, which states punctual repairs in the existing pipeline, on the territory of Bacău, Vrancea and Galați counties	
Crossed protected areas in the proximity	*Phase I.1.* The project's pathway crosses, on certain lengths, the Natura2000 ROSPA0031 Danube's Delta site and the Razim Sinoe Complex. The project is located 382 km away from the Danube's Delta Biosphere Reservation and ROSCI0065 Danube's Delta. *Phase I.2.* The project's pathway crosses, on certain lengths, and is located in the vicinity of ROSCI0162 Lower Siret Plane and ROSPA0017 Lower Siret Plane. The impact is assessed to be within the allowed limits, only affecting the biodiversity on short term (during building phase), without any average and long term effects; the impact diminution and locations' restoration measures ensure the restoration of local environmental conditions, the installation of a natural vegetation succession and rapid restoration (in less than 24 months) of the locations.
Noise and vibrations	Noise and vibrations occur during the performance period, being reduced in extent and of temporary and seldom occurrence. The impact is insignificant, within the allowed limits. There are no sources with a potential impact of sound pollution during the functioning.
Emissions in the atmosphere	The air pollution sources are identified during the project's construction phase. During the functioning phase there are no sources of atmospheric pollutants.
Impact on water streams	*Phase I.1.* The project does not influence the surface or underground waters' quality. *Phase I.2.* The impact on the "water" environmental factor is considered to be within the allowed limits, without affecting underground or surface waters.
Soil / underground contamination risk	The impact on the "soil" environmental factor is assessed to be within the allowed limits, only affecting it on short term (during building phase). The soil will not be affected on average and long term.
Landscape alterations	The impact on landscape and visual environment will be insignificant, it totally dissipating upon the completion of works.
HUMAN POPULATION AND HEALTH	*Phase I.1.* The nearest locality is Isaccea town, 3.61 km away. The works will be performed outside the residential areas. Will not affect the population's health. *Phase I.2.* Impact on human population and health can be assessed as insignificant. Regarding the locations where works are performed less than

Environmental factors	**Environmental features possibly affected by the projects included in the reference scenario resulting from the analysis of the environmental endorsements / classification phase decisions documents' conclusions.**
	100 m away from residential / built areas, it is envisaged the installation of soundproofing panels at the edge of the works area.
Archaeology sites / historical monuments	No potential regarding the occurrence of a significant impact on the cultural patrimony was identified.
Environmental Risks	Assessed as being reduced.
7.3. Interconnection of the natural gas national transportation system with the natural gas international transportation pipeline T1 and reverse flow Isaccea: Phase II: 1. Modernization of the existing GCS in Siliștea, including of Technological Joint (TJ) Siliștea, Brăila county 2. Modernization of the existing GCS in Onești, including of Technological Joint (TJ) Onești, Bacău county 3. Works at the existing Technological Joint in Șendreni, Brăila county	
Crossed protected areas in the proximity	*Phase II.1.* Not applicable *Phase II.2.* Not applicable *Phase II.3.* Natura2000 ROSCI0162 site and ROSPA0071 Lunca Siretului Inferior The impact is assessed to be within the allowed limits, just leading to the affectation of biodiversity on short term (during building phases), without affecting it on average and long term.
Noise and vibrations	Noise and vibrations occur during the performance period, being reduced in extent and of temporary and seldom occurrence. It is considered that during the operation period, the noise and vibrations' impact will be insignificant.
Emissions in the atmosphere	The impact of performance activities on air quality in the work areas will be insignificant and its occurrence will be temporary and reversible. During operation period, by the adopted building measures and the observance of the operation technology, the probability that a significant negative impact on air and climate occurs is reduced.
Impact on water streams	The project does not influence the surface or underground waters' quality.
Soil / underground contamination risk	The impact on the "soil" environmental factor is assessed to be within the allowed limits, only affecting it on short term (during building phase). The soil will not be affected on average and long term.
Landscape alterations	Not applicable, the project involves already existing objectives.
HUMAN POPULATION AND HEALTH	It is foreseen that the project will not have any effects on population's health.
Archaeology sites / historical monuments	Not applicable
Environmental Risks	Assessed as being reduced.
7.4. Developments of the NGNTS in the N-E Romania, for the improvement of the area's supply with natural gas, as well as to ensure the transport capacities towards the Republic of Moldavia • Natural gas transportation pipeline Onești – Gherăești • Natural gas transportation pipeline Gherăești – Lețcani • Gas compression station Onesti • Gas compression station Gherăești	
Crossed protected areas	The pipeline's path will cross / undercross the following protected areas: ROSCI0059 Perchiu Hill. 2.126 Perchiu Natural Reserve, ROSPA0138

Environmental factors	Environmental features possibly affected by the projects included in the reference scenario resulting from the analysis of the environmental endorsements / classification phase decisions documents' conclusions.
in the proximity	Piatra Șoimului - Scorțeni – Gîrleni, ROSCI0364 Moldova river between Tupilați and Roman, ROSCI0378 Siret river between Pașcani and Roman, ROSPA0072 Lunca Siretului Mijlociu, ROSCI0221 Sărăturile in Ilenei Valley. 2.551 Sărăturile in Ilenei Valley Reserve, ROSPA0150 Sârca – Podul Iloaiei Accumulations. There will be a short-term negative impact, especially on avifauna, generated by the construction yard organization activities. On long term, during the functioning phase, the impact on natural protected areas will be insignificant. Four directed drills have been provided, for the sub-crossing of four of the six superposition areas of the project's location with the natural protected areas. The sub-crossing method removes the negative impact on species and habitats in the protected natural area.
Noise and vibrations	Noise and vibrations occur during the performance period, being reduced in extent and of temporary and seldom occurrence. It is considered that during the operation period, the noise and vibrations' impact will be insignificant.
Emissions in the atmosphere	The impact is limited to the works' location area and will cease once the works have been completed. For the functioning period according to the adopted measures, the foreseen values of the air pollutants concentrations will fall within the allowed limits.
Impact on water streams	Impact on surface water streams is temporary, during the project's performance phase. Under normal functioning conditions, natural gas transit through the pipe does is not a pollution source for the bodies of water.
Soil / underground contamination risk	Impact on soil will only manifest during the performance of works, after their completion the land will be restored to its initial condition.
Landscape alterations	The impact on the landscape and on the visual environment will only manifest during the performance of works. The permanent above-ground constructions resulting from the deployment of the project are located in such a manner so that they do not severely affect the landscape and the visual environment in the area. Upon the completion of building works - pipeline mounting works, there will be works to restore the land to its initial degree of usage, and the deforested area will be ecologically restored, except the monitoring area along the pipe (2 m), where the planting of trees, shrubs, fruit trees and grape vine cultures is forbidden.
HUMAN POPULATION AND HEALTH	The impact's negative magnitude is low, of reduced complexity and will only manifest onto the population affected by the occupation of the land necessary for the project's deployment, or located in its immediate vicinity.
Archaeology sites / historical monuments	Not applicable
Environmental Risks	Banking works are proposed, because on the natural gas transportation pipeline Onești – Gherăești – Lețcani, in the river streams crossing areas there are erosions, endangering the stability of the river beds and the safe functioning of the pipe.
7.6. New developments of the NGNTS to takeover natural gas from the Black Sea shore	
Crossed protected areas in the proximity	The pipeline pathway crosses Natura2000 ROSPA0031 site Danube's Delta and Razim Sinoe Complex for 10 km. Neighbouring protected areas: • pipeline's km 0 is located at about 250 m from the Danube's Delta Biosphere Reservation, which superposes in this area with ROSCI0065 Danube's Delta and ROSPA0031 Danube's Delta and Razim Sinoe Complex; • The pipeline pathway is at about 380 m (in the area of km 16), respectively at about 470 m (in the area of km 19) from ROSPA0019 Cheile Dobrogei; • The pipeline pathway is at about 850 m (in the area of km 20-21) from ROSCI0215 Cheia Jurassic Recife

Environmental factors	Environmental features possibly affected by the projects included in the reference scenario resulting from the analysis of the environmental endorsements / classification phase decisions documents' conclusions.
	There will be a short-term negative impact, generated by the construction yard organization activities. On long term, during the functioning phase, the impact on natural protected areas will be insignificant.
Noise and vibrations	Noise and vibrations occur during the performance period, being reduced in extent and of temporary and seldom occurrence. During the functioning of the gas pipeline transportation investment objective, there will be no sources of noise and vibrations.
Emissions in the atmosphere	The impact is limited to the works' location area and will cease once the works have been completed. During its functioning phase, the objective is not an additional pressure source on air quality.
Impact on water streams	The hydrographic network is weakly represented in the project's location, thusly the pollution risk on the bodies of water is insignificant.
Soil / underground contamination risk	Impact on soil will only manifest during the performance of works, after their completion the land will be restored to its initial condition.
Landscape alterations	The general impact caused by surface installations of the natural gas transportation system is insignificant.
HUMAN POPULATION AND HEALTH	The distance between the project's location and the closest locality is of 650 m (Săcele, Constanta county). The potential impact on the population is foreseen during the performance of works by sound and air pollution. The installations' functioning will not affect the population's health.
Archaeology sites / historical monuments	None identified.
Environmental Risks	• The risks caused by the sub-crossing of the Săcele river - for which measures have been envisaged by the Water Management Endorsement. • Possible accidents in the natural gas transportation pipe, for which the Intervention Plans will apply.
7.7. Romania - Serbia Interconnection	
Crossed protected areas in the proximity	It is located in the Natura2000 ROSPA0142 Teremia Mare - Tomnatic site. It is located in the vicinity of the following protected areas: ROSCI0402 Sânandrei Valley, ROSCI0115 Satchinez Swamps and RONPA0757 Satchinez Swamps natural reservation, ROSCI0287 Comlosu Mare. The project's influence will be a temporary one, only during the project's construction phase, in the functioning phase not being foreseen the occurrence of an impact due to the underground laying of the pipe. After the completion of works, the lands will be restored to their initial condition as soon as possible.
Noise and vibrations	The generated noise and vibrations are assessed to be within the acceptable limits, impact assessed as insignificant, within the allowed limits.
Emissions in the atmosphere	The impact is limited to the works' location area and will cease once the works have been completed. During its functioning phase, the objective is not an additional pressure source on air quality.
Impact on water streams	Impact on surface water streams is temporary, during the project's performance phase. It is assessed that the works will not have a significant negative impact on the "water" environmental factor, will not affect water quality in the work area, the physico-chemical, biological and bacteriological quality parameters remaining within the allowed limits. It is assessed that the activity performed in the location will not cause a negative impact on the surface and underground bodies of water, during functioning period.
Soil / underground contamination risk	During the execution period accidental pollutions can occur, but the spilled quantities and concentrations will be low. Potentially soil pollution emissions are not foreseen during the functioning period. Impact on soil is assessed to be low.
Landscape alterations	Considering that the works will generally take place on agricultural lands, in inhabited areas, the impact on landscape is deemed to be insignificant.

Environmental factors	Environmental features possibly affected by the projects included in the reference scenario resulting from the analysis of the environmental endorsements / classification phase decisions documents' conclusions.
HUMAN POPULATION AND HEALTH	Impact on human population and health is deemed to be insignificant, the works being generally performed outside the inhabited areas.
Archaeology sites / historical monuments	The natural gas pipeline pathway crosses the archaeology site Valul Roman II (RAN code 157692.02) In the pipeline pathway's vicinity have been identified the following archaeology sites: - Ianova-Ianova Est (RAN 158430.02) archaeology site; - Giarmata-Valea Bencecului NV-2 (RAN 157255.07) archaeology site; - Cornești-Valea Accead Sud (RAN 158047.13) archaeology site; - Cornești-Cornet (RAN 158047.14) archaeology site; The release of archaeology charge will be performed in the areas for which an archaeology patrimony will be identified.
Environmental Risks	No significant risks identified.
7.8. Modernization of Gas Measurement Station (GMS) Isaccea 1 and Negru Vodă 1	
Crossed protected areas in the proximity	The project concerning the existing GMS Isaccea is located within the Communitarian interest natural protected area ROSPA0031 Danube's Delta and Razim Sinoe Complex. The project is located about 350 m away from the ROMAB003 Danube's Delta. Considering the fact that the project is deployed within an existing objective, the area being densely inhabited, it is assessed that the impact is insignificant, during the execution period as well as during functioning period.
Noise and vibrations	The generated noise and vibrations are assessed to be within the acceptable limits, impact assessed as insignificant, within the allowed limits.
Emissions in the atmosphere	During the performance of works, the impact is limited to the works' location area and will cease once the works have been completed. During its functioning phase, the objective is not an additional pressure source on air quality.
Impact on water streams	The deployment of the proposed project does not imply water streams crossings. It is assessed that, if the measures set forth in the project and the execution technology are observed, the works will not cause a significantly negative impact on the "water" environmental factor.
Soil / underground contamination risk	Impact on soil assessed to be low.
Landscape alterations	Considering the localization within an existing objective with similar features (GMS Isaccea), it is assessed that the impact will be insignificant.
HUMAN POPULATION AND HEALTH	The impact will be perceived locally, only during the execution phase. Impact on human population and health is deemed to be insignificant, the works being generally performed outside the inhabited areas, far from residential areas.
Archaeology sites / historical monuments	The occurrence of an impact on the historical and cultural heritage has not been foreseen.
Environmental Risks	It is assessed that there are no major accidents and/or disasters risks, including those caused by climate change.
8.1. The modernization of the natural gas storage systems' infrastructure - Bilciurești, Dâmbovița county, including the following groups:	
The project was not assessed from an environmental protection point of view.	
8.4. Increase of the underground natural gas storage capacity in the Sărmășel (Mureș county) storage facility.	
The project was not assessed from an environmental protection point of view.	
8.5. Re-engineering and development of the underground natural gas storage facility in Târgu Mureș	

Environmental factors	Environmental features possibly affected by the projects included in the reference scenario resulting from the analysis of the environmental endorsements / classification phase decisions documents' conclusions.
For phase 1 of the project, Environmental Protection Agency Mures issued the Classification Phase Decision no. 602/26.02.2014 according to which the project "is not subject to an environmental impact assessment and is not subject to an adequate assessment". On 8th of May 2020, Environmental Protection Agency Mures issued The Declaration on the authority responsible for monitoring NATURA 2000 sites, confirming that" the project cannot have a significant impact on a NATURA 2000 site". According to the Decision, the potential impact of the works is reduced during the construction and operation period. The 2nd phase of the project was not assessed from an environmental protection point of view.	

Note:

- Were analyzed the projects for which information are available concerning the environmental impact assessment procedure and/or the appropriate assessment procedure, for which were available the classification phases decisions / environmental endorsements / declaration of the authority responsible with Natura2000 sites' monitoring, and which are susceptible to cause changes of the environmental features, due to their location in the proximity of sensible areas (protected natural areas, archaeology sites, densely inhabited areas, coast areas, wetlands, water streams, etc).
- The assessments regarding the potential impact on the environment, presented in the table above, were based on the conclusions extracted from Environmental Impact Assessment Reports and from the Appropriate Assessment Reports, elaborated for the assessed projects, made available by the Beneficiary - Transgaz SA. These conclusions represent the opinion of the consultants who have elaborated the respective studies.

Conclusions - „Do minimum" reference project

- The projects part of the Do minimum scenario concern the performance of the following categories of main investments:
  a) Regarding the natural gas transportation system:
     - performance/modernization/restoration of the natural gas transportation networks - 1,115.15 km
     - performance/modernization of 7 gas compression stations (Podișor, Bibești, Jupa, 2 GCS in Onesti- 1 new and 1 restored, Gherăești and Siliștea)
     - performance of 78 valves stations
     - performance of 33 cathodic protection stations
  b) Regarding the natural gas storage system, it is foreseen the increase of the daily injection and extraction capacity for the 3 storage facilities included in the Do minimum scenario, up to 37 million mc/day and the increase of the compression capacity, modernization of surface technological installations, new drills.
- Regarding the projects included in the "Do minimum" reference scenario, for which the environmental impact assessment phase was performed, it was possible the early identification and assessment of the possible negative effects on the environment and the proposal of adequate measures for the prevention/minimization of the negative effects on the environment. The situation of the environmental impact assessment procedure / appropriate assessment for the project included in the "Do minimum" scenario is presented in the previous table. The identification of the effects on the environment was performed for the execution phase, as well as for the exploitation / operation phase.
- In what the classification in the country's development regions is concerned, it can be noticed that the proposed works, regarding the natural gas transportation, cover particularly the Southern region of Romania, except project 7.4., which is located in the North-Eastern area.
- Out of the 11 projects included in the Do minimum scenario, 5 cross a number of 187 recorded water streams, for which crossings / sub-crossings will be performed for the natural gas transportation pipelines.
- No changes in the quality or in the hydrological regime of the surface or underground waters are foreseen.
- For 4 of the projects included in the "Do minimum" scenario, which have proposed new pathway alignments or for which the modernization / restoration has imposed the expansion / alteration of the existing pathway, deforestation works were necessary. For the minimization / reduction of the impact, ecologic restoration measures have been proposed at the level of the work strip: restoration of the woodside by planting saplings of the species adequate to the vegetation level and the forests' composition; plantation of shrubs and average and tall trees (with root system which would develop on a ground surface of maximum 4 m and which would not affect the pipes), the planting of shrubs with modest root systems. Only a 2 m strip will be kept bare, to allow continuous monitoring during the pipe's operation.
- 5 out of all the projects included in the "Do minimum" scenario cross protected natural areas.
- 7 out of the total projects included in the "Do minimum" scenario are closer than 1.5 km from the boundaries of protected natural areas.
- The general impact on bio-diversity's condition is assessed to be within the allowed limits, just leading to the affectation of biodiversity on short term (during building phases), and being completely reversible.
- The archaeology sites and historical monuments will not be affected. Before the initiation of the execution works and for the protection of archaeology sites, archaeology charge discharges are necessary.
- No significant alterations are foreseen in what the air quality and noise level is concerned.

- Some of the projects having proposed new pathway alignments or for which the modernization / restoration has imposed the pathway's expansion / modification, cause landscape alterations by definitive occupation of certain surfaces of land. The surfaces permanently occupied as a result of deployment of the projects included in the Do minimum scenario are of 28.56 hectares, with the mention that this surface only refers to projects having envisaged the performance of natural gas transportation pipes, without the natural gas storage projects, for which such information is not yet available.
- Regarding the usage category of lands which will be permanently occupied by the projects proposed as part of "Do minimum" scenario, the greater part is classified in the "arable land" category.

Regarding most projects included in the "Do minimum" reference scenario, the environmental impact assessment phase was performed and therefore it was possible the early identification and assessment of the possible negative effects on the environment, adequate measures being identified and proposed. The performed environmental studies (presentation memoirs, environmental impact assessment studies, appropriate assessment studies) and the regulatory documents issued by the environmental authorities (environmental endorsements, classification phases decisions) which were made available to the consultant highlight the fact that, for all the assessed projects, their effects on the environment occur during the execution period, locally, in the work area and are temporary. The environmental impact during the proposed investments' operation is not assessed as significant.

4.2 ENVIRONMENTAL FEATURES OF THE AREAS TO POSSIBLY BE SIGNIFICANTLY AFFECTED BY THE PROJECTS INCLUDED IN THE DEVELOPMENT "DO MAXIMUM" SCENARIO.

4.2.1 General Considerations

The projects included in the development "Do maximum" scenario are listed in the table below.

Table 16-List of projects included in the "Do maximum" scenario

Project no.	Project name	Projects' statute
Natural gas transportation		
7.1.1	Development on Romanian territory of the Natural Gas National Transportation System on the Bulgaria-Romania-Hungary-Austria corridor - Phase I	FINALISED
7.1.2	Development on Romanian territory of the Natural Gas National Transportation System on the Bulgaria-Romania-Hungary-Austria corridor - Phase II	A non FID
7.2	The development on Romanian territory of the Southern Transportation Corridor for natural gas takeover from the Black Sea shore	FID
7.3	Interconnection of the natural gas national transportation system with the natural gas international transportation pipeline T1 and reverse flow Isaccea	FINALISED
7.4	Project regarding developments of the NGNTS in the North-East of Romania, for the improvement of the area's supply with natural gas, as well as to ensure the transport capacities towards the Republic of Moldavia.	FID
7.5	Enlargement of the bidirectional transportation corridor Bulgaria-Romania-Hungary-Austria (BRHA - Phase II)	LA non FID
7.6	Project regarding new developments of the NGNTS to takeover natural gas from the Black Sea shore	FID
7.7	Romania-Serbia Interconnection	A non FID
7.8	Modernization of GMS Isaccea 1	FINALISED
	Modernization of GMS Negru Vodă 1	FID
7.9	Interconnection of the natural gas national transportation system with the natural	LA non FID

Project no.	Project name	Projects' statute
	gas international transportation system in Ukraine, on Gherăești–Siret direction	
7.10	Development-Modernization of natural gas transportation infrastructure in the North-West Romania	LA non FID
7.11	Increase of natural gas transportation capacity of the Romania-Bulgaria interconnection in the Giurgiu-Ruse direction	LA non FID
7.12	Eastring–Romania	LA non FID
7.13	Monitoring, control and data acquisition system for the cathodic protection stations afferent to the Natural Gas National Transportation System	LA non FID
7.14	Development of SCADA system for the Natural Gas National Transportation System	LA non FID
7.15.	Modernization of GMS Isaccea 2 and GMS Negru Voda 2 for the bidirectional flow on T2 pipe	LA non FID
7.16.	Modernization of GMS Isaccea 3 and GMS Negru Voda 3 for the bidirectional flow on T3 pipe	LA non FID
7.17.	NTS interconnection to LNG Terminal located on the Black Sea shore	LA non FID
Natural gas storage		
8.1	Modernization of the natural gas storage system's infrastructure - Bilciurești	FID
8.2	Increase of the underground natural gas storage capacity in the Ghercești storage facility.	LA non FID
8.3	New underground natural gas storage facility in Fălticeni	LA non FID
8.4	Increase of the underground natural gas storage capacity in the Sărmășel (Transilvania) storage facility.	A non FID
8.5.	Re-engineering and development of the underground natural gas storage facility in Târgu Mureș	A non FID

The analysis of the environmental features which may be affected by the projects proposed by the "Do maximum" development scenario was performed considering:

- spatial location of the proposed projects;
- nature of proposed investments;
- construction works' category;
- the results of the environmental features possibly affected by similar projects included in the reference scenario analysis.

There were analyzed the main alterations which could occur, during execution phase, as well as during operation / exploitation phase. But the magnitude of the effects on the environment depends on the specificity of project's location, on performance duration, of type of performed works and on project size.

The list of strategic projects part of TYNDP 2021-2030 included in the Do maximum development scenario includes 22 projects, 11 more than the Do minimum scenario.
General features of the projects included in the "Do maximum" scenario

- The projects part of the *Do maximum* scenario concern the performance of the following categories of main investments:
    - Regarding the natural gas transportation system:
- gas transportation systems performed/modernized/restored - 2.951 km; This value is an informative one, due to the fact that the pathways of these projects have not been yet exactly established.
- Performance/modernization of 6 gas compression stations
    - Regarding the natural gas storage system, it is foreseen the increase of its capacity up to 800 million mc/cycle, by the increase of the compression capacity, modernization of surface technological installations, new drills, the performance of a new natural gas storage facility (project 8.3.).

- A number of 2 projects do not include construction works (project 7.13 - Monitoring, control and data acquisition system for cathodic protection stations afferent to the Natural Gas National Transport System, and project 7.14 - Development of SCADA system for the Natural Gas National Transport System). For these projects, the environmental impact was not analyzed because their impact on the environment is null. These projects are about the deployment of safety, monitoring and control and equipment purchase systems.
- for 8 projects involving the performance / modernization of NGNTS, still not assessed from an environmental protection point of view, the initiation of these strategic projects is conditioned by certain technical elements regarding the gas networks' development requirements. The trajectory of most of these projects was not established yet, existing only an approximate location, which can suffer alterations during the technical project phase. For project 7.12. Eastring, during actual phase 3 pathway options are proposed, out of which one will be selected, depending on the results of the technical-economical and environmental analyses' results, as well as on the pipeline's trajectory, established by the partner countries.
- A number of 2 projects include the performance of new natural gas transport pipeline corridors (projects 7.9. and 7.12, option 3).
- Most of these project are in the category of projects submitted to the environmental impact assessment, according to law 282/2018. This phase is about identifying and analyzing in detail the environmental features which may be significantly affected, also presenting in detail the physical and qualitative alterations occurred as a result of the deployment of each separate project.
- These projects will be deployed during different periods. TYNDP envisages a 10-year period (2021-2030). Presently, the deployment calendar was not yet established for all the projects. The performance of some of the proposed projects is conditioned by the performance of other projects and by the establishment of the execution necessity, depending on the market's demands (see Table 4. List of the main projects proposed by Transgaz SA by TYNDP 2021-20).

4.2.2 Environmental features of areas which could be significantly affected by the development/modernization/increase of natural gas transportation infrastructure capacity projects

A gas transportation system includes, basically, the following main pieces of equipment:

- natural gas transport pipelines
- valves (sectioning, regulation)
- cathodic protection stations
- Gas compression stations
- Gas measurement stations
- Surveillance and control systems.

The main types of works performed as part of these projects are:

- Geo technical investigations works
- The preparation phase afferent to the performance of works - includes the materialization of the work corridor afferent to the project, the removal of the existing vegetation, the building of access roads - where necessary,
- Building site organization works;
- Land scraping, digging, filling works in order to lay down the gas transportation pipes. The gas transportation pipes are located below the freeze area, at minimum 1 m below the surface.
- Anti-corrosive insulation of the pipe
- Special building works - performance of water streams sub-crossings, communications pathways
- The performance of mechanic resistance tests and pipeline impermeability

- Marking the pipe's trajectory
- Restoration of the location along the natural gas transportation pipeline's trajectory.

For some of the plan's objectives, like Natural Gas Compression Stations, building-mounting works are envisaged, involving:

- excavations for groundworks;
- masonry, thermal insulation, plastering, varnishing and covering works;
- technical and urban connections performance works;
- mounting and commissioning works for the technological, monitoring, control and command equipments.

These projects will cause temporary changes in the lands' usage (associated with construction site organization, storage of building materials, temporary access roads, etc.) and definitive changes in the lands' usage by definitive occupation of certain surfaces (as a result of having erected the afferent facilities).

With the performance of the proposed projects, safety and protection areas will be created, according to the Technical Standards (TS) for natural gas transportation pipes' design and execution, approved by the NAER Order 118/2013 (TS 118/2013). In these protection/safety areas, a series of activities or investments which could endanger the pipe's integrity are restricted.

In their path, the gas transportation pipes cross: communication paths, charted and uncharted water streams, oil, gas, water pipes, Telco networks, as well as forests, pastures and agricultural ecosystems. The crossing of obstacles by the natural gas transportation pipes is performed subterranean or by air.

The influence of the ***soils and surface and/or underground waters' quality*** could be determined, during these projects' performance phase, by the following pressures:

- accidental / uncontrolled spills of pollutants directly on the soil or in the waters;
- Sedimentation on the soil of potentially contaminant powders with other atmospheric pollutants resulting from digging,
- transportation of materials and personnel;
- raw materials loading and unloading activities;
- improper waste management;
- improper elimination of waste waters;
- soil slumping and erosions.

Upon completion of works, the greater part of the lands will be returned to the natural / economical circuits, until their initial condition have been restored. For the restoration of the location in the natural gas transportation pipeline's pathway, levelling, compaction, fertilization and restoration of the fertile soil layer stripped in the beginning of the works. The surplus soil will be dissipated in the work corridor area, or will be transported and stored in places agreed with the local authorities, to be reused, for example in the neighbouring areas' lining and in the coverage of dislevelments / holes in the area.

A particular situation may occur in the case of natural gas transportation pipelines laid on ground levels in areas with various forms of pollution (vulnerable areas affected by nitrites pollution, waste pollution, historically contaminated areas). In such situations, the moving of certain soil layers which have accumulated such pollutants may lead, as a result of washing and exposure of profound soil layers, to pollutants' migration in the depth and affecting the underground waters. In these situations, additional measures must be taken in risk areas. These surfaces will be identified during technical project and environmental impact assessment phases, establishing adequate measures for the protection of the soil layer.

During functioning, the natural gas transportation is performed in a closed, airtight (pressurized) system

and may cause an insignificant impact only in accidental situations, due to inadequate handling / storage of the substances used a result of a faulty waste management system.

The ***water quality*** can be affected during the performance of building works by: excavations works performed to lay down the pipes, the performance of water streams aerial or underground crossing works or potential accidental pollutions.

Table 17 - The situation of river streams crossings

Development Scenario	Number of projects including water streams crossing	Number of recorded crossed water streams	Remarks
Do minimum	5	188	Large water streams (Danube river, Mureș, Jiu, Olt, Bega, Timiș, Argeș, Trotuș, Bistrița rivers) will be crossed by directed horizontal drilling technique,
Do maximum	10	567	Important water streams will be crossed (Danube river, Târnava Mică and Târnava Mare, Siret, Someș, Argeș, Cris, Nistru, Olt, Sebeș, Jiu, Mureș, Timiș rivers) For projects not part of the Do minimum scenario, the manner in which these crossings will be performed has not been established yet.

Under normal functioning conditions, natural gas transportation through the pipe does is not a pollution source for the crossed body of water. Natural gas, even in the case of technical faults or accidents, will flow into the atmosphere, not polluting the water streams. The measures taken while welding the pipeline sections will not allow for any gas leaks. For breakdown situations, the pipeline contains warning systems and sectioning valves, allowing for the cessation of natural gas circulation inside the pipe and therefore in the sub-crossing area, until repair works have been performed.

During the functioning period of the natural gas NTS's installations will result only domestic-type waste waters, as a result of current activities performed by the personnel involved in pipeline operation.

Air quality

During execution, air quality may be affected by the atmospheric pollutants emissions, of nitrogen oxides, sulphur oxides, carbon oxides types, volatile organic compounds, heavy metals, emanating from the means of transportation and the tools used in the construction works. The main atmospheric pollutant of the execution phase will be represented by solid particles (total particles in suspension - TPS with a wide dimensional spectrum, including particles with equivalent aerodynamic diameters below 10 µm– PM10), released during the terracing works, resulting from diggings, construction materials loading-unloading activities, etc.

During its functioning phase, the performed objectives are not an additional pressure source on air quality. The natural gas compression stations, the only installations susceptible to generate an impact on air during the functioning period, are classified as average burning installations (with a nominal thermal power greater or equal to 1 MW and below 50 MW), according to Law 188/2018 on the limitation of air emissions of certain pollutants produced by average burning installations. The techniques presently used in these burning installations allow the reduction of nitric oxides below the threshold imposed by the EU standards in force. The modernization and execution of new gas compression stations mentioned in TYNDP provide them with an increased level of efficiency and the increase of exploitation safety of pipes and installations by replacing the existing equipment. These GCS are performed, generally, in locations outside the urban area, outside the built-up area or, when they are located within the built-up area (the case of GCS Onesti modernization, proposed by strategic

project 7.4) the location is not in the town's industrial area, not representing a discomfort factor.

The projects deployed as part of TYNDP will not have the potential to change air quality in the long run or on extended areas. The impact during the Plan's performance phase will be a temporary one, while the impact during the functioning phase will only have localized, low-intensity effects.

The construction works and the traffic of the means of transportation during the projects' execution period will determine an increase in the ***level of noise and vibrations***. These will occur locally, in the work fronts area and in their vicinity.

When choosing the trajectories of the new pipelines' pathways, efforts are made to avoid, as much as possible, sensitive areas: densely inhabited areas, protected natural areas, ecological corridors, archaeology sites, wetlands, landslide areas, flooding-risk areas.

During its functioning period, the GCS functioning is held to be the only source of noise.

Effects on biodiversity

Some of the proposed projects cross or are in located in the vicinity of national or local interest protected natural areas, with sites included in the Natura2000 network. The appropriate assessment performed for TYNDP's goal was to identify the sensible protected natural areas, susceptible to be affected by the deployment of natural gas transportation projects proposed by TYNDP.

During building phase:

- Some linear projects (gas pipes) intercept protected natural areas or are performed in their relevant vicinity. The trajectory of the proposed pipelines intercepts various types of natural, semi-natural or anthropic habitats, which can be temporarily affected during the works for laying the pipes. The flora and fauna species harboured by these habitats can be also disturbed during the performance of works. In order to minimize these disturbances and to reduce the habitats' fragmentation impact, specific measures will be adopted, mainly consisting in:
    - The control of dust and exhaust fumes during the performance of works;
    - Minimization of stripped areas;
    - Scheduling of works, in order to avoid sensible periods for certain species of plants and animals;
    - The constructor will deploy certain plans meant to foresee any eventual disturbances of the environment, e.g.:
        - Waste management plan
        - Spills management plan and prevention and intervention plan in case of accidental pollution
        - Traffic plan
        - Erosions control plan
        - Biodiversity monitoring plan.
    - Depending on the receptor's sensitivity, the execution works will be supervised by specialist biologists who will propose adequate measures for the protection of species of conservative interest, e.g. trajectory reconfigurations, scheduling of works, species' relocation, species' replanting, etc.
    - Restoration of the environment affected by works by re-covering with indigenous biological material;
- in what the forested species are concerned, they will temporarily be removed from the forestry circuit, following that, upon the completion of the works and the restoration of the land to its initial condition, to plant wooden species belonging to the species spectrum characteristic to the vegetation level, but maintaining a monitoring band of about 2 m. At the work strip level will be planted shrub species with more superficial rooting, which would contribute in the reduction

(annulment) of the technological corridor and the restoration of the bio-eco-cenotic functionality of the forestry massifs, thusly cancelling the fragmentation phenomena.

During their functioning period, the current operation activities are not able to significantly affect the local flora and fauna populations; the location of the gas compression stations, objectives which will be present within semi-natural habitats, will not affect the natural habitats of an elevated degree of bio-eco-cenotic significance.

The number of protected natural areas crossed by the projects part of these 2 development scenarios, with the lengths afferent to the natural gas transportation pipes is presented in table below:

Table 18 Protected natural areas crossed by the projects part of Do minimum and Do maximum development scenarios

Scenario	Community importance sites (SCI)		Special Avifaunistic Protection Sites (SPA)		Other natural protected areas	Total	
	number	Pipes length, km	number	Pipes length, km		Number of crossed protected natural areas	Total length of pipes in protected areas, km
Do minimum	15	40	11	35	**8**	**34**	**61.87**
Do maximum	52	120	28	188	**13**	**94**	**208.62**

In the table below are shown, in percentages, the biotopes which will be affected by the construction of the natural gas transportation pipes included in the Do minimum and Do maximum development scenarios. A simplified mapping model was elaborated, defining 7 categories of biotopes, as follows: roads (access roads), anthropic and anthropized biotopes, agro-ecosystems, pastures (natural), forests (including arboretums outside the national forestry fund), riparian biotopes. The types of biotope for which an exact classification could not have been performed are listed in "others" category.

Table 19 Categories of biotopes to be affected by the deployment of projects

Biotope	Do minimum (%)	Do maximum (%)
road	1.45	0.47
anthropic	1.05	1.83
Agro-ecosystems	77.66	74.81
pastures	6.88	12.92
forest	9.91	8.36
riparian	1.59	1.14
other	1.45	0.47

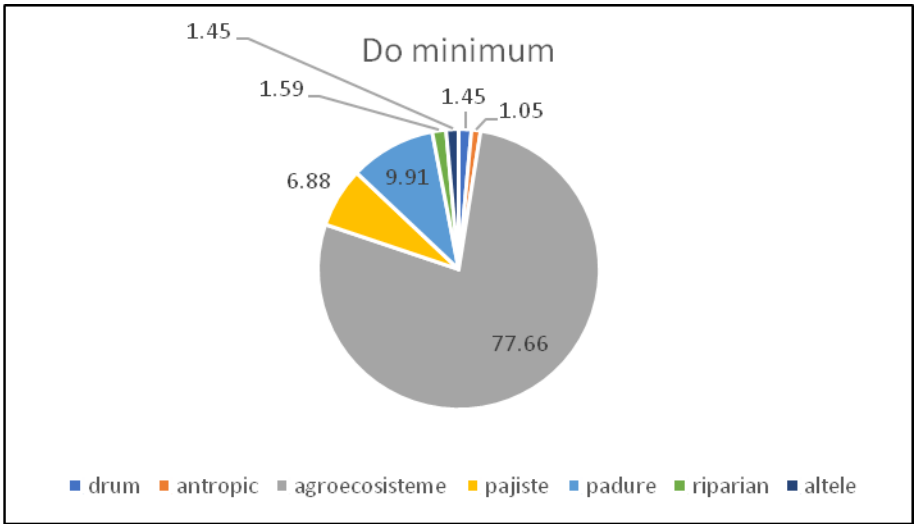


Fig 16, Biotopes crossed by the natural gas transportation pipes in Do minimum scenario

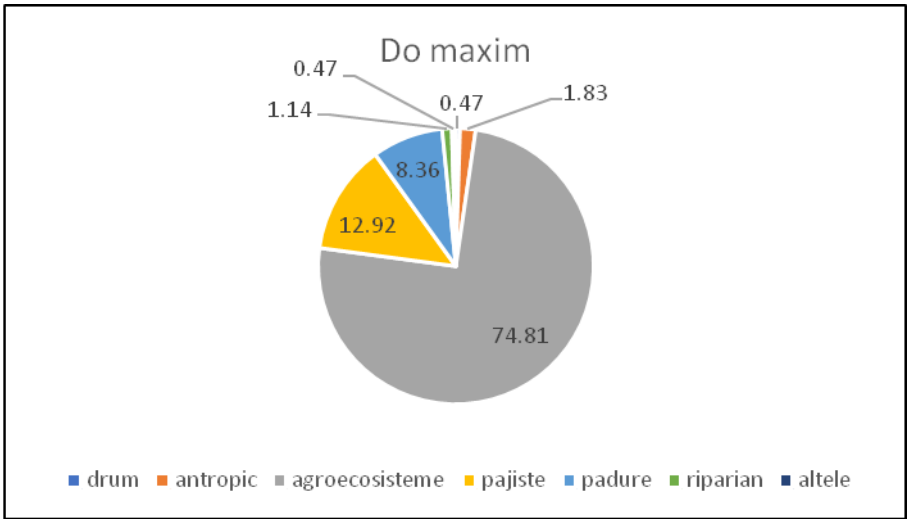


Fig 17. Biotopes crossed by the natural gas transportation pipes in Do maximum scenario

One can notice that the trajectories of the natural gas transportation pipelines cross, in a percentage of over 80%, agro-ecosystems and pastures biotopes.

During the performance of building works there is the risk of uncovering objects in the ***archaeology heritage***, which have been unknown until the beginning of works.

Transgaz SA includes its own Archaeology Directorate, which collaborates with the Designing Service in establishing the optimal trajectories, in order to avoid, as much as possible, the interference of the natural gas transportation pipes with archaeology and heritage elements. The Archaeology Directorate performs a preliminary research regarding the proposed trajectory, in order to identify any areas of archaeology potential in its path. If, during the execution works, archaeology elements unknown by designing date are revealed, the works are suspended and the competent bodies are notified.

The new natural gas transportation pipes' construction projects will have direct effects on the ***natural resources consumption***: on the water sources used for sprinkling the work fronts and for the

performance of technological tests, aggregates for the production of concrete and for pipe testing, wood, energy (including electricity and fuels), organic matter (vegetable debris, organic fertilizer and chemical amendments) and biological material (seeds, seedlings, etc) necessary during the ecological reconstruction of the affected areas, others. The natural resources necessary for each separate project's deployment will be detailed part of the AEI/AA procedures, because they are different for each separate project.

Important quantities of waste will result during the construction period and they will mainly consist in building materials, respectively excavation soil, construction materials waste, metallic waste, wood. Most of the resulted waste is not dangerous.

Generally, during the functioning period is estimated that will result reduced quantities of waste, considering the activities' specificity. The proposed works will be performed using new, lasting materials, not requiring frequent replacements.

4.2.3 Environmental features of the areas to possibly be significantly affected for the natural gas storage projects

In the underground natural gas storage facility, natural gas is injected in the period between April and October using drills, following that, using the same drills, the gas is subsequently extracted during the cold season, namely between November and March.

The main phases of the underground natural gas storage technological process using drills is the following:

- *the natural gas injection (storage) cycle* involves the takeover of natural gas during the hot season from the National Transportation System, from the pipe pressurized at 13-21 atm, following which the gas is aspirated in the compression station, where gas is compressed on several pressure steps (maximum regimen pressure being of 150 bars) and then, by injection pipes, the gas reaches the groups of drills. From here, by inflow pipes, the gas reaches the eruption heads and, using the extraction pipes, it reaches the underground storage facility, located at various depths.
- *natural gas extraction* involves the takeover (extraction) of gas during the cold season, from October to April, using the drills. The extraction technological flow is the following:
    - Gas is extracted using extraction pipes, eruption heads and pipes and it reaches the heaters;
    - the impurities in the gas is separated in horizontal liquid separators, from where it travels to underground reservoirs, for temporary storage, until it is evacuated to injection stations;
    - following the separation operation, the passing of gas through ultrasonic measurement panels, with measurement capacities per total group and for each separate drill;
    - the passing of the gas through the triethylene glycol (TEG) drying station, where gas is dehydrated
    - gas is transported, using collecting pipes, to the measurement panel, and then supplied to the National Transportation System.

The influence of the ***soils and surface and/or underground waters' quality*** could be determined, during these projects' performance phase, by the following pressures:

- accidental / uncontrolled spills of pollutants directly on the soil or in the waters;
- materials and personnel transportation, raw materials loading and unloading activities;
- improper waste management;
- improper elimination of waste waters;

- soil compaction activities.

There are no soil pollution sources during normal functioning conditions. The pollution may occur accidentally, as a result of inappropriate handling and storage of used substances, as well as a result of faulty waste management.

The ***water quality*** can be affected, during the performance of building works, due to accidental spills of polluting substances. During functioning period deposit waters result, which are eliminated in a closed system, following to be injected in the injection drills for deposit waters.

Air quality may be affected by the atmospheric pollutants emissions, of nitrogen oxides, sulphur oxides, carbon oxides types, volatile organic compounds, heavy metals, emanating from the means of transportation and the tools used in the construction works.

During the functioning period result emissions from the burning of natural gas during the gas compression technological process, gas regeneration and from the functioning of heating installations. Such emissions are estimated to have low values, so that the performed objectives will not represent a significant pressure source on air quality.

The construction works and the traffic of the means of transportation will determine an increase in the ***level of noise and vibrations***. These will occur locally, in the work fronts area and in their vicinity.

During the operation period, the functioning of the equipments specific to gas storage facilities (compressors, pumps, fans) represents potential noise sources.

Important quantities of ***waste*** will result during the construction period and they will mainly consist in building materials, respectively excavation soil, construction materials waste, metallic waste, wood. Most of the resulted waste is not dangerous.

Generally, during the functioning period is estimated that will result reduced quantities of waste, considering the activities' specificity. The proposed works will be performed using new, lasting materials.

Effects on biodiversity

The natural gas storage projects proposed for modernization / re-engineering are not located on the surface of national or local interest natural protected areas.

No situations have been identified where these storage facilities may affect surfaces included in the protected natural areas.

In what the location for the new natural gas storage facility is concerned (project 8.3 new natural gas underground storage facility in Fălticeni, Moldavia), two of the localities proposed as locations for the new natural gas storage facility include surfaces part of Natura2000 sites:

- the territory of Pocoleni locality, Suceava county, includes Natura2000 sites ROSPA0064 Fălticeni Lakes and ROSCI0310 Fălticeni Lakes.
- the territory of Davideni locality, Neamț county, includes ROSCI0363 Moldova River sites between Oniceni and Mitești.

Nonetheless, we would like to mention that we have no data regarding a more precise localization of the proposed location for this storage facility, except at locality level.

The effects on biodiversity during building phase are:

- the projects may cause certain anthropic habitats to be affected, but the duration will be reduced;
- upon the completion of works, for the affected habitats measures are provided for their restoration to the natural / productive circuits;
- the induced disturbance (stress) remains limited, present within active work areas (construction site organizations and work fronts);
- the forest surfaces will not be removed from the forestry circuit.

The effects on biodiversity during functioning phase are:

- during their functioning period, the current operation activities are not able to significantly affect the local flora and fauna populations; the location of the gas storage facilities will not affect the natural habitats of an elevated degree of bio-eco-cenotic significance.

Risks associated with proposed gas storage projects

With these modernization / expansion proposed projects, investments are performed for the increase of storage facilities' capacity, as well as to re-engineer and to improve their technical condition. According to article 10 of Law 59/2006, security reports must be revised / elaborated before the initiation of construction works. The security reports will be part of the environmental impact assessment procedure's documents, and the conclusion of the revised security reports will be adapted in the regulatory documents issued by the competent bodies.

Within the security reports are established, amongst others, the risk areas and the safety distances.

The risk areas are calculated for the methane gas explosion in each of the storage facility's objects, and they are in reference to:

The Domino effect area and increased fatality, where thermal radiation drops from 127 kW/mp to 7 kW/mp and the overvoltage has a value of about 0.6 bar. Inside this area, the explosion will cause significant victims during the first 10 minutes for people and animals in open areas. Damages and destructions of the drills and of the existing installations will occur; constructions may fall and objects may be blasted;

The incipient fatality risk area, where thermal radiation drops from 7 kW/mp to 5 kW/mp and the overvoltage reaches values between 0.3 and 0.6 bar. Inside this area, the explosion will cause falling down, severe burns and even death of people and animals and drills and existing installations will be damaged; not reinforced walls and civil constructions will cave, objects may be blasted. Also, spontaneous textiles' combustion occurs, and wood ignites without open fire. Firemen will need special protection equipment;

Irreversible wounds risk area, where thermal radiation is between 5 kW/mp and 3 kW/mp. People and animals in this area will be wounded, the installations' composing elements will become deformed, constructions will be damaged. People will feel pain in about 15 s to 1 m and their skin will blister. Windows break and noise level is intense.

Reversible wounds risk area, where thermal radiation is between 3 kW/mp and 0,9 kW/mp The skin of people in the area will show redness. Constructions are outside destruction danger.

The safety distances are calculated for each object of the storage facility, partly based on specific formulas and considering the legal regulations in force, in this case the *County Standard for the establishment of fire prevention distances between the composing elements of the technological installations in the extractive gas and oil extractive industry*, issued and approved by the Ministry of Mines, Oil and Geology by Order 278/1986, respectively the *Technical Standards for the designing and execution of upstream supply and natural gas transportation pipes*, approved by NAER Chairman's Decision 1220/2006, Appendix 3A and Appendix 3B.

The minimal protection and safety distances presently established for storage facilities, without

considering the expansion of their capacities, are presented in chapter 3.8.

In table below we present a synthetic situation regarding the risks associated with the proposed natural gas storage projects.

We mention that the storage facilities' modernization proposals are presented in Table 6 - List of the natural gas storage projects, proposed by TYNDP 2021-2030.

Table 20 Risks associated with proposed gas storage projects

Project code	Project name	Location	Present situation	Environmental Endorsement	Risks associated with the proposed expansion project
1. Natural gas storage facilities belonging to SNGN ROMGAZ SA - Natural Gas Storage Branch DEPOGAZ Ploiești SRL					
8.1.	**Modernization of the natural gas storage system's infrastructure - Bilciurești; beneficiary - SC DEPOGAZ SA Ploiești**	in the outskirts of Răcari town and Cojasca commune, Dâmbovița county	The storage facility in Bilciurești consists in 7 groups of drills, namely: • Group 118 (drills: 17, 127, 128, 129, 130); • Group 145, (drills 134, 145, 163, 166, 169); • Group 6 (drills: 135, 136, 137, 144, 152); • Group 57 (drills 57, 107, 116, 118, 125, 138, 139, 156, 157, 170 and 1 injection drill-106; • Group 101 (drills 101, 105, 120, 121, 140, 141, 150, 160, 164); • Group 102 (drills 102, 109, 115, 117, 122, 131, 133, 151, 154, 155, 158, 159, 168, 171) • Group 137 (drills 6, 110, 113, 119, 142, 143, 149, 153, 162). The storage facility's maximum total capacity is of 13.5 million mc/day; The storage facility of Bilciurești is regulated by Law 59/2016 regarding the control of major accident dangers involving dangerous substances - higher level objective. The Safety Report was elaborated in 2019, establishing the safety distances for each drill and for each risky component. These do not intercept any potential sensible receivers, like habitations, material assets, communication pathways.	The storage facility functions based on the following environmental endorsements: -no. 8697/ 27.02.2012 reviewed on 27.06.2016 and 13.03.2019, issued by EPA Dâmbovița -no. 8698/ 27.02.2012 reviewed on 27.06.2016 and 12.03.2019, issued by EPA Dâmbovița -no. 8702/ 27.02.2012 reviewed on 27.06.2016 and 07.03.2019, issued by EPA Dâmbovița -no. 8699/ 27.02.2012 reviewed on 27.06.2016 and 18.03.2019, issued by EPA Dâmbovița -no. 8703/ 27.02.2012 reviewed on 27.06.2016 and 18.03.2019, issued by EPA Dâmbovița -nr. 8700/ 27.02.2012 reviewed on 27.06.2016 and 08.03.2019, issued by EPA Dâmbovița -no. 8701/ 27.02.2012 reviewed on 27.06.2016 and 18.03.2019, issued by EPA Dâmbovița	The proposed project involves the same risks as the current activity, respectively dangers of major accidents caused by methane gas. Major accident dangers consist in: - the occurrence of a technological accident, causing natural gas leaks, leading to fires and/or explosions; - Actions of unauthorized individuals, with effects similar to those of a technological accident; - Possible occurrence of a terrorist attack, with effects similar to those of a technological accident; - Possible occurrence of natural disasters caused by seismic activity or by other severe weather phenomena (lightning); The aforementioned risks add to the already existing risks associated with the underground storage of natural gas activity. To properly manage these risks, during designing phase, the Safety Report will be revised with the risk associated with the new proposed investments. The conclusions of the safety report will also be considered in the planning of the location, so that the installations and the structures are located at minimal sufficient distances one from the others and from any potential sensitive receptors. Thusly it is eliminated the cascade transmission of the effects generating major accidents dangers in the base source and in other sources.

Project code	Project name	Location	Present situation	Environmental Endorsement	Risks associated with the proposed expansion project
				For the natural gas storage system's infrastructure in Bilciurești modernization the environmental protection regulation procedure was not yet initiated.	
8.2	Increase of the underground natural gas storage capacity in the Ghercești storage facility - holder: SC DEPOGAZ SA Ploiești	Location: Branch headquarters: Craiova city, Traian Lalescu str. , no. 29, Dolj county; Location of industrial objectives: Outside the built-up area of Ghercești commune, Ungureni village, Șimnicu de Jos commune, Gârlești village, Pielești commune, Mischii commune and the built-up area of Pielești commune, Dolj county.	The natural gas storage facility in Ghercești occupies a total surface of 66.665 sqkm and includes the following endowments: - underground natural gas storage facility, with a total storage capacity of 105,000 tons, located 10 km away from Craiova city, a supply and collecting pipes system with a diameter from 4" to 24", with a total length of about 180 km; - 6 groups of drills, by the technological installations of which are transported the extracted natural gas, with a total of 118 injection-extraction drills in and from the storage facility - with double function, 83 out of which functional drills and 35 non-functional drills. The distribution of the injection-extraction drills on groups is the following: • Group 1: 21 drills: 21, 602, 603, 604, 605, 606, 614, 615, 800, 801, 804, 805, 813, 818, 819, 820, 821, 908, 909,910,912. • Group 2: 16 drills: 113,119,128,131, 206, 219, 803, 822, 853, 4, 9, 11, 236, 917, 922, 918. • Group 3: 11 drills: 3, 12, 218, 616, 806, 807, 809, 850, 913, 914, 921. • Group 5: 5 drills: 5, 211, 619, 02, 811. • Group 6: 10 drills: 130, 305, 315, 610, 611, 915, 851, 902, 907, 920. • Group 7: 20 drills: 215, 607, 608, 612, 617,	The storage facility functions pursuant to the Environmental Endorsement no. 214/ 11.07.2013 issued by EPA Dolj. For the storage capacity increase works, the environmental protection regulation procedure was not yet initiated.	The proposed project involves the same risks as the current activity, respectively dangers of major accidents caused by methane gas. Major accident dangers consist in: The occurrence of a technological accident, causing natural gas leaks, leading to fires and/or explosions; Actions of unauthorized individuals, with effects similar to those of a technological accident; Possible occurrence of a terrorist attack, with effects similar to those of a technological accident; Possible occurrence of natural disasters caused by seismic activity or by other severe weather phenomena (lightning); The aforementioned risks add to the already existing risks associated with the underground storage of natural gas activity. To properly manage these risks, during designing phase, the Safety Report will be revised with the risk associated with the new proposed investments. The risk areas will be revised, considering the new proposed investments. The conclusions of the safety report will also be considered in the planning of the location, so that the installations and the structures are located at minimal sufficient distances one from the others and from any potential

Project code	Project name	Location	Present situation	Environmental Endorsement	Risks associated with the proposed expansion project
			620, 808, 812, 814, 815, 816, 817, 904, 901, 903, 905, 906,911,916,919. • The storage facility's maximum total capacity is of 1.4 million mc/day; The storage facility of Ghercești is regulated by Law 59/2016 regarding the control of major accident dangers involving dangerous substances - higher level objective. The Safety Report was elaborated in 2019, establishing the safety distances for each drill and for each risky component. They do not intercept any potential sensitive receptors.		sensitive receptors. Thusly it is eliminated the cascade transmission of the effects generating major accidents dangers in the base source and in other sources.
8.3	New underground natural gas storage facility in Moldavia - beneficiary SC DEPOGAZ SA Ploiești	The project's location was not yet established. It will be analyzed which of the four commercial depleted deposits - Comănești, Bacău county, Todirești, Pocoleni Suceava county and Davideni, Neamt county, fulfil the requirements to be converted in natural gas storage facility.	The project is for now only at intention level. Except some approximate locations (at locality level) for the 4 proposals, other details are not known that can make possible an analysis by which one of the locations to be selected as favourable on technical-economical and environmental reasons	The environmental protection regulation procedure was not yet initiated.	An underground natural gas storage facility with methane gas storage capacity of 1.4 million mc/day is regulated by Law 59/2016 regarding the control of major accident dangers involving dangerous substances - higher level objective. For such a project, the Security Report must be already elaborated during the designing phase. This report will be part of the environmental impact assessment procedure's documents, and the conclusion of the revised security report will be adapted in the regulatory documents issued by the competent bodies. The main risks associated with an underground natural gas storage facility project are represented by major accidents dangers caused by methane gas. Major accident dangers consist in: The occurrence of a technological accident, causing natural gas leaks, leading to fires and/or explosions; Actions of unauthorized individuals, with

Project code	Project name	Location	Present situation	Environmental Endorsement	Risks associated with the proposed expansion project
					effects similar to those of a technological accident; Possible occurrence of a terrorist attack, with effects similar to those of a technological accident; Possible occurrence of natural disasters caused by seismic activity or by other severe weather phenomena (lightning); The distances and the safety areas for each project component involving risks associated with methane gas will be established in the Security Report. The Security Report also lays out the necessary measures for the prevention of major accidents and intervention in case of major accidents' occurrence. The conclusions of the safety report will also be considered in the planning of the location, so that the installations and the structures are located at minimal sufficient distances one from the others. Thusly it is eliminated the cascade transmission of the effects generating major accidents dangers in the base source and in other sources.
8.4.	Increase of the underground natural gas storage capacity in the Sărmășel (Transilvania) storage facility. - holder: SC DEPOGAZ SA Ploiești	The administrative headquarters of the storage facility is located outside the built-up area of Sărmașu locality, str. Băilor, F.N.,	The natural gas storage facility in Sărmășel expands on a surface of about 19 sqkm, located at a depth of about 500 m, maximum injection pressure of 40 bar. On the storage facility's structure are located 11 groups of drills, to which are connected 65 injection-extraction drills. Each drill has a double role: storage and extraction. The storage facility's capacity is of maximum 6 million mc/day and of about 900 million mc/cycle.	The storage facility functions pursuant to the Environmental Endorsement no. 18/ 14.03.2018 issued by EPA Mureș. The environmental protection regulation procedure regarding the increase of the storage facility was not yet initiated.	The proposed project involves the same risks as the current activity, respectively dangers of major accidents caused by methane gas. Major accident dangers consist in: The occurrence of a technological accident, causing natural gas leaks, leading to fires and/or explosions; Actions of unauthorized individuals, with effects similar to those of a technological accident; Possible occurrence of a terrorist attack, with

Project code	Project name	Location	Present situation	Environmental Endorsement	Risks associated with the proposed expansion project
		Mureș county. The natural gas storage facility is located outside the built-up area of Sărmașu locality, Sărmașu town, Mureș county, and outside the build-up area of Cămărașu commune, Cluj county (a group of 2 drills)	The storage facility of Sărmășel is regulated by Law 59/2016 regarding the control of major accident dangers involving dangerous substances - higher level objective. The Safety Report was elaborated in 2019, establishing the safety distances for each drill and for each risky component. They do not intercept any potential sensitive receptors.		effects similar to those of a technological accident; Possible occurrence of natural disasters caused by seismic activity or by other severe weather phenomena (lightning); The aforementioned risks add to the already existing risks associated with the underground storage of natural gas activity. To properly manage these risks, during designing phase, the Safety Report will be revised with the risk associated with the new proposed investments. The safety areas and distances will be revised, considering the new proposed investments. The conclusions of the safety report will also be considered in the planning of the location, so that the installations and the structures are located at minimal sufficient distances one from the others.
2.	**Natural gas storage facility belonging to DEPOMUREȘ S.A.**				
8.5.	Storage facility – Depomureș - re-engineering and development of the underground natural gas storage facility Târgu Mureș; beneficiary DEPOGAZ MUREȘ	The natural gas storage facility Târgu Mureș is located outside and inside the built-up area of Târgu Mureș (Dealul Budiului); outside the built-up area of Budiu Mic village, Crăciunești commune,	The total surface of the storage facility's perimeter is of 28 sqkm. The Târgu Mureș storage facility consists in: • 5 groups of storage drills including 18 drills. • Gas Drying Station (GDS) Corunca, The installations which could cause a potential major accident danger in the storage facility's location are the 18 storage drills. The minimal safety distance established for these objectives is a 50 m radius from the storage drill's pit opening to the outer limits of the constructions. The pipes and other installations and equipments in the organization of the group of drills, respectively from the organization of the gas drying station are not regulated by Law	The storage facility functions based on the Environmental Authorization no. 30/ 20.04.2018, reviewed on 23.05.2019 and issued by the Environmental Protection Agency Mureș.	Major accident dangers consist in: The occurrence of a technological accident, causing natural gas leaks, leading to fires and/or explosions; Actions of unauthorized individuals, with effects similar to those of a technological accident; Possible occurrence of a terrorist attack, with effects similar to those of a technological accident; Possible occurrence of natural disasters caused by seismic activity or by other severe weather phenomena (lightning); The aforementioned risks add to the already existing risks associated with the underground

Project code	Project name	Location	Present situation	Environmental Endorsement	Risks associated with the proposed expansion project
		Mureș county. The gas drying station is located in Corunca locality, Corunca commune	59/11.04.2016. The storage facility is located in the southern part of Târgu Mureș urban agglomeration. The objectives from the natural gas storage facility's location are in the vicinity of the SNGN Romgaz SA- branch in Târgu Mureș (the Domino effect, according to the SEVESO III Directive), respectively are in the vicinity of habitations located about 50 m away. The storage facility holds 10 drills, fitted with packers and safety valves, ensuring an increased protection for the storage facility's vicinities[19].		storage of natural gas activity. To properly manage these risks, during designing phase, the Safety Report will be revised with the risk associated with the new proposed investments. The safety areas and distances will be revised, considering the new proposed investments. The conclusions of the safety report will also be considered in the planning of the location, so that the installations and the structures are located at minimal sufficient distances one from the others. Thusly it is eliminated the cascade transmission of the effects generating major accidents dangers in the base source and in other sources.

19 Source - Presentation sheet and Statement elaborated by SC Depomureș SA to obtain the Environmental Endorsement.

4.2.4 Conclusions - „Do maximum" development scenario

As a result of the analysis regarding the influence of investments proposed by this development scenario regarding the alteration of the environmental features, the following conclusions can be noted:

- In what the classification in the country's development regions is concerned, it can be noticed that the works proposed as part of the Do maximum scenario, referring to the natural gas transportation, cover all the Romanian regions.
- The length of the natural gas transportation networks included in the "Do maximum" scenario for the performance / modernization / restoration will be of about 2952 km. The length of the gas transportation networks is not precise, due to the fact that the greater part of the projects included in the Do maximum scenario are not completed, some of them being in incipient phases, and the trajectories proposed for them may undergo alterations until their performance.
- By the nature of the construction works specific to the proposed investments, these will determine permanent alterations of reduced extent regarding the occupied surfaces of land and the lands' usage category. More than 80% of the lands on which the NGTNS's objectives will be located are agricultural lands or pastures. Their location has been established, as much as possible, outside the inhabited areas.
- The implementation of the projects proposed by the Do maximum development scenario foresees insignificant alterations regarding the air quality and the noise levels at local level.
- Out of the 17 strategic natural gas transportation projects included in the Do maximum scenario, 10 are foreseen to cross a number of 566 recorded water streams, for which crossings / sub-crossings will be performed for the natural gas transportation pipelines. No changes in the quality or in the hydrological regime of the surface or underground waters are foreseen.
- Out of the total number of projects part of the "Do maximum" scenario, 11 are foreseen to cross a number of 94 protected natural areas, on a total length of 208.62 km. This length is an appreciative one, in the conditions where the technical performance projects are not completed for the greater part of them and, therefore, neither is the trajectory. We mention that a part of protected natural areas of the SCI and SPA type, natural parks, are superposed territorially.
- Out of the total number of projects part of the "Do maximum", 12 are estimated to be, on certain portions of their pathway, closer than 1.5 km from the boundaries of protected natural areas.
- In the situation where the proposed projects may affect the protected natural areas, restoration and/or improvement measures of the preservation condition have been proposed. The impact on the Natura2000 network, determined by the deployment of the TYNDP's development scenarios is analyzed as part of the Appropriate Assessment Study, its conclusions being presented in Annex of the Environmental Report.
- The archaeology sites and historical monuments will not be affected. Theoretical and field archeological diagnoses are required to protect the archeological sites before the execution of the execution works.
- The locations of the natural gas storage facilities proposed for modernization / expansion are not located in areas where there would be at risk to affect the population or the protected natural areas, the requirements set forth by the Security Reports being observed. Nonetheless, we highlight a sensitive situation regarding the natural gas storage facility in Târgu Mureș, which is surrounded by potential sensitive receptors. The analysis of the impact on the environment realised for the Targu Mures storage, on phase 1 of the project development, has not identified a significant impact (see the Decision of the initial evaluation stage no 602/2014 of EPA Mures). On the start of phase 2 of the project, the reengineering and development works proposed for this storage facility will have to be performed based on an assessment regarding the impact on the environment, which will consider the sensitive vicinities and their protection needs.

- The project proposed for the execution of a natural gas storage facility in Moldova (project 8.3),

is currently only at a level of intent, being a project for which a final decision for investment gas not yet been made. Except for some extremely approximate locations of the 4 proposals, stated only at locality level, no other details are known which could make possible an analysis through which one of these localities could be selected as favourable. Two of these 2 proposed locations for the storage have surfaces in the vicinity of Natura2000 sites (Pocoleni, Suceava County-Natura2000 site ROSPA0064 Fălticeni Lakes and ROSCI0310 Fălticeni Lakes, and Davideni, Neamț County – near ROSCI0363 site Moldova River between Oniceni and Mitești), but it cannot be concluded that the location of the storages will be close to these sites.

Final decision for choosing one of the 4 locations proposed will take into consideration, apart from the technical and economical reasons, the results of the environmental analysis and the risk analysis as the natural gas storage facilities are objectives that fall under the incidence of Law 59/2016 on the control of major accident hazards, involving dangerous substances. The location of the new natural gas storage facility will be chosen with the adequate assessment of the possible effects on the inhabited and protected areas in the location area.

The analysis of projects included in the Do maximum development scenario, from the environmental impact perspective, has been only possible at the known detail level. But the analysis of the Do minimum scenario at detailed level, by environmental studies at project level, has also provided important clues on the extent of the impact caused by the development of Do maximum scenario.

By the deployment of the projects proposed as part of the Do maximum development scenario, the effects on the environment will be felt during their period of execution, manifested locally, in the area of the work front and will only occur temporarily.

The environmental impact during the proposed investments' operation is not assessed as significant, under installations' normal functioning conditions.

5 ANY EXISTING ENVIRONMENTAL ISSUE RELEVANT FOR TYNDP, ESPECIALLY INCLUDING THOSE REGARDING ANY AREA OF PARTICULAR ENVIRONMENTAL INTEREST

Based on the analysis of the actual condition of the environment (presented in Chapter 3 of the Environmental Report) and on the actual natural gas transportation infrastructure's condition (presented in sub-chapter 0 of the Environmental Report), there have been identified the following environmental issues relevant for the natural gas transportation sector and for the Natural Gas National Transportation System Development Plan 2021-2030.

Table 21. Environmental issues relevant for TYNDP 2021-2030

Environmental feature	Relevant environmental issues
AIR	The functioning of the natural gas transportation system does not represent an important atmospheric pollution source. A slight increase of air pollution level is foreseen, mainly with powders, during the project's deployment phase, in the works' and in the building site's areas, but this is a direct and time-limited impact.
Water	The impact on water streams is temporary, during the projects' performance period, upon the completion of the works the location can be restored to its initial condition. The performance of the projects mentioned in the TYNDP does not involve the tapping of important quantities of water from the environment, fact which limits the potential impact on the hydrologic and hydrogeological conditions on the projects' locations or on perimeters located in their close vicinity.

Environmental feature	Relevant environmental issues
	The TYNDP deployment may have a significant local impact, during the gas pipes' execution period, onto the ecosystems of the large water streams crossed (Danube river, Târnava Mică and Târnava Mare rivers, Siret, Someș, Argeș, Cris, Nistru, Olt, Sebeș, Jiu, Mureș, Timiș, etc.) in the conditions where the sub-crossing is performed by open-cut, wet ditch, given the greater duration of the works. If the pipe is laid out by directed drill, the impact is insignificant. During the functioning period of the natural gas NTS's objectives will result domestic type waste waters, eliminated in the sewage networks or in scoopable basins and from the functioning of the gas storage facilities will result deposit waters, which are evacuated in closed system. Under normal functioning conditions, by the deployment of the planned measures for the diminution of the environmental risks during the operation period, the impact caused onto waters is assessed to be negligible.
Ground and underground	The physical (mechanical) impact on soil occurs during the building phase, and compacting and mixing of horizons phenomena may occur. The natural gas transportation pipes may cross risk areas regarding nitrates pollution, areas contaminated with various pollutants, which could generate a pollution basins' expansion risk, under the conditions where the existence of these locations is not envisaged during the design phase. There are no soil pollution sources during normal functioning conditions.
Waste Management	The present condition of the natural gas transportation pipes, where about 74% of them are older than 20 years, determines the performance of permanent repairs and maintenance works, activities which would constantly generate specific waste, but without producing important quantities of waste.
Biodiversity	• The existence of the natural reservations, of natural parks and of Natura2000 sites in the areas of some of TYNDP projects and the anthropic impact onto them. • Intensification of lands' usage for anthropic activities • Invasion of allochtonous species may lead to a severe degradation of the natural systems by altering the interactions within the systems. • The definitive occupation of surfaces of land in the protected areas' vicinity, as a result of the natural gas transportation infrastructure's development. • Faulty planning of natural gas transportation corridors may affect the preservation condition of natural habitats. • The absence or the non-deployment of efficient prevention / diminution measures regarding the impact caused by the performance of natural gas transportation infrastructure projects may contribute in the loss, destruction or fragmentation of habitats.
Climate Change	The greenhouse gas emissions in the natural gas transportation sector occur from: • natural gas combustion processes, occurring in the natural gas TNS's own installations, generating CO, NOx, SOx emissions - these are insignificant, the burning equipments generating emissions below the threshold limits set forth by the regulations in force. • CH4 emissions due to the wear and tear of natural gas transportation pipes and to the lack of tightness of removable joints. These emissions are assessed at the value of 0.000309364% from the annual transported volume, therefore extremely reduced. The natural gas is the cleanest of fossil fuels, with carbon emissions on energy unit 40% less than coal, as well as considerably lower emissions of atmospheric pollutants. Also, due to the flexibility of natural gas-based electricity production units (i.e. short ON-OFF times), these are complementary to the renewable energy sources of variable functioning (v-RES), wind and solar power. Thusly, in the context of EU's ambitious climate policies, natural gas stands out as an energetic transition fuel, able to support the evolution of the energetic system towards a renewable, decentralized and flexible production. The greater the weight of the v-RES is in the electricity mix, the more necessary the natural gas-based flexible electricity production capacities are.
Energetic efficiency and safety	74% of the natural gas transportation network is outdated, with a reduced energetic efficiency. The present dependence on the natural gas transportation pathways from the East towards the West is compromising the energetic security of the European continent, in its entirety.

Environmental feature	Relevant environmental issues
Preservation / use of natural resources	The gas transportation infrastructure is not developed enough so to allow the exploitation / usage of the energy resources discovered in the Black Sea and in the Caspian Sea, which could lead to an over-exploitation of existing resources.
Human Population and Health	The deployment of the TYNDP's projects may cause discomfort to the population during its construction phase, due to the increase of emissions and noise levels in their execution area. But this effect is a temporary one, and only felt in the vicinity of the work front which is located, in over 98% of the cases, outside inhabited areas. The average progress speed of the natural gas transportation pipes' projects is of about 1 km/month, on several work fronts, but located at significant distances one from the other, so that the presence duration of the works inside sensible areas is diminished. Therefore, work phases can be adapted to the local communities' requirements, with the possibility to adapt certain work phases to the local communities' requirements, so that the general disturbance is minimal. On the other hand, less than half of the Romanian households are connected to the natural gas supply network (44.2%), and only one third of Romanian habitations are directly heated with natural gas.
Landscape	The performance of new natural gas transportation corridors leads to the permanent occupation of certain surfaces of land and to alterations in the lands' usage category, sometimes accompanied by the removal of the tree vegetation, followed by the restoration of the ecosystem. But the impact is contained, the permanently occupied surfaces are extremely small and for these can be deployed visual impact dampening measures.
Cultural heritage	On the trajectory of the future natural gas transportation pipes may exist certain cultural and archaeology heritage objectives.
Risks	• Safety issues in the natural gas transportation caused by the networks' wear and tear condition. • The existing and proposed natural gas storage facilities have storage capacities including them on the SEVESO list of installations, being industrial objectives with major accident risk. • The new SEVESO objectives may interact with other existing or proposed SEVESO objectives, and may generate conditions for the occurrence of the Domino effect. • The major accident risks are assessed and quantified during the environmental impact's assessment phase of the respective project, when the Security Report is elaborated according to Law 59/2016 regarding the control over the major accident dangers involving dangerous substances.
Durable transportation	The absence of an infrastructure for alternative fuels, harmonized at the Union's level is a hindrance in the way of introducing on the market of vehicles fuelled with alternative fuels and delays the afferent environmental benefits. Electricity, hydrogen, bio-fuels, natural gas and liquefied oil gas (LOG) are presently identified as the main alternative fuels with the potential to replace oil in the long run.
Population awareness regarding the environmental issues and the relationship with the natural gas transportation system	• Lack of public awareness regarding the natural gas transportation infrastructure's functioning effects on the environment. • A low degree of involvement of the civil society in the decision-making regarding the development options for the natural gas transportation sector.

6 ENVIRONMENTAL PROTECTION OBJECTIVES, SET OUT AT NATIONAL, COMMUNITARIAN OR INTERNATIONAL LEVEL, WHICH ARE RELEVANT AND THE MANNER IN WHICH THEY AND ANY OTHER ENVIRONMENTAL CONSIDERATIONS WERE TAKEN INTO ACCOUNT WHEN ELABORATING THE TYNDP

6.1 RELEVANT ENVIRONMENTAL OBJECTIVES

The relevant environmental protection objectives for the TYNDP's environmental assessment have been established based on:

- The environmental objectives set forth by national and European policies, strategies, plans, programs and regulations;
- The environmental aspects relevant for TYNDP and the present trends of the environmental condition evolution, of nationally identified environmental issues, presented in Chapter 5;
- The relation of the policies, strategies, plans, programs and regulations relevant in the gas transportation sector, existing at national and European level with the TYNDP's objectives and proposals.

The relevant environmental objectives have been presented and completed within the work groups[20]. These appear in Table 22Table 22.

Based on the identified relevant environmental objectives, indicators (or assessment criteria) have been defined, allowing the impact assessment and the establishment of monitoring and checking boundaries, if they will or will not be fulfilled / reached. These indicators are presented in Chapter 11 of the Environmental Report.

Table 22. Relevant environmental objectives (REO) for environmental assessment

Environmental features	Relevant environmental objectives	Targets
AIR	**REO 1. Prevention or reduction of pollution sources' impact on air quality.**	Maintaining the level of emissions within the limits allowed by the law in force.
	REO 2. Reduction at national level of emissions of pollutants into the air generated by the natural gas transportation sector (methane, emissions from methane gas combustion processes)	Keeping levels of emissions in the limits admitted by Law 104/2011 on Ambient air quality.
Source documents: • Directive 2008/50/EC of the European Parliament and Council from May 21st 2008 on surrounding air quality and Clean Air for Europe, transposed to Law 104/2011 on surrounding air quality • (EU) Directive 2015/2193 of the European Parliament and Council from November 25th 2015 regarding the limitation of emissions in the atmosphere of certain pollutants emanating from average burning installations, transposed to Law 188/2018 on the limitation of emissions in the air of certain pollutants emanating from average burning installations		
Surface and underground WATER	**REO 3. Preservation of flowing waters' ecological condition**	The observance of the environmental objectives set forth for each body of water, by preventing and limiting the impact onto them.
	REO 4. Prevention of alterations	The prevention of alterations' occurrence in the

20 Article 15, paragr. (2) – HG 1076/2004 on the establishment of the performance procedure for the environmental assessment for plans and programs

Environmental features	Relevant environmental objectives	Targets
	in the morphology and hydrology of surface bodies of water	hydrologic and morphologic regime, due to natural gas transport infrastructure's construction activity
	REO 5. The prevention of pollutants input in surface and underground waters	The observance of the limit values for the used waters' quality indicators when eliminating them in a natural emissary or in the sewage network.
Source documents: • Directive 2000/60/EC of the European Parliament and of the Council on the establishment of a Communitarian policy framework in the waters field, transposed to Waters' Law no. 107/1996. • Hydrographic Basins Management Plans		
GROUND and UNDERGROUND	**REO 6. Protection of soil's quality, composition and functions**	Prevention of soils' degradation and pollution. Restoration of lands affected by the performance of works.
Source documents: • National Strategy for Romania's Durable Development 2030, approved by GD 877/2018 • Thematic strategy for soil protection (a directive proposal of the European Parliament and Council of September 22nd 2006 to define a framework for the protection of soils and to modify Directive) 2004/35/EC)		
WASTE MANAGEMENT	**REO 7. Optimal management of waste from a technical, economic and environmental point of view.**	Minimization of generated waste quantities Increase of recycled and capitalized waste quantity
Source documents: • Directive 2008/98/EC of the European Parliament and Council of November 19th 2008 on waste, transposed to Law 211/2011 on waste regimen. • National Waste Management Strategy 2014-2020, approved by GD 870/2013		
BIODIVERSITY	**REO 8. Reduction of pressures due to the deployment of the natural gas infrastructure which affect biodiversity**	• The planning of natural gas transportation projects, considering the reduction of the impact on natural habitats and on biodiversity, and avoiding, as much as possible, the protected natural areas. • The reduction of land conversions in the protected areas' surroundings for the development of natural gas transportation infrastructure. • Durable development of gas transportation networks' infrastructure by limiting its impact on biodiversity
	REO 9. Limitation of deforested areas caused by the development of natural gas transportation infrastructure	• Reduction of deforested areas caused by the development of natural gas transportation infrastructure • Establishment and application of optimal compensatory measures for the areas affected by the permanent removal from the national forest fund, according to the provisions of the Forestry Code.
Source documents: • EGO 57/2007 on the regimen of protected natural areas, preservation of natural habitats, of wild flora and fauna, approved with alterations and additions by Law 49/2011, updated, transposing the Directives regarding the preservation of natural habitats and of wild flora and fauna 92/43/EEC and Directive regarding the preservation of wild birds 79/409/EEC • National Strategy and Action Plan for the Preservation of Biodiversity 2014-2020, approved by GD		

Environmental features	Relevant environmental objectives	Targets
1081/11.12.2013		
LANDSCAPE AND VISUAL ENVIRONMENT	**REO 10. The development of the natural gas transportation infrastructure, considering the landscape management, protection and enhancement**	Limitation of the effects on the natural landscape and the inclusion of the gas transportation infrastructure works in the landscape.
Source documents: • Landscape European Convention, adopted in Florence on October 20th 2000, ratified by Romania by Law 451/2002		
NATIONAL CULTURAL HERITAGE	**REO 11. Offering protection to the cultural heritage (in situ preservation of the historical monuments and assets)**	Not affecting the cultural heritage objectives by the performance of the investments objectives proposed by TYNDP.
Source documents: • Strategy for culture and national heritage 2016-2022 • Law 422/2001 updated, on the protection of historical monuments • Law 150 of July 24th 1997 for the ratification of the European Convention on the protection of archaeology heritage (revised), adopted at La Valetta on January 16th 1992.		
HUMAN POPULATION AND HEALTH	**REO 12. The protection of human health by maintaining or limiting the impact caused by the natural gas transportation activity onto the environmental factors' quality**	Maintaining the level of emissions and noise within the limits allowed by the law in force.
	REO 13. The provision of the facilities regarding the population's access to gas supply networks and the improvement of social and economical conditions for the population.	An increased number of households with access to gas supply networks.
	REO 14. Reduction of noise generated by the operation of the equipments specific to the natural gas storage operators (compressors, pumps, fans)/ construction works and traffic of transport means during the execution periods of the project	Perform insulation in the areas where the noise generating equipment is located.
Source documents: • The documents mentioned in the previously mentioned environmental factors • National Health Strategy 2014-2020 and Action Plan for 2014-2020 for the deployment of the National Strategy, approved by GD 1029/2014 • Romania's Territorial Development Strategy, Polycentric Romania 2035 • "Horizons 2010-2020-2030" National Strategy for Romania's Durable Development • Directive 2002/49/EC of the European Parliament and Council on the assessment and management of surrounding noise, transposed to GD 321/2005, modified and completed, on the assessment and management of surrounding noise, • OM no. 119/2014 for the approval of the Norms of hygiene and public health regarding the living environment of the population		
ENERGETIC EFFICIENCY	**REO 15. Increase of the natural gas transportation network's energetic efficiency**	According to the measures and investments program of SNGTN Transgaz for the improvement of energetic efficiency for 5 years of the Energetic Efficiency National Action Plan IV.
Source documents: • Energetic Efficiency National Action Plan IV, approved by GD 122/2015 • Romania's Energetic Strategy for 2019-2030, with perspectives for year 2050		
CLIMATE CHANGES	**REO 16. Increase of low-carbon emissions energy sources' usage**	The internal increase of natural gas consumption in the disservice of much more

Environmental features	Relevant environmental objectives	Targets
		polluting conventional energy sources.
	REO. 17. Reducing the vulnerability of natural gas transportation infrastructure to climate change (extreme weather conditions, high / low temperatures, floods, etc.	Protection of existing gas transportation infrastructure and develop it taking into account the need to adapt to the effects of climate change.
Source documents: • Energy and Climate Change National Integrated Plan (ECCNIP) 2021-2030 • Romania's Energetic Strategy for 2019-2030, with perspectives for year 2050 • GD 739/2016 for the approval of the National Strategy on Climate Change and Economical Growth, based on reduced carbon emissions of the period 2016-2020 and of the National Action Plan • Guidelines on adaptation to the effects of climate change approved by Order 1170/2008.		
PREVENTION OF RISKS	**REO 18. Prevention of major accidents risks and limitation of consequences caused by the occurrence of major accidents on population's health and on the quality of the environment.**	Reduction of major accidents risk
Source documents: • Law 59/2016 on the control over major accidents danger involving dangerous substances, transposing the Directive 2012/18/EU (SEVESO III) • EU Regulation 2017/1938 of the European Parliament and Council of October 25th 2017 on the measures regarding the guarantee of gas supply safety.		
Preservation and efficient use of natural resources	**REO19. Efficient use of natural resources to minimize the environmental impact**	Sustainable exploitation of all types of the country's primary energy resources
Source documents: • Romania's Energetic Strategy for 2020-2030, with perspectives for year 2050 • National Romanian Strategy on Climate Change 2013-2020		
AWARENESS INCREASE REGARDING THE ENVIRONMENTAL ISSUES	**REO 20. The involvement of the public and of the interested factors and their consultation during the entire duration of the decision-making process and the deployment of the measures proposed for the reduction of the impact on the environment.**	Consultation with the public and with the interested factors, according to the procedure set forth in GD 1076/2004.
Source documents: • Directive 2001/42/EC of the European Parliament and Council on the assessment of certain plans and programs' effects on the environment • HG 1076/2004 on the establishment of the performance procedure for the environmental assessment for plans and programs • Law 544/2001 on free access to information of public interest		

6.2 ASSESSMENT OF RELEVANT ENVIRONMENTAL OBJECTIVES' COMPATIBILITY WITH THE TYNDP'S OBJECTIVES

The goal of this section is to assess the compatibility between the TYNDP 2021-2030 proposed objectives and the environmental objectives relevant of the Environmental Assessment on environmental aspects: climate change, soil, waste and dangerous substances management, biodiversity, human population and health, energetic efficiency and preservation of natural resources,

increase of the degree or awareness regarding the environmental issues caused by the natural gas storage and transportation sector.

The Natural Gas National Transportation System Development Plan 2021-2030, elaborated according to the provisions of Law 123/2012 of electricity and natural gas, with the objectives proposed in the Romania's Energetic Strategy 2020-2030 project, with perspectives on year 2050, observes the requirements of the European energetic policy regarding:

A. provide a safe natural gas supply;
B. increase of the interconnectivity degree of the national natural gas transportation network with the European network;
C. increase of the natural gas national transportation network's flexibility;
D. natural gas market's liberalization;
E. the creation of an integrated natural gas market on European Union level;
F. third-party connection to the transportation system, according to specific regulations, within the limits of the transportation capacities and with the observance of the technological regimens;
G. expansion of the pipes' network, up until the entry in the localities attested as national and respectively local interest resorts, when these localities are located no more than 25 km away from the transport and system's operators connection points;
H. provision of the connection to the natural gas network of new investments which generate new jobs

In addition to these objectives, by TYNDP 2021-2030, Transgaz also proposes:

I. the promotion of investments projects contributing in the performance of a durable natural gas transportation system which observes the safety requirements set forth by the law in force, with the limitation of the impact on the environmental and on population;
J. the performance of the projects in such a manner so the impact on the natural and anthropic environment is minimal;
K. the performance of the projects in such a manner so the impact on biodiversity is minimal.

The assessment of the compatibility between the relevant environmental objectives and the TYNDP's objectives was performed with a matrix using the following symbols:

+	objectives are compatible
?	compatibility depends on certain hypotheses
0	objectives do not influence each other / there is no connection between the presented objectives
X	incompatibility

Table 23. Assessment of compatibility between the TYNDP's objectives and the relevant environmental objectives for the Environmental Assessment

ENVIRONMENTAL ISSUE	REO	TYNDP Objectives 2021-2030										
		A	B	C	D	E	F	G	H	I	J	K
Air	REO1	+	0	+	0	0	+	0	+	+	+	+
	REO2	0	0	0	0	0	0	0	0	+	+	0
Water	REO3	0	?	?	0	0	0	0	0	+	+	+
	REO4	0	?	?	0	0	0	0	0	+	+	+
	REO5	0	?	?	0	0	0	0	0	+	+	+
Soil and underground	REO6	0	?	?	0	0	0	0	0	+	+	+
Waste Management	REO7	0	0	0	0	0	0	0	0	+	+	+
Biodiversity	REO8	0	?	?	0	0	0	?	0	+	+	+
	REO9	0	?	0	0	0	0	?	0	+	+	+
Landscape	RE10	0	?	?	0	0	0	?	0	+	+	+

ENVIRONMENTAL ISSUE	REO	TYNDP Objectives 2021-2030										
		A	B	C	D	E	F	G	H	I	J	K
Cultural heritage	REO11	0	?	?	0	0	0	0	0	+	+	0
Human Population and Health	REO12	0	0	0	0	0	0	0	0	+	+	+
	REO13	+	+	+	+	+	+	+	+	+	+	+
	REO14	0	0	0	0	0	0	0	0	+	+	+
Energetic efficiency	REO15	+	+	+	0	+	0	0	+	+	+	+
Climate changes	REO16	0	0	+	+	+	0	+	+	+	+	+
	REO17	+	0	0	0	0	0	0	0	+	0	0
Environmental Risks	REO18	+	0	0	0	0	0	0	0	+	+	+
Preservation and efficient use of natural resources / use of renewable resources	REO19	0	+	0	0	+	0	0	0	+	+	+
Population awareness	REO20	0	0	0	+	0	0	0	0	+	+	+

Analyzing the assessment matrix for the compatibility between the TYNDP 2021-2030 objectives and the relevant environmental objectives, it is assessed that the TYNDP specific objectives envisage the alignment with the environmental objectives. Each TYNDP proposed objective observes the requirements of at least one environmental objective. No incompatibilities have been identified between the relevant environmental objectives and the TYNDP objectives. But reaching the proposed targets depends on the observance of the requirements proposed in Chapter 11.

Situations have been identified where the compatibility depends on certain hypotheses (assessed with "?") for the following situations:

- Environmental objectives regarding water and soil protection (REO 3÷6), in correlation with TYNDP objectives B and C referring to the expansion of natural gas NTS, with the risk that the projects proposed for expansion would affect the condition of soils and/or surface and underground waters. In order to prevent these situations, special measures are provided in chapter 11.
- Environmental objectives regarding the preservation of biodiversity (REO 8,9) in correlation with the TYNDP objectives B, C and G which refer to natural gas NTS expansion, with the risk of them superposing on protected or valuable habitat areas. The possible impact these projects will have on biodiversity is reflected in their potential localization on the protected natural areas' territory, or at a certain distance from them. In order to prevent these situations, special measures are provided in chapter 11.
- Environmental objectives regarding the protection of landscape (REO 10) in correlation with the TYNDP objectives B, C and G referring to natural gas NTS expansion, which could prejudice the landscape in certain areas. In order to prevent these situations, special measures are provided in chapter 11.
- The environmental objects regarding the protection of the cultural heritage (REO 11) in correlation with the objectives of TYNDP objectives B and C which refer to natural gas NTS expansion, which could cross archaeologically loaded areas / surfaces, that which could affect or destroy cultural or archaeology heritage elements, where the performance of the projects is not associated with adequate identification and protection measures for them.

Generally, as can also be concluded from the assessments of the projects performed so far, included in the Do minimum scenario, the planned trajectories of the objectives part of natural gas NTS consider the potential effects on the environment and reduction / minimization measures regarding any potential negative effects as early as project phase.

Each of the projects part of TYNDP 2021-2030 will be submitted to the environmental impact assessment before its execution and specific environmental protection measures will be identified.

7 POTENTIAL SIGNIFICANT EFFECTS ON THE ENVIRONMENT, INCLUDING ON ASPECTS LIKE: BIODIVERSITY, POPULATION, HUMAN HEALTH, FAUNA, FLORA, SOIL, WATER, AIR, CLIMATE FACTORS, MATERIAL VALUES, CULTURAL HERITAGE, LANDSCAPE AND THE RELATIONSHIPS BETWEEN THESE FACTORS

The need to study and assess the impact of a human activity on all the fields, but particularly on the environment, is justified by three large categories of arguments:

- timely initiation of actions meant to reduce the collateral negative effects, determined by the respective activity;
- the objective assessment of all the possibilities, in order to choose the action strategy in a systemic perspective;
- the need to involve the population in the decision-making regarding the promotion of activities or projects which will influence their lives in one way or another.

Below, we will make reference to aspects regarding the TYNDP 2021-2030's implementation impact on environmental elements, on communities and on the historical and cultural heritage.

7.1 POTENTIAL SIGNIFICANT EFFECTS DURING THE CONSTRUCTION PERIOD AND DURING THE NATURAL GAS STORAGE CAPACITIES / TRANSPORTATION PIPES' OPERATION PERIOD

The table below shows the potential significant effects on the environment, possibly caused by the deployment of TYNDP 2021-2030 projects, with the assessment of the potential impact, its nature, magnitude analysis, remaining impact and cross-border nature of the impact. The data are informative in nature, following that as part of the environmental impact assessment for each separate project an in-depth analysis is performed, also considering concrete data.

Table 24. Potential effects on environmental factors during the deployment period of the projects part of TYNDP 2021-2030

No.	Activity	Potential impact	Nature of the impact	Extent of impact	Magnitude	Remaining impact	Cross-border nature of impact
1. Significant effects on human population and health							
1.1	**Performance of works / building site organization**	Loss of income source as a result of definitive land occupation	Permanent, negative	depending on the number of land owners	Reduced, given the small surface of the lands of definitive occupation	Not present	Not applicable
		Loss of income source as a result of temporary land occupation	Temporary, negative	depending on the number of land owners	Reduced, the land being restored to its initial condition after completion of works.	Not present	Not applicable
		Suspension of access towards jobs, other lands, etc.	temporary, negative, during works	depending on: the number of land owners - roads' crossing manner - duration of works	Reduced, depending on the number of land owners and their destination, on the roads' crossing manner, on the duration of works	Not present	Not applicable
		Machinery-made noise and vibrations	temporary, negative, during works	Depending on the condition of the machineries, on the activity's specificity and the number of machineries functioning at once	Reduced, but can be significant in the works' area. Generally, the work locations are organized outside inhabited areas, thusly minimizing a potential negative impact.	Not present	Only in the boundary strip
		Accidents danger in digging area	temporary, negative, during works	At local level	Reduced, depending on the duration of works, on the area's configuration and on the enforced protection measures.	only in case of accident	Not applicable
1.2	**Construction site associated traffic**	Production of noise and vibrations	temporary, negative, during works	At local level	Reduced. Depending on transportation type (heavy, men at work, etc), on the condition of the road and on the buildings near the road. May be significant if no noise reduction measures are enforced.	In case the speed limits are not observed, the vibrations may cause damages to nearby buildings	Not applicable
		Air pollution by road traffic	temporary, negative,	At local level	Reduced, depending on the condition of the transportation	Not applicable	Not applicable

No.	Activity	Potential impact	Nature of the impact	Extent of impact	Magnitude	Remaining impact	Cross-border nature of impact
			during works		vehicles, on the duration of works, on the location of access roads near the locality and on the condition of the roads. May be significant if no preventive measures are enforced.		
1.3	**Operation period of the natural gas transport pipeline**	Life quality alteration by increase in the number of habitations connected to the natural gas distribution network	positive, in the long run	depending on the number of habitations connected to the natural gas distribution network	Significant on the population's comfort	Increase in the quality of life	Not applicable
		Employment opportunities, by creating the conditions for the development of economic activities as a result of natural gas availability	positive, in the long run	depending on the areas' availabilities	Significant on population's income	Increases the standard of living	Bulgaria, Hungary, Ukraine- positive, as a result of provision of natural gas transit
		Risk of explosions,	negative, direct or indirect	duration and magnitude of impact is determined by the extent of breakdown's consequences	Reduced, if the installed protection systems and the applied prevention measures are considered. May also be significant, depending on the location as compared to the explosion site when it happened and on its consequences (if there is a fire or not).	depending on the speed and efficiency of the intervention	- Not applicable in the area where the border is represented by a water stream (Bulgaria) - Locally, in the border area (if the breakdown takes place in that area), and extended, as a result of natural gas supply cessation during the repairs
		Improvement of environmental quality by widely using natural gas and	Direct, in the long run,	At national and cross-border level	Significantly positive	Permanent, long-term impact	Positively significant for the projects deployed

No.	Activity	Potential impact	Nature of the impact	Extent of impact	Magnitude	Remaining impact	Cross-border nature of impact
		ceasing the use of other, more polluting fuels.	positive				in the border area.
1.4	**Stations and afferent equipment operation Natural gas NTS**	Risk of explosions, under breakdown conditions	negative, direct or indirect	duration and magnitude the impact is determined by the extent of breakdown's consequences	Reduced, if the installed protection systems and the applied prevention measures are considered. May also be significant, depending on the location as compared to the explosion site when it happened and on its consequences (if there is a fire or not).	Not predictable	Locally, in the border area (if the breakdown takes place in that area), and extended, as a result of natural gas supply cessation during the repairs.
		The use of local workforce	direct, positive	At local level	Can be significant, depending on the number of hired individuals	Increase in population's income	Not applicable
		Machinery-produced noise	Direct, negative	At local level	Restricted to the functioning area.	Not predictable	Not applicable
1.5	**Natural gas storage facility operation**	Explosions, under pipes breakdown conditions	negative, direct or indirect	the impact's duration and magnitude is determined by the extent of breakdown's consequences	Reduced, if the installed protection systems and the applied prevention measures are considered. May also be significant, depending on the location as compared to the explosion site when it happened and on its consequences (if there is a fire or not).	depending on the intervention's rapidity and efficiency	Not applicable
		The use of local workforce	direct, positive	local	Can be significant, depending on the number of hired locals	Increase in population's income	Not applicable
2. Significant effects on flora and fauna							

No.	Activity	Potential impact	Nature of the impact	Extent of impact	Magnitude	Remaining impact	Cross-border nature of impact
2.1	**Location of the works / construction site organization**	Loss of habitat as a result of temporary land occupation	Temporarily, in the short run, negative	depending on the type of habitat	Significant or reduced, depending on the affected habitats and on the enforced protection measures	Depending on the enforcement of protection measures	Not applicable
		The disturbance of species located in the work front area, possible mortalities due to the circulation of machineries, general perturbations in the work front adjacent area due to noise, storage of waste and soil, human presence.	Temporarily, in the short run, negative	depending on the habitat and present species	Significant or reduced, depending on affected species.	Depending on the enforcement of protection measures	Not applicable
		Potential damage of the elements with a high preservation value: mature trees, wetlands, springs, temporary or permanent ponds, reproduction or sheltering places, ecotone areas abundant in species, mammals sheltering areas, etc.	Temporarily, in the short run, negative	depending on the habitat and present species	Significant or reduced, depending on the affected elements with a high preservation value.	Depending on the enforcement of protection measures	Not applicable
		Deforestation on the work corridors, in case of forests crossing	Negative, directly	in the pipe's corridor	Significant in case of new corridors, reduced in case of existing ones	In the pipe's protection area, the restoration of removed forests, orchards or vineyards is not allowed.	Not applicable
		The damage on habitats and aquatic species in case of open-cut wet ditch crossing of surface waters.	temporary, negative, during works	Local	Significant or reduced, depending on the duration of works	Depending on the chosen crossing method and on the enforced	Not applicable if the sub-crossing of the Danube river will be performed

No.	Activity	Potential impact	Nature of the impact	Extent of impact	Magnitude	Remaining impact	Cross-border nature of impact
						environmental protection measures.	by directed drilling.
		Cessation of the access towards feeding and/or reproduction places, due to excavation and soil storage works.	temporary, negative, during works	depending on the migration paths and the populations' distribution in the area	Significant or reduced, depending on the number of migration paths identified on the pipe's trajectory and on the enforced protection measures.	Not identified	Not applicable
		Production of noise and vibrations	temporary, negative, during works	Local	Reduced. Depending on transportation type (heavy, men at work, etc), on the condition of the road and on the buildings near the road. May be significant if no noise reduction measures are enforced.	The return of animals in the area affected by works after their completion	Not applicable
		Air pollution by transportation of materials powdered materials and deposits on vegetation	temporary, negative, during works	Local	Reduced, depending on the condition of the transportation vehicles, on the duration of works, on the location of access roads near the locality and on the condition of the roads. May be significant if no preventive measures are enforced.	Not applicable	Not applicable
2.2	**Natural gas transportation pipe operation period with its afferent equipments, natural gas storage facilities**	No impact under normal functioning conditions.					
		Disturbance of species during the performance of installations checks	temporary, negative, local, during the checking works	Local	Reduced	Not applicable	Not applicable
		Danger of destruction for	negative,	Duration and magnitude	May vary between Reduced and	Not applicable	Not applicable

No.	Activity	Potential impact	Nature of the impact	Extent of impact	Magnitude	Remaining impact	Cross-border nature of impact
		species or habitats, in case of breakdowns in the natural gas transportation system	direct or indirect	the impact is determined by the extent of breakdown's consequences	Significant, depending on the extent of breakdown's consequences		
		Installation of invasive species on the restored terrains, after the completion of works	Negative, directly	local	Reduced	Depending on the enforcement of protection measures	Not applicable
3. Significant effects on air and climate							
3.1.	**Deforestation of definitively occupied surfaces**	Reduction of green areas' capacity to filter air	Direct, temporary, negative	Local, temporary, until the planting of shallow rooting trees, contributing in the restoration of the bio-eco-cenotic functionality of forestry massifs	Reduced.	Reduction of green areas' capacity to filter air	not present
3.2.	**Earth movement** (land cleaning, soil excavation, fillings and handling of aggregates)	Pollution with suspended particles	Direct, negative.	Local, temporary, during building site organization.	Reduced. The dust emissions often substantially differ from one day to the next, depending on specific operations and dominant weather conditions	Excessively excavated soil must be stored in such a manner as it does not constitute sources of pollution	In the terrestrial border area, possibly a local impact in the border area, during the performance of works in that area
3.3.	**Building site associated traffic**	Air pollution by traffic	Direct, negative	Local, temporary, during building site organization.	Reduced, depending on the condition of the transportation vehicles, on the duration of works, on the location of access roads near the locality and on the condition of the roads. May be significant if no preventive measures are enforced.	Not applicable	Not applicable
3.4	**Natural gas pipe, stations**	Explosions followed by fires, in breakdown situations	negative, direct	duration and magnitude of impact is determined	Reduced, if the installed protection systems and the	depending on the intervention's	Locally, in the terrestrial border

No.	Activity	Potential impact	Nature of the impact	Extent of impact	Magnitude	Remaining impact	Cross-border nature of impact
	and natural gas storage facilities' operation periods	(events with a reduced occurrence probability, given the installed protection systems)	or indirect	by the extent of breakdown's consequences	applied prevention measures are considered. May also be significant, depending on the location as compared to the explosion site when it happened and on its consequences (if there is a fire or not).	speed and efficiency	areas, if the breakdown occurs in that area
		Emissions from burning installations	Local, direct and indirect	local	Reduced	Not predictable	Not applicable
		Reduction of air pollution by widely using natural gas and ceasing the use of other, more polluting fuels.	Direct, in the long run, positive	At national and cross-border level	Significantly positive	Permanent, long-term impact	Positively significant for the projects deployed in the border area.
4. Potential impact on surface and underground waters' quality and quantitative regimen							
4.1.	**Building site organization**	Pollution with waste waters, if insufficiently treated Accidental pollutions with hydrocarbons or with other dangerous substances	Direct,	local	Reduced	Not present	Not applicable
		Accidental pollution with waste or various materials	Direct, negative, in the short run	Local	depending on the pollutant's nature and quantity.	Not present	Not applicable
4.2.	**Pipe cleaning and testing**	Accidental pollution with suspensions, grease, etc. in case of elimination directly in the emissary of the waters used in cleaning and testing the pipe	Direct, negative, in the short run	Depending on the receptor's size	Reduced. May be significant, in case of reduced flow water streams	It does not exist, if the waster is settled before its elimination in the emissary	Insignificant
4.3.	**Sub-crossing by directed drill**	Accidental bentonite contamination in case of	Indirect, negative,	local	Reduced	Not present	Not applicable

No.	Activity	Potential impact	Nature of the impact	Extent of impact	Magnitude	Remaining impact	Cross-border nature of impact
		breakdown of the drilling tube	in the short run				
4.4.	**Water crossing by open-cut wet ditch**	Increase of water turbidity by performance of pipe laying ditches	Direct, cumulative, for the entire duration of the works (digging, mounting, covering)	Depending on the receptor's size (Danube river, bigger or smaller rivers)	Reduced or significant, depending on the duration of performed operations. If water supply sources are located upstream, the cessation of the water supply or the increase of the settling period is necessary.	Not present - a great deal of the fine fractions extracted from the river bed will be distributed as deposits, on various distances, downstream.	Not applicable if the sub-crossing of the Danube river will be performed by directed drilling.
4.5.	**Aerial water stream crossing**	Erosion of the water stream banks	Direct, negative	Local	Reduced	May exist if the issue is not fixed.	Not applicable
		Accidental pollution with hydrocarbons	Direct, negative, in the short run	local	Depending on the accidentally spilled quantity of hydrocarbons.	May exist in case of significant pollution.	Not applicable
4.6.	**Gas pipe operation period**	No impact under normal functioning conditions					
4.7.	**Performance of periodical checks or restoration of pipes breakdown**	Pollution specific to sub-crossing / crossing works	negative, direct	the impact's duration and magnitude is determined by the extent of the breakdown		May exist in case of significant pollution	Not present
4.8	**Operation of gas compression stations afferent to**	Removal of non-treated waste waters	negative, direct or indirect	Depending on the used waters quantity	Reduced or insignificant if the indicators in NTPA 001/2005 are not observed.	Mud deposits in the water treatment plant	Not applicable
		Accidental pollution of underground water with	negative, direct	Local, given the small amount of waste	Reduced	Ecologic deposit	Not applicable

No.	Activity	Potential impact	Nature of the impact	Extent of impact	Magnitude	Remaining impact	Cross-border nature of impact
	natural gas NTS	improperly stored waste					
4.9	**Natural gas storage facility operation**	Removal of non-treated waste waters	negative, direct or indirect	Depending on the used waters quantity	Reduced or insignificant if the indicators in NTPA 001/2005 are not observed.	Mud deposits in the water treatment plant	Not applicable
		Accidental pollution of underground water with improperly stored waste	negative, direct	Local, given the small amount of waste	Reduced.	Ecologic deposit	Not applicable
5. Significant effects on soil and underground							
5.1.	**Location of works**	Definitive removal from the agricultural / forestry circuit of certain plots of land	Permanent, negative	In the stations and valves area	Reduced, depending on the measures enforced for the prevention of impact.	Not present	Not applicable
		Temporary removal from the agricultural/forestry circuit of plots of land	Temporary, negative	All along the pipe's trajectory, in the work corridor	Reduced, depending on the measures enforced for the prevention of impact.	Not present	Not applicable
		Stripping of the vegetable soil layer and the performance of an artificial profile for the terracing works	temporary, during works	Locally, along the pipe's trajectory, in the work corridor	Reduced, depending on the measures enforced for the prevention of impact.	Not present	Not applicable
		Accidental spills of polluting substances/compounds directly on the soil	temporary, negative during works	Local	Reduced, depending on the measures enforced for the prevention of impact.	Not present	Not applicable
		The pipes' pathway can be superposed on contaminated areas, implying the enforcement of adequate measures to limit any eventual pollution risks and any expansion of pollution basins.	negative, direct	Duration and magnitude of the impact is determined by the extent of the contamination and by the dislodged soil surface	Reduced, depending on the extent of the works and on the quantity of dislodged contaminated soil	Possibly, if works are performed improperly.	Not applicable
5.2.	**Operation period of the gas pipe**	In case of revisions, may occur possible accidental pollutions with hydrocarbons, improperly	temporary, negative during works	Local	Reduced	Not present	Not applicable

No.	Activity	Potential impact	Nature of the impact	Extent of impact	Magnitude	Remaining impact	Cross-border nature of impact
		stored waste, waste waters, dangerous substances					
5.3.	**Operation of gas compression stations afferent to natural gas NTS**	Accidental pollutions with non-treated waste waters, in case of damages in the sewage system or in the water treatment plant	direct or indirect, negative	duration and magnitude of the impact is determined by the extent of breakdown's consequences	Reduced	Not predictable	Not applicable
5.4	**Natural gas storage facilities**	Breaks or cracks of the installations leading to spillage of deposit waters	Direct, negative	Depending on the quantity of spilled deposit water	Reduced or significant, depending on the intervention measures application period.	depending on the intervention's speed and efficiency	Not applicable
		Accidental pollutions with non-treated waste waters, in case of damages in the sewage system or in the water treatment plant	direct or indirect, negative	Duration and magnitude of impact is determined by the extent of breakdown's consequences	Reduced	Not predictable	Not applicable
6. Significant effects on landscape and visual environment							
6.1.	**Location of works**	During the construction period, the visual impact is characteristic to building site activity	Local, temporary, negative	Only at building site organization level	Reduced	The restoration of the area affected by the works needs time	Not applicable
		Deforestation on the work corridors, in case of forests crossing	Direct, negative	in the pipe's corridor	Significant in case of new corridors, reduced in case of existing ones	In the pipe's protection area, the restoration of removed forests, orchards or vineyards is not allowed.	Not applicable
6.2.	**Gas pipe and afferent stations operation period**	Absent, if the pipe is completely buried					
		Alteration of the landscape's aesthetic value	Direct, negative, in the long	Limited to the reduced surface of the objectives	Reduced, at local level	Not present	Not applicable

No.	Activity	Potential impact	Nature of the impact	Extent of impact	Magnitude	Remaining impact	Cross-border nature of impact
			run				
6.3.	**Natural gas storage facilities' operation period**	Landscape alteration in the storage facilities' location	Direct, negative, in the long run	Limited to the objectives' surface	Reduced, at local level	During the objectives' functioning period	Not applicable
7. Significant effects on the historical and cultural heritage							
7.1.	**Location of works**	Accidental destruction of artefacts during digging	Direct, negative, permanent	In the works area	Significant, in case of destruction, but with an extremely reduced possibility to occur	Depending on the artefact's historical value	Not applicable
7.2.	**Natural gas NTS operation period**	Destruction of an archaeology site in case a pipe in its vicinity explodes	Direct, negative, permanent	local	Significant, but with an extremely reduced possibility to occur.	depending on the intervention's speed and efficiency	Not applicable
7.3		Improvement of heritage objectives' damage by reduction of the acidifying effect gas emissions	Direct, positive, permanent	National	Significant	Cessation of heritage elements' degradation due to acidifying effect gas emissions	Not applicable

7.2 IMPACT ASSESSMENT METHODOLOGY

When determining the potential significant effects on the environment, it was considered the identification of the manner in which the scenarios proposed by TYNDP lead to the accomplishment of the relevant environmental objectives, set forth for each separate environmental aspect.

A numeric scoring system was used to quantify each scenario's effects.

Table 25. The scoring system proposed for the assessment of the potential effects on the environment of the projects proposed by TYNDP 2021-2030

Scoring	Impact extent	Description
+2	Significant positive impact	It refers to major (significant) effects with positive character, manifesting in the long run or permanently, are wide-spread and contribute in the accomplishment of the established environmental objective
+1	Positive impact	It refers to minor (reduced) effects with positive character, direct or indirect, noted on a local level and which may partially contribute in the accomplishment of the established environmental objective
0	No effect / effect cannot be determined	Null effects, extremely reduced or for which precise forecasts cannot be performed, additional on site details are necessary regarding the project's features and their size
-1	Negative impact	It refers to minor (reduced) effects with negative character, direct or indirect, noted on a local level and which make the accomplishment of the established environmental objective difficult
-2	Significant negative impact	It refers to major (significant) effects with negative character, manifesting in the long run or permanently, are wide-spread and prevent the accomplishment of the established environmental objective

The scoring and assessment of the effects was performed by assessing the effects on the relevant environmental objectives, in correlation with the expected technical results of the Plan for each separate scenario. The substantiation of the effects identified on the established relevant environmental objectives is presented for each separate environmental aspect.

This assessment methodology allows, on one side, a quick overview of the effects on the environmental objectives and creates the possibility to understand the type, nature and duration of its effect and, on the other side, allows a quick identification of the environmental objectives which cannot be accomplished without the application of adequate measures for the minimization/reduction of negative effects.

The cumulative effect of the projects part of TYNDP 2021-2030 was assessed by summing up the score granted to each separate objectives, for each of the 3 scenarios:

- "Do nothing" zero alternative
- "Do minimum" reference scenario
- "Do maximum" development scenario

By comparing the scores obtained for the 3 scenarios proposed by TYNDP, we were able to determine which is the one with most of the positive effects on the long run and which may lead to the accomplishment of the established environmental objectives.

Below are presented the detailed results of the assessment.

7.3 POTENTIAL SIGNIFICANT ENVIRONMENTAL EFFECTS - *"DO NOTHING" SCENARIO*

This scenario considers the present condition of the natural gas transportation infrastructure and the evolution of the transport activity, with none of the TYNDP being deployed.

In the assessment of the potential significant effects of the "Do nothing" scenario on the relevant environmental objectives, established for each environmental aspect, the environmental issues identified for the natural gas transportation sector were considered, respectively the conclusions of the present environmental condition's analysis and its probable evolution if TYNDP is not deployed.

Table 26. Potential significant environmental effects - *"Do nothing" scenario*

Environmental feature	Potential effects of the "Do nothing" scenario (Alternative 0)	Relevant environmental objective / score per objective	Total score granted
AIR	• The absence of natural gas supply to the population, as a source of thermal energy, results in domestic consumers (estimated at about 90% of the households in the rural area and 15% in the urban area) to use other, much more polluting (wood, coal, diesel, etc.) sources of thermal energy in their individual heating installations, in inefficient heaters with incomplete burning, without particle filters, leading to a local increase of air pollution in residential areas. • On the other hand, wood comes mainly from forest cutting, which leads to the reduction of forests' protective role. • Coal exploitation in surface quarries has a strong impact on the environment, by excavations, deforestations, gross storage, etc. • The non-performance of rehabilitation / modernization works for NGTNS's specific installations, 74% out of which already obsolete, may lead to uncontrolled gas emissions in the atmosphere (methane, burning gases - CO, NOx, SOx, powders), exceeding the allowed limits for network losses and/or the functioning of technically and morally severely worn equipment. The technical condition of the pipes is still adequate, by the performance of preventive maintenance works, and is also supported by annual investments and modernization programs. • The non-performance of rehabilitation works envisaged by TYNDP may lead to damages of the NGTNS's pipes, with impact on air quality in the area, in case of fires caused by explosions. • The absence of natural gas supply for the functioning of industrial installations leads to their functioning using different types of fuel (coal, diesel, etc.), with a higher potential of air pollution.	*REO 1 Prevention or reduction of pollution sources' impact on air quality.* Score: -1 *REO2. Reduction at national level of air pollutants generated by natural gas transportation sector* *Score: -1*	-2
WATER	• The non-deployment of TYNDP will not have an impact on surface or underground bodies of water. Under normal conditions, the natural gas transit through the pipe is not a source of pollution for the crossed water stream. • The non-performance of the rehabilitation works may led to damages in the pipes crossing water streams. To repair these damages, interventions must be performed in the river bed, leading to a local impact on the aquatic environment.	*REO 3. Preservation of flowing waters' ecological condition* Score: -1 *REO 4. Prevention of alterations in the morphology and hydrology of surface bodies of water* Score: 0 *REO 5. The prevention of pollutants input in surface and underground waters* Score: 0	-1
SOIL and the underground	The non-deployment of TYNDP involves the following important aspects: • The non-performance of strategic interconnections with the neighbouring countries will involve the development of new exploitation sites on Romanian territory, with an impact on soil quality in the	*REO 6. Protection of soil's quality, composition and functions* Score: -1	-1

Environmental feature	Potential effects of the "Do nothing" scenario (Alternative 0)	Relevant environmental objective / score per objective	Total score granted
	exploitation area • The non-supply of natural gas for the functioning of thermal energy plants / electricity plants / industrial installations leads to their functioning using other types of fuels (coal, diesel, etc), therefore causing the pollution of soil as a result of mining activities, the occupation of the soil with polluting raw materials, cinder and ash.		
WASTE MANAGEMENT	• The present condition of the natural gas transportation pipes, where about 74% of them are older than 20 years, determines the performance of permanent repairs and maintenance works, activities which would constantly generate specific waste.	*REO 7. Optimal management of waste from a technical, economic and environmental point of view* Score: -1	-1
Biodiversity	• The non-deployment of the TYNDP objectives does not lead to direct, significant alterations of the biodiversity, but can be foreseen certain indirect changes, caused by gas emissions resulting from the production and usage of conventional thermal energy, from other sources than natural gas. • The non-deployment of rehabilitation/modernization works may lead to breakdowns in the natural gas transportation pipes, causing fires which can be devastating for the area in which they occur. But these situations are extremely rare, the systems belonging to NTS permanently undergoing checks / maintenance programs. • Not implementing TYNDP does not lead to removal of areas from the forest circuit.	*REO 8. Reduction of pressures due to the deployment of the natural gas transportation infrastructure, which affect natural habitats* score: 0 *REO.9. Limit the deforested areas* *score: 0*	0
LANDSCAPE	• The non-performance of TYNDP will not cause any alterations of the present landscape. • The NGTNS natural gas objectives will be kept in the same condition, needing modernization / repairs, with negative local influences on the landscape.	*REO 10. The development of the natural gas transportation infrastructure, considering the landscape management, protection and enhancement* score 0	0
CULTURAL HERITAGE	The non-deployment of TYNDP may have positive, as well as negative effects, if we consider the following aspects: • The non-performance of new natural gas transportation pipes eliminates the possible danger that certain artefacts or historical monuments become affected during the construction phase; • Continuing to use solid fuels as thermal and electrical energy production source will lead to an increased degree of air pollution, causing damage to certain historical and cultural values, as well as to certain archaeological sites • The delayed rehabilitation of existing pipelines will lead to the increase of the risk of their damage, with potential explosions and fires, possibly also damaging heritage objectives.	*REO11. Offering protection to the cultural heritage (in situ preservation of the historical monuments and assets)* score 0	0

Environmental feature	Potential effects of the "Do nothing" scenario (Alternative 0)	Relevant environmental objective / score per objective	Total score granted
HUMAN POPULATION AND HEALTH	The non-deployment of TYNDP will lead to direct negative effects as a result of emissions in the atmosphere (see the Air chapter), but also to indirect effects, as a result of the absence of natural gas supply during the cold season, of frequent cessations of natural gas supply or as a result of the impossibility to connect new consumers. Not implementing NGNTSPD does not lead to a change in the noise level in the case of natural gas storage facilities. Natural gas storage deposits are located outside inhabited areas, and there is an obligation to maintain a minimum safety / protection distance from them.	*REO 12. The protection of human health by maintaining or limiting the impact caused by the natural gas transportation activity onto the environmental factors' quality* score -1 *REO13 The provision of the facilities regarding the population's access to gas supply networks and the improvement of social and economical conditions in the area* score -1 *REO14. Reduce the noise generated by the operation of equipments specific to the natural gas storage deposits.* *score : 0*	-2
ENERGETIC EFFICIENCY	• The condition of the national gas transportation network, where 74% of the network's pipes and joints have an actual functioning duration exceeding 20 years, close to their normal functioning lifespan, the maintenance of inefficient systems of the natural gas transportation infrastructure will not allow the increase of the energetic efficiency in the natural gas transportation sector. Moreover, by not performing repair works in the equipments part of natural gas NTS, the natural gas transportation system's energetic efficiency will drop even more. • If the plan's objectives are abandoned, there will still be dependence on the natural gas transportation pathways from the East towards the West, a fact compromising the energetic security of the European continent, in its entirety.	*REO 15. Increase of the natural gas transportation network's energetic efficiency* score -2	-2
Climate changes	• The GGE emissions will continue to be elevated while energy sources (coal, hydrocarbons, etc) with elevated levels of GGE emissions will still be used. Nowadays, the electricity production mix in Romania exceeds the EU average on CO2 emissions. • Although the natural gas losses in the natural gas national transportation system are low (assessed, according to TYNDP, at about 1.118883 Smc/h), its modernization will lead to a minimization of the network losses (due to exploitation wear and tear and joints' lack of tightness) up to almost zero.	*REO16. Increase of low-carbon emissions energy sources' usage* score -1 *REO17. Reduce the vulnerability of the natural gas transportation infrastructure to climate change.* *score: -1*	-2

Environmental feature	Potential effects of the "Do nothing" scenario (Alternative 0)	Relevant environmental objective / score per objective	Total score granted
Environmental Risks	• The absence of NTS's modernization works reduces the system's level of safety. • The non-deployment of the Plan may lead to damages, resulting in sudden cessations of the gas supply (as a result of damages to transportation pipes) for economic objectives presenting explosion risks. This may cause immense economic damages, and eventually loss of human lives. • The technical condition of the natural gas NTS's objectives is still adequate, although 74% of the transportation pipes and the supply joints have been functioning for more than 20 years, because the exploitation activity performs in the context of a mainly preventive, planned, corrective maintenance system. • The non-deployment of the TYNDP provisions do not excuse the national operator from the observance of the provisions of EU Regulation 2017/1938 of the European Parliament and Council of October 25th 2017 on the measures regarding the guarantee of gas supply safety.	*REO18. Prevention of major accidents risks and limitation of consequences caused by the occurrence of major accidents on population's health and on the quality of the environment* score -1	-1
Preservation and efficient use of natural resources	• Presently, the gas transportation infrastructure is not developed enough so to allow the exploitation / usage of the energy resources discovered in the Black Sea and in the Caspian Sea and in the Middle East, which could lead to an over-exploitation of existing resources and to the creation of dependence on imports. • Another consequence of the Plan's non-deployment may be an orientation of the energetic resources' consumption towards energy sources more polluting than methane gas, or even the cessation of the activity of certain economic agents, which cannot align with the standards imposed for the protection of the environment, as they are unable to connect themselves to low-carbon emission energy sources. • The impossibility to use natural gas as a reserve choice for renewable energies in the area.	*REO19. Maintaining a diversified and balanced energetic mix nationwide* score -2	-2
Population awareness	• Lack of public awareness regarding the natural gas transportation infrastructure's effects on the environment. • A low degree of involvement of the civil society in the decision-making regarding the development options for the natural gas transportation sector.	*REO20. The involvement of the public and of the interested factors and their consultation during the entire duration of the decision-making process and the deployment of the measures proposed for the reduction of the impact on the environment* score 0	0
Grand TOTAL for environmental objectives		***-14***	
Grand TOTAL for environmental factors			***-14***

Weights of the potential effects of the non-deployment of TYNDP (the Do nothing scenario) for the relevant environmental aspects are:

- for 60% of the analyzed environmental aspects, the non-deployment of TYNDP generates negative effects
- for 40% of the analyzed environmental aspects, the non-deployment of TYNDP will not have notable effects.

No positive effects are assessed regarding the non-deployment of the plan regarding none of the environmental aspect (see Figure 20 negative effects no effect / the effect can be estimated positive effects

Fig 18. The weight of the possible effects on the environmental objectives - Do nothing scenario

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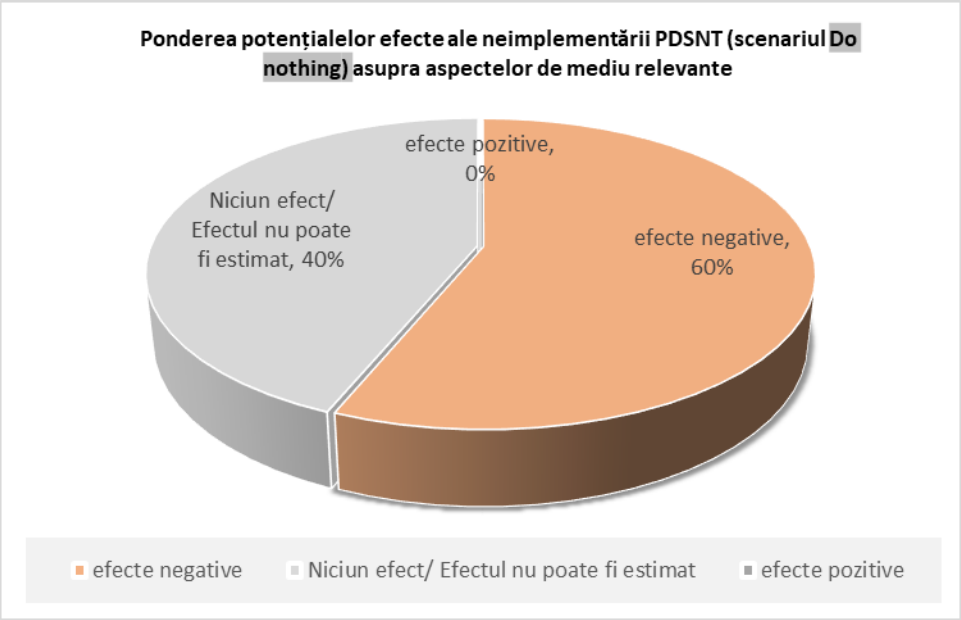


negative effects no effect / the effect can be estimated positive effects

Fig 18. The weight of the possible effects on the environmental objectives - Do nothing scenario

By the absence of any intervention, the "Do nothing" scenario will have significant negative effects on the environmental objectives set for: energetic efficiency and preservation of natural resources.

The cumulative effect of the "Do nothing" scenario has been assessed by adding the score granted to each separate objective.

The Do nothing development scenario is assessed with:

- insignificant negative effects for the following environmental objectives: Air (REO 1, REO2), Water (REO 3), Soil (REO 6), waste management (REO 7), Human Population and Health (REO 12 and REO 13), Climate Change (REO 16, REO17), Environmental Risks (REO 18) ,
- negative effects significant for the Energetic Efficiency (REO 15) and Preservation / Durable use of resources (REO 19) objectives.

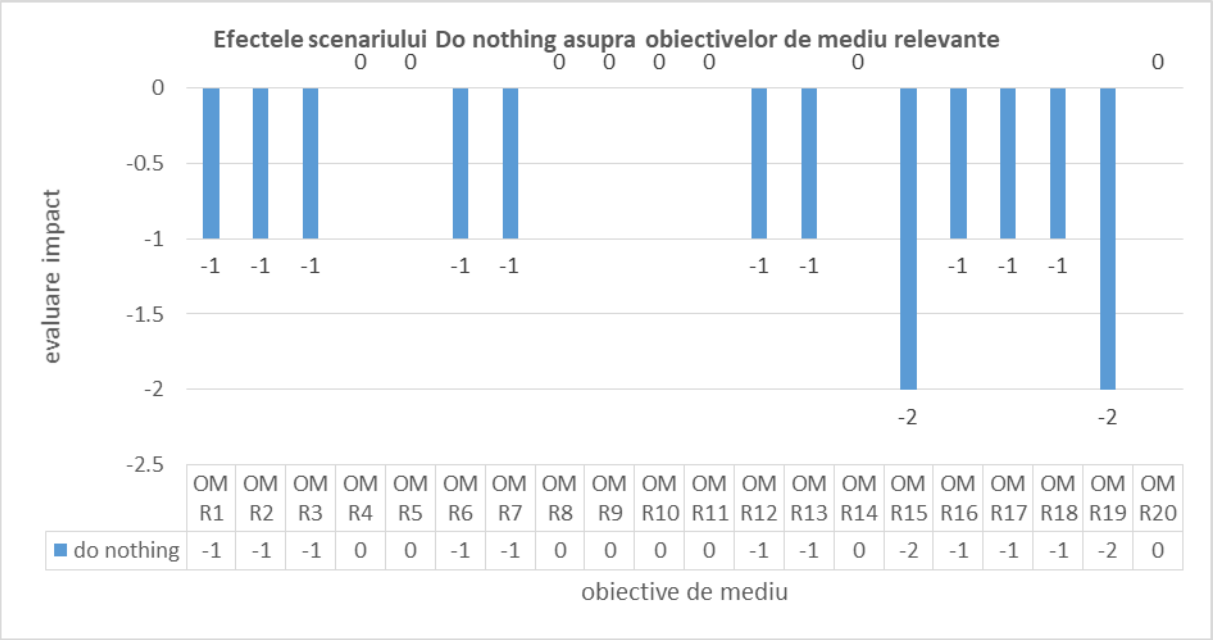


Fig 19. The effects of the Do nothing scenario on relevant environmental objectives

7.4 POTENTIAL SIGNIFICANT EFFECTS ON THE ENVIRONMENT - "DO MINIMUM" SCENARIO (REFERENCE SCENARIO)

This scenario considers projects pending deployment, with assured financing sources - a number of 11 projects listed in Table 13.

For most of these projects, the environmental impact assessment procedure has been performed (existing the classification phases decisions or environmental endorsements issued by the competent Environmental Authority, establishing the deployment conditions).

In the scoring of each objective was also considered the fact that for the potential negative effects on the environment, submitted for analysis, measures for their reduction/limitation/avoidance have been established. It is considered that the deployment of these measures will diminish the negative effects.

Table 27. Potential significant effects on the environment – the *Do minimum* scenario

Environmental aspect	Potential effects of the "Do minimum" scenario	Relevant environmental objective / score awarded per objective	Total score awarded
AIR	• Among the conventional fuels used for (domestic or industrial) heating, but also for electricity production, natural gas resources are the ones that emit the least pollutants, the use of this resource on a large scale, currently remaining the most environmentally friendly solution to environmental factors. By supplying the population and economic agents with natural gas, the carrying out of the projects included in the Do minimum scenario will contribute to the reduction of air pollution by giving up other, more polluting fuels, used in combustion plants for heating or operation of industrial installations. • By carrying out the projects included in the Do minimum scenario, a slight increase in the degree of air pollution, mainly with dust, is identified during the implementation period of the projects, in the area of works and site organizations, this being a direct and limited impact in time. • The operation of the natural gas transportation system is not an important source of air pollution. • By carrying out the rehabilitation/modernization works of the Natural Gas National Transport System (NGTNS) installations, the gas emissions in the atmosphere, generated by the current operation of the system, will be reduced. • Given the composition of natural gas (over 99.5% CH4, 0.05% - 0.19% CO2, 0.04 - 0.12% N2 and the absence of H2S), PP will contribute during the operation phase to the improvement of the general air quality, by reducing the greenhouse gas emissions generated by the energy sector. The combustion process for natural gas generates carbon dioxide, nitrogen oxides and sulphur oxides, but the quantities (concentrations) are significantly lower than those generated by burning coal or petroleum product (50% carbon dioxide, 33% nitrogen oxides, 1% respectively sulphur oxides from the quantities of the same compounds resulting from the burning coal).	*REO1 Preventing or reducing the impact of pollution sources on air quality.* score +1 *REO2. Reduce at national level of air pollutants generated by the natural gas transportation sector.* *score: +1*	+2
WATER	• The TYNDP does not propose measures that directly affect the quality of water bodies. • The impact on watercourses is temporary, during the project execution period, the impact on the environmental factor WATER being evaluated negatively, minor. The works for carrying out the projects included in the Do minimum scenario, in connection with the watercourses, may temporarily affect the watercourses during the organisation of the construction site, but, to the same extent, these watercourses may also be affected in the event of a report of damage to existing pipes. • Under normal conditions, the transit of natural gas through the pipeline, does not present sources of pollution for the body of water crossed. Subject to compliance with the measures planned to reduce environmental risks during operation, the impact on water is considered to be reduced. • The impact on watercourses was assessed for most of the projects included in the Do minimum scenario (see Table 15. Situation of environmental impact assessment/appropriate assessment for projects included in the reference *Do minimum* scenario), the conclusions of the consultants who carried out these assessments being	*REO 3. Maintaining the ecological status of running water* score 0 *REO 4. Prevention of changes in the morphology and hydrology of surface water bodies* score 0 *REO 5. Prevention of the contribution of pollutants*	-1

Environmental aspect	Potential effects of the "Do minimum" scenario	Relevant environmental objective / score awarded per objective	Total score awarded
	that the impact of the implementation of the projects included in this scenario has no significant influences on surface or groundwater.	*in surface and groundwater* score -1	
SOIL and subsoil	• The physical (mechanical) impact on the soil is manifested in the construction phase of the objectives proposed in the TYNDP, along with the discovery, excavation and transport activities. The affected land area coincide with the work strip. • The areas permanently occupied for the implementation of projects included in the Do minimum scenario are very small (28.56 ha). • Along the route of the gas transportation pipelines, on a width of approximately 40 m, a protection zone will be established that will limit some activities (e.g. constructions, real estate developments, etc.). • By improving the natural gas transportation infrastructure, the NGTNS safety will be increased and the risks of accidental pollution will be reduced. • Given the nature and size of the activities carried out, the impact generated on the soil and subsoil is considered to be moderate. • The risk of pollution and the expansion of nitrate pollution basins is retained in the case of the implementation of BRUA projects (7.1) and 7.2 (The Southern Transport Corridor for taking over natural gas from the Black Sea coast) for which appropriate measures shall be taken to limit possible risks of spreading pollution. The pollution prevention measures are identified in the environmental impact assessment studies carried out for these projects.	*REO 6. Protecting soil quality, composition and functions* score -1	-1
WASTE MANAGEMENT	• By carrying out the projects included in the Do minimum scenario, the most important quantities of waste will be generated during the construction, rehabilitation, modernization of the natural gas transportation network, requiring appropriate waste management programs (collection and disposal in fractions of waste, their reuse where the situation allows). • During the operation period, given that the repair/modernization works will be performed with high-performance, durable materials, it is expected that there will be no significant amounts of waste from capital repair activities on the rehabilitated sections, for a period of at least 10 years • The Do minimum scenario has insignificant negative effects on the objective of reducing the amount of waste generated.	*REO 7. Technically, economically and environmentally optimal waste management* score -1	-1
Biodiversity	• The transport activity and the works for the construction of natural gas transportation infrastructure may have direct negative effects on the protected natural areas, on the Biodiversity, especially in the project implementation phase. • In the operation phase, by taking specific measures to restore the lands affected by the works and the small	*REO 8. Reducing pressures due to the construction of transport infrastructure of gas networks that lead to the damage to biodiversity*	-2

Environmental aspect	Potential effects of the "Do minimum" scenario	Relevant environmental objective / score awarded per objective	Total score awarded
	surface areas necessary for the NGTNS operation, the effect is felt only to a small extent, in case of accidental interventions in the gas transport network • According to the information from the regulatory acts obtained for the projects included in the Do minimum scenario, 7 strategic natural gas transportation projects intersect 27 SCI and SPA-type sites of community importance in the Natura2000 Network. These projects also include works to cross watercourses, which could negatively affect aquatic ecosystems during the construction period. The areas permanently occupied by the installations/objectives of the NGNTS located inside the Natura2000 areas are very small (0.99 ha). • The negative effects on the environmental objectives set for this component have been identified in detail at project level. These projects have been subject to an environmental assessment procedure and/or appropriate assessment, and measures have been taken to ensure that the impact on protected natural areas and biodiversity is minimal. • For the implementation period and for the operation period, biodiversity monitoring programs are proposed in the protected areas crossed.	score -1 *REO9. Limit deforested areas* *score: -1*	
LANDSCAPE	• The gas transport infrastructure has minor negative effects on the landscape, the construction of new gas transport networks leading to minor changes in the natural landscape (permanent occupation of small surface areas of land, temporary deforestation works followed by restoration works, etc.). The projects proposed in the Do minimum scenario comply with the spatial planning plans, the zonal and general urban plans. • For the related objectives of NGTNS (compression stations, taps) are provided with architectural solutions that will facilitate a better integration in the landscape, as well as the construction of supporting structures such as green curtains. • For natural gas storage deposits we identify direct negative effects on the landscape and the construction or expansion/modernization of new deposits may lead to changes in the natural landscape (permanent occupation of land, construction of specific installations). These deposits are located outside residential areas, so the landscape is not significantly affected.	*REO 10. Development of gas network transport infrastructure taking into account the landscape management, protection and planning policies* score -1	-1
CULTURAL HERITAGE	• The analysed scenario does not have negative effects on the environmental objectives established for the cultural heritage. The projects proposed in the Do minimum scenario do not affect the cultural heritage and the archaeological sites (according to the decisions of the framing stages and the environmental agreements). • Improving gas transport infrastructure may lead to potential positive effects for the cultural and natural capitalization of areas, by improving air quality due to the use of natural gas as a fuel instead of solid fuels.	*REO 11. Ensuring the protection of cultural heritage* score +1	+1
Population and HUMAN HEALTH	• In general, projects for the construction of natural gas transportation infrastructure overlap with relatively modest residential areas, avoiding crowded areas, so that the inconvenience caused by the construction phase is minimized as well as the effects of a potential risk that may occur.	*REO 12. Protection of human health by maintaining or limiting the impact generated by the*	+1

Environmental aspect	Potential effects of the "Do minimum" scenario	Relevant environmental objective / score awarded per objective	Total score awarded
	• The routes of the projects included in the Do minimum scenario have been chosen so that the activity of the local communities in the project influence area is as little affected as possible, both during the construction period and in the operation stage (which involves the establishment of technological protection perimeters with a whole series of activity restriction regimes); thus, areas of habitation, as well as transport routes or networks have been avoided as far as possible. • The operation of the natural gas transportation system does not lead to noise, air or water pollution. • The expansion and rehabilitation of the gas network will lead to the improvement of the living and environmental conditions of the population through the possibility of connection to the gas source, less polluting than the traditional fuels used for heating. • Achieving the Do minimum scenario will lead to the possibility of connecting new consumers located mainly in the southern and north-eastern part of the country.	*activity of natural gas transportation on the quality of environmental factors* score 0	
		REO 13. Ensuring utilities related to access to gas networks for the population and improving socio-economic conditions in the area score +1	
		REO14. Reduce the noise generated by the operation of the equipments specific to the natural gas storage deposits *score: 0*	
ENERGY EFFICIENCY	• Improving the gas transport infrastructure will allow an increase in the energy efficiency of the NGTNS but limited to the project routes included in the Do minimum scenario. • Increasing transport capacity and the expansion of natural gas networks will make an important contribution to the operation of renewable energy generating equipment by balancing electricity produced from (wind and photovoltaic) intermittent renewable sources, given the flexibility of gas-fired power plants. Natural gas, through flexibility, allows complementarity with renewable resources. The amount of electricity produced by wind or solar farms is not always sufficient to cover the consumption. When the wind does not blow or the sun does not shine, the electro-energetic system needs flexible sources of electricity production to quickly cover the peaks of consumption. From this point of view natural gas technologies are most suitable due to the low start-up time, the low minimum technical power, high load (charge/discharge) variation speed. The flexible and gas-efficient power plants are an ideal partner for renewable energy whose input to the system fluctuates, supporting the transition to a CO2-free energy system. Thus, in the context of the EU's ambitious climate policies, natural gas stands out as a fuel for the energy transition, able to support the evolution of the energy system towards renewable, decentralized and flexible production. The higher the share of v-RES in the electricity mix, the more necessary are the flexible capacities to produce electricity based on natural gas.	*REO 15. Increasing the energy efficiency of the natural gas transportation network* score +1	+1

<table>
<tr><th>Environmental aspect</th><th>Potential effects of the ”Do minimum” scenario</th><th>Relevant environmental objective / score awarded per objective</th><th>Total score awarded</th></tr>
<tr><td></td><td>• The interconnection of our country to the regional natural gas transportation systems is an essential step in the development of NGTNS and in the integration in the European market. In addition to being an obligation within the European Union, the interconnection and alignment of operating rules brings benefits of energy, trade, economic and political security</td><td></td><td></td></tr>
<tr><td>Climatic changes</td><td>• Of the three forms of fossil fuel; natural gas, oil and coal, natural gas produces the lowest amount of carbon dioxide per unit of energy generated.
<table>
<tr><th>Fuel type</th><th>Carbon dioxide per kilowatt of energy generated (kg)</th></tr>
<tr><td>coal</td><td>0.34</td></tr>
<tr><td>Oil</td><td>0.29</td></tr>
<tr><td>Gas</td><td>0.21</td></tr>
</table>
• Therefore, in the context of global warming, natural gas should be the only fossil fuel that can be used. In addition to low CO2 emissions, natural gas produces almost no sulphur dioxide or particulate matter by combustion, and allows the use of modern burners that are designed to produce very low nitrogen dioxide emissions.
• Burning natural gas for home heating or industrial use produces 25-30% less CO2 than crude oil and 40-50% less CO2 than coal per unit of energy produced and significantly lower emissions of air pollutants.
• The implementation of the Do minimum scenario will lead to the possibility of expanding the use of natural gas for domestic and industrial consumption, which will generate a lower level of greenhouse gas emissions than in the case of using fuels with high GGE emissions.
• Also, the modernization / rehabilitation of NTS will lead to the reduction of greenhouse gas losses in the atmosphere (CH4) and emissions generated by combustion equipment (NOx, CO2) that are part of the NTS.</td><td>REO 16. Increasing the use of low-carbon energy sources
score +1

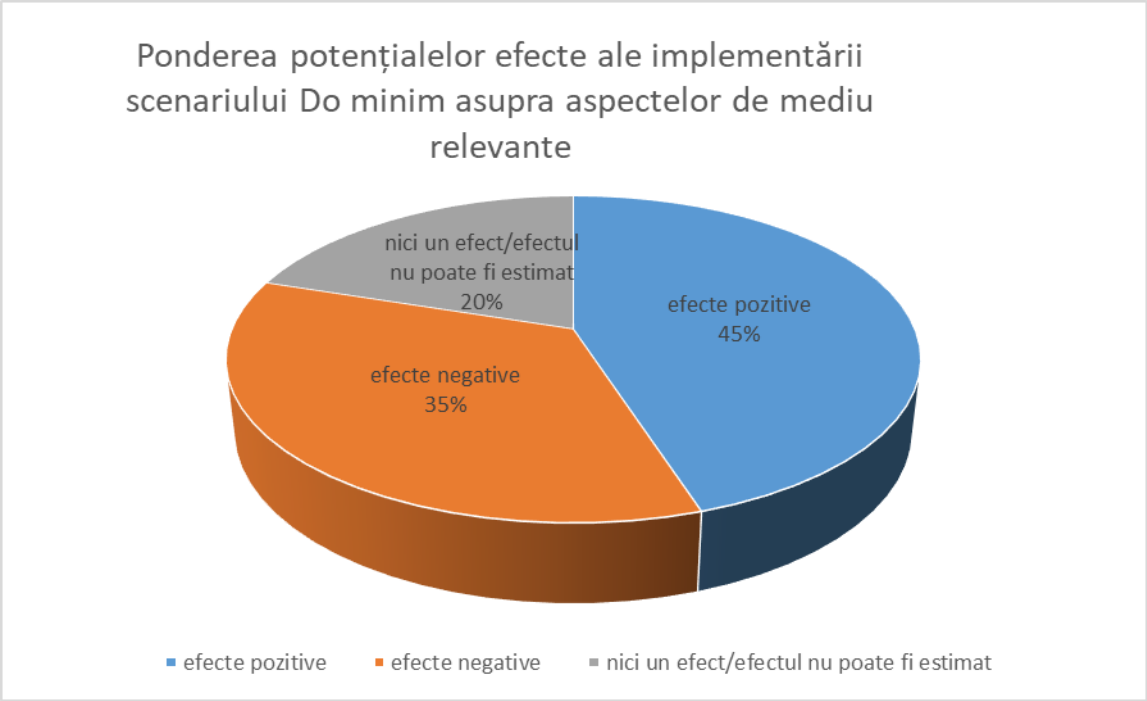
REO17. Reduce the vulnerability of the natural gas transportation infrastructure to climate change
score: +1</td><td>+2</td></tr>
<tr><td>Environmental risks</td><td>• Achieving the Do minimum scenario leads to an improvement in the state of safety of the current natural gas transportation system. The major projects included in this scenario provide for safety measures set for other types of objectives, inhabited areas, networks along their route for which a domino effect could be created in case of fire/explosion (gas networks, energy, etc).
• Natural gas supply security underpins any energy policy - any disruption to gas supplies has important consequences for the economies of EU Member States. To strengthen this security, the countries of the European Union must diversify their energy vectors and energy sources, but at the same time act to modernize their natural gas transportation infrastructure.
• In the Do minimum scenario, interventions are provided for the modernization of the infrastructure or the increase of the capacity at the existing natural gas deposits: Bilciurești (project 8.1), Sărmășel (project 8.4) and Târgu Mureș (project 8.5). These targets are at risk of major accident. Increasing storage capacity involves reassessing the risk of a major accident and reviewing safety areas as well as potential receptors. Location</td><td>REO 18. Prevention of the risks of major accidents and limiting the consequences generated by the occurrence of major accidents on the health of the population and on the quality of the environment
score -1</td><td>-1</td></tr>
</table>

Environmental aspect	Potential effects of the ”Do minimum” scenario	Relevant environmental objective / score awarded per objective	Total score awarded
	alternatives are limited because the deposits exist. Thus, there is the possibility of overlapping inhabited areas with risk areas, especially in the case of the Târgu Mureș deposit, towards which residential areas have developed. These risks can be minimized by applying specific protection technologies (probes equipped with packers and safety valves that provide increased protection to the vicinity of the deposit)		
Preservation and sustainable use of natural resources/Use of renewable resources	• The projects proposed by TYNDP are intended to exploit the natural gas resource, increasing the availability of this resource and its use on a larger scale, allowing a decrease in pressure on other, more polluting natural resources. By using natural gas as an energy resource, a better balance of energy will be achieved. • In the context of geopolitics and geostrategic of European energy routes, Romania benefits from the advantages of geographical location on important natural gas transportation corridors with access to natural gas resources discovered in the Black Sea, which leads to the need to efficiently exploit these opportunities. • In the case of achieving the Do minimum scenario, this objective is achieved only partially.	*REO 19. Maintaining a diversified and balanced energy mix at national level* score +1	+1
Population awareness	• It is estimated that this scenario will have direct positive effects for the goal of improving environmental behaviour. However, more action is needed to raise awareness among users and their understanding of the effects of gas transportation on the environment. • The involvement of stakeholders and the public in the decision-making process, both in the strategic assessment phase and in the environmental impact assessment procedures for each individual project, will allow the adoption of optimal measures to reduce the environmental impact, taking into account the prior experiences in implementing these types of projects, the concerns, the needs of the population, the objectives and action plans existing in other sectors of activity collateral with the gas transport sector or in direct relation with it.	*REO 20. Involving the public and stakeholders and consulting them throughout the decision-making process in establishing and implementing proposed measures to reduce the environmental impact* score +1	+1
Overall TOTAL on environmental objectives		***+2***	
Overall TOTAL on environmental factors			***+2***

The shares of the potential effects of the implementation of the TYNDP in the Do minimum scenario, for the relevant environmental aspects are:

- for 45% of the REO, the implementation of the TYNDP in the Do minimum scenario generates positive effects,
- for 35% of the REO, the implementation of the TYNDP in the Do minimum scenario generates negative effects.

No significant negative impacts or significant positive impacts were assessed for any of the environmental aspects analysed in case of implementing the Do minimum scenario of TYNDP 2021-2030.



positive effects negative effects no effect / the effect can be estimated

Fig 20. Share of potential effects on environmental objectives - Do minimum scenario

The share of potential negative effects is estimated to be 25% lower compared to the Do nothing scenario.

The cumulative effect of the Do minimum scenario was assessed by summing the score given to each objective.

The Do minimum development scenario is assessed with positive effects for the following environmental objectives:

- Air (REO1, REO2)
- Cultural heritage (REO 11)
- Population and human health (REO 13)
- Energetic efficiency (REO 15)
- Climatic changes (REO 16, REO17)
- Preservation / sustainable use of resources (REO 19)
- Raising awareness of environmental issues in the gas transport sector (REO 20)

The Do minimum scenario is not assessed with significant positive effects for any of the objectives.

The Do minimum development scenario is assessed with potential minor negative effects on the following environmental objectives:

- Water (REO 5) ;
- Soil and subsoil (REO 6)
- Waste management (REO 7)
- Biodiversity: (REO 8, REO9))
- Landscape (REO 10)
- Environmental risks (REO 18)

No significant negative effects are assessed by implementing the Do minimum scenario.

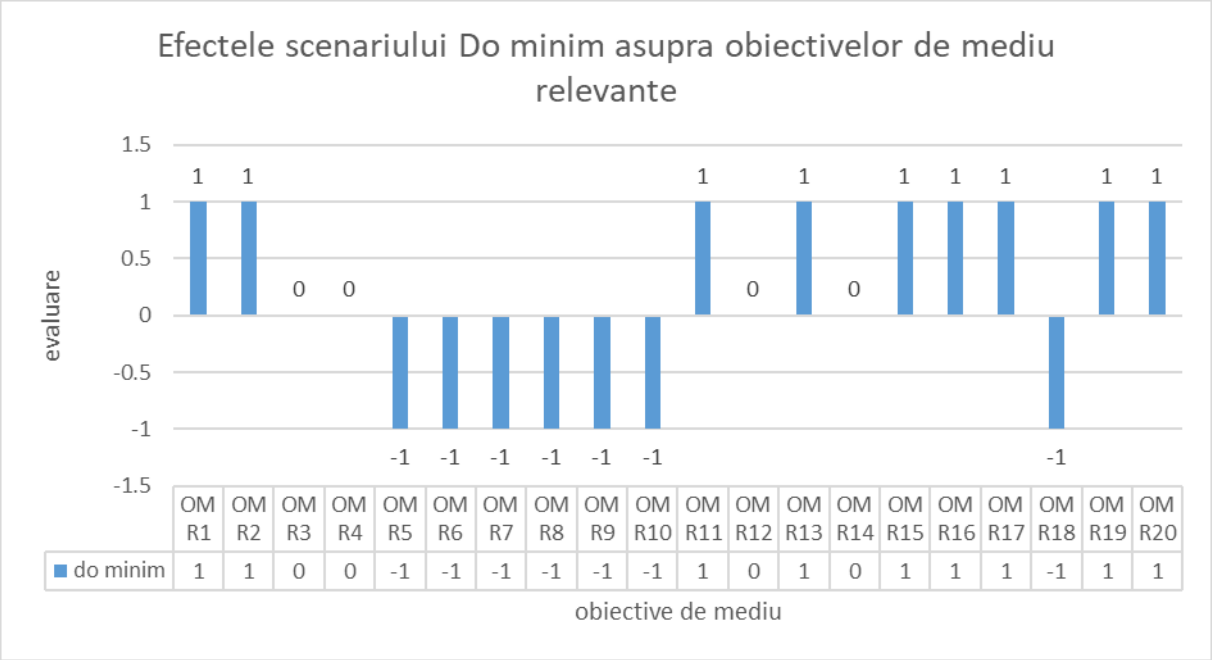


Fig 21. Effects of the Do minimum scenario on environmental objectives

7.5. POTENTIAL SIGNIFICANT EFFECTS ON THE ENVIRONMENT – THE ”DO MAXIMUM” DEVELOPMENT SCENARIO

The “Do maximum” Development Scenario includes a number of 22 projects. The implementation of these projects will be carried out on different time horizons, expected by 2030. It is possible that not all the proposed projects be carried out, the decision to carry out some of them depending either on the evolution of the capacity demand, on the results of exploration processes/ exploitation of the natural gas deposits in the Black Sea or on the evolution of other projects.

Table 28. Potential significant effects on the environment - *Do maximum* scenario

ENVIRONMENTAL ASPECT	Potential effects of the "Do maximum" scenario	Relevant environmental objective / score awarded per objective	Total score awarded
AIR	• The implementation of the projects included in the Do maximum scenario will extend the gas network over a much larger area than in the case of the Do minimum, which will offer the possibility to connect several natural, domestic or industrial gas users to the gas network. This will contribute to reduce air pollution by replacing conventional pollutant fuels with methane gas to a greater extent than in the case of the Do minimum scenario. This is coupled with carrying out rehabilitation/modernization works of the NGTNS installations on several sections, reducing methane gas losses on the network. • Of the conventional fuels used for (household or industrial) heating, but also for the production of electricity, natural gas resources are the ones that emit the least pollutants, the use of this resource on a large scale, currently remaining the friendliest solution to environmental factors. By supplying natural gas to the population and economic operators, the implementation of the projects included in the Do minimum scenario will contribute to the reduction of air pollution by giving up other, more polluting fuels used in combustion plants for heating or operation of industrial plants. • The impact on air, especially due to dust pollution, is identified during the implementation period of the projects in the Do maximum scenario, this being a direct and time-limited impact. • During operation, the natural gas transportation system is not an important source of air pollution. • Considering the composition of natural gas (over 99.5% CH4, 0.05% - 0.19% CO2, 0.04 - 0.12% N2 and the absence of H2S), the implementation of TYNDP will contribute, during the operation phase, to the improvement of the general air quality, by reducing greenhouse gas emissions generated by the energy sector. The combustion process for natural gas generates emissions of carbon dioxide, nitrogen oxides and sulphur oxides, but the quantities (concentrations) are significantly lower than those generated by burning coal or petroleum product (50% carbon dioxide, 33% oxides nitrogen or 1% sulphur oxides of the same compounds resulting from the burning coal.	*REO 1 Preventing or reducing the impact of pollution sources on air quality.* score +1 *REO. Reduce at national level the emissions of air pollutants generated by the natural gas transportation sector.* *score: +1*	+2
WATER	• The TYNDP does not propose measures that directly affect the quality of water bodies. • The impact on watercourses is temporary, during the project execution period, the impact on the environmental factor WATER being evaluated negatively, minor. • Under normal conditions, the transit of natural gas through the pipeline, does not present sources of pollution for the body of water crossed. Subject to compliance with the measures planned to reduce environmental risks	*REO 3. Maintaining the ecological status of running water* score 0	-1

ENVIRONMENTAL ASPECT	Potential effects of the "Do maximum" scenario	Relevant environmental objective / score awarded per objective	Total score awarded
	during operation, the impact on the waters is considered to be negligible. • The works for carrying out the projects included in the Do minimum scenario, in connection with the watercourses, can temporarily affect the watercourses during the organisation of the construction site, but, to the same extent, these watercourses may also be affected in the event of a report of damage to existing pipes.	*REO 4. Prevention of changes in the morphology and hydrology of surface water bodies* score 0 *REO 5. Prevention of the contribution of pollutants in surface and groundwater* score -1	
SOIL and subsoil	• The physical (mechanical) impact on the soil is manifested in the construction phase of the objectives proposed in the TYNDP, along with the discovery, excavation and transport activities. The affected land area coincide with the work strip. • The implementation of the proposed projects will determine an increase of the degree of permanent occupation of the lands (determined by the construction of facilities and objectives related to natural gas transportation and storage infrastructure), but extremely low. At present, insufficient information is available to determine the areas that are definitively occupied for carrying out the projects, but, by reference to the Do minimum scenario, it can be estimated that they will not exceed 100 ha. • Along the route of the gas transportation pipelines and around the natural gas storage deposits, protection zones and safety zones will be established (according to the Technical Norms in the field of natural gas transportation and storage) in which a series of activities will be limited (e.g. constructions, real estate developments, etc.). • When designing natural gas transportation pipelines, the existence of the potential risk of crossing contaminated areas will be taken into account, for which appropriate measures shall be taken to limit the possible risks of pollution expansion. This aspect will be analysed punctually, on each project. • By improving the natural gas transportation infrastructure, the NGTNS safety will be increased and the risks of accidental pollution will be reduced. • Given the nature and size of the activities carried out, the impact generated on the soil and subsoil is considered to be moderate.	*REO 6. Protecting soil quality, composition and functions* score -1	-1
WASTE MANAGEMENT	• In the case of the Do maximum scenario, the resulting waste quantities will be higher than in the case of the Do minimum scenario during the investment period, but staggered in time (until 2030) so that the impact is not	*REO 7. Technically, economically and*	-1

ENVIRONMENTAL ASPECT	Potential effects of the "Do maximum" scenario	Relevant environmental objective / score awarded per objective	Total score awarded
	significant. • The development and modernization of natural gas transportation infrastructure may have short-term negative effects on the objective of reducing the amount of waste generated, but after the completion of these works which will be carried out with durable and time-resistant materials, the amount of waste will be greatly reduced. • During the operation period, given that the repair/modernization works will be performed with high-performance, durable materials, it is expected that there will be no significant amounts of waste from capital repair activities on the rehabilitated sections for a period of at least 10 years. • The Do maximum scenario has insignificant negative effects on the objective of reducing the amount of waste generated	*environmentally optimal waste management* score -1	
Biodiversity	• The transport activity and the works for the construction of natural gas transportation infrastructure may have direct negative effects on the protected natural areas, on the Biodiversity, especially in the project implementation phase. According to the assessments, part of the project routes included in the Do maximum scenario intersect, in addition to the Do minimum scenario, 54 protected natural areas that are part of the Natura2000 Network. • In the operation phase, by taking specific measures to restore the lands affected by the works and the small surface areas necessary for NGTNS operation, the effect is felt only to a small extent, in case of accidental interventions in the gas transport network. • In order to avoid significant effects, detailed individual evaluation of projects and planning of specific measures is required to prevent and reduce the impact due to the development of the gas transport infrastructure. • Negative effects can be kept under control, from the design phase, by establishing new alignments so as to avoid, as far as possible, crossing protected natural areas and limiting the percentage of land affected, as well as deforested areas. • Without the application of appropriate measures and the imposition of restrictions, this scenario may have direct negative effects on the environmental objectives set for the Biodiversity component.	*REO 8. Reducing pressures due to the construction of transport infrastructure of gas networks that lead to the damage to biodiversity* score -1 *REO9. Limit the deforested areas* *SCORE -1*	-2
LANDSCAPE	• The development of gas transport infrastructure may have direct but minor negative effects on the landscape. The construction of new objectives related to gas transport infrastructure (gas compression stations, storage facilities, MAS, GMS, CPS) which have small surface areas, may lead to changes in the natural landscape (permanent occupation of land areas, temporary deforestation works on execution period followed by delivery after completion). • For natural gas storage deposits, direct negative effects on the landscape are identified, the construction or expansion/modernization of new deposits may lead to changes in the natural landscape (permanent occupation of land areas, construction of specific installations). These deposits are located outside residential areas, so the landscape is not significantly affected.	*REO 10. Development of gas network transport infrastructure taking into account the landscape management, protection and planning policies* score -1	-1

ENVIRONMENTAL ASPECT	Potential effects of the ”Do maximum” scenario	Relevant environmental objective / score awarded per objective	Total score awarded
	• Carrying out the TYNDP will allow the rehabilitation of certain facilities related to the gas transport system that will determine an improvement of the landscape due to the damaged infrastructure, in certain cases. • There is the possibility of implementing measures to reduce the effects on the landscape that may be implemented in parallel with the process of planning and building the gas transport infrastructure. • The development of gas transport infrastructure will take into account the management, protection and landscaping policies.		
CULTURAL HERITAGE	• The implementation of this scenario envisages to improve the trend of increasing acidifying gas emissions and thus to improve the deterioration of heritage objectives due to the much lower impact of natural gas on the environment compared to traditional solid fuels. • It is possible, during the construction works, to identify, during the excavations, archaeological heritage objectives, unknown at the beginning of the works. In this case, Transgaz has well-established procedures to be followed, including a special compartment that deals exclusively with this aspect.	*REO 11. Ensuring the protection of cultural heritage (in situ preservation of historical assets and monuments)* score +1	+1
Population and HUMAN HEALTH	• Proposed materials for construction, design, testing, commissioning, monitoring and maintenance of the natural gas transportation and storage system are in accordance with the best available technologies and current international best practices. The operation of such systems does not have a significant effect on the environment under normal operating conditions (water, air, soil or noise pollution). • In general, projects for the implementation of natural gas transportation infrastructure overlap with relatively modest residential areas, avoiding crowded areas, so that the inconvenience caused by the construction phase is minimized as well as the effects of a potential risk that may occur. The project routes are designed so that the activity of the local communities in the project influence area is affected as little as possible, both during the construction period and in the exploitation phase (which involves the establishment of technological protection perimeters with a whole series of restriction regimes for certain activities); thus, areas of habitation, as well as transport routes or networks have been avoided as far as possible. • The expansion and rehabilitation of the gas network will lead to the improvement of the living and environmental conditions of the population through the possibility of connection to the gas source, less polluting than the traditional fuels used for heating. • Achieving the Do maximum scenario will allow a significant expansion of the local natural gas network, increasing the comfort of living and improving the living conditions of local communities. Achieving the Do maximum scenario will lead to the extension of the gas transmission network on the entire territory of Romania,	*REO 12. Protection of human health by maintaining or limiting the impact generated by the activity of natural gas transportation on the quality of environmental factors* score: 0 *REO 13. Ensuring utilities related to access to gas networks for the population and improving socio-economic conditions in the area* score +2	+2

ENVIRONMENTAL ASPECT	Potential effects of the ”Do maximum” scenario	Relevant environmental objective / score awarded per objective	Total score awarded
	offering the possibility of connecting new consumers from all areas of the country. • The emergence of new employment opportunities by creating the conditions for the development of economic activities as a result of gas availability in all regions of the country. • An improvement of living conditions will also take place by increasing energy security, an aspect that represents the major, strategic objective of the TYNDP, with relevance not only limited to neighbouring countries (Bulgaria, Romania, Hungary, Ukraine, Moldova) but given in a regional context, at the level of the Member States of the European Union. • The connection to the regional gas transport corridors allows the supply of new sources, such as the Caspian Basin (the Southern Corridor), the Eastern Mediterranean and LNG (Vertical Corridor), etc. Thus, Romanian consumers, domestic and industrial, will benefit from the effects of competition between multiple sources of natural gas.	*REO14. Reduce the noise generated by the operation of equipments specific to the natural gas storage deposits* *score 0*	
ENERGY EFFICIENCY	• The implementation of the projects included in the TYNDP is part of the energy security strategy and policies at the European Union level, which aims both to diversify energy sources by encouraging the production of alternative energy and by diversifying supply routes and transport routes. Thus, for natural resources for which no alternative solutions have been found at present (as is the case of natural gas), diversification of access routes is a major solution. • Through the projects proposed for the development and modernization of the natural gas transportation infrastructure and through the implementation of intelligent control, automation, communications and network management systems, Transgaz will maximize energy efficiency throughout the chain of activities carried out. • Efficient natural gas-based capacities have the prospect of a competitive position in the energy mix, due to relatively low GGE and exhaust emissions, as well as their flexibility and ability to regulate quickly. They are able to provide system and reserve services for intermittent renewable energy sources. Due to the flexibility of natural gas-based electricity generation units (i.e. short start-up and shut-down times), they are complementary to renewable energy sources with variable operation (v-RES), wind and solar energy. Thus, in the context of the EU's ambitious climate policies, natural gas stands out as a fuel for the energy transition, able to support the evolution of the energy system towards renewable, decentralized and flexible production. The higher the share of v-RES in the electricity mix, the more necessary are the flexible capacities to produce electricity based on natural gas. • The projects proposed in the Do maximum scenario contribute to strengthening energy security, which requires access to the natural gas resource in a safe and at a reasonable price. • Better control of routes and distribution is ensured and alternative supply possibilities for consumers are created, thus replacing situations of energy dependence with those of interdependence. • In the scenario where the development of natural gas transportation and storage infrastructure is limited to the	*REO.15. Increasing the energy efficiency of the natural gas transportation network* score +2	+2

<table>
<tr><th>ENVIRONMENTAL ASPECT</th><th>Potential effects of the ”Do maximum” scenario</th><th>Relevant environmental objective / score awarded per objective</th><th>Total score awarded</th></tr>
<tr><td></td><td>completion of projects with final investment decision (Do minimum scenario), the level of disruption in Romania in 2020 is over 20% (ie. decreases by 20%) , and in 2030 the level of disruption rises to over 30%, which makes our country the most exposed in the long run to a massive interruption of natural gas supply through Ukraine. The 2030 projections made by ENTSO-G under the assumptions of the GRIP plan show that carrying put all projects of common interest until 2030 is sufficient to eliminate any risk of reduced deliveries in the Southern Corridor region - with the notable exception of Romania. The scenario of a prolonged interruption of gas supplies through Ukraine in January-February indicates a risk of energy security for Romania [21.]</td><td></td><td></td></tr>
<tr><td>Climatic changes</td><td>• Of the three forms of fossil fuel; natural gas, oil and coal, natural gas produces the lowest amount of carbon dioxide per unit of energy generated.
<table><tr><th>Fuel type</th><th>Carbon dioxide per kilowatt of energy generated (kg)</th></tr><tr><td>coal</td><td>0.34</td></tr><tr><td>Oil</td><td>0.29</td></tr><tr><td>Gas</td><td>0.21</td></tr></table>• Therefore, in the context of global warming, natural gas should be the only fossil fuel that can be used. In addition to low CO2 emissions, natural gas produces almost no sulphur dioxide or particulate matter by combustion, and allows the use of modern burners that are designed to produce very low nitrogen dioxide emissions.
• Burning natural gas for home heating or industrial use produces 25-30% less CO2 than crude oil and 40-50% less CO2 than coal per unit of energy produced and significantly lower emissions of air pollutants.
• The implementation of the Do maximum scenario will lead to the possibility of expanding the gas network on a much larger area than in the case of the Do minimum scenario, which will offer the possibility of connecting several domestic or industrial natural gas users to the gas network. This will contribute to reduce GGE emissions to a greater extent.
• Also, the modernization / rehabilitation of NTS will lead to the reduction of greenhouse gas losses in the atmosphere (CH4) and emissions generated by combustion equipment (NOx, CO2) that are part of the NTS.</td><td>REO 16. Increasing the use of low-carbon energy sources
score +1

REO17. Reduce the vulnerability of the natural gas transportation infrastructure to climate change
score +1</td><td>+2</td></tr>
<tr><td>Environmental risks</td><td>• The projects included in the Do maximum scenario do not yet have the finalized routes or locations (in the case of the 8.3 natural gas storage project). When carrying out technical projects, the distances provided in the technical regulations will be taken into account, so that the risks induced by the implementation of projects included in this alternative will be kept under control.
• The management of natural gas transportation networks will be improved by implementing the concept of ”Smart energy transportation system” and ”Smart gas transportation systems” (strategic projects 7.13 and 7.14)</td><td>REO 18. Prevention of the risks of major accidents and limiting the consequences generated by the occurrence of major</td><td>-1</td></tr>
</table>

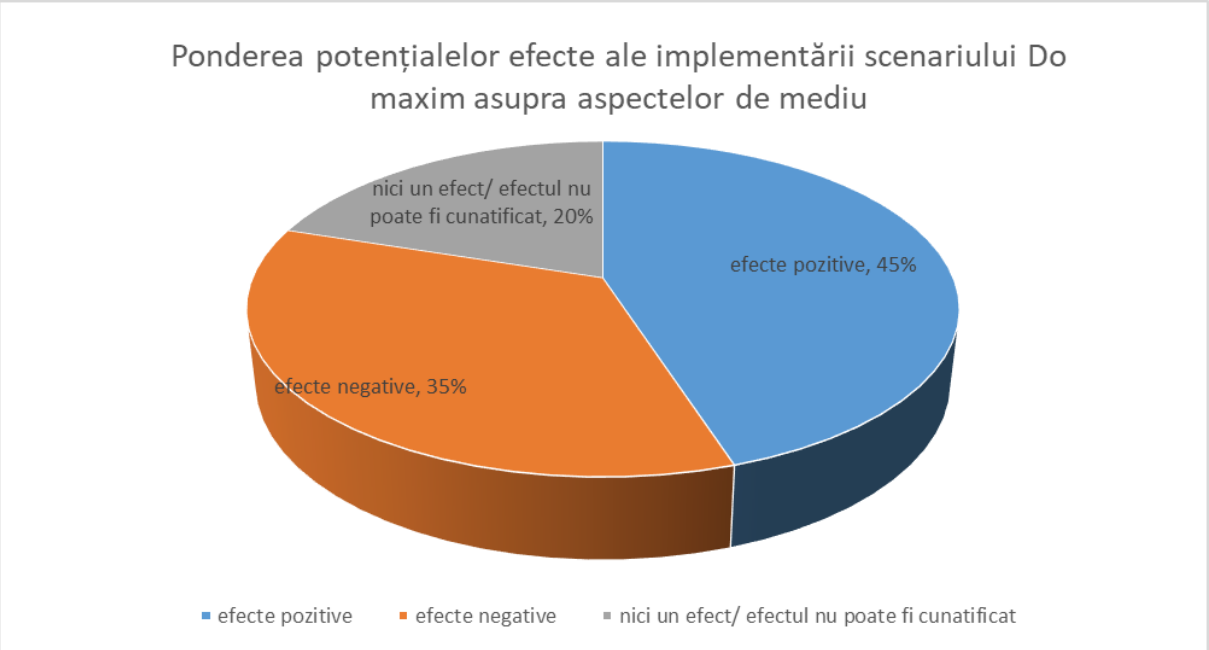
21 SURSA- Raport „Perspectivele gazelor naturale în România și modalități de valorificare superioară a acestora”

ENVIRONMENTAL ASPECT	Potential effects of the ”Do maximum” scenario	Relevant environmental objective / score awarded per objective	Total score awarded
	which will manage safety issues and the use of smart pressure instruments, flow, metering, internal inspection of pipes, odorization, cathodic protection, traceability, all generating increased flexibility in the operation of the system, improving its integrity and safety in operation and increasing energy efficiency. • In the Do maximum scenario, interventions are provided for the modernization of the infrastructure or the increase of the capacity at the existing natural gas deposits: Bilciurești (project 8.1), Sărmășel (project 8.4) and Târgu Mureș (project 8.5). A new natural gas storage facility is also planned in the area of North – East - Fălticeni, Suceava County (project 8.3.) and increase in the storage capacity in Ghercești (project 8.2). These targets are at risk of major accident. Increasing storage capacity involves reassessing the risk of a major accident and reviewing safety areas as well as potential receptors. Location alternatives are limited because the deposits exist. Thus, there is the possibility of overlapping inhabited areas with risk areas, especially in the case of the Târgu Mureș deposit, towards which residential areas have developed. These risks can be minimized by applying specific protection technologies (probes equipped with packers and safety valves that provide increased protection to the vicinity of the deposit. For the new storage facility in Moldova, several location options are proposed in the area of exhausted well fields. The choice of the final location will be made through the multiple criteria of technical-economic and environmental analysis. The chosen location will induce the lowest risk of major accident and damage to potential receivers.	*accidents on the health of the population and on the quality of the environment* **score -1**	
Preservation and sustainable use of natural resources/Use of renewable resources	• The projects proposed by TYNDP are intended to exploit the natural gas resource, increasing the availability of this resource and its use on a larger scale, allowing a decrease in pressure on other, more polluting natural resources. By using natural gas as an energy resource, a better balance of energy will be achieved. • In the context of geopolitics and geostrategic of European energy routes, Romania benefits from the advantages of geographical location on important natural gas transportation corridors with access to natural gas resources discovered in the Black Sea, which leads to the need to efficiently exploit these opportunities. The Do maximum scenario will allow the implementation of projects 7.2, 7.5. with the use of Black Sea gas resources and 7.12 ensuring access to natural gas reserves in the Caspian region and the Middle East. • The total production could fall by more than 60% by 2040 or even more, if non-FID developments are not put into operation (ESR-source of Romania). • Failure to achieve the Do maximum scenario will lead to a significant increase in dependence on resource imports. • The projects proposed by TYNDP 2021-2030 stimulates the development of renewable energy production in the region (especially wind and solar energy) given the possibility of using natural gas as a reserve for renewable energy. • The activity of underground storage of natural gas, with significant geological potential for expansion, can	*REO 19. Maintaining a diversified and balanced energy mix at national level* score +2	+2

ENVIRONMENTAL ASPECT	Potential effects of the ”Do maximum” scenario	Relevant environmental objective / score awarded per objective	Total score awarded
	develop and modernize on a commercial basis, in a regional market context.		
Population awareness	• It is estimated that this scenario will have direct positive effects for the goal of improving environmental behaviour. • However, more action is needed to raise awareness among users and their understanding of the effects of gas transportation on the environment. • The involvement of stakeholders and the public in the decision-making process, both in the strategic assessment phase and in the environmental impact assessment procedures for each individual project, will allow the adoption of optimal measures to reduce the environmental impact, taking into account the prior experiences in implementing these types of projects, the concerns, the needs of the population, the objectives and action plans existing in other sectors of activity collateral with the gas transport sector or in direct relation with it.	REO 20. *Involving the public and stakeholders and consulting them throughout the decision-making process in establishing and implementing proposed measures to reduce the environmental impact* score +1	+1
Overall TOTAL on environmental objectives		***+5***	
Overall TOTAL on environmental factors			***+5***

The shares of the potential effects of the implementation of the TYNDP in the Do maximum scenario, for the relevant environmental aspects are:

- for 45% of the REO, the implementation of the TYNDP in the Do maximum scenario generates positive effects,
- for 35% of the REO, the implementation of the TYNDP in the Do- maximum scenario generates negative effects.



positive effects negative effects no effect / the effect can be estimated

Fig 22. Share of potential effects on environmental objectives produced by the development Do maximum scenario

It is found that by implementing the Do maximum scenario, there is no change in the share of potential positive or negative effects on environmental aspects compared to the Do minimum scenario. The difference between the two scenarios is to assess the extent of the impact for a part of the objectives of the TYNDP, 3 of the environmental objectives (REO 13, REO 15 și REO 19) obtaining score +2 (significant positive, long-term or permanent effects, have a wide range of coverage and contribute to the achievement of the environmental objective set for this scenario).

The Do maximum development scenario is assessed with positive effects for the following environmental objectives:

- Air (REO 1, REO2)
- Cultural heritage (REO 11)
- Climatic changes (REO 16, REO17) .
- Raising awareness of environmental issues in the gas transport sector (REO 20)

and with significant positive effects for the objectives:

- Population and human health (REO 13
- Energetic efficiency (REO 15)
- Preservation / sustainable use of resources (REO 19)

The Do maximum development scenario is assessed with potential minor negative effects on the following environmental objectives:

- Water (REO 5) ;
- Soil and subsoil (REO 6)
- Waste management (REO 7)
- Biodiversity: (REO 8, REO9)
- Landscape (REO 10)
- Environmental risks (REO 18)

No significant negative effects are assessed by implementing the Do maximum scenario.

For the Do maximum development scenario, the cumulative effect was assessed by summing the score given to each objective.

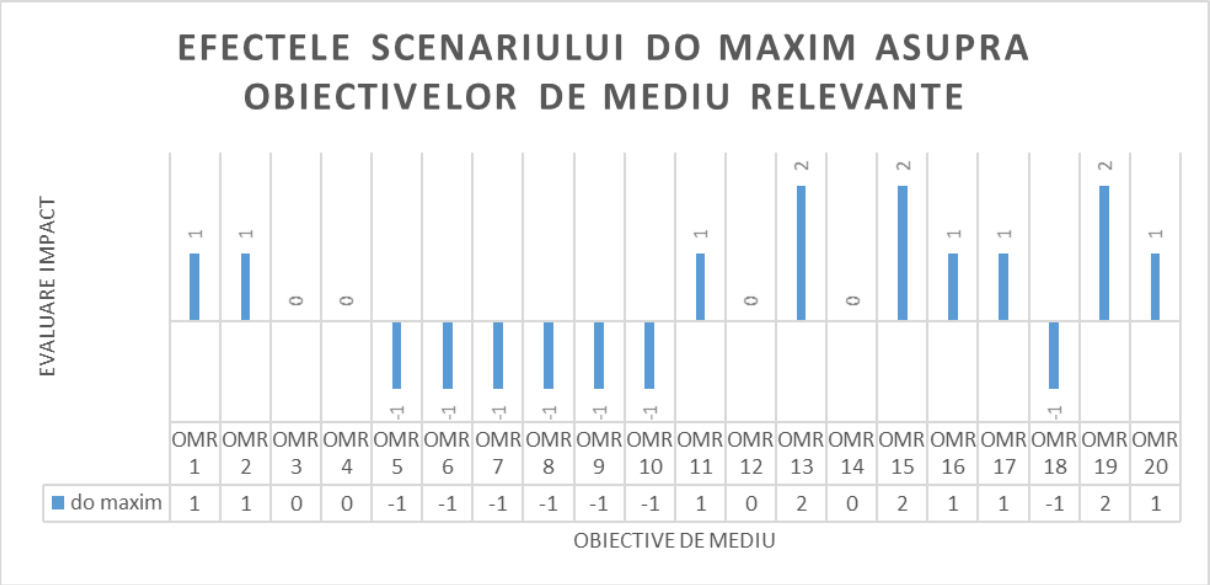


Fig 23. Effects of the Do maximum development scenario on environmental objectives

7.6. COMPARATIVE ANALYSIS OF POTENTIAL ENVIRONMENTAL EFFECTS FOR THE 3 SCENARIOS

The assessment of the effects of the plan on the environmental objectives relevant to the 3 analysed scenarios, is summarized in Table 29. The assessment of the effects of the plan for the 3 analysed scenarios, on each environmental factor separately, is summarized in Table 30.

Table 29. Centralization of the scores awarded for each scenario in relation to the relevant environmental objectives

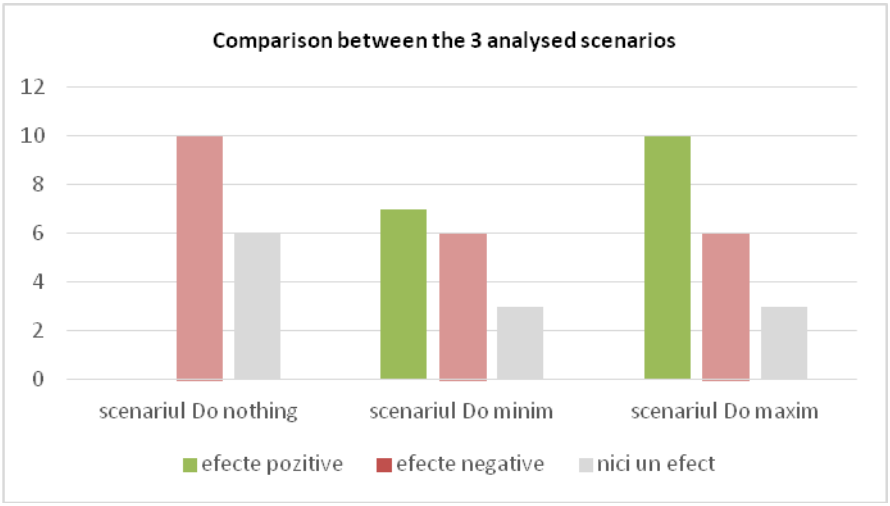
ENVIRONMENTAL ASPECT	Relevant environmental objective	Score awarded on each environmental objective		
		Do-nothing scenario	Do minimum scenario	Do maximum scenario
AIR	REO 1 Preventing or reducing the impact of pollution sources on air quality.	-1	+1	+1
	REO2. Reducing at national level of emissions of air pollutants generated by the natural gas transportation sector.	-1	+1	+1
WATER	REO 3. Maintaining the ecological status of running water	-1	0	0

ENVIRONMENTAL ASPECT	Relevant environmental objective	Score awarded on each environmental objective		
	REO 4. Prevention of changes in the morphology and hydrology of surface water bodies	0	0	0
	REO 5. Prevention of the contribution of pollutants in surface and groundwater	0	-1	-1
SOIL and Subsoil	REO 6. Protecting soil quality, composition and functions	-1	-1	-1
WASTE MANAGEMENT	REO 7. Technically, economically and environmentally optimal waste management	-1	-1	-1
Biodiversity	REO 8. Reducing pressures due to the construction of transport infrastructure of gas networks that lead to the damage to biodiversity	0	-1	-1
	REO9. Limiting the deforested areas.	0	-1	-1
LANDSCAPE	REO 10. Development of gas network transport infrastructure taking into account the landscape management, protection and planning policies	0	-1	-1
CULTURAL HERITAGE	REO 11. Ensuring the protection of cultural heritage (in situ preservation of historical assets and monuments)	0	+1	+1
Population and HUMAN HEALTH	REO 12. Protection of human health by maintaining or limiting the impact generated by the activity of natural gas transportation on the quality of environmental factors	-1	0	0
	REO 13. Ensuring utilities related to access to gas networks for the population and improving socio-economic conditions in the area	-1	+1	+2
	REO14. Reduction of noise generated by the operation of equipments specific to natural gas storage facilities.	0	0	0
ENERGETIC EFFICIENCY	REO.15. Increasing the energy efficiency of the natural gas transportation network	-2	+1	+2
Climatic changes	REO 16. Increasing the use of low-carbon energy sources	-1	+1	+1
	REO17. Reducing the vulnerability of natural gas transportation infrastructure to climate change	-1	+1	+1
Environmental risks	REO 18. Prevention of the risks of major accidents and limiting the consequences generated by the occurrence of major accidents on the health of the population and on the quality of the environment	-1	-1	-1
Preservation and efficient use of natural resources	REO 19. Maintaining a diversified and balanced energy mix at national level	-2	+1	+2
Population awareness	REO 20. Involving the public and stakeholders and consulting them throughout the decision-making process in establishing and implementing proposed measures to reduce the environmental impact	0	+1	+1
	TOTAL	**-14**	**+2**	**+5**

Table 30. Centralization of the scores awarded for each scenario in relation to environmental factors

ENVIRONMENTAL ASPECT	Score awarded on each environmental objective		
	Do nothing scenario	Do minimum scenario	Do maximum scenario
AIR	-2	+2	+2
WATER	-1	-1	-1
SOIL and Subsoil	-1	-1	-1
WASTE MANAGEMENT	-1	-1	-1
Biodiversity	0	-2	-2
LANDSCAPE	0	-1	-1
CULTURAL HERITAGE	0	+1	+1
Population and HUMAN HEALTH	-2	+1	+2
ENERGETIC EFFICIENCY	-2	+1	+2
Climatic changes	-2	+2	+2
Environmental risks	-1	-1	-1
Preservation and efficient use of natural resources	-2	+1	+2
Population awareness	0	+1	+1
TOTAL	**-14**	**+2**	**+5**

From the analysis of the potential effects on the environmental objectives on the 3 scenarios it resulted that the Do maximum development scenario is the optimal scenario for implementation. The negative effects generated by this scenario are offset by the positive effects. By establishing and implementing an optimal system of measures to prevent, reduce and control the environmental impact (both for the operation phase and for the exploitation phase) it is estimated that the negative effects produced by the implementation of the projects proposed by this scenario will be insignificant and will enable the environmental objectives set to be achieved. In addition, the Do maximum scenario is the only scenario that has significant positive effects on 3 environmental objectives - Preservation and efficient use of natural resources, Energy efficiency and Population and human health.



Do nothing scenario — positive effects

Do minimum scenario — negative effects

Do maximum scenario — no effects

Fig 24. Comparison between the effects on environmental factors of the 3 analysed scenarios

7.7. ASSESSMENT OF THE CUMULATIVE EFFECTS OF TYNDP ON RELEVANT ENVIRONMENTAL OBJECTIVES

Cumulative effects may occur:

- either in the situation where an environmental factor is the receiver of the same type of pollutant/pressure caused by different activities within the same project/plan (e.g. population health = receiver of noise from different sources)
- or in case of overlaps of similar pressures induced by the implementation of 2 or more plans/programs in neighbouring areas (part of a common area) (eg: joint exploitation of a water source with limited flow, common use of a watercourse for wastewater discharge, etc.)

The importance of these cumulative effects arises when it is found that, although analysed individually, different activities or plans/ programs do not prove to have a significant impact, cumulatively analysed shows that they can generate a significant impact on environmental or other factors of interest.

As the first situation is already covered by the impact assessment method applied above, we will make some considerations regarding the second situation.

The table below presents an analysis of the overall cumulative impact taking into account the relevant environmental objectives and the effects on the environment resulting from the analysis carried out in the above-mentioned tables.

It is thus estimated that the cumulative effects caused on the environment by the simultaneous implementation of the various relevant plans are not designed to lead to a significant negative impact.

Table 31. Cumulative assessment of the effects of TYNDP implementation

Relevant environmental objectives of the TYNDP	Overlaps with other plans or programs	Cumulative effects that can be generated	There are any prerequisites for achieving the objective? If so, the proposed measures
REO 1 Preventing or reducing the impact of pollution sources on air quality.	• Possible cumulative impact, during the implementation of the projects provided in TYNDP, with other plans providing for the carrying out of construction works. The cumulative impact could be generated for a limited time and locally. Plans and programs that provide for such works: • Romania's General Transport Master Plan • Large Infrastructure Operational Program (LIOP)	• During the project execution, air emissions (flue gases and dusts) resulting from traffic associated with construction sites and specific site organization works may occur, which may contribute to exceeding the maximum permissible concentrations, especially for dust, in some sectors. The effects will be local, in the short term. • There are no air emissions during operation - there will be no cumulative impact on the air environment factor.	• Yes, provided that the works are staged in the areas where the works are carried out so that there is no overlap of effects. Thus, the effects of accumulation can only occur at the level of limited sectors, the impact remaining at an insignificant negative level.
REO2. Reducing at national level of emissions of air pollutants generated by the natural gas transportation sector	• Not the case	•	•
REO 3. Maintaining the ecological status of running water **REO 4. Prevention of changes in the morphology and hydrology of surface water bodies** **REO 5. Prevention of the contribution of pollutants in surface and groundwater**	• Possible cumulative impact, during the implementation of the projects provided in TYNDP, with other plans providing for works to be carried out on water or in connection with waters. Plans and programs that provide for such works: • PP for the development of water and wastewater infrastructure • The general transport master plan for Romania if the works proposed for the transport infrastructure overlap,	• There are no water emissions during the construction and operation of the projects, so there will be no cumulative impact on the environmental factor - water. • The TYNDP implementation may have a significant local impact during the execution of gas pipelines on the ecosystems of large watercourses crossed (the Danube river, Târnava Mică and Târnava Mare, Siret, Someș, Argeș, Criș, Nistru, Olt, Sebeș, Jiu, Mureș, Timiș rivers, etc) under the conditions of carrying out the open ditch underpass, given the longer period of execution of the works. If the location of the pipes is done by guided drilling, the impact is insignificant. For the projects included in the Do minimum scenario, it is already known	• Yes, considering that during the route selection activities, information will be obtained from the local public administrations in the localities crossed by the natural gas pipeline regarding the existing projects. Thus, information is collected on existing or planned projects in the area. These refer especially to the water supply and sewerage systems, infrastructure restoration (road restoration, rehabilitation of landscaping in the

Relevant environmental objectives of the TYNDP	Overlaps with other plans or programs	Cumulative effects that can be generated	There are any prerequisites for achieving the objective? If so, the proposed measures
	on certain sectors, with the projects for crossing the watercourses by the projects provided in TYNDP.	that the crossing of large watercourses will be done by guided drilling. It is not yet known which crossing solution will be chosen in case of unassessed projects, included in the Do maximum scenario. In case it is decided to carry out open ditch crossing (it is a low probability) these works may interfere with the PP mentioned in the left column.	locality, etc.). The designed route will ensure that the route of the gas pipeline does not intersect and observe the safety and protection distances from other objectives along the route.
REO 6. Protecting soil quality, composition and functions	• Not applicable	• There are no soil emissions during the construction and operation of the project - there will be no cumulative impact on the soil environmental factor. • The land areas for which the use category needs to be changed are reduced, so the impact is insignificant.	• Not applicable Taking measures to eliminate pollution during the construction period and as a result of ecological restoration actions will lead to the elimination of the possibility of affecting the soil.
REO 7. Technically, economically and environmentally optimal waste management	• Waste Management National Plan 2018-2025	• No significant amounts of waste will result - there will be no cumulative impact on the waste environmental factor.	• Not applicable The compliant waste management program will lead to the elimination of uncontrolled waste landfills from the project implementation area.
REO 8. Reducing pressures due to the construction of transport infrastructure of gas networks that lead to the damage to biodiversity	• National Strategy and Action Plan for Conservation of Biodiversity 2014-2020 • Possible cumulative impact, during the implementation of the projects provided in TYNDP, with plans that provide for carrying out construction works in protected areas. The cumulative impact could be generated for a limited time and locally. Plans and programs that provide for such works: • Romania's General Transport Master Plan	• The cumulative effects are recorded where anthropogenic activities are carried out in the protected natural area. This aspect must be analyzed for each project and appropriate measures taken. At the level of NTNTSDP level, for the known routes, effects are estimated only during the execution period of the works. In the case of deforestation, a cumulative impact may occur as a result of illegal deforestation. • The cumulative impact analysis performed at the level of the assessed projects included in the Do minimum scenario reveals a neutral level due to the ecological reconstruction (restoration) measures to be assumed. • It is considered that, from the point of view of cumulative impact, no negative impact elements can be highlighted	• Yes. During the design phase of the route, it is necessary to avoid, as much as possible, the crossing of the protected natural areas or the passage through their proximity. The proposed projects are to be carried out in stages, affecting restricted sectors in the vicinity of access roads. The effects of cumulation may occur only in limited sectors, enabling species susceptible to such effects (e.g. large carnivores) but which are highly mobile, to use alternative, temporary movement routes.

Relevant environmental objectives of the TYNDP	Overlaps with other plans or programs	Cumulative effects that can be generated	There are any prerequisites for achieving the objective? If so, the proposed measures
	• Development plan for the electricity transmission network for the period 2018-2027	that could lead to irreversible damage to the area. • Fragmentation phenomena will appear only in the construction phase, the phenomenon remaining limited as spatial but also temporary extension. • The relatively small area of project implementation area and the timing hereof in relation to the total area of protected areas crossed is taken into account for asserting an insignificant impact in relation to the integrity of the protected natural area of Community interest. • During the operation of the natural gas transmission pipelines, no effects with impact on flora and fauna species were highlighted, so a summary (cumulating) of the effects cannot be induced.	
REO9. Limiting the deforested areas	Possible cumulative impact, during the realization of the projects provided in TYNDP, with plans that foresee the realization of construction works in forest areas: • Electricity transmission network development plan for 2018-2027	• The cumulative impact analysis performed at the level of the evaluated projects included in the Do minimum scenario reveals a neutral level caused by the ecological reconstruction (restoration) measures assumed for the situation in which the natural gas transportation pipelines cross forest areas	• Yes, with the condition of applying the established protection measures.
REO 10. Development of gas network transport infrastructure taking into account the landscape management, protection and planning policies	• Not applicable	• The NGTNS completion does not induce major changes in the landscape structure.	• Not applicable
REO 11. Ensuring the protection of cultural heritage (in situ preservation of historical assets and monuments)	Strategy for culture and national heritage 2016-2022.	• Not applicable	• Not applicable

Relevant environmental objectives of the TYNDP	Overlaps with other plans or programs	Cumulative effects that can be generated	There are any prerequisites for achieving the objective? If so, the proposed measures
REO 12. Protection of human health by maintaining or limiting the impact generated by the activity of natural gas transportation on the quality of environmental factors	Possible cumulative impact, during the implementation of the projects, with plans/programs that provide for the realization of construction works. The cumulative impact could be generated for a limited time and locally. Plans and programs that provide for such works: • Transport Master Plan • Large Infrastructure Operational Program (LIOP) • Development plan for the electricity transmission network for the period 2018-2027 • Other plans and projects that provide for construction works.	• During the project execution, cumulative effects may occur and are related to air emissions (flue gases and dusts) and noise resulting from traffic associated with construction sites and specific site organization works. They may contribute, locally, in the short term, to exceed the maximum permissible concentrations, in particular for dusts and to increase the noise level. • The impact on the air environment factor, due to pollutant emissions and noise generated during the construction period remains limited due to the phased attack of the project, being generally assessed at an insignificant negative level. • During the operation period, the occurrence of a cumulative impact generated by the operation of the NGTNS facilities on human health is not estimated.	• Yes, provided that the works are staged in the areas where the works are carried out so that there is no overlap of effects. Given the episodic and short-term overlap, the risk of cumulative impact effects remains insignificant.
REO 13. Ensuring utilities related to access to gas networks for the population and improving socio-economic conditions in the area	• Not applicable	• Not applicable	• Not applicable
REO14. Reducing the noise generated by the operation of the equipments specific to the natural gas storage deposits	• The obligation to respect the protection distances and the safety areas imposed by the SEVESO legislation means that in the areas adjacent to these storage deposits it is not possible to build other objectives, potentially generators of noise.	•	•

Relevant environmental objectives of the TYNDP	Overlaps with other plans or programs	Cumulative effects that can be generated	There are any prerequisites for achieving the objective? If so, the proposed measures
REO 15. Increasing the energy efficiency of the natural gas transportation network	With plans and programs that provide for similar work to increase energy efficiency: • Romania's energy strategy • National Action Plan in the field of energy efficiency	• Positive cumulative effects may be generated in the case of the implementation of other plans that provide for the increase of energy efficiency	• Yes. The implementation of the measures provided for in the TYNDP to increase energy efficiency.
REO 16. Increasing the use of low-carbon energy sources	With plans and programs providing for similar works to reduce greenhouse gas emissions: • Romania's energy strategy • Integrated National Energy and Climate Change Plan 2021-2030	• Positive cumulative effects may be generated in the case of the implementation of other plans that provide for the reduction of greenhouse gas emissions	• Yes. The implementation of the projects provided for in TYNDP.
REO17. Reducing the vulnerability of the natural gas transportation infrastructure to climate change	Not applicable	•	•
REO 18. Prevention of the risks of major accidents and limiting the consequences generated by the occurrence of major accidents on the health of the population and on the quality of the environment.	• Plans proposing projects with a risk of major accident (for example ESR)	• Under normal operating conditions there are no risks. • There is a risk of overlapping protection/safety areas between Seveso objectives. • Domino effects may occur between existing Seveso objectives and those proposed in the plan. Their extent will be quantified by assessing the risk of major accidents.	• Yes. When choosing the location for the new natural gas storage facility and when carrying out modernization/capacity increase projects for the existing deposits, the location of other SEVESO objectives will be taken into account.
REO 19. Preservation and sustainable use of natural resources	• With Plans and projects that provide for similar projects for the efficient use of natural resources • Romania's energy strategy • Romania's Mining Strategy 2017– 2035	• Positive cumulative effects may be generated in the implementation of other plans that provide for the conservation and efficient use of natural resources.	Yes. By applying preservation measures and efficient use of natural resources.

Relevant environmental objectives of the TYNDP	Overlaps with other plans or programs	Cumulative effects that can be generated	There are any prerequisites for achieving the objective? If so, the proposed measures
REO 20. Involving the public and stakeholders and consulting them throughout the decision-making process in establishing and implementing proposed measures to reduce the environmental impact	All plans and projects subject to environmental assessment according to GD 1076/2004.	• Raising public awareness and involvement in environmental decisions.	Yes. The plan is subject to public analysis and debate.

From the analysis carried out above it can be concluded that TYNDP does not generate cumulative effects with other plans and/or programs that could lead to negative environmental impact.

However, TYNDP may generate positive cumulative effects with other plans or programs that refer to the reduction of greenhouse gas emissions and to the increase of energy efficiency.

The environmental impact assessment to be carried out at project level will identify the range of cumulative environmental effects generated by both existing pressures and new projects.

8. POSSIBLE SIGNIFICANT EFFECTS ON THE ENVIRONMENT, INCLUDING HEALTH, IN A CROSS-BORDER CONTEXT

The development and modernisation of infrastructure networks play an important role in connecting a country with the neighbouring countries and capitalizing its economic, tourist and cultural resources.

8.1. EXISTING SITUATION - INTEGRATION OF THE NATIONAL NATURAL GAS TRANSPORT NETWORK INTO EUROPEAN NATURAL GAS TRANSPORT NETWORKS

Currently, the import/export of natural gas in/from Romania is carried out through 7 cross-border interconnection points:

Table 32. Cross-border interconnection points

Characteristics of cross-border interconnection pipes	
UKRAINE	**Orlovka (UA)–Isaccea (RO)** - DN 1000, Capacity of 8.6 billion cubic meters/year, Pmax = 55 bar
	Tekovo (UA)–Medieșu Aurit (RO) - DN 700, Capacity = 4.0 billion cubic meters/year, Pmax = 70 bar
	Isaccea 1/Orlovka 1, Capacity of 6.8 billion cubic meters/year, following the Trilateral Agreement concluded in December 2019, Pmax = 49.5 bar on the import direction and a capacity of 5.7 billion cubic meters/year until 30.09.2020 and 4.1 billion cubic meters/year starting 01.10.2020 at a Pmax = 45 bar on the export direction
HUNGARY	**Szeged (HU)–Arad(RO)–Csanadpalota** - DN 700, Capacity = 1.22 billion cubic meters/year, Pmax = 55 bar. Starting with October 1st, 2019, the import capacity through this interconnection increased to 1,75 billion cubic meters/year
REPUBLIC OF MOLDOVA	**Ungheni (MO) – Iași (RO)** - Capacity = 1.5 billion cubic meters/year, Pmax = 50 bar
BULGARIA	**Ruse (BG)–Giurgiu (RO) -** DN 500, Capacity = 0.55 billion cubic meters/year, Pmax = 40 bar respectively Pmax = 30 bar on the export and import direction
	Negru Vodă 1/Kardam, Capacity = 6.4 billion cubic meters/year on the export direction and on the import direction, Capacity = 5.7 billion cubic meters/year starting 01.01.2020 and at a Pmax = 55 bar on both transport directions

The natural gas markets of neighbouring countries indicate their significant dependence on imported natural gas sources. If until recently, for all these countries, natural gas of Russian origin was the only source of supply, currently, by planning and implementing new infrastructure projects, the neighbouring countries seek their diversification, for the obvious purpose of increasing security of gas supply and, last but not least, to ensure the conditions of price competitiveness.

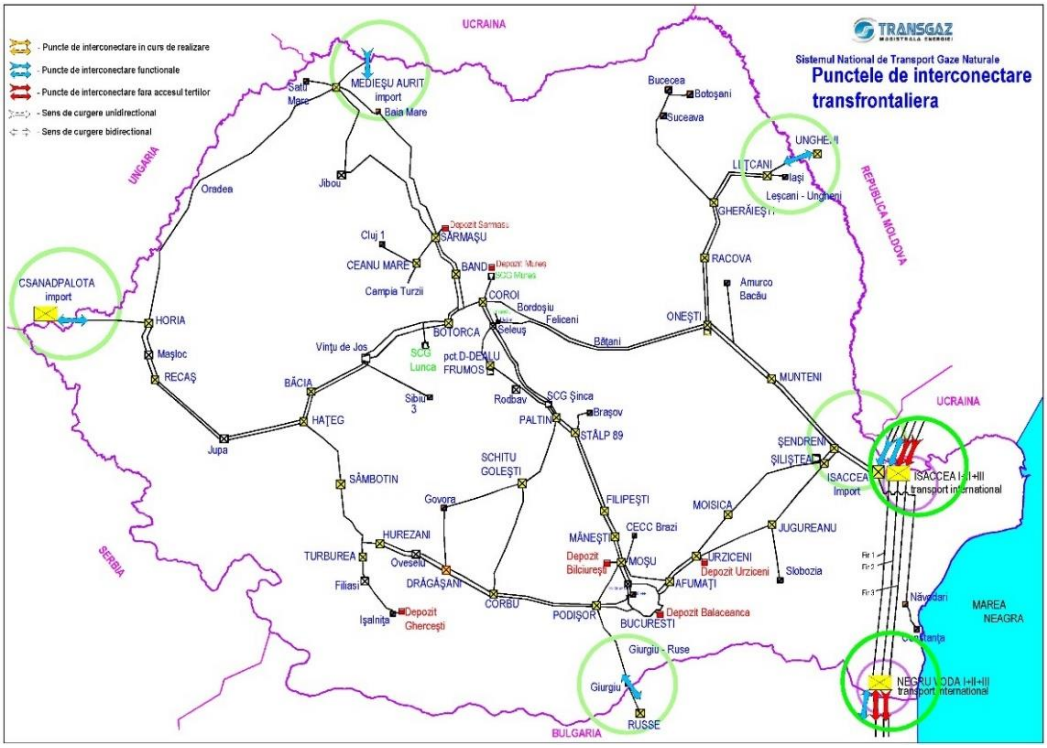


Fig 25. NGTNS cross-border interconnection points

Table 33. Natural gas market in the region and possibilities for natural gas supply

THE REPUBLIC OF BULGARIA	
Transport operator	• Bulgartransgaz
Interconnections with Romania	• Negru Vodă II and III – Transgaz RO • Ruse/Giurgiu–Transgaz RO
Future projects	• Turkey-Bulgaria interconnection • Greece-Bulgaria interconnector • Interconnection of national natural gas transmission systems between Bulgaria and Serbia • NGTNS Rehabilitation, Modernization and Development • Construction of a gas pipeline between BG – RO (investments in the Bulgarian system to increase capacity under the BRUA project) • Eastring–Bulgaria • Expanding Chiren's storage capacity • Construction of a pipeline to increase capacity and interconnection with the ring-shaped existing system, between SC Valchi Dol and Novi Iskar tap station • Construction of a pipeline between Varna and Oryahovo • Construction of a pipeline to increase capacity and interconnection with the ring-shaped existing system, between SC Provadia and Rupcha • Construction of new warehouses on the Bulgarian territory
Collaboration/ interconnection agreements	• Interconnection Agreements for Ruse/Giurgiu and Negru Vodă I Interconnection Points concluded in 2016 and the related additional documents. These agreements provide for procedures for the nomination, correlation and allocation of quantities on interconnection pipelines, lay down the technical details of the operation and exploitation of the measurement stations related to the two points and are governed by the provisions of *(EU) Regulation 703/2015 establishing a network code for interoperability and data exchange rules.* • For Negru Vodă 2+3/Kardam Interconnection Point, given that the International Transit 2 and 3 transport pipelines on the Bulgarian territory are being joined, TRANSGAZ and Bulgartransgaz have agreed on the development of a single

	interconnection agreement at the level of a virtual interconnection point, PI Negru Voda 2 3/Kardam. The agreement is to be concluded after the following conditions have been met: - conclusion of the Interconnection Agreement on Virtual Interconnection Point (VIP) Isaccea 2,3; - amending the historic contract with Gazprom Export regarding the T3 Pipeline
SERBIA	
Transport operators	• SRBIJAGAS and YUGOROSGAZ
Interconnections with Romania	• -
Future projects	• Interconnection with Romania on the Mokrin – Arad direction • Interconnections with Bosnia and Herzegovina on the Novo Selo-Bijeljina direction • Interconnection with Bulgaria on the Nis-Dimitrovgrad direction • Carrying out the Banatski Dvor gas storage (capacity between 450 million cubic meters and 750 million cubic meters, with a maximum daily capacity of up to 10 million cubic meters) • Carrying out the Itebej gas storage (capacity between 800 million and 1 billion cubic meters of gas)
Collaboration/ interconnection agreements	In 2017, TRANSGAZ SA and JP Srbijagas signed the Memorandum of Understanding on the development of cooperation between the two companies. By creating the necessary infrastructure to interconnect natural gas transmission systems, TRANSGAZ and Srbijagas aim to contribute to increasing predictability in energy supply in the region, through alternatives that can be more efficient than natural gas supply solutions offered by other variants.
HUNGARY	
Transport operator	• FGSZ Ltd
Interconnections with Romania	• Csanadpalota–Transgaz (RO)
Collaboration/ interconnection agreements	• Romania-Hungary Reverse flow, Hungarian section, phase 1. • Slovenia-Hungary interconnector. • The Hungarian section of the Tesla project. • HU – UA Reverse flow. • Eastring– Hungary. • Construction of a pipeline between Varosfold – Ercsi – Gyor. • Construction of a pipeline between Ercsi – Szazhalombatta. • Construction of another compression station at Varosfold. • Romania-Hungary Reverse flow, Hungarian section, phase 2. • BG-RO-HU-AT Transmission corridor. • Construction of another compression station at Hajduszoboszlo. • Construction of a transit pipeline between Vecses – Varosfold. • Development of the Hungarian section of Tesla project.
Collaboration/ interconnection agreements	• *Joint operation of the Csanádpalota Cross-Border Interconnection Point*, in accordance with the European Network Codes (CAM, BAL, INT): - It is carried out under the Interconnection Agreement and subsequent addenda, concluded for the Csanádpalota Interconnection Point, concluded in 2015 between TRANSGAZ and FGSZ in accordance with the provisions of Regulation no. 703 (EU) 2015/703 of the Commission of 30 April 2015, establishing a network code for the rules on interoperability and data exchange; - the parties have maintained contact with regard to updating the Interconnection Agreement on IP Csanádpalota in accordance with the provisions of the applicable European regulations; - The Joined Demand Assessment Report for the Incremental Capacity between Romania and Hungary was finalized and published. - The supply of grouped and ungrouped capacity at the interconnection point,

	common to both transport directions, was established for the annual capacity tenders scheduled for 6th July 2020, in accordance with the ENTSOG calendar. • *The implementation of the requirements imposed by EU Regulation no. 459/2017 (CAM NC – European Network Code on Capacity Allocation Mechanisms) establishing a network code on capacity allocation mechanisms in gas transmission systems and repealing (EU) Regulation no. 984/2013:* - under the TSO Affiliation Agreement to the Regional Capacity Reservation Platform (RBP) for the trading of grouped and ungrouped capacity at cross-border interconnection points with gas transmission systems in Hungary and Bulgaria; in order to maximize aggregate capacity tenders, TRANSGAZ collaborates annually with FGSZ by agreeing annually on the technical and available capacities for the Csanádpalota Joint Interconnection Point • *The "Development on the Romanian territory of the Bulgaria-Romania-Hungary-Austria transport corridor" project":* - the contact with FGSZ for the coordinated development of the BRUA project was maintained; - The parties conducted a Binding Open Season procedure for the allocation of the incremental natural gas transmission capacity at the Csanadpalota interconnection point between Romania and Hungary, in accordance with the Binding Open Season Manual Procedure (posted on the websites of both companies); the third period for submitting tenders ended on March 31st, 2020. - The result of the IV economic test carried out by the two companies was negative, and the related Joint Report was published on the Transgaz and FGSZ websites. According to this Report, Binding Open Season Procedure has ceased.
UKRAINE	
Transport operator	• Ukrtransgas subsidiary of Naftogaz
Interconnections with Romania	• Orlovka–Isaccea (RO) • Tekovo–Medieșu Aurit (RO)
Collaboration/ interconnection agreements	• It is important to stress the interest shown by Ukraine both for the physical reverse flow at the points of interconnection with the Romanian system, but especially in Isaccea 1 point, thus being able to ensure natural gas supplies from the South-East through the Bulgarian transport system and the transit way I. • Romania-Ukraine interconnection project
Collaboration/ interconnection agreements	• The collaboration between the parties for the joint operation of the Isaccea 1 /Orlovka Cross-border Interconnection Point is based on the Interconnection Agreement concluded in 2016 and the amendment on the implementation of bidirectional physical flow at this interconnection point, signed in December 2019. This agreement is governed by the provisions of (EU) Regulation 703/2015 establishing a network code for the rules on interoperability and data exchange. At the Isaccea 1/Orlovka Interconnection Point, bidirectional gas flow was introduced and, in this regard, in December 2019, Transgaz and Ukrtransgaz and TSO Ukraine LLC amended the relevant Interconnection Agreement • Operation of the Isaccea 2,3/Orlovka Virtual Interconnection Point The Parties are in the process of negotiating the Interconnection Agreement. In this regard, the parties held a joint public consultation at the end of 2017 on the trade rules applicable in Isaccea 2,3 VIP. • Operation of the Medieșu-Aurit-Tekovo cross-border Interconnection Point For the operation of the Medieșu-Aurit-Tekovo cross-border Interconnection Point, the parties are in the process of negotiating an Interconnection Agreement. The business rules of the Interconnection Agreement on the Medieșu-Aurit/Tekovo Cross-Border Interconnection Point were subject to a public consultation process that

	took place between 1st July and 1st September 2017, the parties subsequently publishing a joint declaration on the results of the public consultation. In January and February 2020, several meetings of the joint technical working groups took place, during which a verification program was agreed in order to establish the compliance with ISO and EN standards of all gas measuring stations at the cross-border points between Ukraine and Romania (SMG Tekovo, SMG Medieșu Aurit, SMG Orlovka Import Romania, SMG Isaccea Import Romania). After completing the agreed verification steps, the parties shall consider concluding interconnection agreements on the Isaccea 2,3 and Medieșu Aurit interconnection points.
REPUBLIC OF MOLDOVA	
Transport operator	• Moldovatransgaz and Vestmoldtransgaz
Interconnections with Romania	• Moldovatransgaz • Ungheni (IUC) RO-MD
Collaboration/ interconnection agreements	• Extension of the Iași – Ungheni – Chisinau Interconnector (Phase II). • Construction of the natural gas transmission network with DN 500 on the Ungheni – Bălți segment, connecting the transmission network ”Ananiev-Cernăuți-Bogorodiceni” from the North of the Republic. • Construction of the Natural Gas Compression Station located in Ungheni district.
Collaboration/ interconnection agreements	• The Operating Agreement for the Ungheni Interconnection Point and the related additional documents concluded with Vestmoldtransgaz, Republic of Moldova, on 14.08.2014. Based on the Extraordinary General Meeting of Shareholders' (EGMS) decision, on 18.12.2017, the company Eurotransgaz SRL was established in Chisinau, having as sole partner TRANSGAZ SA from Romania. In fulfilling its object of activity, Eurotransgaz SRL participated in the investment competition regarding Vestmoldtransgaz. On February 26th, 2018, the Commission for conducting privatization tenders in the Republic of Moldova announced the result of the contest by which Eurotransgaz SRL became the winner of this competition. On March 28th, 2018 Eurotransgaz signed the contract to take over Vestmoldtransgaz Chișinău. The Parties are currently in discussions on the conclusion of the Interconnection Agreement on the Ungheni Interconnection Point. The public consultation on the business rules of the Interconnection Agreement on the Ungheni Interconnection Point took place in June

At present, Romania's interconnection with the natural gas transmission systems of the neighbouring states is insufficient, the physical capacity being additionally limited by the reduced operating pressure of the NGTNS compared to the pressure regimes in the neighbouring countries.

8.2. POTENTIAL SIGNIFICANT EFFECTS ON THE ENVIRONMENT, INCLUDING HEALTH, IN A CROSS-BORDER CONTEXT, IN THE SITUATION OF TYNDP IMPLEMENTATION

8.2.1. Identification of projects that may have cross-border influence

From the point of view of the TYNDP effects on the environment and human health in a cross-border context, the projects carried out at the border and which aim to achieve interconnections with the networks of neighbouring countries are relevant.

The analysis of the potential significant effects was performed for the reference Do minimum scenario and the Do maximum development scenario for those projects that include construction works and for which the indicative routes have been proposed by the holder.

The projects included in the TYNDP 2021-2030 that will be implemented near the border line, included in the *Do minimum reference scenario*, are presented in the following table:

Table 34. Projects located in the vicinity of border areas in the *Do minimum* reference scenario

Project code	Project name	Neighbouring country
7.7	Romania-Serbia interconnection	Serbia

Project 7.7. includes construction works and involves the construction of a new gas transport corridor.

For this project, the environmental impact assessment procedure has already been completed, the Decision of the classification stage No. 142 dated 25.06.2019 being issued by APM Timiș.

The interconnection will be performed on the territory of ATU Comloșu Mare, about 2.5 km from the residential areas of the locality.

Fig 26. The route of the strategic natural gas transmission project 7.7

It appears from the analysis of the Decision of the classification stage No 142 of 25.06.2019 issued by APM Timiş that the project does not induce a significant negative impact in a cross-border context on the environment and human health.

The project is not located in the vicinity or inside Natura2000 sites in the neighbouring country - Serbia.

The Romania-Serbia interconnection project is in accordance with the Energy Sector Development Strategy of the Republic of Serbia until 2025, for the period 2017-2023.

For the Do maximum development scenario, similarly, for the analysis of the effects in a cross-border context, the projects that make the cross-border connections with the neighbouring countries were considered. In this way, in addition to the Do minimum scenario, 3 more projects were identified which are presented in the following table.

Table 35. Projects located in the vicinity of border areas in the Do maximum reference scenario

Project code	Project name	Neighbouring country	Interconnection locations
7.5	Developing the bidirectional transport corridor Bulgaria–Romania–Hungary–Austria (BRUA-Phase III)	Hungary	Szeged (HU)–Nadlac, Arad(RO)–Csanadpalota
7.7	Romania-Serbia interconnection	Serbia	UAT Comloșu Mare (RO)- Mokrin (Serbia)
7.9	Interconnection of the national natural gas transmission system with the natural gas transmission system in Ukraine, on the Gherăești – Siret direction	Ukraine	Siret (RO)- Cernăuți (UCR)
7.11	Increasing the natural gas transmission capacity of the Romania-Bulgaria interconnection on the Giurgiu-Ruse direction	Bulgaria	Giurgiu (RO)-Ruse (BG) by making a new underpass to Danube River
7.12	Eastring–Romania - Option 1	Hungary, Bulgaria	Csengersima (HU)-Satu Mare (Peles, RO) Giurgiu (RO)-Russe (BG)
	Eastring–Romania - Option 2	Hungary Bulgaria	Csanadpalota (HU)-Nadlac (RO) Giurgiu (RO)-Russe (BG)
	Eastring–Romania - Option 3	Hungary, Bulgaria	Csanadpalota (HU)-Nadlac (RO) Grojdibodu (Dolj, RO)-Dolni Vadin (BG)

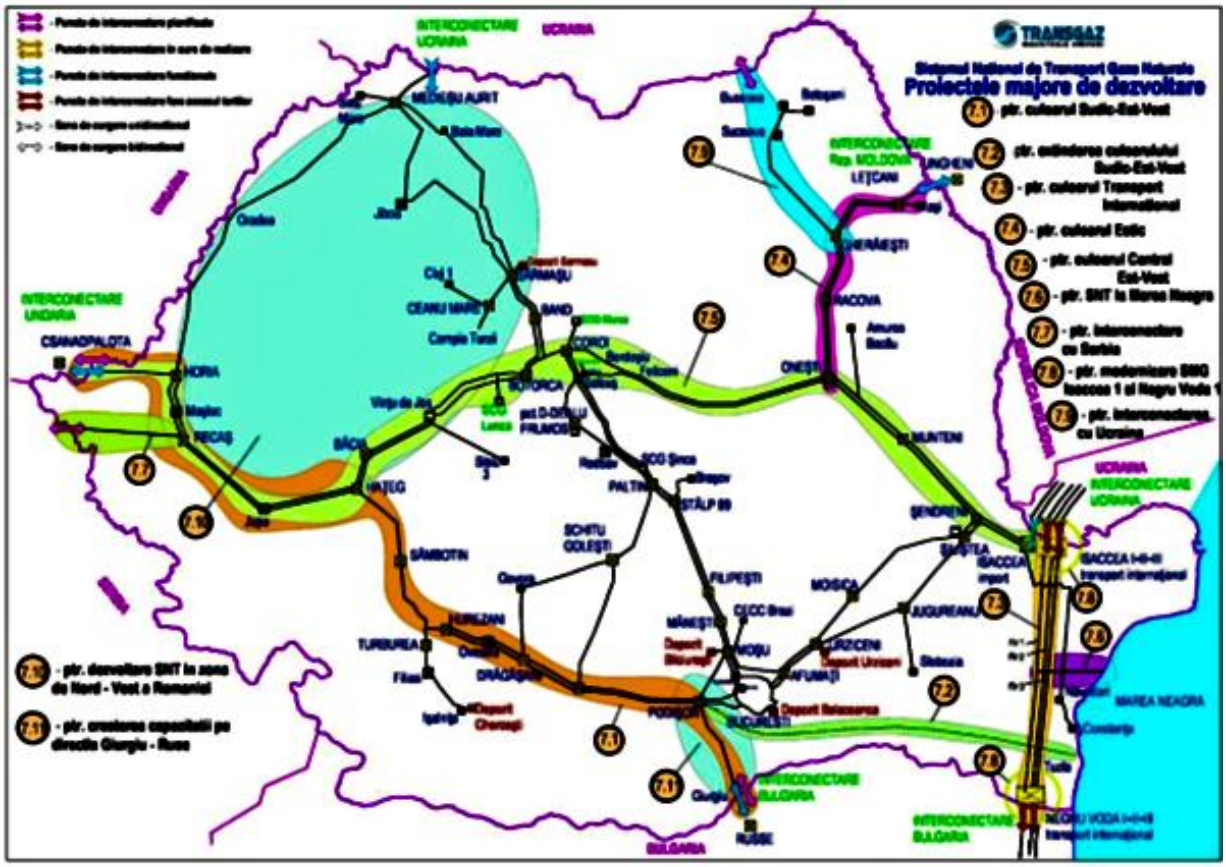


Fig 27. Projects 7.9 and 7.11 proposed in the vicinity of the border line - Do maximum Scenario

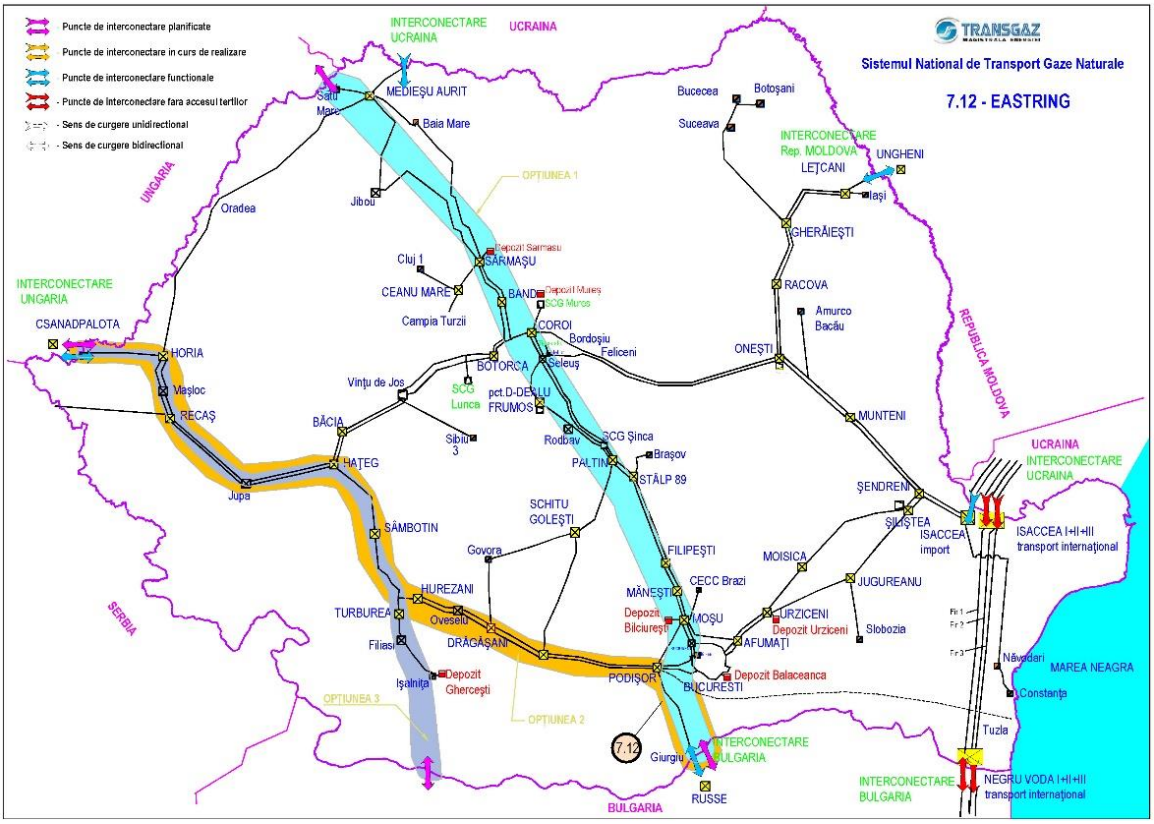


Fig 28. Cross-border interconnections proposed through the 3 options of 7.12. Eastring project

8.2.2. Potential significant effects of projects in a cross-border context

The proposed projects will be implemented in differing timeframes, in different locations. The potential negative effects on the environment, including human health, which could arise as a result of the implementation of the projects proposed by the TYNDP (for all scenarios considered) were analyzed in detail in the previous chapter (Chapter 7). We briefly present the main environmental effects of project implementation that could have a cross-border impact:

Changes in soil characteristics mainly caused by:

- Temporary changes in land use (associated with the work front, site organizations, storage of construction materials, temporary access roads, etc.) and permanent changes in land use through the permanent occupation of land areas. They will only be felt in the national territory.
- Changing the category of land use by creating new constructive elements will cause changes in the physical and aesthetic characteristics of the natural landscape at local level, on the territory of Romania. They will not have a cross-border impact.
- Soil pollution could only be caused by the occurrence of accidental/ uncontrolled discharges of pollutants directly on the ground or in water, deposits on the ground of dusts potentially contaminated with other air pollutants during the construction period from construction and transport activities, improper storage of waste, improper disposal of wastewater. This impact is temporary, only during the construction period, is insignificant and will not have a cross-border influence. Due to the small amounts of potentially polluting substances used, a possible accidental pollution will be felt only in the national territory. In order to avoid and limit these effects, a series of measures will be proposed to reduce the impact both from the planning phase and during the construction and operation phase (see chapter 9).

Effects on protected natural areas and biodiversity:

Projects may cross or be adjacent to protected natural areas of national or local interest, with sites included in the Natura2000 network. The appropriate assessment carried out for TYNDP aimed to identify sensitive protected natural areas, likely to be affected by the implementation of the proposed projects.

These projects will not have a significant impact on protected areas in the border area. There is only one project that is identified with the potential to intersect a Natura2000 site - it concerns project 7.12, option 1, which, upon entering Romania from Hungary, intersects the Natura2000 site HUHN10001 Szatmár-Bereg. Except for this project, all other projects with possible cross-border impact are located at distances of more than 1000 m from Natura2000 sites located in the territories of neighbouring countries.

Given that the routes of the projects considered are indicative routes, which may undergo significant changes in the design phases, as well as the fact that the projects included in the TYNDP development scenarios will be developed over different periods of time, detailing the effects generated and their magnitude can be achieved at project level at a later stage, in which potential cross-border effects will be notified to interested neighbouring states.

We consider that, even if the routes provided are only indicative routes, a significant negative impact on the sites mentioned is unlikely to occur.

Table 36. Projects in the Do maximum development scenario in relation to protected natural areas

Project code	Project name	Neighbouring country	Code and name of protected area	Area type	Approximate distance from the interconnection point (m)
7.5	Developing the bidirectional transport corridor Bulgaria–Romania–Hungary–Austria (BRUA-Phase III)	Hungary	Hódmezővásárhely környéki és csanádi-háti puszták	Natura2000 site code HUKM20001	1000
			HU01 Körös-Maros	National Park	4600
			Maros	Natura2000 site cod HUKM20008	4150
7.7	Romania-Serbia interconnection	Serbia	The project is not located in the vicinity or inside protected areas in the neighbouring country - Serbia		
7.9	Interconnection of the national natural gas transmission system with the natural gas transmission system in Ukraine, on the Gherăești – Siret direction	Ukraine	The project is not located in the vicinity or inside protected areas in the neighbouring country - Ukraine		
7.11	Increasing the natural gas transmission capacity of the Romania-Bulgaria interconnection on the Giurgiu-Ruse direction	Bulgaria	Komleks Aleko - Telika	Protected area code BG06	3600
			Marten - Ryahovo	Natura2000 site code BG0000529	1900
7.12	Eastring– Romania - Option 1	Bulgaria	Komleks Aleko - Telika	Protected Site code BG06	3600
			Marten - Ryahovo	Natura2000 site code BG0000529	1900
		Hungary	Szatmár-Beregi	Landscape Protection Area code HU02	7400
			Csaholc - Garbolc	Natura2000 site code HUHN20054	5400
			Szatmár-Bereg	Natura2000 site cod HUHN10001	0
	Eastring– Romania - Option 2	Bulgaria	Komleks Aleko - Telika	Protected Site code BG06	3600
			Marten - Ryahovo	Natura2000 site code BG0000529	1900
		Hungary	HU01 Körös-Maros	National Park	4500
			Hódmezővásárhely környéki és csanádi-háti puszták	Natura2000 site code HUKM10004	8000
			Hódmezővásárhely környéki és csanádi-háti puszták	Natura2000 site code HUKM20001	1000
			Maros	Natura2000 site code HUKM20008	1041

Project code	Project name	Neighbouring country	Code and name of protected area	Area type	Approximate distance from the interconnection point (m)
	Eastring– Romania - Option 3	Bulgaria	Cheshmata	Protected Site code BG06	6700
			Gendjov orman	Protected Site code BG06	9000
			Ostrov Malak Boril	Protected Site code BG 06	5300
			Karaboaz	Natura2000 site code BG0000335	9000
		Hungary	HU01 Körös-Maros	National Park	4500
			Hódmezővásárhely környéki és csanádi-háti puszták	Natura2000 site code HUKM10004	8000
			Hódmezővásárhely környéki és csanádi-háti puszták	Natura2000 site code HUKM20001	1000
			Maros	Natura2000 site code HUKM20008	1041

Change in water quality

- Surface water pollution and groundwater contamination with changes in physical, chemical and biological qualities could only be caused by the occurrence of accidental/uncontrolled discharges of pollutants directly on the ground or in water, deposits on the ground of potentially contaminated dust with other air pollutants, improper storage of waste, improper disposal of wastewater. In order to prevent these situations, work and intervention procedures are established.
- Rivers in the border area will not be affected.
- In the case of the proposed strategic projects 7.11 and 7.12, the problem of crossing the Danube river arises. In the case of the project 7.11. only a supplement of the existing underpass of the Danube river on the Giurgiu-Ruse direction is performed, which aims to increase the gas transport capacity in this direction. The implementation of the Giurgiu-Ruse interconnection project is conditioned by the execution of the Black Sea (Tuzla) - Podișor pipeline.
- Temporary and local disturbance of morphological elements and/or water flow characteristics, as well as possible temporary influences on the groundwater may occur during construction works for crossing watercourses.
- The underpass solution (open trenches, guided drilling or other underpass solution) of the Danube river is not yet finalized. In the case of the open trench underpass solution, the impact may be felt by the aquatic ecosystem. If the location of the pipe is done through guided drilling, the impact is insignificant.
- For these projects, the joint procedure TRANSGAZ Romania and BULGARTRANSGAZ will be carried out for the joint procurement of design contracts for the Danube crossing and implicitly for the environmental impact assessment, both on the national territory and in a cross-border context.

Change in air quality

- During the construction period air quality may be affected by emissions of air pollutants (such as particulate matter, nitrogen oxides, sulphur oxides, carbon oxides, volatile organic compounds, heavy metals, benzene) from means of transport and to equipment used for construction. The dusts resulting from excavations, loading and unloading activities of building materials, etc are an additional factor. They are manifested locally, on the work fronts and in its vicinity and will not have cross-border effects.

- During the operation period there will be no significant sources of air quality pollution.

Increase in noise and vibration levels

- Construction works, traffic of means of transport will cause an increase in noise and vibration. They are manifested locally, on the work fronts and in its vicinity and will not have cross-border effects..
- There will be no sources of noise pollution the operating period.

Waste generation

- During the construction period, the types of waste generated are represented by materials resulting from excavations that cannot be reused as filling materials, household waste, waste resulting from construction or demolition activities. The Environmental Report provided for measures to prevent/reduce the amount of waste generated, as well as measures for their proper disposal.
- It is expected that the environmental impact generated by the resulting waste will be insignificant and will not be felt at cross-border level.

The effects on human health are closely related to changes in air, water, soil quality and noise levels. As previously shown, these changes caused by the implementation of these projects will be of local nature, will be limited in duration (during construction) and will not extend to the cross-border level.

Risks

- A significant negative impact may be recorded during the pipeline operation period only in the event of a damage followed by fire. This aspect can also have a cross-border impact if it occurs in the border area. The lack of gas transit as a result of a pipeline damage on the Romanian territory can be considered a negative cross-border impact towards the consumers from the countries to which the natural gas is transited.
- Natural gas pipelines are provided with protection and safety elements that allow the cessation of gas supplies in case of damage and immediate interventions on the damaged sector, so as to avoid accidents/explosions with effects on the environment and the population. The probability of accidents in the natural gas transmission system is extremely low considering the protection and safety systems with which NGTNS is equipped.
- As regards the natural gas deposits proposed for the execution/modernisation, they are located at distances of more than 70 km from the border so that the effects of a potential risk that could occur are not able to affect neighbouring countries.

8.2.3. Conclusions on cross-border effects

In conclusion, the environmental effects that may occur "remotely" as a result of the implementation of projects proposed by TYNDP refer mainly to the impact of cross-border watercourses during the execution of works, protected areas crossed and possible damage to pipelines in the cross-border area.

In the case of cross-border watercourses, the adoption of the underwater drilling method eliminates the possibility of potentially significant effects on the environment.

By complying with existing national and European regulations, by assessing in detail and by implementing the proposed measures, it is expected that the potential negative effects on the environment and human health induced by natural gas transportation projects will not be significant in a cross-border context.

At this stage, based on the available information and considering at strategic level the alternatives proposed by TYNDP in relation to the environmental objectives set at European and national level, it can be stated that no potential significant negative effects on the environment or human health have been identified in a cross-border context.

There are all prerequisites for the effects of the TYNDP implementation to generate a positive impact with a cross-border effect as it meets the requirements of European energy policy on ensuring security of gas supply, increasing the interconnection of the national gas transportation network to the European network and creating the gas market integrated natural resources at the European Union level.

Due to the fact that part of the objectives of the plan relate to interconnection actions with the neighbouring countries, future projects will have to be developed either in partnership with the neighbouring countries or involving a consultation process with the neighbouring authorities and stakeholders during the development of environmental impact assessment projects and studies.

In all cases, the procedure for informing and consulting potentially affected parties will take place.

9 PROPOSED MEASURES TO PREVENT, REDUCE AND COMPENSATE AS MUCH AS POSSIBLE ANY NEGATIVE EFFECT OF THE TYNDP IMPLEMENTATION ON THE ENVIRONMENT

As shown in Chapter 7 – Potential significant negative effects on the environment, the scenarios proposed for the TYNDP may have negative effects on the environmental objectives set for certain environmental components, namely water, soil and subsoil, waste management, biodiversity, landscape.

The level of detail of TYNDP and implicitly of the strategic environmental assessment, does not allow the detailed identification of all potential effects that may arise as a result of the implementation of the Plan. Some of the projects have already been implemented, for others there are only feasibility studies and for certain projects the location is not yet established (construction of gas storage facility in Moldova area- project 8.3, NGTNS interconnection at LNG Terminal located on the Black Sea coast - project 7.17). Therefore, in order to comply with the provisions of *Government Decision no. 1076/2004, regarding the establishment of "measures to prevent, reduce and compensate for significant effects on the environment resulting from the implementation of the plan*", we will further address this issue in general terms, and certain aspects are due to be studied in greater depth in the environmental impact assessment procedure carried out for each investment project proposed to be carried out. This assessment shall start from the design phase, as a preliminary assessment, and will be finalised in the evaluation phase carried out in the formal proceedings. This will allow, as early as the design stage, to provide for the financial resources necessary to carry out environmental protection measures or to avoid adopting those options which would harm the environment.

It is therefore necessary to propose appropriate measures to eliminate, prevent, reduce and/or compensate for the likely negative effects, as well as additional measures to enhance (strengthen) the positive effects of the TYNDP on the environment. In establishing these measures, the legislative provisions were taken into account, as well as the measures provided for in the national strategies/action plans.

The proposed measures apply to all stages of a project (planning stage, construction stage and operation stage) and cover all environmental aspects analysed (air, climate change, water, soil, biodiversity, population and human health, waste management, energy efficiency, resource consumption, landscape, cultural heritage).

These measures relate to:

- Avoiding sensitive areas (protected natural areas, densely-populated areas, natural obstacles and barriers such as watercourses, mountainous areas, etc.) by choosing the best route alternatives for projects included in the TYNDP, preventing and reducing environmental effects where these areas cannot be avoided, compensating where significant impacts cannot be avoided;
- Environmental impact assessment and proper assessment in the early planning and design phases.

Projects included in TYNDP that may have significant effects on the environment due to their nature, size or location will be subject to an environmental impact assessment before issuing development approval (the projects subject to environmental impact assessment are listed in Annex 1 of Law 292/2018 on the assessment of the impact of public and private projects on the environment and the projects for which the need to carry out the environmental impact assessment are mentioned in Annex 2 of the same law):

- projects falling under Annex 1 - point 16. Pipes with a diameter of more than 800 mm and a length of at least 40 km, letter a) for the transport of gases.
- Projects falling under Annex 1- point 24- any modification or extension of the projects listed in the Annex, if the modification or extension itself meets the threshold values set out in the Annex.
- Projects falling under Annex 2 - point 3 Energy industry, letter d) underground storage of combustible gases (for natural gas storage facilities).
- projects that fall under Annex 2 - point 13.a)- Any modifications or extensions, other than those provided at point 24 of annex no. 1, of the projects provided in annex no. 1 or in this Annex, already authorized, implemented or in the process of being implemented, which may have significant adverse effects on the environment
- projects that fall under Annex 2 - point 13.b) - projects listed in Annex 1, carried out exclusively or mainly for the development and testing of new methods or products which are not used for more than 2 years

In the environmental impact assessment stage, the negative effects on the environment will be identified in detail, their intensity will be quantified, specific measures will be proposed to reduce the significant negative effects generated.

For a project which is not directly related to the management of the protected natural area of community interest but which may significantly affect the area, alone or in conjunction with other projects, an appropriate assessment of the potential effects on the protected natural area of community interest will be performed, in accordance with the provisions of the GEO no. 57/2007 on the regime of protected natural areas, conservation of natural habitats, wild flora and fauna, with subsequent amendments and supplements.

The environmental impact assessment and the appropriate assessment will also have to take into account the cumulative effects of these projects, both in relation to existing and proposed ones, in the same sector or in other sectors of activity.

It is also recommended that, when establishing the implementation timetable for projects developed through the TYNDP, the period necessary to carry out the appropriate environmental assessment and /or impact assessment on the environment, should also be taken into account.

The strategic environmental assessment aims to identify the times of potential (positive or negative) effects on the environment and to integrate environmental aspects into the preparation and adoption of TYNDP.

The table below sets out the measures that need to be taken to prevent, reduce and compensate for potential negative effects on the environment. These measures relate in particular to the design and construction phase, which can lead to a significant impact on the environment. Under normal operating conditions, the impact is not significant.

Table 37. Measures to prevent, reduce and compensate for potential negative effects on environmental characteristics

Relevant environmental characteristics	Measures to prevent, reduce and compensate for potential negative effects on environmental characteristics
All, detailed below, technical infrastructure	**General measures:** **M.1.** Information on the urban planning of the municipalities on the route of the proposed projects and the analysis of the alternative variants of the route, in the design phase, in order to: • avoid, as much as possible, the built-up area; • avoid the location of natural gas transmission pipelines in Natura 2000 sites, scientific reservations, nature reserves, natural parks, within the built-up areas of municipalities; • avoid areas affected by floods, landslides or erosion processes; • minimize the permanently occupied areas; • locate stations and valves as much as possible in areas that have lost their ecological functions, but taking into account hydraulic calculations **M.2.** Assessment of the impact on environmental characteristics and, where appropriate, appropriate assessment of the impact of projects on Natura2000 sites. **M.3.** Designing stations and interior facilities of administrative buildings so that the impact on the environment is minimal. **M.4.** Introduction, among the selection criteria of the manufacturer, of the requirements related to: • the use of the best available techniques; • presentation of an environmental management and monitoring programme for environmental elements in the construction phase. • the obligation to accompany the materials used by quality bulletins/ certificates and to carry out the welding control using the best available control technique, with accredited laboratories **M.5.** Staging the construction works of projects in the same area or those located in adjacent areas and correlating the prevention, reduction, compensation measures (if applicable). **M.6.** Carrying out environmental management plans for projects so that throughout the project so that environmental performance can be assessed throughout its duration (design, construction and operation stage) **M.7.** The location of the new natural gas storage facility (project 8.3) and the choice of the final route option for the Eastring project (7.12) will be based on a multiple criteria technical-economic and environmental analysis.
Air	**M.8. Reduction of powder and dust emissions during the execution work for which the following measures may be applied:** • Proper maintenance of vehicles and machinery with periodic inspections. • Covered transport of powdery materials. • Reduction of dust resulting from traffic associated with the site • Proper storage of powdery materials and proper waste management, etc. **M.9.** Proper maintenance of natural gas transmission infrastructure and NGTNS equipment during operation/exploitation.
Climatic changes	**M.10.** Use as much as possible of renewable energy technologies for space heating or for electricity generation in buildings connected to the natural gas transmission infrastructure. **M.11.** Using, as much as possible, of renewable energy technologies for space heating or for the production of electricity in buildings connected to the natural gas transmission infrastructure. **M.12.** Natural gas transmission pipelines positioning on land that is not located in areas with the potential for landslides or with the potential for flooding **M.13.** Location of SNT objectives, as much as possible, in areas that have lost their ecological functions, but taking into account hydraulic calculations

Relevant environmental characteristics	Measures to prevent, reduce and compensate for potential negative effects on environmental characteristics
WATER	**M.14.** Projects proposed by TYNDP must adopt the best design and construction methods in order to limit/restrict activities that may lead to changes/disruption of watercourses during construction: • Choosing solutions for crossing high watercourses that have minimal impact (eg the method of horizontal guided drilling). • Choosing the location of a project taking into account all water use downstream of its existing implementation area, under construction or included in some plans or programs (eg Drinking water sources, irrigation) • Carrying out projects proposed by TYNDP that are built on water or which are related to water, will be done in compliance with regulations in the field of water management. **M.15.** Natural gas transmission infrastructure projects must include measures to prevent/reduce water pollution, measures for waste water collection and treatment: • Measures for the treatment of wastewater resulting from car washing, water used to test the pipeline, • Provision of measures for the collection and treatment of water loaded with pollutants in appropriate facilities, discharge of purified effluent according to legal provisions • Safe storage of hazardous substances and materials • Establishing the location of new transport corridors/ extensions/ ancillary constructions so as not to affect the sanitary or hydrogeological protection areas. • The projects proposed for TYNDP should provide for measures for the proper management of waste in both the construction and operating phases. • In the projects proposed by TYNDP to provide measures to reduce the consumption of water resources
Soil	**M.16.** Limitation of temporary or permanently occupied land areas **M.17.** Safe storage of materials to avoid soil pollution **M.18.** Provision of measures for the ecological reconstruction of all lands temporarily affected at the completion of the execution works and their return to the initial uses. **M.19.** Assessment of soil quality in the project location area, identification of pollution-sensitive areas and their avoidance, as much as possible. **M.20.** Identification from the project phase of contaminated soils that could be crossed by natural gas transmission pipelines. Appropriate measures to limit possible pollution and pollution expansion risks. **M.21.** Proposing, where appropriate, soil quality monitoring programs in the area of project sites both during the construction and operation period
Waste	**M.22.** Waste management will be based on a **waste management plan**. During the execution of the works and during the operation/ decommissioning of the projects, the waste management will be carried out on the basis of a Waste Management Plan, which should include: types, sources, quantities, management mode, minimization measures, responsibilities. The plan will take into account all regulations specific to the waste sector.
Use of resources and their sustainable management	**M.23.** Development of a construction-phase **traffic plan** to streamline the transport schedule, reduce fuel consumption and reduce traffic disruptions on potential relevant receivers. **M.24.** Provision of measures to prevent resource consumption, reuse materials where possible.
Biodiversity	**M.25.** Choosing the locations of the projects, including the site organizations, necessary for carrying out the works so as to avoid, as far as possible, the protected natural areas. **M.26.** Investigation, by scientific methods, of the location of the gas pipeline and the area of influence, the determination of the species likely to be affected and the

Relevant environmental characteristics	Measures to prevent, reduce and compensate for potential negative effects on environmental characteristics
	proposal of alternatives to the route where appropriate. Clear identification of priority habitats that require strict preservation. Avoid, as much as possible, protected natural areas or forested areas. **M.27.** The deforested forest area will be replanted in the work corridor or in another area, under the conditions established by the Forestry Code. The damage to priority forest habitats, which involve compensatory measures under the Habitats Directive, will be avoided. **M.28.** During the works, the open ditch will be covered in the area of animal migration routes to facilitate the crossing of the ditch by animals. Measures will be taken to protect any nests encountered (relocation) **M.29.** The contractor shall take all measures necessary for the proper maintenance of vehicles and machinery, for the proper management of waste and materials, for compliance with the maximum permissible limits on the level of noise and vibration pollution. **M.30.** Depending on the sensitivity of potential receptors in protected areas, optimal working periods will be established to keep the pressures on the biotic component as low as possible (eg avoidance of nesting periods for birds, periods of migration to amphibian breeding sites, or spawning periods of fish species in the case of large river crossings). **M.31.** The choice of the optimal route variants and the technical implementation solutions is made so that it is not necessary to adopt compensatory solutions, as defined by the Habitats Directive and the Romanian legislation in force. **M.32.** After the completion of the works, the land will be restored, as far as possible, to the initial state and the environment will be facilitated by specific measures (use of original roofing material, planting of trees and non-invasive vegetation, from species similar to those affected during the works, etc.). Measures will be taken to stop the spread of invasive plant species in areas where the soil has been stripped. **M.33.** Provision of biodiversity monitoring programs in the in the location area of infrastructure projects for the construction period and during the operating period. **M.34.** Compliance with the specific measures proposed by the Appropriate Evaluation Study for TYNDP (see table no. 37.1)
Population and human health	**M.35.** The routes of the linear projects and the locations of the various components of the projects will be chosen so as to have as little influence as possible on the population. **M.36.** Avoiding as much as possible the areas with high population density when choosing the locations of projects and site organizations **M.37.** Ensuring the access of the inhabitants, during the works, to grazing areas, agricultural land, etc. **M.38.** Execution works will be carried out so that the pressures on the population in the construction site area are as low as possible. **M.39.** Limiting the noise level by installing low noise equipment in residential areas, soundproofing the buildings where the noise generating equipment is located.
Energetic efficiency	**M.40.** Implementation of measures to reduce technological losses. **M.41.** Energy efficiency measures for buildings belonging to the NGTNS.
Cultural heritage	**M.42.** Route alternatives in order to avoid historical monuments, including archaeological sites. Provision of funds for the archaeological supervision of the works. Ceasing the works and resorting to archaeological research, including the discharge of archaeological load, if heritage objectives are identified along the project route.
Natural landscape	**M.43.** For the construction stage, during the works, in the sensitive areas likely to generate impact on the landscape, measures will be applied to reduce the impact consisting of multi-role shielding panels. In addition to shielding the perspectives and reducing the impact on the landscape, these panels also have a sound-absorbing role, reducing wind speed (windshields), retaining dust particles and limiting the access of

Relevant environmental characteristics	Measures to prevent, reduce and compensate for potential negative effects on environmental characteristics
	some species of fauna in the perimeters affected by the works, with active fronts, which present an increased risk for them. These structures also clearly delimit the perimeters of the site, limiting unauthorized access and also limiting the risks of injury **M.44.** Replanting the affected area with native plant species. Avoid the use of exotic and potentially invasive species. Create a plant protection curtain around the pipeline stations, where possible. **M.45.** Compliance with the provisions of landscaping plans, general and zonal urban plans. **M.46.** Avoiding as much as possible the areas with special landscape value, the protected natural areas, when choosing the locations of the natural gas transportation infrastructure projects, including the construction site.
Risk prevention	**M47.** Provision of measures, from the project phase, for the prevention of environmental and technological risks with potential direct negative impact on the environment and human health. **M48**. Setting and applying remedial measures in cases of accidents or extreme weather events (fires, frost). **M49.** Modernization/extension/increase of the capacity of natural gas storage facilities will be based on an environmental impact assessment and a Safety Report that will identify whether the safety and protection areas necessary to be established overlap with inhabited or protected areas. **M50.** Identification, from the design phase, of all SEVESO objectives in the vicinity of the route in order to avoid the domino effect in case of damage to the gas pipeline followed by explosion. **M51**. Operational interventions in case of damages in order to avoid the explosions followed by fires **M52**. Foreseeing projects on safety measurements for preventing risks to: • the system of sectioning valves, in order to be able to carry out quick and safe interventions in case of breakdowns. • the protection system of the pipeline in order to avoid corrosion, • the SCADA system for remote surveillance of the transportation pipeline during the exploitation period • compliance with the technical norms of design, execution and maintenance for the objectives from the transport and storage of natural gas
Raising public awareness, including the operator of proposed works on environmental issues	**M53.** Providing relevant information for applicants and beneficiaries on the environmental aspects to be observed and the appropriate assessment of the potential environmental effects of the projects included in the TYNDP 2021-2030.

This is supplemented by specific measures to avoid, reduce and compensate the impact of TYNDP on Natura2000 sites proposed by the Appropriate Assessment Study:

Table 37.1 Specific measures to avoid, reduce and compensate the impact of TYNDP on Natura 2000 sites proposed by the Appropriate Assessment Study

Component	Code	Measure	Result
Planning,	M1	Appropriate assessment and environmental impact assessment will be initiated in the early stages of design	Reducing

Component	Code	Measure	Result
design and environmental impact assessment		and continued throughout the development and implementation of projects, with particular emphasis on those projects that may have negative effects on protected areas (Natura 2000 sites and other protected natural areas).	environmental costs
Habitat loss Altering habitats Disruption	M2	Rigorous scientific substantiation of appropriate assessment studies, in compliance with best practices in the field in the case of projects that intersect or are designed in the immediate vicinity of Natura 2000 sites. The impact assessment and the avoidance/reduction/compensation measures will take into account the ecological requirements of species and habitats of community interest, the preservation objectives of the sites in order to maintain the integrity of the sites.	
Fragmentation	M3	The design of the routes and the technical solutions adopted for carrying out the gas transportation elements will take into account the approach aimed at preventing and avoiding impacts from the design phase. The hierarchy of solutions adopted will aim to avoid impacts on Natura 2000 sites and other protected natural areas, developing solutions to reduce impacts, and offset impacts only as a last resort.	Preventing impacts
	M4	Avoiding the intersection of the boundaries of protected natural areas in the case of natural gas transportation projects where this is possible.	
	M5	If it is not possible to avoid the intersection of protected areas, resources shall be maintained for establishing the final route according to the identification of sensitive areas in the intersection area, thus avoiding the impact on the main conservation objectives, and avoiding jeopardising the integrity of sites. The final routes will be established according to the recommendations made in the appropriate assessment studies and/ or impact assessment studies). Applying the concept of "micrositing" may be a measure aimed at reducing the impact on a small scale.	Avoiding damage to sensitive areas in protected areas, minimizing the impact from the design phase
	M6	Integrating solutions with the least impact on biodiversity components and sensitive areas in technical projects, such as under-crossing of watercourses through horizontal guided drilling, avoidance of forested areas, grasslands, meadows, wetlands. Tracing new transport routes mainly in agricultural areas.	Reducing the impact on natural values
	M7	In case of intersection of projects with protected natural areas, all technical solutions that can minimize the affected areas will be considered. No site organization will be carried out inside the protected areas. Access roads, material or land deposits will be reduced to what is strictly necessary, solutions will be adopted to narrow the work corridor.	Reducing the perimeters where the impact takes place
	M8	Development of a Biodiversity Management Plan, and its application from the moment of picketing of project	Prevention and reduction of the

Component	Code	Measure	Result
		elements to land restoration and equipment withdrawal. The appointment of people responsible for implementing the management plan and reporting all incidents and measures taken. The inclusion of a biodiversity expert during execution in sensitive areas, supervising the works, enforcing the biodiversity management plan and training the staff responsible for the execution works.	impact at local level, proper application of the imposed reduction measures.
	M9	All works involving ecological reconstruction activities will only be carried out on the basis of an Ecological Reconstruction Plan to prevent the use of species and solutions unsuitable for the place and habitats, as well as the installation of invasive species in the affected areas. The elaboration of an Ecological Reconstruction Plan that will offer punctual solutions for the affected habitats and species will be carried out according to the recommendations from the environmental assessment studies and the requirements of the environmental authority.	Reducing medium and long term impact. Control of invasive species.
Monitoring and additional measures Occurrence of non-native and/or invasive species	M10	Training of staff with minimum knowledge of protected species and habitats, and measures to reduce their impact.	Application of local reduction measures
	M11	Development and implementation of a Biodiversity Monitoring Plan. The monitoring will be started at the time of picketing the route and will be continued after the completion of the works. Reporting the current state and compliance with the measures included in the environmental agreement and the biodiversity management plan to the environmental authorities. The success of measures to avoid, reduce and compensate the impact will be analyzed, and it will be reported if further measures are necessary.	Increasing the success of reduction measures. Gather important information on the residual impact.
	M12	In the case of works requiring the stripping of land areas (most construction-assembly pipes or pipe repairs) especially if these works are implemented over long distances and continuously (working corridor) the monitoring and management of invasive non-native plants is required to prevent their establishment and spread within and in the vicinity of protected areas. This aspect will be detailed in the biodiversity management plan and in the monitoring plan, and will be continued for at least 3 seasons after the end of the execution.	
Habitat alteration Disruption	M13	In case of overlaps with sensitive areas, maintaining the possibility of applying solutions to bypass or avoid the destruction of elements of high biodiversity value, such as secular trees, periodic ponds, springs, marshland and other wetlands, species-rich meadows, colonies of mammals or birds or any other values identified by applying the "micrositing" concept.2	The possibility of preventing and reducing local-scale impacts through expertise and collaboration between biodiversity conservation experts, contractor and beneficiary.
	M14	By carrying out interventions on surface water bodies, any changes to the flow of water, banks or substrate that could significantly affect water-dependent species of community	Prevention of damage to water bodies and aquatic

Component	Code	Measure	Result
		interest (fish, amphibians, reptiles and mammals).	species
	M15	Planning machinery access on already existing access roads limiting the construction of new access roads to the strict minimum. Avoiding machinery access during rainy periods or in extreme drought in order to prevent phenomena of accentuated erosion.	Reduction of affected areas. Prevention of erosion phenomena
Mortalities	M16	Solutions to avoid structures that can create traps for wildlife. Application of routing fences for amphibians, reptiles and small mammals. The works will be carried out in stages, without maintaining ditches dug for long periods of time.	Reducing mortality rates caused by project implementation.
	M17	If areas where there are colonies or individuals of protected animals or plants cannot be bypassed, and their impact cannot be prevented by other methods, temporary capture and relocation shall be considered. Special attention will be paid to the colonies of ground squirrels (*Spermophilus citellus*) found in the areas of the working corridor (in the sites containing this species).	
	M18	Identification of areas where collision of machinery with animals is likely during the execution phase and implementation of measures to prevent this: installation of routing fences to control small mammals and herpetofauna, speed limitation, inclusion of tubular bridges, staff training, etc.	
	M19	Avoiding the storage of dangerous or harmful substances, poisons, antifreeze, oil or other toxic substances in the working areas.	
Disruption	M20	Avoiding periods of high sensitivity to species of community interest present in the project implementation area, as identified in the specialized studies, and works planning outside these periods. If sensitivity periods are different for the identified species, the optimal periods will be chosen taking into account the specifics of the area and the species that use that most intensive segment. For example, in the case of a segment that can separate wetlands from forests, the spring migration period of amphibians will be completely avoided. Areas where many species of birds of community interest nest (eg heron colonies, shore martin colonies, nests of rapacious birds) should be avoided between April and June. No work will be carried out in riverbeds during the breeding season of fish species. Work will be carried out in short segments and in a short time to reduce the inconvenience caused.	Reducing disruption, preventing the decrease in reproductive success, preventing mortality caused by project implementation.
	M21	In case of intersection with special avifauna protection areas (SPA), the planning of works outside the breeding period will be considered, avoiding the periods of: - March - June in forest habitats and near them up to 50 m of wood edges - April - July in open habitats	
	M22	Reducing noise during execution by choosing high-performance machines, and avoiding the simultaneous use of several machines.	Reducing noise disturbance.

Component	Code	Measure	Result
	M23	Avoiding light pollution at night. The use of security lights inside and in the vicinity of protected areas shall be limited to the minimum necessary.	Reducing the disturbance caused by artificial light pollution.
	M24	Prohibition of bringing, feeding and keeping dogs, cats or other pets in the execution areas inside and in the vicinity of protected areas.	Reducing the disturbance caused by domestic animals. Reducing wildlife mortality indirectly caused.
	M25	Avoiding accidental pollution by substances resulting from the maintenance of the machinery fleet. Prohibition of maintenance work inside and in the vicinity of protected areas, surface waters and in the area of municipalities.	Prevention of soil and water pollution.
	M26	Prohibition of disposing of food waste in the area of work surfaces, to avoid attracting large carnivores.	Preventing unwanted interactions between large carnivores and humans
	M27	Proper waste management, compliance with the measures imposed by regulatory acts on environmental protection.	Reducing pollution by abandoning waste.
	M28	Prohibition of the capture, killing, collection or disturbance of animal species in the working corridor area. Prevent the destruction of any form of shelter or breeding structures. Limiting the presence of the personnel responsible for the execution works in the perimeters designated for the works.	Reducing mortality rates caused by project implementation.
Barrier effect	M29	Avoid creating ecological barriers (eg between feeding and shelter areas, feeding and breeding) by maintaining the site for long periods of time. The excavation works will be carried out in stages, keeping the site active only for short distances.	Ensuring habitat connectivity. Prevention of barrier effect on fauna.

Measures proposed for the prevention and reduction of possible impacts in case of Community interest habitats, including the priority habitats

Project code	Site code	Site name	Type of investment foreseen in the overlapping area	Potentially affected habitat of Community interest	Potentially affected main habitat	Measures proposed to prevent and reduce impacts
7.5	ROSCI0130	Oituz - Ojdula	Rehabilitation / replacement of pipes	9110, 9130, 91V0, 9410	91E0*	When setting the location of the works, avoiding the priority habitat 91E0* will be taken into account. In case of need to design new pipes, using the existing corridor, respectively design the pipes near DN11 road. Avoiding the impact on the

Project code	Site code	Site name	Type of investment foreseen in the overlapping area	Potentially affected habitat of Community interest	Potentially affected main habitat	Measures proposed to prevent and reduce impacts
						mature forests from the site.
	ROSCI0037	Ciomad - Balvanyos	Rehabilitation / replacement of pipes	9110, 9130, 9170, 91V0	No	Use existing corridor. If the case of designing new pipe sections occurs, this should be done in parallel with 11C road, avoiding as much as possible intersecting the site, as the road represents the southern border in this section.
	ROSCI0384	Râul Târnava Mică	Rehabilitation / replacement of pipes	No	91E0*	When setting the location of the works, avoiding the priority habitat 91E0* will be taken into account. Preserving the existing corridor, river over-crossing or under crossing in the existing crossing locations, avoiding cutting mature trees.
	ROSCI0236	Strei - Hațeg	New pipe	9110, 9170, 91Y0, 8310	No	Careful design to avoid the intersection with the protected area of national interest RONPA0533 Pădurea Slivuț (overlapped with ROSCI0236) – the indicative route received from the Owner has a section that runs parallel with the border of the protected area intersecting it on a distance of about 250m. From the design phase, the areas with caves will be avoided. Designing the new pipe in the area overlapping with ROSCI0236 site will be considered in the parallel vicinity with DN66 road in order to prevent the impact on the forest habitats.
	ROSCI0292	Rusca Montană - Țarcu – Retezat Corridor	New pipe	9110, 9170, 91V0, 6510, 9410 Maybe 6520	No	For habitats 9110, 9170 and 91V0: the plan should take into account to avoid as much as possible the mature forest and plan the route in the vicinity parallel to the DN668 road. Habitat 6520: including some rapid rehabilitation measures where avoiding the impact is not possible. In order to set the final route,

Project code	Site code	Site name	Type of investment foreseen in the overlapping area	Potentially affected habitat of Community interest	Potentially affected main habitat	Measures proposed to prevent and reduce impacts
						develop measures to prevent / avoid and reduce the impact from the planning phase.
7.9	ROSCI0184	Pădurea Zamostea - Lunca	New pipe	91F0, 91Y0	No	Plan the pipeline east of Siret River, outside the limits of the site or under crossing this section of about 900 m, which intersects the meadow wood vegetation, through directed horizontal drilling.
7.10	ROSCI0021	Câmpia Ierului	New pipe	Wetlands and meadows	1530*, 40A0*, 6240*	Plan the pipeline on the existing corridor in Buduslă – Vășad area. Bypassing from the planning phase Sălacea meadow, because here a complex of priority habitats were mapped during a project carried out during 2019 – 2020.
	ROSCI0322	Muntele Șes	New pipe	Community interest forest habitats	91E0*	From the planning phase, considering to bypass the site in Bătrânu – Bucea area, by engineering the pipeline to the eastern and southern part of the site.
	ROSCI0231	Nădab - Socodor – Vărșad	New pipe	No	1530*	Planning the pipeline in the vicinity parallel to DN79 road, or over crossing / under crossing the salted meadows of Nădab area.
	ROSCI0025	Cefa	New pipe	3160, 6430, 6510	1530*	During the planning phase, analyse the regenerating wood vegetation and plan the pipeline to bypass on the eastern part, or undercrossing the area (on a distance of 300m) in Berechiu area. Using the existing corridor or bypassing the site, by planning a new pipeline near DN79 road in Mădăraș – Marțihaz – Cefa area.
	ROSCI0099	Știucilor - Sic - Puini – Bonțida Lake	New pipe	6210, 6430, 6510	1530*, 40A0*	Bypassing the site from the planning phase to the eastern part in Sucutard area. When setting the location of the works, avoiding 1530* and 40A0* habitats will be taken into account. Measures to prevent / avoid and reduce the impact at

Project code	Site code	Site name	Type of investment foreseen in the overlapping area	Potentially affected habitat of Community interest	Potentially affected main habitat	Measures proposed to prevent and reduce impacts
						planning phase, in view of avoiding the areas with protected habitats.
	ROSCI0410	Sucutard hayfields	New pipe	Maybe 6210	No	Avoiding from the planning phase the semi-natural meadows type 6210, by planning the route of the pipeline between the two fragments of the site, along the DN 109C road.
	ROSCI0302	Bozânta	New pipe	6440, 6510	No	Crossing the site and the river by horizontal drilling or aerial pipeline, or plan it on the eastern end.
7.11	ROSCI0043	Comana	New pipe	The majority of critical habitats are potentially affected	1530*, 40C0*, 91AA*, 91I0*, 91E0*	When setting the location of the works, avoiding priority habitats will be taken into account. Use the existing corridors and / or planning the pipeline in the vicinity parallel with 5B road that crosses the site in Cămineasca – Schitu area. Analyse the distribution of habitats possibly affected in a study at planning phase. Measures to prevent / avoid and reduce the impact at planning phase.
	ROSCI0088	Gura Vedei - Șaica – Slobozia	New pipe	92A0, 91F0	No	Adjusting the route to the already existing cuts from the riparian wood vegetation or over / under crossing them. Measures to prevent / avoid and reduce the impact at planning phase.
7.12.1	ROSCI0227	Sighișoara - Târnava Mare	New pipe	There is not enough information	There is not enough information	Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0043	Comana	New pipe	There is not enough information	There is not enough information	Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase.

Project code	Site code	Site name	Type of investment foreseen in the overlapping area	Potentially affected habitat of Community interest	Potentially affected main habitat	Measures proposed to prevent and reduce impacts
						Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0088	Gura Vedei - Șaica - Slobozia	New pipe	There is not enough information	There is not enough information	Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0099	Știucilor - Sic - Puini - Bonțida Lake	New pipe	There is not enough information	Maybe 91H0*, 91I0*	Avoiding from planning phase the site to the eastern side of Sucutard. Measures to prevent / avoid and reduce the impact at planning phase, in view of avoiding the areas with protected habitats.
7.12.2	ROSCI0129	North of Gorjul de Vest	New pipe	There is not enough information	Maybe 4070*, 91E0*, 7220*, 9180*	Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0236	Strei - Hațeg	New pipe	There is not enough information	Maybe 6240*	Avoiding the intersection with steppic subpanonian meadows or under /over crossing them. Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0292	Rusca Montană - Țarcu – Retezat Corridor	New pipe	Maybe 9110, 9170, 91V0 6520 6510	No	For habitats 9110, 9170, 91V0: The planning should consider avoiding as much as possible the mature forest and projecting the route in the vicinity parallel with DN68 road. 6520 habitat: inclusion of some rapid rehabilitation measures where impact cannot be avoided. Development of measures to prevent / avoid and reduce the impact at planning phase, for the setting of the final route.

Project code	Site code	Site name	Type of investment foreseen in the overlapping area	Potentially affected habitat of Community interest	Potentially affected main habitat	Measures proposed to prevent and reduce impacts
	ROSCI0063	Defileul Jiului	New Pipe	There is not enough information	Maybe 40A0*, 7220*	Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. When setting the location of the works, avoiding the priority habitats will be taken into account. Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0043	Comana	New pipe	There is not enough information	There is not enough information	Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0088	Gura Vedei - Șaica - Slobozia	New pipe	There is not enough information	There is not enough information	Measures to prevent / avoid and reduce impact at planning phase.
7.12.3	ROSCI0292	Rusca Montană - Țarcu – Retezat Corridor	New pipe	Maybe 9110, 9170, 91V0 6520 6510	No	For habitats 9110, 9170, 91V0: The planning should consider avoiding as much as possible the mature forest and projecting the route in the vicinity parallel with DN68 road. 6520 habitat: inclusion of some rapid rehabilitation measures where impact cannot be avoided. Development of measures to prevent / avoid and reduce the impact at planning phase, for the setting of the final route.
	ROSCI0129	North of Gorjul de Vest	New pipe	There is not enough information	Maybe 4070*, 91E0*, 7220*, 9180*	Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. When setting the location of the works, avoiding the priority habitats will be taken into account. Measures to prevent / avoid and reduce

Project code	Site code	Site name	Type of investment foreseen in the overlapping area	Potentially affected habitat of Community interest	Potentially affected main habitat	Measures proposed to prevent and reduce impacts
						impact at planning phase.
	ROSCI0236	Strei - Hațeg	New pipe	There is not enough information	Maybe 6240*	Avoiding the intersection with steppic subpanonian meadows or under /over crossing them. Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. At setting the location of the works, avoiding the priority habitats will be taken into account. Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0045	Jiu Corridor	New pipe	Maybe 2130	Maybe 6260*	Analysis of distribution of Community interest habitats in relation to the location of the project and plan the final route taking into account the location of the habitats from the site, with consulting the specialists involved in research and site administration, as the site shelters very rare habitats. When setting the location of the works, avoiding the priority habitats will be taken into account. Measures to prevent / avoid and reduce impact at planning phase.
	ROSCI0063	Defileul Jiului	New pipe	There is not enough information	Maybe 40A0*, 7220*	Analysis of distribution of Community interest habitats in relation to the location of the project and avoiding of habitats of Community importance at planning phase. When setting the location of the works, avoiding the priority habitats will be taken into account. Measures to prevent / avoid and reduce impact at planning phase.

Measures proposed for the prevention and reduction of possible impacts in Community interest species - specific cases

Project code	Site code	Site name	Type of investment foreseen in the overlapping area	Potentially affected species of Community Interest	Potentially affected species code of Community interest	Measures proposed to prevent and reduce impact
7.10	ROSPA0097	Pescăria Cefa - Pădurea Rădvani	New pipe	*Otis tarda*	A129	Measures to prevent / avoid and reduce the impact at planning phase. Planning the route, the applied method and especially the implementation period outside the breeding period between March and July. We recommend contacting the specialists involved in activities of research and conservation of the bustard, and collaboration with them on the entire phase of design and esecution of construction and installation works, as we speak of a very rare species on a national level.

10.STATEMENT OF REASONS WHICH LED TO THE SELECTION OF THE OPTIONS CHOSEN FOR TYNDP AND A DESCRIPTION OF HOW THE ASSESSMENT WAS CARRIED OUT, INCLUDING ANY DIFFICULTIES ENCOUNTERED IN PROCESSING THE INFORMATION

10.1. REASONS WHICH LEAD TO THE SELECTION OF THE OPTIONS CHOSEN FOR TYNDP

TYNDP is a general framework for promoting territorial cohesion through the development of natural gas transmission networks and interconnection between different gas sources and consumers under conditions of ensuring price competitiveness and security in ensuring the supply of natural gas. TYNDP allows the implementation of the Guiding Principles for the Sustainable Spatial Development of the European Continent (see chapter 2.2.2.2).

The development of the NGTNS depends on the possibilities of interconnecting with the neighbouring countries, respectively of ensuring the connection to the natural gas source and the choice of those routes whose cost-benefit analysis, including environmental aspects, will lead to minimizing costs and reducing the environmental impact as much as possible.

The analysis of the environmental impact assessment highlighted the positive and negative aspects of the development of the various strategic projects proposed, but it should be borne in mind that the Plan is closely connected with other plans such as those on spatial planning, development of new energy sources, etc. This Plan was developed for the purpose of developing the NGTNS, taking into account environmental aspects.

The process of developing the TYNDP was a very complex one. This process required the following steps to be taken:

- *Step 1:* Identify the objectives of the Plan. Strategic objectives are those objectives defined at the governmental or ministerial level. For TYNDP these are the objectives from the Romania Energy Strategy draft for the period 2020-2030 with the perspective of 2050 prepared by the Ministry of Economy, Energy and Business Environment.
- *Step 2:* Defining problems - is the result of a diagnostic analysis of the national natural gas transmission system. The underlying causes have been identified and are responsible for the manifestation of the issues.
- *Step 3:* Generating projects: these are specific interventions that address operational objectives and issues.
- *Step 4:* Project assessment and prioritization: A systematic process of project assessment is required for two main reasons. First, there may be several projects that meet a certain operational objective and thus a selection process becomes necessary. Secondly, a project may solve a problem but may have a poor quality-price ratio.
- *Step 5:* Development of the Scenarios of the Development of the Scenarios of the of the Development Plan for the National Natural Gas Transportation System.

The necessary data underlying the development of the TYNDP cover several areas:

- Statistical indicators related to the natural gas market in the country and in the region
- Natural gas consumption and natural gas consumption forecasts for the period 2021-2030
- Natural gas production and forecast of domestic natural gas production for the period 2021-2030
- Underground natural gas storage and forecasts for underground natural gas storage 2021-2030

Depending on the fundamental problems identified, a series of projects/investments have been established that could lead to their solution.

In the project selection, three evaluation criteria were taken into account: economic, environmental and political (including funding).

The Development Plan for the National Natural Gas Transportation System 2019-2028 version provided the necessary information to start the environmental assessment procedure. This Plan was published in an advisory version in May 2019 and was the starting point for the preparation of the Environmental Report and the basis for discussion for the working groups under the ESA procedure.

Between August 2019 and December 2019, the TYNDP 2019-2028 version was analyzed, debated and improved. The consultations with stakeholders (Ministry of Energy, National Energy Regulatory Authority and other third parties) also played an important role in the finalisation of the TYNDP). These consultations have helped to identify the root causes of the problems in the national gas transportation system, the detailed investigation of the fundamental problems of the sector, obtaining additional information necessary for the elaboration of the TYNDP.

In parallel with the technical consultations, consultations for the strategic environmental assessment for TYNDP also took place. The consultations within the working group specifically set up for strategic environmental assessment have enabled the setting of specific environmental objectives, environmental objectives relevant to the plan, identification of the potential environmental impact generated by the implementation of the proposed projects, preventive measures, reduction/compensation of significant effects on the environment, the programme to monitor the significant environmental effects of the plan implementation.

The TYNDP version 2019-2028 was based on 14 strategic natural gas transmission projects and 5 possible natural gas storage projects, submitted for analysis by the promoting authorities.

Following the proposals made in the Working Group, the content of TYNDP has improved, the action

directions to achieve its objectives being presented in several development scenarios.

The final version of the TYNDP 2021-2030 Report includes 3 analysis scenarios in terms of environmental impact:

- The "Zero Development" (“Do nothing”) scenario - which does not propose any measures or investments in natural gas transportation infrastructure;
- The “Reference Scenario” (“Do minimum”) - which takes into account projects for which the Final Investment Decision (FID) has been taken and projects in an advanced stage of development for the Final Investment Decision (A non FID);
- The Development scenario ("Do maximum") - which takes into account all projects proposed by the Plan.

The projects included in the development scenarios are specified in TYNDP -chapter 12 and in the Environmental Report - tables 13 and 15.

The effects of not implementing TYNDP (Do Nothing Scenario) can be found in the content of this environmental report in Chapter 3.15.

The Do minimum scenario is the starting point for the Do maximum development scenario. The projects included in this scenario are projects that, in their majority, are already in the implementation stage, have secured funding and will be carried out regardless of whether or not TYNDP is approved as they are considered Projects of Common Interest (PCI) by the European Commission.

The scenario selected by TYNDP and proposed for implementation is the Do maximum scenario, oriented towards the “Development based on economic and environmental sustainability” or “Do Something Policy”. The projects included in this scenario are the best alternative from an economic and environmental point of view.

The Do maximum oriented development scenario oriented towards "Development based on economic and environmental sustainability" or "Do Something Policy" brings the following economic and environmental benefits:

- maximizing energy efficiency throughout the natural gas transportation chain and creating an intelligent, efficient, reliable and flexible natural gas transportation system.
- use of low carbon resources
- integration of the natural gas market and interoperability of natural gas transportation systems in the region;
- convergence of natural gas prices in the region;
- increasing the flexibility of the European natural gas transportation system by creating two-way flow interconnections;
- opening the access of Romania and the European Union to a new source of natural gas - by interconnecting the BULGARIA-ROMANIA-HUNGARY-AUSTRIA corridor with the Black Sea;
- increasing competition in the European gas market by diversifying sources, transport routes and companies active in this region;
- increasing the security of natural gas supply;
- reducing the degree of dependence on natural gas imports from Russia;
- boosting the development of renewable energy production in the region (especially wind and solar energy) having regard to the possibility of using natural gas as a backup for renewable energies, which leads to a significant increase in the sustainability of proposed projects.

10.2. DIFFICULTIES ENCOUNTERED

The difficulties encountered during the process of carrying out the strategic environmental assessment for TYNDP are the following:

- TYNDP proposes a considerable number of investments, with extended coverage area. For the projects included in the Do -maximum scenario, the routes, for some of them, are indicative, at corridor level, part of which may undergo significant changes in the technical project phase. Also, for part of the projects, the type of work specific to each project, their volume, the carrying out/implementation period or execution details is not known at this stage in order to be able to achieve a quantification of the impact generated by each project. In view of these aspects, the analysis regarding the determination of the possible environmental characteristics to be affected as well as the potential effects generated by TYNDP on the environment was carried out starting from the nature of the proposed investment.
- The Environmental Report did not include field activities to collect data and information on the exact characteristics of the locations of the proposed investments, the assessment was performed using existing statistical data at national level and GIS analysis.
- The elaboration of the environmental assessment was based on an extensive documentation, but the accuracy of the assessment was diminished by the relatively low quantitative level of the database and of the information belonging to the public domain, respectively:
    - Lack of GIS support for the spatial delimitation of SEVESO units, spatial location of historical and cultural heritage assets;
    - Lack of approved management plans for the protected areas included in Natura2000 in the implementation area of the Plan.
    - The still low availability of spatial location data of habitats and populations of species of conservation interest.
- For some of the projects proposed by the Do maximum scenario, different locations or route variants for 2 projects are still being analyzed: project 8.3 for which 4 possible locations are currently being analysed and project 7.12 Eastring for which 3 route options are being analysed.
- The Eastring Project is a large-scale project, promoted by EUSTREAM, which aims to connect natural gas transportation systems in Slovakia, Hungary, Romania and Bulgaria in order to gain access to natural gas reserves in the Caspian and Middle East regions. Given the still incipient stage of project analysis, the information provided for this project is very limited.
- Also, the projects related to the modernization/refurbishment / capacity increase for the natural gas storage facilities are in the initial stage of development, the available information being reduced.

11. DESCRIPTION OF THE MEASURES ENVISAGED FOR MONITORING THE SIGNIFICANT EFFECTS OF THE TYNDP IMPLEMENTATION

The program for monitoring the effects of the implementation of the TYNDP aims at identifying, respectively preventing the negative effects on the relevant environmental objectives and allows proposing additional protection measures, to reduce the environmental impact or to remedy areas that may be affected.

The monitoring program monitors:

- the way in which the relevant environmental objectives are met through the TYNDP implementation - obtaining and recording information on significant effects on the environment, implementation and monitoring of all types of effects: positive, negative, direct, indirect, cumulative;
- The validity of the predictions on the assessment of potential environmental effects and conclusions of the Strategic Environmental Assessment and the Appropriate Assessment;
- Identification of unforeseen negative effects and the possibility of applying appropriate remedial action that can be taken;
- Whether the proposed measures to diminish/reduce the effects on the environment are implemented and allow their effectiveness to be verified.

The monitoring program includes all environmental aspects and defines the following:

- elements that will be monitored taking into account the environmental objectives relevant to the TYNDP
- Indicators to be followed (these indicators make it possible to monitor the effectiveness of the proposed impact mitigation measures, the achievement of the proposed objectives and targets)
- Performance period/monitoring frequency (monitoring frequency depends on the identified problem, sometimes a single monitoring is needed, sometimes regular monitoring and long-term monitoring is required)
- The responsible (who is responsible for organizing and coordinating the monitoring system)

The reference period for the application of monitoring measures includes four stages: planning, design, construction and operation.

At the end of each calendar year a Report will be prepared which will include information on environmental monitoring, monitoring methods, monitoring results and measures to reduce the environmental impact for the investments proposed by TYNDP. Environmental information will be presented on environmental components, using the indicators in the following table as well as other indicators recommended by the Competent Environmental Authority for each project

To monitor the effects of the plan, the indicators in the following table are proposed.

Table 38 Proposed indicators for monitoring the effects of TYNDP 2021-2030

Environmental aspect	Environmental objective	Proposed indicators	Aim	Frequency	Description	Responsible
AIR	REO 1 Preventing or reducing the impact of pollution sources on air quality	Number of new fixed pollutant emission sources introduced by the implementation of TYNDP and their characterization	The resulting emissions shall fall within the maximum permissible concentrations according to the legislation in force (Law 104/2011, Order 462/1993, Law 188/2018)	Annually	Emission sources that generate pollutant emissions into the atmosphere by their operation, will be taken into account	NCNGT Operator
	REO2. Reducing at national level of emissions of air pollutants generated by the natural gas transportation sector	Technological consumption determined by the loss of natural gas through leaks. Number of sources for pollutants emission for NTS.	Keeping the level of emissions in the limits approved by Law 104/2011 on ambient air quality, updated	Annually	The emission sources that generate, through their operation, emissions of pollutants into the atmosphere will be taken into account.	NCNGT Operator
Surface water and groundwater	REO3. Maintaining the ecological status of running water	Number of watercourses whose quality has been modified by the implementation of TYNDP	Zero	Annually	The state of surface water downstream of the project implementation area will be compared to the reference state	NCNGT Operator
	REO 4. Prevention of changes in the morphology and hydrology of surface water bodies	Number of watercourses that have undergone morphological or hydrological changes through the implementation of TYNDP	Zero changes produced to the hydrological and morphological regime of watercourses	Annually	Changes may occur in the morphology of the riverbed and the banks, the leakage dynamics as a result of works on watercourse	NCNGT Operator

Environmental aspect	Environmental objective	Proposed indicators	Aim	Frequency	Description	Responsible
					crossings by natural gas transportation pipelines. It will be verified whether measures are proposed and implemented for projects included in the TYNDP to prevent changes in the morphology and hydrology of surface water bodies	
	REO 5. Prevention of the contribution of pollutants in surface and groundwater	Number of fixed sources of surface and groundwater water pollution introduced by the implementation of TYNDP and their characterization.	The quality indicators of the discharged wastewater must meet the maximum permissible concentrations according to the legislation in force. (GD 188/2002 updated for the approval of certain Norms regarding the conditions for discharging wastewater into the aquatic environment of waste water)	Annually	Emission sources that generate, by their operation, emissions of pollutants in surface or underground waters (drainable basins, small wastewater treatment plant, etc).	NCNGT Operator
SOIL AND SUBSOIL	REO 6. Protecting soil quality, composition and functions	High quality land areas (agricultural land, pastures, forests, etc.) temporarily and permanently occupied by TYNDP projects (ha)	The areas occupied in the forest fund, vineyards, orchards should be as small as possible	Annually	It should be considered, from the design phase, that the occupied areas are as small as possible - in	NCNGT Operator Natural gas storage facility operator

Environmental aspect	Environmental objective	Proposed indicators	Aim	Frequency	Description	Responsible
					relation to the strict minimum. They will occupy, if possible, already anthropogenic or unproductive affected lands and measures will be imposed to restore them to the initial state or even measures to re-enter the productive circuit for these lands	
WASTE MANAGEMENT	REO 7. Technically, economically and environmentally optimal waste management.	Specific waste production for projects proposed by TYNDP, tons/ year in relation to pipe lengths or built-up areas	A target will be set based on past performance	Monthly evidence and annual reporting according to GD 856/2002	Reports will be made of the amount of waste generated both during the construction period and for the operation period, according to GD 856/2002v In the design phase, special attention will be paid to this aspect by optimally performing the preliminary measurements and estimates so that the losses are	NCNGT Operator Natural gas storage facility operator
		The degree of waste recovery (by reuse or recycling) for proposed TYNDP projects, tons/year, related to pipe lengths or built-up areas	The value of the indicator shall tend towards 100% recovery	Monthly records and annual reporting to the competent environmental authorities, according to GD 856/2002		

Environmental aspect	Environmental objective	Proposed indicators	Aim	Frequency	Description	Responsible
					as reduced as possible.	
BIODIVERSITY	REO 8. Reducing pressures due to the construction of transport infrastructure of gas networks that lead to the damage to biodiversity.	Areas from Natura2000 sites or other protected areas occupied by projects (ha)	The value of the indicator must be zero.	Annually	The route of new projects will avoid, as far as possible, the crossing of protected natural areas or, where this is not possible, the occupancy rate should be minimal and should not affect habitats.	NCNGT Operator Natural gas storage facility operator
		The priority habitat type and area affected by plan objectives (ha)	Zero priority habitat areas affected	Annually	Project locations shall not intercept priority habitats, for which compensatory measures need to be taken	NCNGT Operator Natural gas storage facility operator
		The type and area of the community habitat in the Natura2000 network affected by the objectives of the plan (ha)	This value must tend to zero	Annually	If project locations intercept habitats of community interest, the effects on habitat and site preservation status will be assessed in an appropriate assessment and reduction or	NCNGT Operator Natural gas storage facility operator

Environmental aspect	Environmental objective	Proposed indicators	Aim	Frequency	Description	Responsible
					alternative measures will be proposed, as appropriate.	
	REO9. Limiting the deforested areas	Deforested areas from the forest fund	Reduction of deforested areas caused by the development of natural gas transportation infrastructure Establishment and application of optimal compensatory measures for the areas affected by the permanent removal from the national forest fund, according to the provisions of the Forestry Code.	Annually	As far as possible, the route of new projects will avoid the crossing of forest areas or, where this is not possible, the occupancy rate should be kept to a minimum and protection or compensation measures should be implemented, as appropriate.	NCNGT Operator
LANDSCAPE AND VISUAL ENVIRONMENT	REO 10. Development of gas network transport infrastructure taking into account the landscape management, protection and planning policies	The total landscape transformations that could occur as a result of the performance of TYNDP (permanently and temporarily occupied land areas, deforested, stripped areas, number of decommissioned buildings)	Zero transformations in areas with special landscape value	Annually	Analysis of the existing situation when establishing the route for new NGTNS locations.	NCNGT Operator Natural gas storage facility operator
NATIONAL CULTURAL HERITAGE	REO 11. Ensuring the protection of cultural heritage	Goods and historical monuments inventoried on the route of gas transportations pipelines proposed by TYNDP	Preferably this value is zero	Annually	For each project, the archaeological load will be unloaded	NCNGT Operator Natural gas storage facility operator

Environmental aspect	Environmental objective	Proposed indicators	Aim	Frequency	Description	Responsible
POPULATION and HUMAN HEALTH	REO 12. Protection of human health by maintaining or limiting the impact generated by the activity of natural gas transportation on the quality of environmental factors	The number of people likely to be exposed to high concentrations of pollutants in the areas where the plan is implemented.	This value must tend to zero	It will be analyzed in the design phase	When establishing the final route alternatives for the new transport corridors, densely populated areas will be avoided as much as possible.	NCNGT Operator Natural gas storage facility operator
	REO 13. Ensuring utilities related to access to gas networks for the population and improving socio-economic conditions in the area.	The coverage degree of the natural gas transmission network (km of newly built natural gas transmission networks).	Increasing trend	Annually	The influence of the projects proposed by TYNDP on the demand for the connection of the population and economic agents to the gas network.	NCNGT Operator
	REO14. Reducing the noise generated by the operation of the equipments specific to the natural gas storage deposits	The construction of the natural gas storage projects proposed by TYNDP will not determine an increase in the level of noise pollution in the location area.	Perform insulation in the areas where noise generating equipments are located so that the level of noise at the inhabited areas does not surpass the maximum admitted level.	Annually	Ensure specific measures and equipment for the insulation and protection of noise and vibrations generating sources, verify their efficiency and operate only those that do not overpass the maximum	Operator Natural gas storage facility

Environmental aspect	Environmental objective	Proposed indicators	Aim	Frequency	Description	Responsible
					admitted noise level.	
ENERGETIC EFFICIENCY	REO.15. Increasing the energy efficiency of the natural gas transportation network	The number of projects proposed by TYNDP for the modernization/rehabilitation/refurbishment of NGTNS carried out	100% projects proposed by TYNDP for modernization/ rehabilitation/refurbishment carried out	Annually	Improving energy efficiency throughout the natural gas transmission activity chain.	NCNGT Operator Natural gas storage facility operator
CLIMATIC CHANGES	REO 16. Increasing the use of low-carbon energy sources	Building/modernization/rehabilitation/refurbishment of the natural gas transmission network (km of natural gas transmission networks built/modernized / rehabilitated/refurbished in relation to the situation proposed by TYNDP).	100% projects proposed by TYNDP for modernization/ rehabilitation/refurbishment carried out	Annually	Achieving this goal will facilitate the placing on the national market of less polluting fuels, respectively natural gas	NCNGT Operator
	OMR17. Reducing the vulnerability of the natural gas transportation network to climate change	The number of projects proposed by TYNDP for the modernization / rehabilitation / refurbishment of NTS, adapted to the effects of climate change (extreme weather conditions, high / low temperatures, floods)	Protecting the natural gas transportation infrastructure and its development taking into account the need to adapt to climate change.	Annually	Protect the existing natural gas transportation infrastructure and its development considering the need to adapt to the effects of climate change.	NCNGT Operator
RISK PREVENTION	REO 18. Prevention of the risks of major accidents and limiting the consequences generated by the occurrence of major accidents on the	Number of SEVESO objectives carried out by TYNDP that meet the operating conditions related to the protection of the population and the environment	100%	Annually	SEVESO objectives present the highest risk in case of damage followed by fire	Natural gas storage facility operator

Environmental aspect	Environmental objective	Proposed indicators	Aim	Frequency	Description	Responsible
	health of the population and on the quality of the environment.					
Preservation and efficient use of natural resources	REO 19. The use of natural gas resources efficiently while minimizing environmental impact	Reducing technological losses on the NG transmission network	Downward trend	Annually	Report to previous year	NCNGT Operator
INCREASE AWARENESS OF ENVIRONMENTAL ISSUES	REO20l.Involvement of the public and its consultation throughout the decision-making process in establishing and implementing the proposed measures to reduce the environmental impact	Number and type of public environmental information provided Number of communication and promotion events organized The number of web page accesses with plan environmental information.	At least 1 action / year	Annually	In the stage of Strategic Environmental Assessment and Stage of Environmental Impact Assessment	NCNGT Operator

12. SUMMARY WITHOUT TECHNICAL NATURE

12.1. Introduction

DEVELOPMENT PLAN FOR THE NATIONAL NATURAL GAS TRANSMISSION SYSTEM 2021 - 2030 (TYNDP) is part of the category of plans that are subject to the strategic environmental assessment procedure. In accordance with decisions no. 35520/2.10.2019 and no. 43114/ 29.11.2019 issued by the Ministry of Environment - Impact Assessment Service, TYNDP is subject to the environmental assessment procedure in accordance with the provisions of GD 1076/2004 on the establishment of the procedure for carrying out the environmental assessment for plans and programs, respectively the appropriate assessment procedure.

The author of the Environmental Report is Fundatia Pronatura, in collaboration with SC NATURALNET SRL, both companies registered in the LIST OF EXPERTS ELABORATING ENVIRONMENTAL STUDIES, established pursuant to the provisions of the MEWF (Ministry of the Environment, Waters and Forests) Order 1134/20.05.2020, under item 244 and position 396 respectively.

The Environmental Report includes the following information:
- general data on the TYNDP content, the main, specific and environmental objectives of the TYNDP;
- analysis of the relationship with other relevant plans and programs;
- relevant aspects of the current state of the environment and of its probable evolution in the situation of non-implementation of TYNDP;
- the environmental characteristics of the area may be significantly affected;
- existing environmental issues relevant to the natural gas transportation sector;
- environmental protection objectives, set at national, community or international level, which are relevant to TYNDP
- potential significant effects on the environment and conclusions of the appropriate assessment;
- potential significant effects on the environment, including health, in a cross-border context;
- the measures proposed to prevent, reduce and compensate as completely as possible any negative effects on the environment of the implementation of the plan or program;
- the statement of reasons which led to the selection of the options chosen for TYNDP and a description of how the assessment was carried out, including any difficulties encountered in processing the information;
- the description of the measures envisaged for monitoring the significant effects of the implementation of the plan or program;
- the general conclusions that emerge from the strategic environmental assessment;
- a non-technical summary of the information provided.

12.2. General presentation of the Development Plan for the Natural Gas National Transportation System 2021-2030

TYNDP presents the development directions of the Romanian natural gas transportation network and of the major projects that Transgaz SA intends to implement in the next 10 years.

The natural gas transportation activity is carried out by Transgaz based on the Concession Agreement for the pipelines, installations, equipment and facilities related to NGTNS, in the public domain of the Romanian state, concluded with the National Agency for Mineral Resources (ANRM), approved by GD no. 668/2002 published in the Official Gazette no. 486/8th July 2002, valid until 2032.

The operation by Transgaz SA Mediaş of the National Natural Gas Transportation System mainly includes the activities:

- trade balancing
- contracting natural gas transportation services

- dispatching and technological regimes
- natural gas quality measurement and monitoring
- natural gas odorization and international natural gas transportation
- natural gas research and design

Through the DEVELOPMENT PLAN FOR THE NATIONAL NATURAL GAS TRANSMISSION SYSTEM 2021 - 2030 (TYNDP) for the next 10 years, Transgaz proposes major investment projects for the strategic and sustainable development of the natural gas transportation infrastructure in Romania, while pursuing its compliance with the requirements of European regulations in the field and environmental protection.

The DEVELOPMENT PLAN FOR THE NATIONAL NATURAL GAS TRANSMISSION SYSTEM 2021 - 2030 (TYNDP) carried out in accordance with the provisions of Law no. 123/2012 on electricity and natural gas, with the objectives proposed in the framework of the Energy Strategy of Romania 2020-2030 with the perspective of 2050, meets the requirements of the European energy policy on:

- ensuring security of natural gas supply;
- increasing the interconnection of the national gas transportation network to the European network;
- increasing the flexibility of the national natural gas transportation network;
- liberalization of the natural gas market;
- the creation of the integrated natural gas market at European Union level;
- ensuring the connection of third parties to the transportation system, according to specific regulations, within the limits of transport capacities and in compliance with technological regimes;
- extension of the pipeline network to the entrance to localities certified as tourist resorts of national and local interest, respectively, when these localities are at a maximum distance of 25 km from the connection points of the transport operators and of the system;
- ensuring the connection to the natural gas network of new, job-generating investments.

A sustainable development of the natural gas transportation infrastructure in Romania, involves an extensive investment programme that allows the alignment of the NGTNS to the transport and operation requirements in accordance with the European environmental protection rules. In this respect, Transgaz proposes:

- promoting investment projects that contribute to the achievement of a sustainable natural gas transportation system in safe conditions provided by the legislation in force, limiting the impact on the environment and the population;
- carrying out projects so that the impact on the natural and anthropogenic environment is minimal;
- carrying out projects so that the impact on biodiversity is minimal

The situation of the national natural gas transportation system

The main components of the National Natural Gas Transportation System on 31.12.2020 were the following:

The main components of NGTNS on 31.12.2020

NGTNS objective/component name	M.U.	Value
Main transport pipelines and natural gas supply connections, of which - international transport pipelines (Transit II, Transit III) - BRUA	km	13.925 369 479
Measuring control stations (MCS) in operation	piece	1.128
Valve control stations (VCS, NT)	piece	58

NGTNS objective/component name	M.U.	Value
Imported gas measuring stations (GMS) (Giurgiu, Horia, Isaccea import, Negru Vodă IV, Medieșu Aurit, Isaccea Tranzit I, Negru Vodă I)	piece	7
Measuring stations located on gas transportation pipelines (GMS) (Isaccea Tranzit II, Isaccea Tranzit III, Negru Vodă II, Negru Vodă III)	piece	4
Gas compression stations (GCS) (Șinca, Onești, Siliștea, Jupa , Podișor)	piece	6
Cathodic protection stations (CPS)	piece	1.041
Gas odour stations (GOS)	piece	982

Regarding the natural gas transportation pipelines and connections, out of the 13,430 km in operation, approx. 74% have an effective service life of more than 20 years, close to their normal length of operation. However, their technical condition is maintained at an appropriate level due to the fact that the exploitation activity is carried out in the context of a predominantly preventive, planned, corrective, maintenance system and is supported by annual development and modernization investment programs.

The natural gas transportation system in Romania consists mainly of the following transport channels:

Southern Channel 1 - East-West

Presently, the following are ensured by the pipelines used as part of this channel:
- natural gas import, using the interconnection point Csadpalota with Hungary;
- natural gas import, using the interconnection point Giurgiu and Bulgaria
- takeover of the internal natural gas production from sources in Oltenia;
- natural gas supply to consumers in the Western and Southern areas - Bucharest.

The development of this natural gas transportation channel envisages the increase of the transportation capacity of the crossborder interconnection point with Hungary, at 4.4 bil. Mc/year, towards Csanapalota-Horia, and ensuring the natural gas transportation from the Black Sea towards the internal consumption areas and towards the crossborder interconnection points of this channel (Hungary, Bulgaria).

This development will involve the construction of new pipelines and the placement in certain locations (Podișor, Bibești, Jupa) of compression systems stations).

Central Channel 2 - East-West

Presently, the following are ensured by the pipelines used as part of this channel:
- natural gas import, using the interconnection point Csadpalota with Hungary;
- natural gas import, using the interconnection point Isaccea with Ukraine;
- takeover of the internal natural gas production from sources in Ardeal;
- natural gas supply to consumers in the Eastern and Western areas.

The development of this natural gas transportation channel envisages the increase of the transportation capacity of the crossborder interconnection point with Hungary, to 8.8 bil. mc/year in the direction Csanapalota-Horia and the supply of the bidirectional natural gas transportation.

To this end, the rehabilitation of certain existing pipelines in this channel, the building of new pipelines and the setting up of compression systems or the amplification of some of the existing ones must take place.

Channel 3 North-South

Presently, the following are ensured by the pipelines used as part of this channel:
- natural gas import, using the interconnection point Medieșu Aurit with Ukraine;
- takeover of the internal natural gas production from sources in Ardeal;
- storage of natural gas in internal storage areas;

- natural gas supply to consumers in the Northern, Central and South-East areas - Bucharest.

Interconnector 4 North-West

At present, the following are ensured by the pipelines used as part of this channel:

- natural gas supply to consumers in the Western area - Oradea;
- Interconnection of channels 1, 2 and 3

Interconnector 5 South-East

At present, the following are ensured by the pipelines used as part of this channel:

- Transportation of imported gas from the interconnection point Isaccea with Ukraine towards the Bucharest consumption area and this area's storage facilities (Bilciurești, Urziceni, Bălăceanca);
- natural gas supply to consumers in the South-Eastern area;
- Interconnection of channels 1, 2, 3 and 6

Eastern Channel 6

Presently, through this channel's pipelines, the transportation of natural gas from the production areas located in the Eastern part of the country and the interconnection point Isaccea towards Moldova de Nord consumption area is ensured.

The development of this natural gas transportation channel envisages to ensure the operation within the designed technical parameters of the physical bidirectional interconnection with the Republic of Moldova.

To this end, the rehabilitation of certain existing pipelines in this channel, the building of new pipelines and the setting up of two compression stations must take place.

Channel 7 - International Transport

Through the pipelines in this channel is presently performed the international transport of natural gas from Russia, via Ukraine, by Isaccea I+II+III interconnection point towards Bulgaria, Greece and Turkey, by Negru Vodă I+II+III interconnection point.

The development of this natural gas transportation channel envisages the performance of the physical interconnection with the national natural gas transportation system in Romania and the insurance of bidirectional flow in the crossborder interconnection points Isaccea and Negru Vodă by upgrading the measurement systems GMS Isaccea I and GMS Negru Vodă I.

STRATEGIC PROJECTS of TYNDP

The development directions for TYNDP envisage a large-scale development of the natural gas transportation network aimed at reconfiguring the natural gas transportation network which, although extensive and complex, was designed at a time when the emphasis was on the supply of natural gas to large industrial consumers and creating their access to resources concentrated in the centre of the country and in Oltenia, as well as at the only source of import.

The list of major projects proposed by SC Transgaz SA through TYNDP 2021-2030 is presented in the table below.

List of major projects proposed by SC Transgaz SA through TYNDP 2021-2030 is presented in the table below

Project code	Name of TYNDP project	Reasoning / Project importance	Project development stage
7.1. ***7.1.1*** ***7.1.2.***	**The development in Romania of the Natural Gas National Transportation System on Bulgaria - Romania - Hungary - Austria channel (BRHA)** ***Phase I*** ***Phase II***	- Provides the adequate natural gas transportation capacity between the cross border interconnection points RO-BG and RO-HU, to increase the interconnection degree to an European level; - Provides natural gas transportation capacities for the capitalization of natural gas from the Black Sea on the Central-European markets. The project was included in the updated list of common interest projects, published in November 2017 as appendix to Regulation 347/2013.	PHASE I of the project is finalised For phase II of the project the final implementation decision will be taken only if the project is commercially viable.
7.2.	**Development on Romanian territory of the Southern Channel for the takeover of natural gas from the Black Sea shore**	The project proposes the development on Romanian territory of a natural gas transportation infrastructure, from the Black Sea shore up to the Romanian-Hungarian border.	The following were obtained: Building permit. The final investment decision. The works procurement procedure is in progress.
7.3.	**Interconnection of the national transportation system with the international natural gas transportation pipelines T1 and reverse flow Isaccea**	▪ It creates a natural gas transportation channel between the markets in Bulgaria, Romania and Ukraine, in the situation where the new interconnection between Greece and Bulgaria is also performed; ▪ Physical reversible flows will be able to be supplied in Negru Vodă 1 point, according to the requirements of Regulation (EU) 1938/2017; ▪ It creates the possibility to takeover in the Romanian transportation system of natural gas found in the Black Sea, to capitalize them on the Romanian and on regional markets.	Finalised
7.4.	**TNS developments in North-Eastern Romania, for the improvement of the natural gas supply of the area, as well as to ensure transportation capacities to the Republic of Moldavia**	The performance of this project will improve the supply with natural gas in North-Eastern Romania, the necessary pressure and the natural gas transportation capacity of 1.5 bil mc/year will be ensured in the interconnection point between the natural gas transportation systems of Romania and of Republic of Moldavia.	Under construction, estimated completion date - 2021

Project code	Name of TYNDP project	Reasoning / Project importance	Project development stage
7.5.	**Amplification of bidirectional transport channel Bulgaria-Romania-Hungary-Austria (BRHA phase 3)**	In the hypothesis where the transportation capacities necessary for the capitalization of the natural gas from the Black Sea on the Central-Western European markets exceed the transportation potential of the BRHA Phase II channel, TRANSGAZ has planned the development of the central channel, which practically follows the layout of some pipes from the actual system, but which presently operates at inadequate technical parameters for a main pipeline.	The implementation of this project depends on the evolution of the capacity demand, respectively on the results of the processes of exploration/exploitation of the natural gas fields in the Black Sea or other on-shore perimeters, and a final investment decision will be taken only when the demand for Additional capacity is confirmed by booking agreements and contracts
7.6.	**New developments of NTS in order to takeover of natural gas from the Black Sea shore.**	The goal of the project is the creation of an additional point to takeover the natural gas supplied by the submarine exploitation perimeters in the Black Sea.	The Building Permit has been obtained. Execution works are in progress. Estimated completion deadline – year 2021.
7.7	**Interconnection Romania-Serbia - interconnection of the Natural Gas National Transportation System with the similar Serbian natural gas transportation system**	Romania-Serbia Interconnection - interconnection of the Natural Gas National Transportation System with the similar Serbian natural gas transportation system.	Obtaining a building permit in progress. Foreseen commissioning deadline - year 2021
7.8	**Upgrading of GMS Isaccea I and GMS Negru Vodă 1**	The project is undertaken to fulfil the requirements of the Interconnection Convention for Isaccea I Interconnection Point, concluded with PJSC Ukrtransgaz, Ukraine, on 19.07.2016 and the Interconnection Convention for Negru Vodă 1 Interconnection Point, concluded with Bulgartransgaz, Bulgaria, on 19.05.2016.	Isaccea 1- finalised for GMS Negru Vodă 1- Foreseen commissioning deadline - year 2021
7.9	**Interconnection of the natural gas national transportation system with the Ukrainian natural gas transportation system, on the direction Gherăești – Siret**	The project ensures the increase of the degree of interconnection of the national natural gas transmission network to the European natural gas network by interconnecting the NTS with the natural gas transmission system from Ukraine, on the route of Gherăești – Siret.	Transgaz developed the pre-feasibility study. The project is conditions by the accomplishment of the strategic project 7.4. Estimated completion deadline – year 2026, but it depends on the establishment of the parameters for the interconnection point and the implementation schedule of the project on the Ukrainian territory.
7.10	**Development / Modernization of natural gas**	The aim of the project is to create new natural gas transportation capacities or to increase existing capacities	The project is in an incipient phase, being completed only the Pre-feasibility Study.

Project code	Name of TYNDP project	Reasoning / Project importance	Project development stage
	transportation infrastructure in the North-Western area of Romania		The project will be developed taking into account the projects of major importance already in progress, to be executed on the Romanian territory (BRUA gas pipeline (7.1), Black Sea-Podișor pipeline (7.2), Romania's interconnection pipeline with the Republic of Moldova (7.4)
7.11	**Increase of the natural gas transportation capacity of the Romania-Bulgaria interconnection, on Giurgiu-Ruse direction**	The project is performed in order to fulfil the obligations undertaken by the Memorandum on the cooperation for the performance of the Vertical Corridor, concluded between Transgaz SA, Bulgartransgaz, DESFA SA, FGSZ Ltd. and ICGB AD.	The project is in an incipient stage, only the Feasibility Study being completed, the capacities to be developed part of this project will be set out subsequently, based on which the final technical solution being elaborated.
7.12	**Eastring–Romania**	The project aims to connect the natural gas transportation systems in Slovakia, Hungary, Romania and Bulgaria, to gain access to the natural gas storage facilities in the Caspian region and in the Middle East. EASTRING will offer the most profitable, direct transportation route between the gas platforms in the West of the European Union and the Balkan Region/Eastern Turkey - an area with a very high potential to provide gas from various sources. With this possibility to diversify the transportation routes, as well as the supply sources, the safe supply of the entire region will be ensured, mainly to the South-East European countries.	Feasibility study elaborated. Foreseen completion deadline: year 2027 for Phase 1 year 2030 for Phase 2.
7.13	**Monitoring, control and data acquisition system for cathodic protection systems afferent to the Natural Gas National Transportation System**	The implementation of the acquisition, command and monitoring system for the cathodic protection system will provide an increase durability and safety in the exploitation of transport pipelines, a simple operation of a complex protection system of the pipelines, with reduced maintenance expenses. The system will provide information on the pipeline's electrical safety, as well as for the intrinsic cathodic protection (without external cathodic current source), providing information in certain points or sections, for a restrictive rectification of the dispersion currents to alternative current induced in the pipeline.	Feasibility Study under progress Foreseen commissioning deadline: year 2023.
7.14	**Development of SCADA system for the Natural Gas National Transportation System**	The upgrading of the natural gas transportation infrastructure must be supported, in the following years, by the development of a top of the range, flexible SCADA system, by the upgrading of the hardware and software architecture, migrating towards a decentralized architecture, with the control distributed on	Feasibility study - pending completion. Foreseen commissioning deadline: year 2023

Project code	Name of TYNDP project	Reasoning / Project importance	Project development stage
		organizational administrative units, according to the TRASGAZ S.A. structure.	
7.15	**Upgrading of GMS Isaccea 2 and GMS Negru Voda 2 to achieve the bidirectional flow on pipeline T2**	To provide the bidirectional flow at the border with Ukraine and Bulgaria on the transit pipeline T2, the upgrading of natural gas measurement systems GMS Isaccea 2 and GMS Negru Vodă 2 is a must.	The projects will be developed depending on the market demand assessment results for the interconnection points located on T2 and T3 pipelines, on transportation direction Bulgaria-Romania-Ukraine (the trans-Balkan channel
7.16.	**Upgrading of GMS Isaccea 3 and GMS Negru Voda 3 to achieve the bidirectional flow on pipeline T3**	To provide the bidirectional flow at the border with Ukraine and Bulgaria on the transit pipeline T3, the upgrading of natural gas measurement systems GMS Isaccea 3 and GMS Negru Vodă 3 is a must.	
7.17.	**TNS interconnection to GNL Terminal, located at the Black Sea shore**	It will provide the takeover of natural gas from the Black Sea shore, using a GNL terminal.	The project is in its incipient stage.

In addition to these strategic projects, TYNDP also envisages 75 projects included in the Upgrading and Investments Development Plan for the Natural Gas National Transportation System for 2020-2023, presented in Annex 2. Given that these projects have an insignificant impact on the environment, the proposed development scenarios and the Environmental Report only analyze the implementation of projects classified as strategic projects.

Underground storage of natural gas

Underground storage of natural gas plays a major role in ensuring a safe supply of natural gas, facilitating the balancing of the consumption-internal production-natural gas import, by covering the consumption peaks caused mainly by temperature variations, as well as the upkeeping of the optimal functioning features of the natural gas national transportation system, in order to obtain technical and economical advantages.

Underground storage facilities are used mainly to:

- Cover consumption peaks and demand's fluctuating regime;
- Operative recovery of functional parameters of the transportation system (pressures, yields);
- The control of deliveries in extreme situations (cessation of the sources, accidents, etc

Also, the underground storage of natural gas has the strategic role to provide the supply of natural gas from storage facilities, in cases of force majeure (natural disasters, earthquakes and other unforeseen events).

The activity of underground storage of natural gas is a regulated activity and can only be performed by NAER licensed operators.

The underground storage capacity of natural gas is provided in Romania by 6 underground natural gas storage facilities, with a total active capacity of 33.2758 TWh per storage cycle, respectively an injection capacity of 270.4450 GWh/day and an extraction capacity of 345.550 GWh/day, managed by two storage system operators:

- *SNGN ROMGAZ SA - natural gas storage branch DEPOGAZ Ploiești SRL* which holds the license to operate 5 underground natural gas storage facilities, with the cumulated active capacity of 90.6% of the total storage capacity and
- *SC Depomureș* SA operating the underground natural gas storage facility in Târgu Mureș.

Development directions of the natural gas storage system

The list of the natural gas storage projects, proposed by TYNDP 2021-2030, is presented in the table below.

List of the natural gas storage projects, proposed by TYNDP 2021-2030

Project code	Name of project / Operator	Project goal	Development stage
Operated by N.G.N.S. ROMGAZ SA - natural gas storage branch DEPOGAZ Ploiești SRL			
8.1.	**Upgrading of the natural gas storage system's infrastructure in Bilciurești**	The goal of the project is to increase the daily supply capacity of natural gas from the storage in Bilciurești up to a yield of 18 million mc/day and to provide an increased degree of exploitation safety	The project is during its designing phase. Foreseen completion deadline: 2025
8.2.	**Increase of the natural gas underground storage capacity of the storage facility in Ghercești**	The project aims to complement the infrastructure of the Ghercești natural gas storage system, to provide operating conditions at the capacity of 600 million m3/cycle	The project is in its incipient stage. Foreseen completion deadline: 2026
8.3	**New natural gas underground storage facility in Moldavia**	The goal of the project is to develop a new underground storage facility in North-Eastern Romania (the Moldavia region). Conversion into an underground storage facility of one or of several depleted fields amongst the following: Pocoleni, Comănești, Todirești or Davideni.	The project is in its incipient stage. Foreseen completion deadline: 2029
8.4	**Increase of the natural gas underground storage capacity of the storage facility in Sărmășel (Transylvania)**	The project aims to develop the existing underground storage facility in Sărmășel by increasing the capacity from 900 million m3 / cycle to 1550 million m3 / cycle.	The project is in its incipient stage. Foreseen completion deadline: 2024.
Operated by SC Depomureș SA			
8.5	**Storing unit - Depomureș - engineering and development of natural gas underground storage facility in Târgu Mureș**	The project aims to refurbish and develop the underground natural gas storage facility in Târgu Mureș to improve the storing technical conditions and to increase the performance of the supplied services, especially in the context of the actual dynamics of the natural gas market. The development project of Depomureș was declared in 2013 a Common Interest Project (CIP) by the European Committee. The project is included on the Common Interest Projects' list in force, in the NSI Gas corridor (Central and Eastern Europe region), bearing the reference no. 6.20.4	The project is in the process of obtaining the final investment decision. Foreseen completion deadline for Stage I - year 2023. Stage 2 will start only after the completion of Phase 1 implementation.

Benefits of the Projects

Romania aims to become an energetic pole in Eastern Europe, from the point of view of creating a natural gas transportation network strongly interconnected with similar natural gas transportation networks in the region, as well as from the natural gas supply point of view.

The three main directions in which Romania must work and develop to achieve this status are:

- The interconnection of the natural gas and electricity networks and the creation of the physical and institutional infrastructure necessary for the operation of a liquid energy market;
- The development of new, endemic sources of natural gas and the integration on regional electricity markets;
- The observance of the European energetic policies, the increase of the negotiation capacity within the EU institutions and the collaboration with other member states in supporting the common strategic goals.

Through its significant resources and opportunities offered by geographical positioning, Romania can ensure a high degree of energy security and regional integration.

Today, the cross-border interconnection of the networks is a priority in Romania's energetic policy. To answer the requirements of the European Union's energy policy, based on three fundamental objectives: energetic safety, durable development and competitiveness, Transgaz SA has provided in its management plan for the period 2017-2021 the increase of the level of adequacy of its natural gas transportation network, in order to ensure the interoperability with the neighbouring systems, the development, rehabilitation and upgrading of natural gas transportation infrastructure, the improvement of efficiency and the interconnection with the natural gas transportation systems of neighbouring countries.

Any scenario for the development of natural gas and electricity production or the diversification of external sources of import requires an adequate transport infrastructure. By achieving the objectives set forth in the 10-year Development Plan, 2021-2030, Transgaz wishes to become an important natural gas transportation operator on the natural gas international market, with a transportation system which is upgraded, smart and integrated at European level and with a modern management system, aligned to the international performance standards and laws.

Based on the significant dependence of the European energy market in the import of energetic resources from Russia and Middle East, the role of natural gas reserves discovered in the Black Sea is, undoubtedly, of major importance for Romania's energetic safety, for the reinforcement of Romania's role as an important EU player as energy producer and exporter, for the inclusion of the country in the main European gas transportation channels and for the increase of the economic well-being in the following decades.

By 2030,with the necessary interconnections, Romania will have had several options for importing natural gas:

- using the liquefied natural gas (LNG) regional terminals in Greece, Croatia and Poland, the Romanian market will be able to purchase gas from the Levantine Basin (Eastern Mediterranean);
- using the Bulgaria-Romania interconnection, Caspian gas can be imported from the Southern Gas Corridor

As an EU member state, Romania has chosen the path of natural gas market liberalization and the interconnection of TNS to neighbouring states' transportation networks. This has allured significant Romanian and international investments in the exploitation and development of new deposits, which have consolidated a long-term elevated degree of availability of natural gas in the national economy.

12.3. Connection with other plans and programs

The Environmental Report analyzed the most important existing plans, programs, strategies, policies, conventions, both at national and European level, which are related to the natural gas transportation sector in order to identify common issues and themes with those of the Development Plan of the National Natural Gas Transportation System 2021-2030 subject to strategic environmental assessment.

The list of studied documents is:

- European regulations
    - (EU) Regulation 2017/1938 of 25 October 2017 on measures to ensure security of gas supply adopted by GD 32/2019 for the approval of the Preventive Action Plan on measures to ensure security of gas supply and the Emergency Plan

-European and national policies
    - EU Energy Policy

- National plans
    - Integrated National Plan in the field of Energy and Climate Change (PNIESC) 2021-2030 - April 2020 version
    - National Action Plan in the field of energy efficiency (PNADEE) IV approved by GD 122/2015
    - The national waste management plan 2018-2025, approved by GD 942/2017
    - Operational Program for Sustainable Development 2021-2027
    - Updated National Management Plan afferent to the national segment of the international hydrographic basin of Danube River which is in the territory of Romania, 2016-2021 approved by GD 859/2016

- European and national strategies
    - EU Strategy for Liquefied Natural Gas and Gas Storage, 16 February 2016
    - Romanian Territorial Development Strategy 2013 (RTDS)
    - Polycentric Romania 2035- Territorial cohesion and competitiveness, development and equal opportunities for people
    - National Strategy for the Sustainable Development of Romania Horizons 2010-2020-2030
    - Romanian Energy Strategy (SER) for the period 2019-2030 with the perspective of 2050.
    - National Strategy and Action Plan for biodiversity conservation 2014-2020 approved by GD no. 1081/11.12.2013
    - Strategy for culture and national heritage 2016-2022
- Other documents
    - Guiding Principles for the Sustainable Territorial Development of the European Continent, (CEMAT 2000)
    - National territory management plan (NTMP)
    - Large Infrastructure Operational Programme 2014-2020
    - Directive 2014/94/EU of the European Parliament and of the Council of 22 October 2014 on the installation of infrastructure for alternative fuels (adopted by GD 87/2018).

The analysis of these documents has shown that the main European and national objectives related to the natural gas transportation system are common to those proposed in TYNDP and are aimed at achieving the same benefits and objectives.

12.4. Environmental issues relevant for the DEVELOPMENT PLAN FOR THE NATIONAL NATURAL GAS TRANSMISSION SYSTEM 2021 - 2030

Air quality

The operation of the natural gas transportation system is not an important source of air pollution.

A slight increase in the degree of air pollution, mainly with dust, is expected during the implementation period of the projects, in the area of works and site organizations, but this is a direct and limited impact in time.

Water quality

The impact on the watercourses is temporary, during the implementation of the projects, at the conclusion

of works the location can be brought to the initial form.

The TYNDP implementation can have a significant local impact during the execution of gas pipelines on the ecosystems of large watercourses crossed (the Danube river, Târnava Mică and Târnava Mare, Siret, Someș, Argeș, Criș, Nistru, Olt, Sebeș, Jiu, Mureș, Timiș rivers, etc) under the conditions of carrying out the open ditch underpass, given the longer period of execution of the works. If the location of the pipes is done by guided drilling, the impact is insignificant.

During the operation of the NGTNS objectives, natural gas results in domestic wastewater discharged into the sewerage networks or in drainable basins and the operation of natural gas storage facilities results in reservoir waters that are discharged in a closed system.

Under normal operating conditions, by implementing planned measures to reduce environmental risks during operation, the impact on water is negligible.

Soil quality

The physical (mechanical) impact on the soil is manifested in the construction stage, being able to defend phenomena of compaction and mixing of horizons.

There is the possibility of natural gas transportation pipelines to cross risk areas with regard to nitrate pollution, areas contaminated with various pollutants, which could give rise to a risk of expanding pollution basins, provided that the existence of these sites in the project phase is not taken into account.

Under normal operating conditions there are no sources of soil pollution.

Waste management

The current state of the natural gas transportation pipelines, in which approximately 74% of them are more than 20 years old, determines the performance of permanent repair and maintenance works, activities that constantly generate specific waste, without resulting in significant quantities of waste.

The natural gas transportation activity does not result in significant amounts of waste.

Biodiversity

The implementation of strategic projects included in TYNDP may have an influence on protected natural areas. The possible impact that these projects may have on biodiversity is reflected in their location, on some sections of the route, in the territory of protected natural areas or at a certain distance from them.

When implementing projects that may have an impact on protected natural areas, the prevention, reduction and compensation measures specified in the Appropriate Assessment Study and in this Report shall be taken into account. Each proposed project will be subject, before implementation, to the environmental impact assessment procedure which will identify other more detailed forms of impact, with the provision of specific measures to reduce the impact.

Climatic changes

Greenhouse gas emissions from the natural gas transportation sector come from:

- natural gas combustion processes that take place in NGTNS's own natural gas installations that generate CO, NOx, SOx emissions - these emissions are insignificant, the combustion equipment generating emissions below the limit values imposed by the regulations in force.
- CH4 emissions due to the wear and tear of natural gas transportation pipelines and the leakage of

demountable joints, These emissions are valued at 0.000309364% of the annual volume transported, thus extremely low.

Natural gas is the cleanest of fossil fuels, with 40% lower carbon emissions per unit of energy than coal, as well as considerably lower emissions of air pollutants. Due to the flexibility of natural gas-based electricity generation units (i.e. short start-up and shut-down times), they are complementary to renewable energy sources with variable operation (v-RES), wind and solar energy. Thus, in the context of the EU's ambitious climate policies, natural gas stands out as a fuel for the energy transition, able to support the evolution of the energy system towards renewable, decentralized and flexible production. The higher the share of V-SRE in the electricity mix, the more necessary the flexible generation capacities of electricity based on natural gas are.

Energy efficiency and security

74% of the natural gas transportation network has an outdated lifespan with low energy efficiency.

The current dependence on gas transport routes from east to west compromises the energy security at the level of the European continent as a whole.

Conservation/use of natural renewable resources

The natural gas transportation infrastructure is not sufficiently developed to allow the exploitation/use of energy resources discovered at the Black Sea and the Caspian Sea, which may lead to the overexploitation of existing resources.

Population and human health

The implementation of projects in TYNDP may cause discomfort to the population during the construction period by increasing emissions and noise in the performing area. However, this effect is temporarily felt near the working front which is located, in proportion of more than 98%, outside inhabited areas.

The average speed of submission of projects for the implementation of natural gas transportation pipelines is, on several fronts, about 1 km/month, so that the duration of the works in the presence of sensitive areas is reduced, with the possibility of adapting certain work stages to the requirements of local communities, some works can either be postponed or accelerated so that the general inconvenience is minimized.

On the other hand, less than half of Romanian households have access to the natural gas network (44.2%) and only a third of Romania's dwellings are heated directly with natural gas.

Landscape

The construction of new natural gas transport corridors leads to the permanent occupation of certain land areas and to changes in the category of land use, sometimes accompanied by the removal of arboreal vegetation, followed by the restoration of the ecosystem. However, the impact is limited, the permanently occupied areas are extremely small and for them visual mitigation measures can be implemented.

Cultural heritage

It is possible there to be cultural and archaeological heritage objectives along the route of future natural gas transportation pipelines.

Risks

Of the 13.925 km of pipelines in operation, approx. 74% have an effective lifespan of more than 20 years, close to their lifespan. According to Transgaz statements, their technical condition is maintained at an appropriate level due to the fact that the operating activity is carried out in the context of a predominantly preventive, planned, corrective maintenance system and is supported by annual development and modernization investment programmes. In order to prevent the potential risks generated by the operation of NGTNS, the protection and safety zones against the TNS objectives are established, from the design phase. In these areas, specific restrictions and prohibitions are required to ensure the normal operation of the pipelines and to avoid endangering persons, property and the environment.

The existing and proposed natural gas storage facilities have storage capacities that include them in the list of SEVESO installations - industrial objectives with risk of major accident. Specific restrictions and prohibitions are imposed for these purposes. No works are carried out in the safety area without the prior approval of the operator operating the natural gas storage facility.
Major accident risks are assessed and quantified in the environmental impact assessment stage for the respective project, when the safety report is performed according to law 59/2016 on the control of major accident hazards in which hazardous substances are involved.

Sustainable transport

The lack of harmonised alternative fuel infrastructure at European Union level is an obstacle to the placing on the market of vehicles using alternative fuels and delays the achievement of the related environmental benefits. Electricity, hydrogen, biofuels, natural gas and liquefied petroleum gas (LPG) are currently identified as the main alternative fuels with the potential for long-term oil substitution.

12.5. Environmental protection objectives established at national, community or international level that are relevant for the Development Plan of the National Natural Gas Transportation System 2021-2030

Starting from the strategies/plans aimed mainly at environmental protection and from the existing environmental problems at national level related to the natural gas transportation sector, a series of relevant environmental objectives have been proposed for TYNDP that take into account the targets set at national level and the European Environmental Protection Agency (see also Chapter 8 of the Environmental Report). These objectives have been set and agreed within the working groups.

16 relevant environmental targets have been proposed for: air, climate change, water, soil, biodiversity, waste management, population and human health, natural landscape, cultural heritage, risk prevention, energy efficiency, preservation/use of natural renewable resources, degree awareness of environmental issues.

Environmental protection objectives for TYNDP

Environmental aspects	Relevant environmental objectives
AIR	REO 1. Preventing or reducing the impact of pollution sources on air quality.
	REO2. Reducing at national level the emissions of air pollutants generated by the natural gas transportation sector
Surface and groundwater	REO 3. Maintaining the ecological status of running water
	REO 4. Prevention of changes in the morphology and hydrology of surface water bodies
	REO 5. Prevention of the contribution of pollutants in surface and groundwater
SOIL and SUBSOIL	REO 6. Protecting soil quality, composition and functions

Environmental aspects	Relevant environmental objectives
WASTE MANAGEMENT	REO 7. Technically, economically and environmentally optimal waste management.
BIODIVERSITY	REO 8. Reducing pressures due to the construction of transport infrastructure of gas networks that lead to the damage to biodiversity.
	REO9. Limiting the deforested areas
LANDSCAPE and VISUAL ENVIRONMENT	REO10. Development of gas network transport infrastructure taking into account the landscape management, protection and planning policies
NATIONAL CULTURAL HERITAGE	REO 11. Ensuring the protection of cultural heritage (in situ preservation of historical assets and monuments)
POPULATION and HUMAN HEALTH	REO 12. Protection of human health by maintaining or limiting the impact generated by the activity of natural gas transportation on the quality of environmental factors
	REO 13. Ensuring utilities related to access to gas networks for the population and improving socio-economic conditions in the area.
	REO14. Reducing the noise generated by the operation of the equipments specific to the natural gas storage deposits
ENERGETIC EFFICIENCY	REO.15. Increasing the energy efficiency of the natural gas transportation network
CLIMATIC CHANGES	REO 16. Increasing the use of low-carbon energy sources
	REO17. Reducing the vulnerability of the natural gas transportation infrastructure to climate change
RISK PREVENTION	REO 18. Prevention of the risks of major accidents and limiting the consequences generated by the occurrence of major accidents on the health of the population and on the quality of the environment.
PRESERVATION AND EFFICIENT USE OF NATURAL RESOURCES	REO 19. Use natural resources efficiently while minimizing environmental impact
RAISING AWARENESS OF ENVIRONMENTAL ISSUES	REO 20. Involving the public and stakeholders and consulting them throughout the decision-making process in establishing and implementing proposed measures to reduce the environmental impact.

12.6. SCENARIO ANALYSIS

TYNDP 2021-2030 proposes 2 scenarios:

- „Reference Scenario" ("Do-minimum") - which takes into account projects already under construction/implementation or for which funding is provided. The "Do minimum" scenario is the starting point for the Do maximum development scenario. The projects included in this scenario are projects that, for the most part, are already in the implementation stage, have secured funding and will be carried out regardless of whether or not TYNDP is approved as they are considered Common Interest Projects (CIP) by the European Commission.
- Development scenario ("Do maximum") - which takes into account all the projects proposed by the Plan

The Environmental Report for TYNDP 2021-2030 analyzes, in addition to these 2 scenarios, the scenario "Zero development" ("Do nothing") - which does not propose any measures or investment in natural gas transportation infrastructure.

List of projects included in the "Do minimum" reference scenario

Project code	Project name
Natural gas transportation	
7.1.1	The development in Romania of the Natural Gas National Transportation System on Bulgaria - Romania - Hungary - Austria channel Phase I
7.1.2	The development in Romania of the Natural Gas National Transportation System on Bulgaria - Romania - Hungary - Austria channel Phase II
7.2	Development on the Romanian territory of the Southern Transport Corridor for taking over the natural gas from the Black Sea coast
7.3	Interconnection of the national transportation system with the international natural gas transportation pipelines T1 and reverse flow Isaccea Stage I
7.4	TNS developments in North-Eastern Romania, for the improvement of the natural gas supply of the area, as well as to ensure transportation capacities to the Republic of Moldavia
7.6	Project on new NTS developments in order to take over the gas from the Black Sea shore
7.7	Romania-Serbia interconnection
7.8	1.Upgrading of GMS Isaccea I 2. Upgrading of GMS Negru Vodă 1
Natural gas storage	
8.1	Upgrading of the natural gas storage system's infrastructure in Bilciurești
8.4	Increase of the natural gas underground storage capacity of the storage facility in Sărmășel (Transylvania)
8.5	The project aims to refurbish and develop the underground natural gas storage facility in Târgu Mureș

- A number of 11 strategic projects are included in the “Do Minimum” baseline scenario, of which:
- 8 projects, classified as major strategic projects, provide for construction works for gas networks. These projects have already been regulated in terms of environmental protection and implementation has begun. The exception is the modernization of SMG Negru Vodă 1 included in project 7.8. for which the environmental protection approval procedure has not started.
- 3 projects envisage works for modernization and increase of storage capacity for 3 natural gas storage facilities (Bîlciuresti, Sărmășel and Târgu Mureș).

Projects included in the "Do maximum" development scenario are those in the table below.

List of projects included in the scenario "Do maximum"

Project number	Project name
Natural gas transportation	
7.1.1	Development in Romania of the Natural Gas National Transportation System on Bulgaria - Romania - Hungary - Austria channel Phase I
7.1.2	Development in Romania of the Natural Gas National Transportation System on Bulgaria - Romania - Hungary - Austria channel Phase II
7.2	Development on the Romanian territory of the Southern Transport Corridor for taking over the natural gas from the Black Sea coast
7.3	Interconnection of the national transportation system with the international natural gas transportation pipelines T1 and reverse flow Isaccea
7.4	TNS developments in North-Eastern Romania, for the improvement of the natural gas supply of the area, as well as to ensure transportation capacities to the Republic of Moldavia
7.5	Amplification of bidirectional transport channel Bulgaria-Romania-Hungary-Austria (BRHA phase 3)
7.6	Project on new NTS developments in order to take over the gas from the Black Sea shore

Project number	Project name
7.7	Romania-Serbia Interconnection
7.8	1.Upgrading of GMS Isaccea I 2. Upgrading of GMS Negru Vodă 1
7.9	Interconnection of the natural gas national transportation system with the Ukrainian natural gas transportation system, on the direction Gherăești – Siret
7.10	Development / Upgrading of natural gas transportation infrastructure in North-Western Romania
7.11	Increase of the natural gas transportation capacity of the Romania-Bulgaria interconnection, on Giurgiu-Ruse direction
7.12	Eastring–Romania
7.13	Monitoring, control and data acquisition system for cathodic protection systems afferent to the Natural Gas National Transportation System
7.14	Development of SCADA system for the Natural Gas National Transportation System
7.15.	Upgrading of GMS Isaccea 2 and GMS Negru Voda 2 to achieve the bidirectional flow on pipeline T2
7.16.	Upgrading of GMS Isaccea 3 and GMS Negru Voda 3 to achieve the bidirectional flow on pipeline T3
7.17.	TNS interconnection to GNL Terminal, located at the Black Sea shore
Natural gas storage	
8.1	Upgrading of the natural gas storage system's infrastructure in Bilciurești
8.2	Increase of the natural gas underground storage capacity of the storage facility in Ghercești
8.3	New natural gas underground storage facility in Fălticeni
8.4	Increase of the natural gas underground storage capacity of the storage facility in Sărmășel (Transilvania)
8.5.	Refurbishment and development of the Târgu Mureș underground natural gas storage facility

In order to evaluate the characteristics of the effects and the areas that could be affected by the implementation of TYNDP the following aspects were followed:

- type of proposed project (nature of the proposed investment and the sector to which it is addressed - transport or gas storage),
- the general characteristics of the implementation areas that could be modified (areas sensitive or vulnerable to air, soil, water pollution, valuable areas in terms of biodiversity, landscape, cultural value, which are densely populated),
- risks to human health and the environment,
- the period during which the effects on the environment and human health will be felt (the project implementation stage or the operation stage).

The main changes that could occur both in the execution phase and in the operation/exploitation phase were analyzed for all the 3 scenarios analyzed in the Environmental Report.

Conclusions resulting from the analysis of the 3 scenarios

From the perspective on environmental impact, the analysis of the projects included in the Do maximum development scenario was possible only at the level of known detail. The analysis of the Do minimum scenario at a detailed level, through environmental studies carried out at the project level, provided important clues on the extent of the overall development impact and for the Do-maxim scenario.
By implementing the proposed projects, the effects on the environment will be felt, in particular, during their execution period, with local manifestation, in the area of the work front and have a temporary character.
The environmental impact during the period of operation of the proposed investments is not assessed as significant under normal operating conditions.

From the analysis of the potential effects on the environmental objectives for the 3 analyzed scenarios, it resulted that the Do- maximum Development Scenario is the optimal scenario for implementation. By

establishing and implementing an optimal system of measures to prevent, reduce and control the environmental impact (both for the operation phase and for the exploitation phase) it is estimated that the negative effects produced by the implementation of the projects proposed by this scenario will be insignificant and this scenario will enable the relevant environmental objectives set to be achieved. In addition, the Do maximum scenario is the only scenario that has significant positive effects on 3 environmental objectives - Preservation and efficient use of natural resources, Energy efficiency and Population and human health.

Following the analysis of the influence of the investments proposed by this development scenario on the changes in environmental characteristics, the following conclusions can be drawn:

- From the point of view of the classification within the development regions of the country, it is observed that the works proposed in the Do maximum scenario that refers to the natural gas transportation cover all the regions of Romania.
- The length of the gas transportation networks included by the "Do maximum" scenario for construction/modernization/rehabilitation will be approx. 2952 km. The length of the gas transportation networks is not exact because some of the projects included in the Do maximum scenario are not completed, some being in incipient stages, and the routes proposed for them may change until they are completed.
- By implementing the projects proposed by the development scenarios of TYNDP, the physical changes that occur are mainly due to construction works. The environmental impact during the period of operation of the proposed investments is not assessed as significant. No significant changes in air quality and noise level are forecast.
- Due to the nature of the construction works specific to the proposed investments, they will cause permanent small changes in terms of occupied land areas and their category of use. Over 80% of the land on which the objectives of the TYNDP will be located are agricultural land or pastures. Their location is established, as far as possible, outside the man-made areas.
- Of the 17 strategic natural gas transportation projects included in the Do maximum scenario, 10 projects intersect a number of 567 cadastral watercourses for which crossings/sub-crossings will be made for natural gas transportation pipelines. No changes in the quality status or hydrological regime for surface or groundwater are forecast.
- Out of the total number of projects included in the "Do maximum" scenario, 11 of them are estimated to intersect a number of 94 protected natural areas on a total length of 208.62 km. This length is approximate, given that the technical execution projects are not completed for a large part of them and, consequently, the route is not completed either. We mention that some of the protected natural areas such as SCI, SPA, natural parks, overlap territorially.
- Of the total number of projects included in the "Do maximum" scenario, 12 projects are, on certain route sections, at a distance of less than 1.5 km from the SCI limit and 10 projects are at a shorter distance 1.5 km from the SPA limit.
- In the event the proposed projects affect the protected natural areas, measures are proposed to restore and/or improve the habitats in the protected natural areas, to replant with species of the same category as the deforested ones. The impact on the Natura2000 network determined by the implementation of TYNDP development scenarios was analyzed in the Appropriate Assessment Study, the conclusions of this study being presented in Annex 4 of this Environmental Report.
- Archaeological sites or historical monuments will not be affected. Archaeological sites' protection requires archaeological load discharges before the start of the execution works.
- The natural gas storage facilities proposed for modernization/ expansion are not located in areas at risk of affecting the population or protected natural areas, the conditions set out in the Security Reports being complied with. We report a sensitive situation for the natural gas storage facility in Târgu Mureș which is surrounded by potential sensitive receptors. The analysis of the environmental impact carried out for the Targu Mures deposit at phase 1 of the project development did not identify a significant impact (see the Decision of the initial assessment stage no. 602/2014 of EPA

Mures). At the start of phase 2 of the project, the proposed refurbishment and development works will also be carried out on the basis of an environmental impact assessment that will take into account the sensitive vicinities and their protection needs.

- The project proposed for the execution of a natural gas storage facility in Moldova (project 8.3), is currently only at a level of intent, being a project for which a final decision for investment gas not yet been made. Except for some extremely approximate locations of the 4 proposals, stated only at locality level, no other details are known which could make possible an analysis through which one of these localities could be selected as favourable. Two of these 2 proposed locations for the storage have surfaces in the vicinity of Natura2000 sites (Pocoleni, Suceava County- Natura2000 site ROSPA0064 Fălticeni Lakes and ROSCI0310 Fălticeni Lakes, and Davideni, Neamț County – near ROSCI0363 site Moldova River between Oniceni and Mitești), but it cannot be concluded that the location of the storages will be close to these sites.

Final decision for choosing one of the 4 locations proposed will take into consideration, apart from the technical and economical reasons, the results of the environmental analysis and the risk analysis as the natural gas storage facilities are objectives that fall under the incidence of Law 59/2016 on the control of major accident hazards, involving dangerous substances. The location of the new natural gas storage facility will be chosen with the adequate assessment of the possible effects on the inhabited and protected areas in the location area.

12.7. Possible significant effects on the environment, including health, in a cross-border context

From the point of view of the TYNDP effects on the environment and human health in a cross-border context, the projects carried out at the border and which aim to achieve interconnections with the networks of neighbouring countries are relevant.

The analysis of the potential significant effects was performed for the Do minimum reference scenario and the Do maximum development scenario for those projects that include construction works and for which the indicative routes have been proposed by the holder.

The projects included in TYNDP 2021-2030 that will be implemented near the border line, included in the Do minimum reference scenario, are:

Projects located in the vicinity of border areas in the Do minimum reference scenario

Project code	Project name	Neighbouring country
7.7	Romania-Serbia interconnection	Serbia

Project 7.7. includes construction works and involves the construction of a new gas transport corridor.

For this project, the environmental impact assessment procedure was completed, the Decision of the classification stage No 142 of 25.06.2019 being issued by APM Timiș.

The analysis of the Decision of the classification stage no. 142 of 25.06.2019 issued by APM Timiș shows that the project does not induce a significant negative impact on the environment and human health in a cross-border context.

The project is not located in the vicinity or inside Natura2000 sites in the neighbouring country - Serbia.

The Romania-Serbia interconnection project is in accordance with the Energy Sector Development Strategy of the Republic of Serbia until 2025, for the period 2017-2023.

For the Do maximum development scenario, similarly, for the analysis of the effects in a cross-border context, the projects that make the cross-border connections with the neighbouring countries were considered. In this way, in addition to the Do minimum scenario, 3 more projects were identified which are presented in the following table:

Projects located in the vicinity of border areas in the *Do maximum* reference scenario

Project code	Project name	Neighbouring country	Interconnection locations
7.5	Increasing the bidirectional transportation corridor Bulgaria–Romania–Hungary–Austria (BRUA-Phase III)	Hungary	Szeged (HU)–Nadlac, Arad(RO)–Csanadpalota
7.7	Romania-Serbia interconnection	Serbia	UAT Comloșu Mare (RO)- Mokrin (Serbia)
7.9	Interconnection of the natural gas national transportation system with the Ukrainian natural gas transportation system, on the direction Gherăești – Siret	Ukraine	Siret (RO)- Cernăuți (UCR)
7.11	Increase of the natural gas transportation capacity of the Romania-Bulgaria interconnection, on Giurgiu-Ruse direction	Bulgaria	Giurgiu (RO)-Ruse (BG) by making a new underpass to Danube River
7.12	Eastring–Romania- Option 1	Hungary, Bulgaria	Csengersima (HU)- Satu Mare (Peles, RO) Giurgiu (RO)-Russe (BG)
	Eastring–Romania - Option 2	Hungary, Bulgaria	Csanadpalota (HU)- Nadlac (RO) Giurgiu (RO)-Russe (BG)
	Eastring–Romania - Option 3	Hungary, Bulgaria	Csanadpalota (HU)- Nadlac (RO) Grojdibodu (Dolj, RO)- Dolni Vadin (BG)

By complying with existing national and European regulations, by assessing in detail and by implementing the proposed measures, it is expected that the potential negative effects on the environment and human health induced by natural gas transportation projects will not be significant in a cross-border context.

At this stage, based on the available information and considering at strategic level the alternatives proposed by TYNDP in relation to the environmental objectives set at European and national level, it can be stated that no potential significant negative effects on the environment or human health have been identified in a cross-border context.

There are all prerequisites for the effects of the TYNDP implementation to generate a positive impact with a cross-border effect as it meets the requirements of European energy policy on ensuring security of gas supply, increasing the interconnection of the national gas transportation network to the European network and creating the gas market integrated natural resources at the European Union level.

Due to the fact that part of the objectives of the plan relate to interconnection actions with the neighbouring countries, future projects will have to be developed either in partnership with the neighbouring countries or involving a consultation process with the neighbouring authorities and stakeholders during the development of environmental impact assessment projects and studies.

In all cases, the procedure for informing and consulting potentially affected parties will take place.

12.8. Proposed measures to prevent, reduce and compensate as completely as possible any negative effect on the environment resulting from the TYNDP implementation

The Environmental Report proposed appropriate measures to eliminate, prevent, reduce and/or compensate for negative effects, possibly generated by the TYNDP implementation, as well as additional measures to potentiate (strengthen) the positive effects of the TYNDP on the environment.

These measures relate to:
o Avoiding sensitive areas (protected natural areas, densely-populated areas, natural obstacles and barriers such as watercourses, mountainous areas, etc.) by choosing the best route alternatives for projects included in the TYNDP, preventing and reducing environmental effects where these areas cannot be avoided. This is required from the planning phase (feasibility).
o Environmental impact assessment and proper assessment in the early stages of planning and design;
o Taking into account, in the environmental impact assessment and the appropriate assessment, the cumulative impact of the projects proposed by the TYNDP with other projects proposed in the area targeted for location.
o Selection of the best design and construction methods in order to prevent and reduce the environmental impact (reducing direct/indirect effects on the environment);
o Limiting land areas temporarily or permanently occupied by projects proposed by TYNDP,
o Pollution prevention and control both in the construction stage and in the operation stage of the proposed investments;
o Recommendations for adapting the gas transport sector (of new projects carried out) to climate change;
o Limiting the effects on protected natural areas. Most of the potential significant impacts can be avoided by reconsidering project routes and positioning them outside the boundaries of protected natural areas (preferable option for sites with small areas) or, where appropriate, outside areas occupied by habitats and species of community interest (necessary option for sites that occupy large areas and already incorporate a considerable level of anthropogenic presence). For situations where it is not possible to avoid the intersection of protected natural areas or critical areas within them, it is necessary to consider measures to reduce and, where appropriate, compensate significant impacts;

Measures are proposed, both for the planning phase and for the design and operation phase of the proposed investments.

It is also recommended that, when establishing the implementation schedule for the projects developed by TYNDP, the period necessary to carry out the appropriate assessment and/or environmental impact assessment should be taken into account.

12.9. Measures envisaged to monitor the significant effects of the implementation of the Development Plan of the National Natural Gas Transportation System

The program for monitoring the effects of the implementation of the TYNDP aims at identifying, respectively preventing the negative effects on the relevant environmental objectives and allows proposing additional protection measures, to reduce the environmental impact or to remedy areas that may be affected.

The monitoring program monitors:
- the way in which the relevant environmental objectives are met through the TYNDP implementation - obtaining and recording information on significant effects on the environment, implementation and monitoring of all types of effects: positive, negative, direct, indirect, cumulative;

- The validity of the predictions on the assessment of potential environmental effects and conclusions of

the Strategic Environmental Assessment and the Appropriate Assessment;

- Identification of unforeseen negative effects and the possibility of applying appropriate remedial action that can be taken;

- Whether the proposed measures to diminish/reduce the effects on the environment are implemented and allow their effectiveness to be verified;

The monitoring program includes all environmental aspects and defines the following:
- Elements that will be monitored taking into account the environmental objectives relevant to the TYNDP

- Indicators to be followed (these indicators make it possible to monitor the effectiveness of the proposed impact mitigation measures, the achievement of the proposed objectives and targets)

- Performance period/monitoring frequency (monitoring frequency depends on the identified problem, sometimes a single monitoring is needed, sometimes regular monitoring and long-term monitoring is required)

- The responsible (who is responsible for organizing and coordinating the monitoring system)

The reference period for the application of monitoring measures includes four stages: planning, design, construction and operation.

At the end of each calendar year a Report will be prepared which will include information on environmental monitoring, monitoring methods, monitoring results and measures to reduce the environmental impact for the investments proposed by TYNDP.

12.10. General Conclusions

The assessment of the effects of the Development Plan of the National Natural Gas Transportation System 2021-2030 on the environment was made by applying a quantitative and qualitative analysis, using a wide range of information sources. These sources include the Plan, as published by the Beneficiary, the environmental documentation of the projects or elements of the projects assessed and approved by the environmental authorities (reports, impact assessment studies, appropriate assessment studies, environmental agreements, environmental permits), the projections on the location and routes of the constructive elements of the projects that are not yet in an advanced design phase, information obtained during the official meetings from the beneficiary's representatives and other types of public information.

Including two development scenarios in this plan determined how to analyse existing information. Thus, the Do minimum scenario includes 11 projects that are in the completed project phase or in the execution phase and that have a secured source of funding. These projects had previously been analyzed in detail in terms of environmental impact in the procedure for obtaining the environmental agreement. This information was centralized and used in the analyzes carried out in the framework of the strategic environmental assessment.

The Do maximum scenario includes the projects from the Do minimum scenario and proposes 11 more projects that are in different planning phases, some even being only in the intention stage. The analysis of these projects from the perspective of environmental impact was possible only at the level of known detail, but the analysis of the Do minimum scenario at detailed level, through environmental studies conducted at project level, provided important indications on the magnitude of the impact of the whole development scenario.

Conclusions that emerge from the strategic environmental assessment:

- TYNDP covers the entire national territory as a development area. For some of the strategic natural gas transportation and storage projects proposed by TYNDP (some of the projects included in the Do maximum scenario) the technical details are not yet known and the field studies have not been carried out. No information is available for some of these projects to be spatially located.

- During the construction of the proposed projects, the investments proposed by TYNDP may generate temporary and local negative effects on the environmental objectives set for certain environmental components, respectively for air, water, soil and subsoil, waste management, biodiversity, landscape. For all types of projects, the effects on the environment, during the execution period, are not significant, they manifest themselves locally, in the area of the work front and are temporary..

- The construction works specific to the investments proposed by the two development scenarios Do maximum and Do minimum will determine permanent, insignificant changes (being on small areas) regarding the occupied land areas and the categories of land use.

- The proposed routes for part of the projects included in the development scenarios Do maximum and Do minimum, intersect protected natural areas. For these situations, measures to minimize risks to biodiversity are proposed. The conclusion arising from the Appropriate Assessment Study (see Annex 3) is that neither of the two proposed scenarios will cause impacts that would jeopardize the conservation objectives of sites in intersection or proximity areas, and thus the integrity of sites and the Natura2000 network in Romania is not endangered. This aspect was confirmed by the detailed analysis of the projects in the Do minimum scenario, where the impacts remained at a small or medium level, without significant residual impact.

- By complying with existing national and European regulations, by detailed assessment and by implementing the proposed measures, it is expected that the potential negative effects on the environment and human health induced by the projects included in TYNDP will not have a significant impact in a cross-border context.

- Following the analyzes performed, we find that the proposed scenarios Do minimum and Do maximum will not cause impacts that would jeopardize the achievement of environmental objectives.

- From the analysis of the effects on the environment generated by the 2 scenarios proposed by TYNDP, it turned out that the implementation of the Do maximum scenario will generate more important positive effects, being thus recommended for implementation. This scenario has significant positive effects, which are manifested in the long term or permanently, with a wide range of coverage, for 3 of the assessed environmental objectives (Energy efficiency, Population and human health, Preservation and efficient use of natural resources).

The Do maximum development scenario is oriented towards “Development based on economic and environmental sustainability” or “Do Something Policy” and brings the following economic and environmental benefits:

- maximizing energy efficiency throughout the natural gas transportation chain and creating an intelligent, efficient, reliable and flexible natural gas transportation system.
- Use of low carbon resources
- Integration of the natural gas market and interoperability of natural gas transportation systems in the region;
- Convergence of natural gas prices in the region;

Increasing the flexibility of the European natural gas transportation system by creating two-way flow interconnections;

- The opening of Romania and European Union's access to a new natural gas source - by the interconnection of BULGARIA-ROMANIA-HUNGARY-AUSTRIA with the Black Sea;
- The increase of the competition on the European natural gas market by diversification of sources, transportation itineraries and of active companies in this region;
- The increase of natural gas supply security;
- The reduction of the degree of dependence in natural gas imports from Russia;
- Boosting the development of renewable energy production
- (especially wind and solar energy), considering the possibility to use natural gas as a second choice for renewable energies, which leads to a significant increase in the sustainability of the proposed projects.

13. ANNEXES

Annex 1. Composition of the specially constituted working group

Annex 2. Investment modernization and development projects

Annex 3. Conclusions of the appropriate assessment study

Annex 1. Composition of the specially constituted working group

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5	Romanian General Inspectorate for Emergency Situations	Bucharest, Banul Dumitrache str., no. 46, District 2	0212086150	igsu@mai.gov.ro	www.igsu.ro
6	SC DEPOMUREȘ SA	Tamas Erno str., no. 1, 540307 Targu Mures, Mures County, Romania	0 265 217 055	office@depomures.ro	http://www.depomures.ro
7	SNGN ROMGAZ SA – Natural Gas Storage Facility DEPOGAZ Ploiești SRL	Ghe. Grigore Cantacuzino 184 Ploiești 100492, Prahova	0374-403101	info@depogazploiesti.ro	www.depogazploiesti.ro
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12	National Agency of Natural Protected Areas	Piața Valter Mărăcineanu no. 1-3, District 1, Bucharest	021 305 83 90	ananp@ananp.gov.ro	http://ananp.gov.ro/
13	Ministry of Culture	Blvd. Unirii, no. 22, District 3, Bucharest	021 222 85 35	cabinet.ministru@cultura.ro	http://www.cultura.ro/

ANNEX 2. THE SITUATION OF THE PROJECTS IN THE MODERNIZATION AND INVESTMENT DEVELOPMENT PLAN FOR THE NATIONAL NATURAL GAS TRANSPORTATION SYSTEM IN THE PERIOD 2018-2022

Pos. no.	Name of works category	County	Regulatory status	Development status
1	**MODERNIZATION AND REFURBISHMENT OF THE NATIONAL GAS TRANSPORTATION SYSTEM**			
1.1.	***MODERNIZATION OF TECHNOLOGICAL INSTALLATIONS RELATED TO THE NATIONAL GAS TRANSPORTATION SYSTEM (MAS, SCS, PM, NT)***			
1.1.1	***LAND ADAPTATION OF MEASUREMENT LINES TO BE INSTALLED THROUGH THE SCADA PROGRAM AND TECHNOLOGY NODE AUTOMATION (ANNEX 2.1)***			
1.1.2	*TECHNOLOGIC NODE MODERNIZATION MEDIEȘUL AURIT - phase 1*	Satu Mare	Decision of screening stage no. 891/17.11.2016 issued by APM SATU MARE (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the design phase
1.1.3	*GAS AND SMOKE DETECTION SYSTEM IN THE TURBOCOMPRESSORS HALL AT STC ȘINCA*	Brașov	-	Works in execution
1.1.4	*REPLACEMENT OF THE GMS ISACCEA 1 GAS MEASURING STATION*	Tulcea	Decision of screening stage no. 144/06.03.2018 issued by APM Tulcea (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the tendering phase
1.2	***SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM (ANNEX 2.2)***			
2	***DEVELOPMENT OF THE GAS TRANSPORTATION SYSTEM AND RELATED INSTALLATIONS***			
2.1.	***NATURAL GAS TRANSPORTATION PIPELINES***			
2.1.1	*Ø 16" **VASLUI - IAȘI (VASLUI - MOGOȘEȘTI route**) GAS TRANSPORTATION PIPELINE reunification in the Bârnova forest area and pressure tests*	IAȘI	Decision of screening stage no. 55/27.04.2015 issued by APM Iași (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in execution
2.1.2	*Ø 28 " **GANEȘTI - IDRIFAIA – COROI** GAS TRANSPORTATION PIPELINE*	MUREȘ	Decision of screening stage no. 6974/28.03.2013 issued by APM Mureș (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in execution

Pos. no.	Name of works category	County	Regulatory status	Development status
2.1.3	*Ø 12" **NEGRU VODĂ - TECHIRGHIOL** GAS TRANSPORTATION PIPELINE - **PHASE II** (Pecineaga - Techirghiol section - revision 1)*	TULCEA, CONSTANȚA	Environmental Agreement no. 18/10.08.2017 issued by APM Constanța	Completed works
2.1.4	*Ø 28" **SRM SIDEX GALAȚI** CONNECTION PIPELINE*	GALAȚI	Decision of screening stage no. 35 of 2014 and Notification No.21239 of 11.2016 issued by APM Galati	Completed works
2.1.5	*ASSEMBLY OF RECEPTION SCRAPER TRAP (PROVISIONAL) **DN 800 ON PIPELINE Ø32" BATANI - ONEȘTI,** Bogdănești area*	BACĂU	Decision of screening stage no. 235/19.11.2014 issued by APM Bacău (not subject to environmental impact assessment and not subject to appropriate assessment)	Completed works
2.1.6	*SYSTEMATIZATION OF PIPELINES IN THE AREA OF **MOȘU TECHNOLOGICAL NODE***	DÂMBOVIȚA	Decision of screening stage no. 142/06.06.2016 issued by APM Dâmbovita (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the execution phase
2.1.7	*NATURAL GAS SUPPLY MODERNIZATION OF **PLOIEŞTI CITY***	PRAHOVA	-	Tender procedure for execution works
2.1.8	*ASSEMBLY OF RECEPTION SCRAPER TRAP DN 500 PE **ȘENDRENI – ALBEȘTI PIPELINE***	BUZĂU, BRĂILA	Decision of screening stage no. 19/28.01.2015 issued by APM Buzau	Completed works
2.1.9	*RECOVERY OF VULCANIȚA RIVER UNDERCROSSING WITH **PIPELINES Ø28˝ PALTIN - VARF DIHAM SI Ø20˝ STC ȘINCA - STÂLP 89**, points 1,2,3 and 4 Vulcanița- shoring works*	BRAȘOV	Decision of screening stage no. 24/22.01.2014 issued by APM Brasov (not subject to environmental impact assessment and not subject to appropriate assessment)	Completed works
2.1.10	*REHABILITATION OF Ø20" HUREZANI – HATEG PIPELINE, HUNEDOARA COUNTY: **UNDERCROSSING DN 66***	HUNEDOARA	Decision of screening stage no. 9814/01.04.2013 issued by APM Hunedoara (not subject to environmental impact assessment and not subject to appropriate assessment)	Completed works
2.1.11	*GAS TRANSPORTATION Ø 20" **PLĂTĂREȘTI – BĂLĂCEANCA** PIPELINE*	CĂLĂRAȘI, ILFOV	In the procedure of obtaining the environmental agreement	Project in the procedure for obtaining approvals and agreements for obtaining the building permit

Pos. no.	Name of works category	County	Regulatory status	Development status
2.1.12	*SAFETY OF* ***Ø32˝ ȘENDRENI - SILIȘTEA – BUCHAREST PIPELINE****, Scortaru Vechi – Comaneasca area*	BRĂILA	Decision of screening stage no. 12348/29.09.2016 issued by APM Brăila (not subject to environmental impact assessment and not subject to appropriate assessment)	Completed works
2.1.13	*WORKS CONCERNING THE SAFETY OF DN 700* ***PLATOU IZVOR SINAIA – FILIPEȘTI PIPELINE****, Talea - Breaza area (2nd phase)*	PRAHOVA	Decision of screening stage no. 8788/20.08.2018 issued by APM Prahova (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the tendering phase
2.1.14	*ASSEMBLY OF RECEPTION/LAUNCHING SCRAPER TRAP AT POSADA FOR* ***PIPELINES Ø20" STALP 89 - POSADA AND Ø20" POSADA - MOȘU***	PRAHOVA	Decision of screening stage no. 6806/29.07.2016 issued by APM Prahova (not subject to environmental impact assessment and not subject to appropriate assessment)	Tender procedure for execution works
2.1.15	*REHABILITATION OF PIPELINE Ø20" HUREZANI - HAȚEG, GORJ AND HUNEDOARA COUNTY:* ***CONSTRUCTION WORKS (FITTINGS FOR VALVES, CONNECTION COUPLING AND PRESSURE SUPPRESSORS)***	GORJ, HUNEDOARA	Completed works.	
2.1.16	*SAFETY OF THE AIR CROSSING OF TARNAVA MICA RIVER WITH THE NATURAL GAS TRANSPORTATION PIPELINE DN* ***700 BAHNEA - IDRIFAIA****, Bahnea area*	MUREȘ	Classification of Notification no. 573/30.01.2017 issued by APM Mures	Completed works
2.1.17	*Ø 24"* ***MASLOC - RECAȘ*** *GAS TRANSPORTATION PIPELINE* ***- PHASE I,*** *(part II - area through forest fund.)*	TIMIS	Decision of screening stage no. 519/08.01.2019 issued by APM Timis (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the execution phase
2.1.18	*Æ 28²* ***MOȘU – BUCIUMENI*** *GAS TRANSPORTATION PIPELINE*	DÂMBOVIȚA, ILFOV	Decision of screening stage no. 59/06.04.15 issued by APM Dambovita (not subject to environmental impact assessment and not subject to appropriate assessment)	approval procedure
2.1.19	*Ø 10"* ***CÂMPULUNG MOLDOVENESC - VATRA DORNEI*** *GAS TRANSPORTATION PIPELINE (Pojorata - Vatra Dornei route)*	SUCEAVA	- Decision of screening stage no. 68/21.09.2016 revised on 31.03.2017 (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the design phase

Pos. no.	Name of works category	County	Regulatory status	Development status
2.1.20	*Ø20" **CRAIOVA - SEGARCEA - BĂILESTI – CALAFAT** GAS TRANSPORTATION PIPELINE**,** phase I, Craiova – Segarcea route*	DOLJ	The work is carried out on three territorial administrative units (TAUs), as follows: - Carcea TAU: Classification of Notification 4639/04.04.2019 issued by APM Dolj - Craiova TAU: Environmental Agreement no. 1/01.10.15 (APM Dolj) - Teasc TAU: Classification of Notification 14940/20.11.2018 (APM Dolj)	Project in execution
2.1.21	*UNDERCROSSING OF OLT RIVER WITH **Ø 12" DRĂGĂȘANI - CARACAL PIPELINE** (gas supply connection of Caracal city)*	OLT	-	Works in the execution phase
2.1.22	*Ø 32" **CREVEDIA – PODIȘOR** GAS TRANSPORTATION PIPELINE*	ILFOV	Decision of screening stage no. 213/17.07.2014 (not subject to environmental impact assessment and not subject to appropriate assessment)	Completed works
2.1.23	*DEVIATION of **Ø12'' MOINEȘTI – DĂRMANEȘTI PIPELINE,** Dărmăneasca area*	BACĂU	Decision of screening stage no. 125/26.05.2014 issued by APM Bacau (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the execution phase
2.1.24	*ARGES RIVER REPAIR CROSSING WITH **DN 500 SCHITU GOLEȘTI - ȚIGVENI PIPELINE**, Valea Danului area, phase I and II*	ARGEȘ	Decision of screening stage no. 136/14.03.2016 issued by APM Argeș (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the execution phase
2.1.25	*WORKS CONCERNING THE SAFETY OF VEȚCA BROOK AIR CROSSING WITH **DN 600 COROI – BORDOȘIU PIPELINE DN,** Bordoșiu area*	MUREȘ	Decision of screening stage no. 2149.08.06.2017 issued by APM Mureș (not subject to environmental impact assessment and not subject to appropriate assessment)	Completed works
2.1.26	*DEVIATION of **TISAUȚI – BUCECEA PIPELINE**, Salcea area*	SUCEAVA	Decision of screening stage no. 17/19.04.2016 issued by APM Suceava (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the design phase
2.1.27	*SHORING ON **Ø 20˝ BOTORCA - ARAD AND COROI – MASLOC PIPELINES,** Zeicani area*	HUNEDOARA	Decision of screening stage no. 826/25.03.2014 rev. 16.08.2017 issued by APM Hunedoara (not subject to environmental impact assessment and not subject to	Completed works

Pos. no.	Name of works category	County	Regulatory status	Development status
			appropriate assessment)	
2.1.28	*Ø 12" MINTIA - BRAD – STEI GAS TRANSPORTATION PIPELINE,* ***phase I MINTIA - BRAD***	HUNEDOARA	Decision of screening stage no. 8493/04.12.2017 issued by APM Hunedoara (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the execution phase
2.1.29	*SAFETY OF IAZUL BROOK AIR CROSSING ON* ***DN 500 ROTBAV-ȘINCA, DN 600 ȘI DN 700 BĂRCUȚ – ȘINCA PIPELINE****, in Toderița area*	BRAȘOV	Decision of screening stage no. 640/09.11.2017 issued by APM Brasov	Completed works
2.1.30	*SAFETY OF* ***Ø12 " Agârbiciu – SIBIU*** *PIPELINE, in Șeica Mare area*	SIBIU	Decision of screening stage no. 164/13.10.2016 issued by APM Sibiu (not subject to environmental impact assessment and not subject to appropriate assessment)	Technical project under approval by CTE
2.1.31	*WORKS CONCERNING THE SAFETY OF UNDERCROSSING BOGDANA BROOK WITH DN 800* ***ONEȘTI- HAN DOMNEȘTI PIPELINE****, in Bogdana area*	BACĂU	Decision of screening stage no. 300/05.12.2017 issued by APM Bacău (not subject to environmental impact assessment and not subject to appropriate assessment)	Completed works
2.1.32	*SAFETY OF* ***TRANSIT PIPELINE 3*** *in Ceamurlia area*	TULCEA	Decision of screening stage no. 442/03.08.2017 issued by APM Tulcea (not subject to environmental impact assessment and not subject to appropriate assessment)	Completed works
2.1.33	*CONNECTION TO SRM COMANEȘTI 2 AND UNDERCROSSING CRINULUI STREET WITH* ***DN 200 PIPELINE***	BACĂU	Decision of screening stage no. 9/23.01.2018 issued by APM Bacău (not subject to environmental impact assessment and not subject to appropriate assessment)	Completed works
2.1.34	*SAFETY* ***TRANSIT 1, in Camena area***	TULCEA	Decision of screening stage no. 442/03.08.2017 issued by APM Tulcea (not subject to environmental impact assessment and not subject to appropriate assessment)	Completed works
2.1.35	*INTERCONNECTION OF THE JUPA COMPRESSION STATION TO THE NATIONAL TRANSPORTATION SYSTEM*	CARAȘ-SEVERIN	Classification of Notification no. 1732/AAA/13.03.2018 issued by APM Caraș Severin	Works in execution – the construction part Works in the tender phase - the automation part

Pos. no.	Name of works category	County	Regulatory status	Development status
2.1.36	*PROTECTION OF Ø 10" TÂRGU OCNA - SLĂNIC MOLDOVA GAS TRANSPORTATION PIPELINE, Cerdac area, Bacău county*	BACĂU	Completed works	
2.1.37	*Ø 10" TELINE - SIGHIȘOARA AND Ø 28" COROI – BĂRCUȚ INTERCONNECTION GAS TRANSPORTATION PIPELINES*	MUREȘ	Decision of screening stage no. 5347/11.10.2016 reviewed on 14.11.2017, issued by APM Mureș (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the execution phase
2.1.38	*SAFETY OF DN 200 OCNA MUREȘ - AIUD AND DN 250 OCNA MUREȘ – AIUD PIPELINES, Mirăslău area*	ALBA	Decision of screening stage no. 12079/25.01.2017, issued by APM Alba (not subject to environmental impact assessment)	Works in the tendering phase
2.1.39	*WORKS FOR SAFETY OF DN 500 MĂNEȘTI - BRAZI NATURAL GAS TRANSPORTATION PIPELINES LINE I AND II, in Stăncești area*	PRAHOVA	-	Works in the execution phase
2.1.40	*DN 500 SĂRMĂȘEL - BAIA MARE - SATU MARE GAS TRANSPORTATION PIPELINE, Sucutard area*	CLUJ	Decision of screening stage no. 355/20.08.2013 issued by APM Cluj and Official document 1401/27.02.2017 issued by APM Cluj regarding the maintenance of Decision no. 355/2013 (not subject to environmental impact assessment)	Works in the tendering phase
2.1.41	*INTERCONNECTION NATURAL GAS TRANSPORTATION PIPELINE OF SRM BROSTENI TO SNT*	SIBIU	Decision of screening stage no. SB 170/2010.2016 issued by APM Sibiu (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the tendering phase for execution
2.1.42	*RESIZE NATURAL GAS SUPPLY CONNECTION SRM FORD CRAIOVA*	DOLJ	Classification of Notification no. 8789/09.07.2018 issued by APM Dolj	Works in the tendering phase
2.1.43	*SAFETY OF DN 350 LUNA - AIUD, DN 250 LUNA – OCNA MUREȘ (LINE I) AND DN 250 LUNA -OCNA MUREȘ (LINE II) PIPELINE, Razboieni area*	ALBA	Decision of screening stage no. 8033/18.01.2017 issued by APM Alba (not subject to environmental impact assessment)	Works in the design phase
2.1.44	*SAFETY OF DN 200 CORNATEL – AVRIG NATURAL GAS TRANSPORTATION PIPELINE, Cornatel – Sacadate area*	SIBIU	Decision of screening stage no. 42/18.05.2017 issued by APM Sibiu (not subject to environmental impact assessment and not subject to appropriate assessment);	Execution works in the tendering phase

Pos. no.	Name of works category	County	Regulatory status	Development status
2.1.45	*SAFETY OF DN 500 MEDIEȘU AURIT – ABRAMUT PIPELINE, Culciu Mare area*	SATU MARE	Decision of screening stage no. 437/2018 issued by APM SATU MARE (not subject to environmental impact assessment and not subject to appropriate assessment)	
2.1.46	*RESTORATION OF THE STREI RIVER UNDERCROSSINF WITH VEST2 AND VEST 3 PIPELINES, Totia area*	HUNEDOARA	The environmental impact assessment procedure has not started	Works in the design phase
2.1.47	*FITTINGS FOR GROUP VALVES ON MOGOSESTI - LETCANI PIPELINE AND FITTINGS FOR GROUP VALVES ON VASLUI – IASI PIPELINE*	IAȘI	Decision of screening stage no. 209/25.08.2016 issued by APM Iasi (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the execution phase
2.1.48	*UNDERSROSSING DAMBOVITA RIVER WITH INEL BUCHAREST PIPELINE, Balaceanca area*	ILFOV	Classification of Notification no. 13320/03.08.2018 issued by APM Ilfov	Works in the tendering phase
2.1.49	*SAFETY OF Ø 8" RACORD PM ALAMOR PIPELINE, in Alamor AREA*	SIBIU	Classification of Notification no. 12757/03.07.2017 issued by APM Sibiu	Works in the tendering phase
2.1.50	*WORKS FOR THE SYSTEMATIZATION AND INCREASING THE SAFETY IN OPERATION OF THE NGTNS INFRASTRUCTURE IN TG. MURES-UNGHENI - CORUNCA - COROI - ERNEI - REGHIN AREA*	MURES	-	Works in the execution phase
2.1.51	*RECLASSIFICATION OF DN 500 GIURGIU-PODISOR PIPELINE BY PRESSURE TEST, ASSEMBLY POST REGULAR PROTECTION SRM GIURGIU AND REPLACEMENT OF PIPELINE SECTION IN CMID FRATESTI*	GIURGIU	-	Completed works
2.1.52	*PIPELINE INTERCONNECTION ON DIRECTION SARMAS - VEST III, IN NT BAND*	Harghita	-	Works in the execution phase
2.2.	**INCREASING THE TRANSPORT CAPACITY OF NGTNS**			
2.2.1	***NGTNS DEVELOPMENTS IN THE NORTH-EASTERN AREA OF ROMANIA FOR THE PURPOSE OF IMPROVING THE NATURAL GAS SUPPLY OF THE AREA, AS WELL AS PROVIDING TRANSPORT CAPACITIES TO THE REPUBLIC OF MOLDOVA***	Bacau, Neamt, Iasi	Environmental agreement no. 3/06.07.2017 issued by ANPM; Decision to revise the Environmental Agreement no. 2/09.01.2018, revised on 18.04.2018.	Works in the tendering phase for execution

Pos. no.	Name of works category	County	Regulatory status	Development status
2.2.2	***NGTNS DEVELOPMENT ON THE TERRITORY OF ROMANIA ON THE BULGARIA - ROMANIA - HUNGARY - HUNGARY - AUSTRIA CORRIDOR, PHASE 1 (BRUA - Phase I)***	Giurgiu, Teleorman, Dambovita, Olt, Vâlcea, Argeș, Gorj, Hunedoara, Caras Severin, Timis	Environmental Agreement no. 3/05.12.2016 issued ANPM; Decision to revise the Environmental Agreement no. 244/24.12.2017; Decision no. 3/17.01.2018 to rectify Decision no. 244/2017.	Works in the execution phase
2.2.3	*DEVELOPMENT OF THE SOUTHERN TRANSPORT CORRIDOR IN ROMANIA FOR THE TAKING OUT OF NATURAL GASES FROM THE* ***BLACK SEA COAST (Black Sea Shore- Podișor***	Constanta, Călărași, Giurgiu	Environmental Agreement no. 1 /10.05.2018 issued by ANPM	Works in the tendering phase
2.2.4	***NGTNS INTERCONNECTION WITH NATURAL GAS INTERNATIONAL TRANSPORTATION PIPELINE T1 AND REVERSE FLOW ISACCEA*** Phase I: 1. Interconnection of the National Transport System with the T1 pipeline within the Isaccea Gas Measurement Station, Tulcea County 2. Repair of the Dn 800 mm Onești - Cosmești pipeline, following the inspection with intelligent PIG which provides punctual repairs to the existing pipeline on the territory of Bacău, Vrancea, Galați counties	Tulcea, Bacău, Vrancea, Galați	Phase I 1. Decision of screening stage no. 2619/07.03.2018 issued by APM Tulcea (not subject to environmental impact assessment and not subject to appropriate assessment); 2. Decision of screening stage no. 27/16.05.2018 issued by ANPM (not subject to environmental impact assessment and not subject to appropriate assessment).	Works in execution – Phase I Works in execution – Phase II
2.2.5	***NEW NGTNS DEVELOPMENTS FOR THE PURPOSE OF TAKING GASES FROM THE BLACK SEA SHORE (Vadu -T1)***	Constanța	Environmental agreement no. 31/24.11.2017 2018 issued by APM Constanta	Works in the tendering phase
2.2.6.	***CONSOLIDATION OF THE TRANSPORTATION SYSTEM IN ROMANIA, BETWEEN ONESTI-ISACCEA AND REVERSE FLOW AT ISACCEA - PHASE 2 (INTERCONNECTION OF THE NATIONAL TRANSPORTATION SYSTEM WITH THE INTERNATIONAL SYSTEM AND REVERSE FLOW AT ISACCEA) - PHASE 2 MODERNIZATION OF SCG SILISTEA***	Brăila, Bacău	Decision of screening stage no. 5031/01.04. 2019 2018 issued by APM Brăila (not subject to environmental impact assessment and not subject to appropriate assessment) Decision of screening stage no. 20/28.01.2019 2018 issued by APM Bacău (not subject to environmental impact assessment and not subject to appropriate	The tender procedure has been completed, the Execution works will start.

Pos. no.	Name of works category	County	Regulatory status	Development status
			assessment)	
2.2.7	***INTERCONNECTION OF THE NATIONAL NATURAL GAS TRANSPORT SYSTEM IN ROMANIA WITH THE SIMILAR NATURAL GAS TRANSPORTATION SYSTEM IN SERBIA" (INCLUDING POWER SUPPLY, CATODICAL PROTECTION AND FIBER OPTICS)***	Timis	Decision of screening stage no. 142 of 25.06.2019 2018 issued by APM Timiș	Works in the design phase
2.2.8	***NGTNS INTERCONNECTION WITH THE INTERNATIONAL TRANSPORTATION SYSTEM AND REVERSE FLOW AT ISACCEA - PHASE 2 - WORKS IN NT SENDRENI - EXISTING***	Braila	Decision of screening stage no. 2907/09.03. 2018 issued by APM Brăila (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the tendering phase
2.3	**CONSTRUCTION WORKS AND SURFACE INSTALLATIONS FOR MEASUREMENT ADJUSTMENT STATIONS (ANNEX 2.3)**			
2.4	***CATHODIC PROTECTION STATIONS (ANNEX 2. 4)***			
2.5	***CONSTRUCTION WORKS AND SURFACE INSTALLATIONS FOR AIR CONDITIONING INSTALLATIONS (ANNEX 2.5)***			
2.6	***WORKS ON OPERATING NATURAL GAS TRANSPORTATION PIPELINES LOCATED IN INCIDENT RISK AREAS (ANNEX 2.6)***			
3	***INSTALLATIONS AND ELECTRICAL NETWORKS***			
4	***PURCHASE OF LAND***			
5	***NGNTS ACCESS WORKS***			
6	***NGNTS DEVELOPMENT ACCORDING TO LAW 123/2012 (UPDATED), ARTICLE 130***			

ANNEX 2.1 - LAND ADAPTATION OF MEASUREMENT LINES TO BE INSTALLED THROUGH THE SCADA PROGRAM AND TECHNOLOGY NODE AUTOMATION

Pos. no.	*Name of works category*	COUNTY	Regulatory status	Development status
1	Racova technological node	BACĂU	Decision of screening stage no. 267/18.10.2016 issued by APM Bacău (not subject to environmental impact assessment and not subject to appropriate	Works in the execution phase

Pos. no.	*Name of works category*	COUNTY	Regulatory status	Development status
			assessment)	
2	Dragasani technological node	VÂLCEA	Classification of Notification no. 253/20.02.2015 issued by APM Valcea	Works in the execution phase
3	Bacia technological node	HUNEDOARA	-	In the technical project elaboration phase
4	Recas technological node	TIMIȘ		Works in the execution phase
5	Moisica technological node - automation	BUZĂU	Classification of Notification no. 684/2014 issued by APM Buzău	In the final execution phase
6	Feliceni technological node - automation	HARGHITA	-	Works in the design phase
7	Lazaresti technological node - automation	HARGHITA	-	Works in the tendering phase
8	Relocation of ABBNGC8206-type process gas chromatograph from the SMIR Mănești location to NT Mănești and addition of an additional flow	PRAHOVA	-	Completed works
9	Modernization of Bogata III technological node - power supply of drive, automation and objective monitoring components	MUREȘ	Decision of screening stage no. 2869/11.10.2016 issued by APM Mures	Execution works in the tendering phase
10	Gherăești technological node - power supply of drive, automation and objective monitoring components	NEAMȚ	The environmental impact assessment procedure has not started	Works in the design phase
11	Modernization of NT Schitu Goleşti - assembly of scraper trap	ARGEȘ	Classification of Notification no. 6900/30.03.2018 issued by APM Argeș	Works in the design phase

ANEXA 2.2 – DATA ACQUISITION CONTROL SYSTEM

Pos. no.	*Name of works category*	Regulatory status	Development status
1	***SCADA SYSTEM***		

Pos. no.	*Name of works category*	Regulatory status	Development status
1.1	MAS integration in the SCADA System	-	Works in the design phase
1.2	Additional Scada HIGH-LEIT license for terminal server	-	Completed works
2.	***FITTINGS FOR S .C. A. D. A. VALVES AND TECHNOLOGICAL NODES***		
2.1	**S.C.A.D.A.Valves**		
2.1.1	Valve R6 + R43 Lutita	The environmental impact assessment procedure has not started	Works in the design phase
2.1.2	Valve R53 Sarmisegetusa	The environmental impact assessment procedure has not started	Works in the design phase
2.2	**Technological nodes**		
2.2.1	Feliceni	The environmental impact assessment procedure has not started	Works in the design phase

ANNEX 2.3 - ***CONSTRUCTION WORKS AND SURFACE INSTALLATIONS FOR MEASUREMENT REGULATION STATIONS***

Pos. no.	*Name of works category*	COUNTY	Regulatory status	Development status
1	S.R.M. Isalnita	DOLJ	”SRM Isalnita power supply” - Classification of Notification no. 6520/24.06.2014 issued by APM Dolj; ”Demolition works of existing constructions C1 and C2 and decommissioning of technological installations at SRM Ișalnița and construction of new SRM Ișalnița” - The decision of the initial assessment stage no. 9513/27.03.2013 (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the execution phase
2	SRM - Lot 3	-	-	Acquisition of equipments for the measuring control stations (SRM)
3	Relocation, resizing and field adaptation of the technological installation from SRM Supercom Afumați to SRM Dragomirești	ILFOV	Classification of Notification no. 17418/29.07.2015 issued by APM Ilfov	Completed works

Pos. no.	*Name of works category*	COUNTY	Regulatory status	Development status
4	Replacement of technological installations at SRM Timișoara I	TIMIȘ	Decision of screening stage no. 130/04.06.2014 issued by APM Timis (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the execution phase
5	Modernization of SRM Nădrag	TIMIȘ	Decision of screening stage no. 45/10.03.2016 issued by APM Timis (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the execution phase
6	Modernization of SRM Chisineu Cris	ARAD	Classification of Notification no. 10564/19.08.2015 issued by APM Arad	Works in the tendering phase
7	SRM Clinceni - Efficiency of the measurement system by completing the technological installation with appropriate elements/equipment	ILFOV	Classification of Notification no. 29799/31.01.2017 issued by APM Ilfov	Works in the tendering phase
8	SRM DEJ II	CLUJ		Works in the execution phase
9	Modernization and adaptation to SRM Suceava land	SUCEAVA	Classification of Notification no. 3442/23.04.15 issued by APM Suceava	Completed works
10	**Land adaptation for:**			
10.1	S.R.M. Falticeni	Suceava	Classification of Notification no. 2919/06.04.2015 issued by APM Suceava	Works in the tendering phase
10.2	S.R.M. Izvin	Timiș	Classification of Notification no. 1437/06.03.2018 issued by APM Timiș	Works in the design phase
11	Modernization of the natural gas flow measurement system at SMG Isaccea Transit 3 and SMG Negru Voda Transit 3	Tulcea	-	Works in the design phase
12	Connection of electronic commercial measuring systems with diaphragm to process gas chromatographs		-	Works in the execution phase
13	Modernization of SRM Nădrag	Bistrița-Năsăud	Decision of screening stage no. 616/23.10.2017 issued by APM Bistrita – Nasaud (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the tendering phase
14	Modernization and replacement of technological installations	Harghita	Classification of Notification no.	Works in the design phase

Pos. no.	*Name of works category*	COUNTY	Regulatory status	Development status
	within SRM Miercurea Ciuc		5275/04.07.2016 issued by APM Harghita	
15	Filtration / separation installation at SRM SIDEX Galati	Galați	Decision of screening stage no. 117/12.02.2018 issued by APM Galati (not subject to environmental impact assessment and appropriate assessment)	Works in the tendering phase
16	Relocation and adaptation to the land of the SRM Poroterom Orastie technological installation on the SRM Baru location	Hunedoara	-	Works in the tendering phase
17	Modernization of SRM Ganesti	Mureș	-	Works in the execution phase

ANNEX 2.4 – *CATHODIC PROTECTION STATIONS*

Pos. no.	*Name of works category*	COUNTY	Regulatory status	Development status
1	Marsa cathodic protection station	SIBIU	The environmental impact assessment procedure has not started	Works in the design phase
2	Sibiu 2 cathodic protection station	SIBIU	The environmental impact assessment procedure has not started	Works in the design phase
3	Cathodic protection station in the PM Ilimbav area	SIBIU	The environmental impact assessment procedure has not started	Works in the design phase
4	Vădeni cathodic protection station, Gorj county	GORJ	Classification of Notification no. 10595/26.10.2017, issued by APM Gorj (not subject to environmental impact assessment and not subject to appropriate assessment)	Work in execution
5	Bogatu Român cathodic protection station	SIBIU	Classification of Notification no. 21490/20.11.2017, issued by APM Sibiu (not subject to environmental impact assessment and not subject to appropriate assessment) –	Work in execution
6	Cathodic protection on the Coroi - Maşloc pipeline, Craciunelul de Jos area - SPC Craciunelu 2	SIBIU	Decision of screening stage no. 11317/01.02.2018 issued by APM alba (not subject to environmental impact assessment). –	Work in execution
7	Power supply installation at SPC Giarmata Vii	TIMIȘ	Notification no. 3417/18.05.208 issued by APM Timiș (not subject to environmental impact assessment and not subject to appropriate assessment); -	Works in the design phase

ANNEX 2.5 - *CONSTRUCTION WORKS AND SURFACE INSTALLATIONS FOR ODORIZATION INSTALLATIONS*

Pos. no.	*Name of works category*	Regulatory status
1	Land adaptation of odorization installations	Works in the design phase. The environmental impact assessment procedure has not

		started.

ANNEX 2.6 - ***WORKS ON OPERATING NATURAL GAS TRANSPORTATION PIPELINES LOCATED IN INCIDENT RISK AREAS***

Pos. no.	***Name of works category***	**COUNTY**	**Environmental project regulatory status**	**Project development stage**
1	*WORKS REGARDING THE SAFETY OF* ***Ø 10² SRM BREAZA NATURAL GAS SUPPLY CONNECTION***	PRAHOVA	Decision of screening stage no. 9316/28.09.2015, issued by APM Prahova – not subject to environmental impact assessment and not subject to appropriate assessment.	Completed works
2	*WORKS REGARDING THE SAFETY OF* ***Ø8² CORNATEL – AVRIG PIPELINE,*** *Avrig area*	SIBIU	Decision of screening stage no. 51/07.04.2016, issued by APM Sibiu (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in execution
3	*WORKS REGARDING THE SAFETY OF* ***SRM RĂCĂCIUNI NATURAL GAS SUPPLY CONNECTION****, Dumbrava tourist stop area*	BACĂU	Decision of screening stage no. 48/02.03.2016 issued by APM Bacau (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the tendering phase
4	*WORKS REGARDING THE SAFETY OF* ***SRM BRĂILA NATURAL GAS SUPPLY CONNECTION,*** *Agricultural Farm area*	BRĂILA	Classification of Notification – no. 11921/26.10.2015 issued by APM Braila	Completed works
5	*SAFETY OF* ***Ø8˝ OCNA MUREȘ – AIUD PIPELINE****, Decea area*	ALBA	Filing notification no 9109/03.10.2016 issued by APM Alba	Completed works
6	*WORKS REGARDING THE SAFETY OF CONDUCTEI DE* ***Ø20" HATEG - DEALUL BABII – PAROSENI NATURAL GAS TRANSPORTATION PIPELINE****, Dealul Babii area, Hunedoara county*	HUNEDOARA	Decision of screening stage no. 6975/20.12.2016 issued by APM Hunedoara (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the tendering phase
7	*WORKS REGARDING THE SAFETY OF Ø 10"* ***FRASIN – SPĂTĂREȘTI*** *PIPELINE in Spătărești area*	SUCEAVA	Decision of screening stage no. 5/29.02.2016 (not subject to environmental impact assessment and not subject to appropriate assessment)	Works in the tendering phase

ANNEX 3. CONCLUSIONS OF THE APPROPRIATE ASSESSMENT STUDY

The assessment of the Plan on the Natura 2000 network effects was carried out by applying a quantitative and qualitative analysis, using a wide range of information sources. These sources include the Plan, as published by the Plan Holder, the environmental documentation of the projects or the evaluated project elements and approved by the environmental authorities (reports, impact assessments and appropriate assessment studies, environmental agreements), information on the location and the routes of the structural elements of the projects that are not yet in an advanced design stage, (coordinates obtained from the Plan Holder), communication during the official meetings from the plan holder's representatives and other types of public information.

The inclusion in this Plan of two development scenarios determined the analysis of the existing information. Thus, the Do-minimum scenario includes projects that are already approved, in completed design phases or in the execution phase. These projects have been previously analyzed in detail in terms of the impact on the natural capital in order to obtain the environmental agreement; this information is centralized and used in the analyzes performed on the strategic plan. The “Do maximum” scenario includes the projects from the first scenario, and proposes in addition the projects that are in various incipient planning phases. The analysis of these projects from the perspective of the impact on the Natura 2000 network was possible at the level of known detail only; this was carried out using a unitary approach, taking into account only the generally valid details and the approximate routes known at the time of starting the analysis.

The projects included in the “Do Minimum” scenario intersect 15 sites of Community interest (SCI) and 11 special protected areas (SPA).

The analysis of information extracted from the environmental studies carried out at project level provides significant clues on the magnitude of the impact of the entire scenario.

The impacts identified at projects level from this scenario remained at an approachable and reversible level with specific measures, without a significant residual impact.

Although the projects in the “Do maximum” intersect 37 sites of Community importance (SCI) and 17 special areas of conservation (SPA) in addition to the Do-minimum the magnitude of the impacts remains similar, and affordable through general or specific prevention and reduction measures. Although we cannot fully analyse the magnitude of the impact and the residual impact of these projects in the absence of technical details and the in-debth field studies, we have identified the areas where there is a theoretical possibility (not a certainty) of negative impacts on species and habitats of Community interest, at the level of individual Natura 2000 sites on one hand, and on the national Natura2000 sites on the other.

Potential negative impacts that can occur at the implementation of the projects, in case of project intersections with certain sites, can be managed by conducting in-depth studies, for the environmental accord, and developing specific measures of prevention and reduction at site / project level.

Based on the results obtained from this assessment, we consider that the integrity of the sites intersected by the planned investments will not be significantly affected, as the areas where potential impacts can

occur are relatively limited. Thus, the temporary impact takes place on an area of approximately 132 ha (0.006% of the intersected sites area) in total for the Do-minimum, plus an area of approximately 889 ha (0.048% of the intersected sites area) with an impact in the unevaluated projects. However, the area of 889 ha is only an estimate obtained by a theoretical estimate (based on analytical models) of the maximum possible impact area, the actual area is probably smaller due to the restriction of the work lanes, and the fact that there will be no interventions on all these areas and interventions will not be performed simultaneously.

However, there is a possibility that these projects will have a negative localized impact at certain sites, in certain sensitive areas within them; by the assessment carried out at the strategic level, our goal was to identify these locations where these impacts can affect protected habitats or species, and to propose a series of measures to prevent, eliminate and reduce them.

With respect to the community sites near the strategic projects that are not intersected by these we can say that no direct or indirect impacts will occur due to the specifics of the works - temporary interventions in well-defined work corridors. However, all sites and the nationally protected areas have been identified to be integrated into the further analysis if the strategic projects in the Plan will undergo changes in their location.

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