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TRANSGAZ CLIMATE & DECARBONIZATION STRATEGY

2023

Summary

Transgaz Climate & Decarbonization Strategy Including Stakeholders' Engagement Plan

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SUMMARY

EXECUTIVE SUMMARY

Following the identification of the baseline conditions of Transgaz performance in the area of GHG emissions and the definition of the decarbonization action plan for the short-term and the mid-long term, **Transgaz Climate & Decarbonization Strategy (TDS)** is elaborated including a Stakeholders' Engagement Plan (SEP).

1 INTRODUCTION

With the support of European Investment Bank (EIB), Transgaz elaborated a Climate & Decarbonisation Strategy to efficiently decarbonise its business activities and to strengthen its resilience to climate change, considering best practices and national and international climate policies and regulations. This includes creating a climate and decarbonisation strategy for Transgaz to meet national and international (climate) policy requirements and regulations. The overall objective of this strategy is dual:

1. a **Decarbonization Strategy** containing:
   - comprehensive carbon footprint assessment of current operation,
   - ambitious short and mid-term quantitative emission reduction target(s) and proposed high-level actions and measures required to reach those targets,
   - long-term decarbonization options,
   - explanation of the role of offsets and its impact on stakeholders,
   - stakeholder engagement strategy, including possibilities for Transgaz to cooperate with stakeholders (downstream and upstream of the gas transmission system) in projects contributing to decarbonization,
   - actions required from Transgaz to meet national and international (climate) policy requirements and regulations, such as Romania's National Integrated Energy Plan,
2. a **Climate Strategy** containing:
   - high level climate vulnerability assessment for Transgaz and its main stakeholders,
   - actions required from Transgaz to align with the EU Taxonomy and the EU's Corporate Sustainability Reporting Directive as well as the requirements under the EIB's PATH framework,
   - an assessment of investment needs, potential investment sources, and their eligibilities.

2 THE TRANSGAZ DECARBONIZATION STRATEGY (TDS)

In line with the EIB PATH framework, the Transgaz Decarbonization Strategy (TDS) was developed compliant with both national and international regulations in the climate change area as well as with broader environmental management areas.

2.1 BASELINE GHG EMISSIONS INVENTORY

The total GHG emissions due to Transgaz activity in 2020, selected as baseline year for the decarbonization strategy, were of 103,483 tCO_2e/y. More in detail, Table 2.1 summarizes the GHG emissions inventory related to Scope 1+2 and Scope 3 (only selected categories: purchased goods and services, waste generated, business travel, employees commuting) in years 2019, 2020 and 2021.

For Scope 1 GHG emissions, the following emissions sources are considered:

- Methane emissions;
- Natural gas combustion;
- Liquid fuels combustion.

For Scope 2 GHG emissions, the following emissions sources are considered:

- Electricity purchased from the grid.

For Scope 3 GHG emissions, the following categories are considered:

- Purchased goods and services, whose emissions were calculated according to the spend-based approach proposed by the GHG Protocol[1], using emission factors from Quantis[2] and primary data regarding purchase of goods and services provided by Transgaz;
- Waste generated, whose emissions were calculated according to the waste-type specific approach proposed by the GHG Protocol[1], using emission factors from DEFRA[3] and primary data regarding waste production provided by Transgaz;
- Business travel, whose emissions were calculated according to the distance-based approach proposed by the GHG Protocol[1], using emission factors from DEFRA[3] and primary data regarding distance travelled provided by Transgaz;
- Employees commuting, whose emissions were calculated according to the distance-based approach proposed by the GHG Protocol[1], using emission factors from DEFRA[3] and primary data regarding distance travelled provided by Transgaz.

[1] https://ghgprotocol.org/sites/default/files/2023-03/Scope3_Calculation_Guidance_0%5B1%5D.pdf
[2] https://quantis-suite.com/Scope-3-Evaluator/
[3] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2022

Table 2.1: Baseline GHG Emissions for Transgaz

Emissions	2019 (t CO2eq/y)	(%)	2020 (t CO2eq/y)	(%)	2021 (t CO2eq/y)	(%)
Scope 1	214,929	94%	**91,768**	**89%**	87,679	84%
Methane emissions	190,901	84%	**74,618**	**72%**	58,287	56%
Natural gas combustion	21,970	10%	**15,054**	**15%**	26,816	26%
Liquid fuel combustion	2,058	1%	**2,095**	**2%**	2,576	2%
Scope 2	4,615	2%	**2,519**	**2%**	4,435	4%
Purchased electricity	4,615	2%	**2,519**	**2%**	4,435	4%
Scope 3	8,322	4%	**9,197**	**9%**	12,862	12%
purchased goods and services	6,798	3%	**7,802**	**8%**	11,313	11%
waste generated	0	0%	**1**	**0%**	0	0%
business travel	235	0%	**92**	**0%**	149	0%
employees commuting	1,289	1%	**1,301**	**1%**	1,399	1%
Total Transgaz GHG emissions	227,866	100%	**103,483**	**100%**	104,976	100%

2.2 GHG EMISSIONS REDUCTION TARGETS

The baseline year selected for the decarbonization strategy has been 2020; moreover:

- 2030 was selected as target year for the Short-term Decarbonisation Action Plan;
- 2040 was selected as target year for the Medium-term Decarbonisation Action Plan;
- 2050 was selected as target year for the Long-term Decarbonisation Action Plan.

The proposed reduction targets by 2030 for Transgaz, shown in Figure 2.1, are:

- 30% for Scope 1;
- 70% for Scope 2;
- 20% for Scope 3.

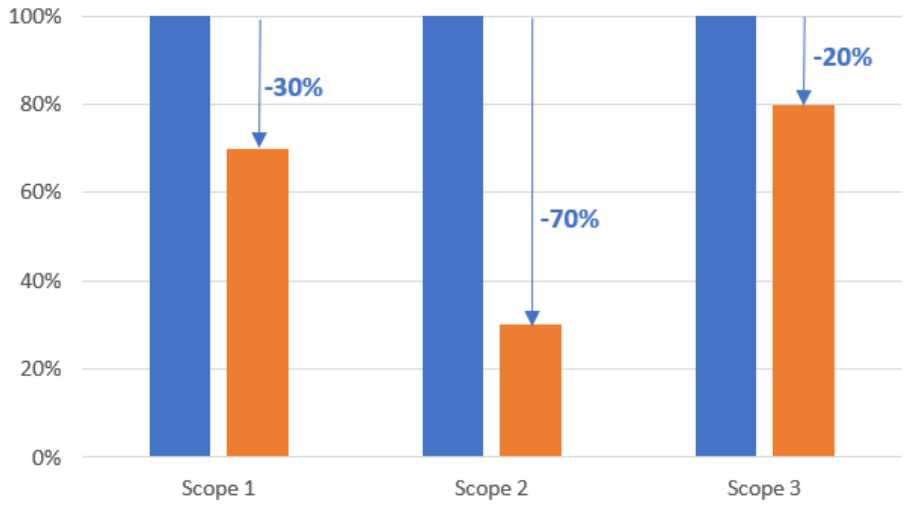

Figure 2.1: Proposed GHG Emission Reduction Targets for Transgaz – Short Term (2030)

By adopting these targets, the total GHG emissions (including Scope 1, 2 and 3 related to selected categories) could be reduced by 31% by 2030 with reference to 2020. Regarding the specific reduction of GHG emissions for the transmission of 1 Sm^3 of natural gas across Transgaz network, the above targets will make possible reducing the specific impact from 0.00946 $kgCO_{2eq}/Sm^3$ (2020 baseline value) to 0.00651 $kgCO_{2eq}/Sm^3$ by 2030, considering unchanged the quantity of transmitted natural gas.

The proposed reduction targets by 2040 for Transgaz are shown in Figure 2.2:

- 40% for Scope 1;
- 90% for Scope 2;
- 30% for Scope 3 (selected categories).

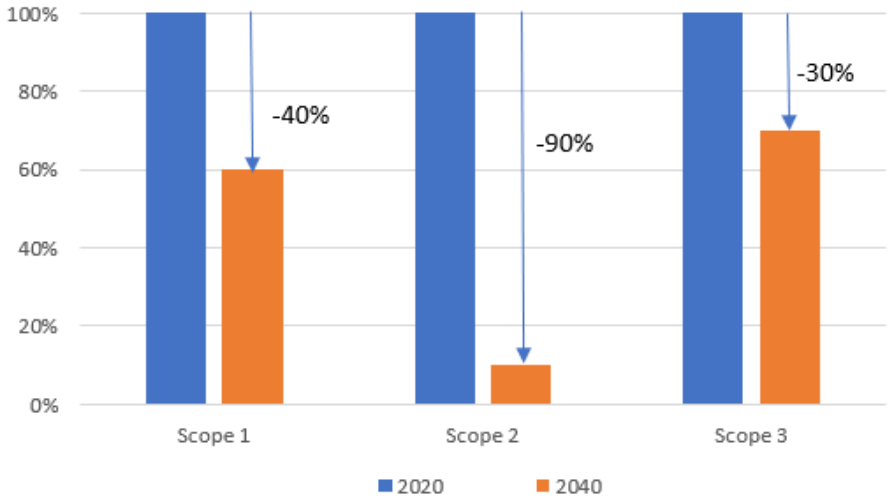

Figure 2.2: Proposed GHG Emission Reduction Targets for Transgaz – Mid-Term (2040)

On the other hand, the proposed reduction targets by 2050 for Transgaz correspond to a reduction by 90% of the Scope 1-2-3 (selected categories) and are shown in Figure 2.3.

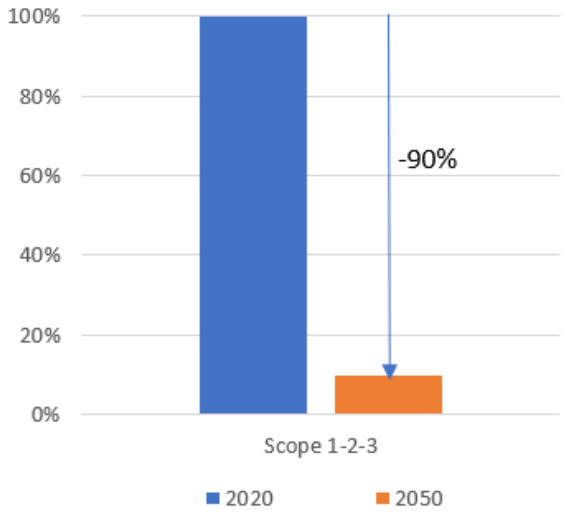

Figure 2.3: Proposed GHG Emission Reduction Targets for Transgaz – Long-Term (2050)

By adopting these targets, the total GHG emissions (including Scope 1, 2 and 3 related to selected categories) could be reduced by 40% by 2040 and by 90% by 2050 compared to 2020. Regarding the specific reduction of GHG emissions for the transmission of 1 Sm^3 of natural gas across Transgaz network, the above targets will make possible reducing the specific impact from 0.00946 $kgCO_{2eq}/Sm^3$

(2020 baseline value) to 0.00564 $kgCO_{2eq}/Sm^3$ by 2040 and to 0.000946 $kgCO_{2eq}/Sm^3$ by 2050, considering unchanged the quantity of transmitted natural gas.

2.3 SELECTED DECARBONISATION MEASURES

This section provides a summary of the measures included in the short-term and in the medium/long-term action plans, in economic and environmental terms.

For each measure, the main information analyzed is the CAPEX required for the implementation (if any, since some of the measures only imply a variation of OPEX), the recurring costs/savings (balance between annual OPEX and annual savings associated to the measure – in both cases "if any" since some of the measures do not require OPEX and some do not lead to economic savings), the avoided GHG emissions and the cost per unit of avoided GHG emissions.

The indicator "cost per unit of GHG emissions avoided" is calculated based on CAPEX, annual OPEX and savings, annually avoided GHG emissions and years of useful life of the investment, according to the formula:

$$GHG_{red.cost} = \frac{CAPEX + years_{inv.life} \cdot (OPEX_{year} - savings_{year})}{years_{inv.life} \cdot GHG_{avoided,year}}$$

The main figures of the 22 selected measures (7 for the short-term, 7 for the medium-term and 8 for the long-term) are presented in Table 2.2, whereas a Marginal Abatement Cost Curve representing for each measure the cost per unit of avoided GHG emissions and the avoided GHG emissions is shown in Figure 2.4.

Figure 2.4: Marginal Abatement Cost Curve for the Proposed Measures

Table 2.2: Summary of Proposed Measures

ID	Measure	CAPEX €	Costs (-) or Savings (+) €/y	GHG Emissions Reduction tCO_2e/y	Cost per Unit of GHG Emissions Avoided $€/tCO_2e$
ST1	Leak Detection and Repair (LDAR) implemented on a regular basis, according to EN 15446, US EPA's Method 21 and OGMP Level 5	-	– 1,600,000	22,385	71
ST2	Reduce pipeline pressure at the lowest possible level to reduce gas flow rate from leaks, compatibly with National Grid Code	200,000	-	2,239	4.5
ST3	Replace devices with high losses, if present, to reduce methane emissions from the network	9,000,000	-	18,655	24
ST4	Implement an Energy Monitoring System of all plants (both consumption and production) taking advantage of the existing SCADA	800,000	186,000	879	– 166
ST5	Purchase electricity certified from renewable sources	-	– 117,000	1,200	98
ST6	Install photovoltaics at company sites	6,174,000	765,000	942	– 474
ST7	Actions to reduce GHG emissions associated to purchased goods and services	n.e.	n.e.	3,900	n.e.
MT1	Use of hot-tapping technique for pipeline connections and Recovery of blowdown gas at compressor stations using stationary compressors	800,000	-	2,239	18
MT2	Replace diesel with biodiesel as fuel for emergency generator sets	-	– 6,500	177	36
MT3	Convert potential energy of compressed gas at delivery plants, where pressure drop and gas flow are high (expanders).	2,500,000	650,000	1,025	– 512

ID	Measure	CAPEX €	Costs (-) or Savings (+) €/y	GHG Emissions Reduction tCO_2e/y	Cost per Unit of GHG Emissions Avoided $€/tCO_2e$
MT4	Replace heating solutions/processes based on natural gas combustion with electric heat pumps fed with electricity 100% from renewable sources, or where applicable with cogeneration based on heat demand, if possible, using biogas, or mixture of natural gas and hydrogen	1,000,000	-	900	56
MT5	Implement CO2 SCS (Separation, Compression and Sequestration/Storage), or selling CO2 to industry	9,000,000	n.e.	6,000	75
MT6	Put into operation the wind turbine in SRM Navodari, and install new ones in other proper locations	2,000,000	600,000	615	– 813
MT7	Implement energy efficiency actions on company assets to reduce electricity and heat consumption	4,000,000	970,000	1,500	– 513
LT1	Use of the gas in-line recompression technology, to recompress gas instead of venting it during maintenance/ construction works on the network	5,000,000	-	2,239	111
LT2	Recover NG/N_2 mixture currently flared in compressor stations and reuse it in boilers used for gas heating	200,000	11,000	44	– 23
LT3	Replace part of natural gas used in turbo-compressors and boilers for gas heating with biomethane or hydrogen	-	– 150,000	1,900	79
LT4	Install power recovery systems based on ORC modules or conventional steam cycles, able to produce electricity from thermal energy available in turbo-compressor exhaust gases	5,200,000	610,000	740	– 472
LT5	Replace existing vehicles using diesel/ gasoline with electric vehicles, charged using electricity 100% from renewable sources, or supply existing vehicles with biodiesel and bioethanol	8,150,000	600,000	2,100	– 92
LT6	Actions to reduce GHG emissions associated to employees' commuting	n.e.	n.e.	600	n.e.

ID	Measure	CAPEX €	Costs (-) or Savings (+) €/y	GHG Emissions Reduction tCO_2e/y	Cost per Unit of GHG Emissions Avoided $€/tCO_2e$
LT7	Actions to reduce GHG emissions associated to business trips	n.e.	n.e.	100	n.e.
LT8	Offsetting residual GHG emissions through the purchase of certificates corresponding to verified emission reduction projects from the market (after implementation of other actions, only if the result does not ensure that the proposed targets are met).	-	– 900,000	30,000	30

3 HYDROGEN AND BIOMETHANE DECARBONIZATION POTENTIAL OF ROMANIAN ENERGY SYSTEM

Use of hydrogen blended with natural gas or in its pure state or biomethane entails the necessity to equip the planned network with measures that make it possible to operate in total safety. These measures concern the selection of materials and equipment suitable for the transport and use of the mixture and the provision of a remote monitoring and control system, or in the network terminals of all operating parameters. The currently available technical bibliography describes various experiences carried out up to now at an international level by companies and research institutions well summarized in the document "Cost estimation of hydrogen admission into existing natural gas infrastructure and end use" (2023) drawn up by the MARCOGAZ - Technical association of the European natural gas industry. Such document reports, for each constructive element of the natural gas supply chain, the degree of compatibility with the use of hydrogen mixtures expressed as a percentage of the volume on the mixture (distinguishing between suitable elements, suitable with the adoption of appropriate correction measures and unsuitable situations to be investigated for lack of sufficient elements to define the degree of compatibility to date).

From the review of such document, for example, steel pipelines for transport and distribution networks are preliminarily ensured as suitable for conveying a hydrogen and natural gas blends with hydrogen percentage (in volume) of 10% with mostly positive results up to 100% but with potential modifications that may be needed. On the other hand, as regards the accessory equipment (devices for intercepting, reducing, measuring, use for industrial uses), the limit hydrogen concentration (in volume) varies from 10% to 30%.

According to this contest, Transgaz, as natural gas transport operator in Romania, is not an ordinary company under the decarbonization perspective but plays a key role for the decarbonization of the whole Romanian energy system. Specifically, at the time being, the "Romania's long-term strategy for the reduction of greenhouse gas emissions" has been drafted and is currently under public consultation.

Indeed, the natural gas transported in its network and then combusted by final users of the industrial and civil sector, is responsible of a considerable share of GHG emissions in Romania. Therefore, the exploitation of the Transgaz infrastructure for energy transition purposes can be fundamental and enabling for the achievement of the national decarbonization targets.

In this context, the key step to be carried out by Transgaz is to have a gas transport network that is ready to transport increasing quantities of alternative fuels like biomethane and especially hydrogen. As anticipated in measure LT3 with reference to the use of these fuels at Transgaz compressor stations, these fuels have the advantage of producing zero GHG emissions during their combustion: hydrogen because no carbon atom is present, biomethane because the amount of carbon dioxide generated during methane combustion is equal to the amount sequestrated by the biomass used for biomethane production during its growth.

It is highlighted that due to its role as gas transport operator, Transgaz would not be involved in the production of the hydrogen or biomethane to be injected into its grid, but to enable the decarbonization of the Country, Transgaz role would be to adapt its infrastructure (pipelines, compressor stations, metering and regulation stations, auxiliary devices, etc.) to be suitable for the operation with the significant percentage of these fuels that is expected for the future. Investments to achieve this suitability could potentially be significant, but they could constitute an important opportunity for Transgaz to face the significant climate-related transition risks associated with the reduction of natural gas demand in the upcoming decades.

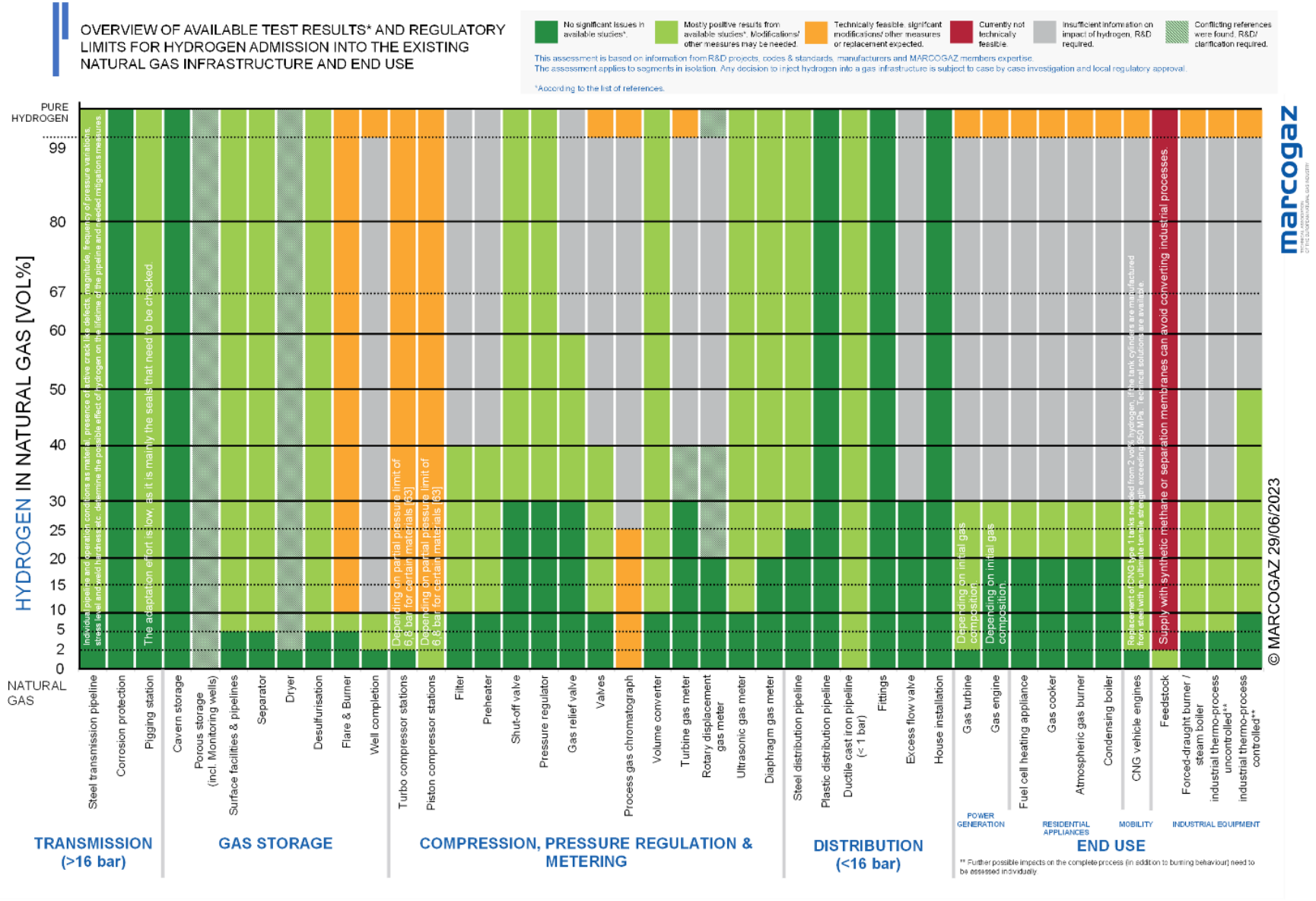

Figure 3.1: Pipeline and relevant equipment - hydrogen readiness assessment (source: MARCOGAZ)

4 THE TRANSAGAZ CLIMATE STRATEGY

The country of Romania is located in South-Eastern Central Europe, halfway between the Atlantic Ocean's coast and the Ural Mountains, inside and outside the Carpathians arch, within the lower basin of the Danube, and has a gateway to the Black Sea [4]. Romania had 19 million people in 2022, which was 4.3% of the population of the EU-27 [5]. In terms of per capita emissions, the nation came in third place in 2019. Since 2005, the gap between Romanian greenhouse gas (GHG) emissions per resident and the level in Europe has decreased by 1 ton of CO_2 equivalent (CO_2e). Between 2005 and 2019, Romania saw an overall decline in GHG emissions per resident of 18%, whereas the average level across Europe fell by 21% over the same time [6].

Romania carries out an annual inventory of GHG emissions in order to comply with its European obligations and international regulations. The country's economic progress was mirrored in the pattern of GHG emissions. A massive reduction in GHG emissions of more than 50% occurred between 1990 and 2000 as a result of Romania's shift from a centralized to a free market economy, the restructuring of all economic sectors, the closure of inefficient industries, and the start of the first two units of the Cernavoda nuclear power plant.

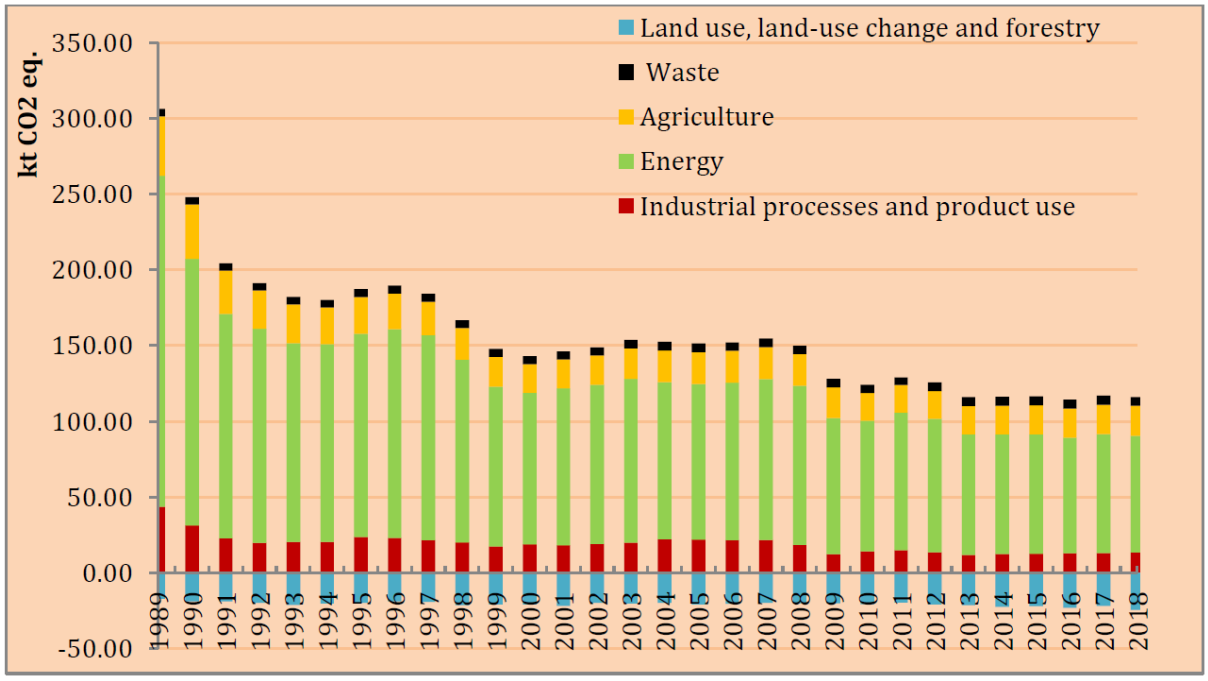

Figure 4.1: GHG emissions trends by sector and sink categories (4th Biennial Report of Romania)

Due to the economic recovery, GHG emissions marginally rose between 2000 and 2008 before stabilizing. A further reduction in GHG emissions occurred between 2009 and 2012 as a result of the world financial and economic crisis. The level of GHG emissions stayed mostly steady after 2013.

[4] Ministry of environment, waters and forests, Romania's Fourth Biennial Report under the UNFCCC (2020) https://unfccc.int/sites/default/files/resource/BR4_Romania.pdf

[5] Eurostat Population change - Demographic balance and crude rates at national levelhttps://ec.europa.eu/eurostat/databrowser/view/demo_gind/default/bar?lang=en

[6] Climate action in Romania https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/696185/EPRS_BRI(2021)696185_EN.pdf

The emissions trends by sector and sink categories for the period 1989-2018 according to the latest National GHG Inventory submitted to the UNFCCC in 2020 is presented in *Figure **4.1***[7].

As shown in *Figure **4.1***, the Energy sector has the largest share in total GHG emissions by around 66% (77 Mt CO_2-e without LULUCF in 2018) followed by Agriculture and Industrial processes sector which contributed by about 17% and 11.6%, respectively. Regarding the Energy sector, its GHG emissions in 2018 have decreased by 62% when compared with the base year because of the transition in the market which led to a reduction of demand of heat & power produced by power plants. Within the energy sector, the transportation sector had an increasing trend from 1989 to 2018 by about 66% while the manufacturing industries and energy industries have a decreasing trend in the same period by about 70%. In 2018, the transport sector had a share of 24% while energy industries have a share of 31.5%, and the manufacturing industries had a share of 15.8%.

The joint goal of the European Union and its Member States, with 1990 as the base year, includes a decrease in emissions for Romania between the years 2013 and 2020.

To be included in the national inventory of GHG emissions, the Romanian National Integrated Energy and Climate Plans (NECP) were finalized during an update of the LULUCF emissions and removals levels. Because of this, the national forestry accounting plan was not yet complete and there was no forestry reference level. As a result, there was a lack of extensive information in the NECP's estimates and expectations about LULUCF.

In 2019, Romania's percentage of renewable energy sources reached 24.3%. Romania set a goal in its 2020 Integrated NECP [8] for the period 2021-2030 to increase the overall share of renewable energy in gross final energy consumption by 30.7% by 2030, which would result in reductions in GHG emissions of 43.9% and 2% (by 2030), respectively, for sectors inside and outside the EU-ETS. The nation's 2030 goal of a 30.7% share focuses mostly on wind, hydro, solar, and biomass-based fuels.

In contrast, the 2020 plan established a 2030 goal to reduce both primary energy consumption (PEC) and final energy consumption (FEC) by 45.1% and 40.4%, respectively. Additionally, the National Recovery and Resilience Plan (RRP) for Romania, approved in September 2021, stated that coal and lignite-fired power generation will cease by 2032 and set precise goals for increasing the output of renewable energy.

Additionally, Romania plans to replace a number of coal-fired power plants with natural gas-powered combined cycle units, modernize two nuclear power plants (unit 1 by December 2028 and unit 2 by 2037), and build at least one new nuclear power plant by 2030.

Romania's 2030 aim for the proportion of renewable energy was deemed "unambitious" by the European Commission [9] when compared to the share obtained using the calculation in Annex II to the Governance Regulation. Similar to this, it is determined that Romania's contribution to the 2030 energy efficiency objective is low ambition (in terms of primary energy consumption) and extremely low ambition (in terms of final energy consumption).

[7] Ministry of environment, waters and forests, Romania's Fourth Biennial Report under the UNFCCC (2020) https://unfccc.int/sites/default/files/resource/BR4_Romania.pdf

[8] Romania's 2021-2030 Integrated National Energy and Climate Plan https://energy.ec.europa.eu/system/files/2020-06/ro_final_necp_main_en_0.pdf

[9] European Commission Assessment of the final national energy and climate plan of Romania https://energy.ec.europa.eu/system/files/2021-01/staff_working_document_assessment_necp_romania_en_0.pdf

Romania's Long-Term Strategy (LTS) [10] was developed in accordance with the provisions of Annex IV of Regulation (EU) 2018/1999. The Reference Scenario (REF), the Middle Scenario, and the Romania Neutral scenario (RO Neutral) are the three eventualities that Romania's LTS takes into account. The NECP 2021–2030 served as the foundation for the Reference Scenario, which took into account a significant increase in the global share of renewable energy sources (RES) in gross final energy consumption: from 30.7%, as indicated in the current version of the NECP, to 34.3%, in the case of the REF Scenario of the LTS. Romanian climate neutrality is the goal of the RO Neutral Scenario, which calls for a 99% reduction in net emissions from 1990 to 2050. As a compromise between the REF Scenario and the RO Neutral Scenario, the Middle Scenario was developed. The Romanian government decided to establish the RO Neutral scenario by the year 2050.

In this context, the Transgaz Climate Strategy is based on the Equator Principles' Guidance Note on Climate Change Risk Assessment (EP IV) issued in October 2020[11] and the latest update released in May 2023[12].

The Transgaz Climate Strategy presents a spectrum of the most relevant physical and transition risks that might interest Transgaz assets in Romania. The analysis was performed at the level of all Transgaz' activities, and it is not to related a specific site or project location.

Moreover, the climate change risk assessment was structured on a bottom-up approach based on the following steps:

1. Identification of climate pattern variation;
2. Description of specific changes;
3. Estimation of associated effects due to the changes;
4. Assessment of the physical and transition risks;
5. Proposal of adaptation measures to be considered by the Company to adapt to potential future climate scenarios (up to the year 2100);
6. Assessment of the residual risk and the potential financial risk.

The Transgaz Climate Strategy takes into account the physical and transition risks and provides an evaluation of the adaptation measures to mitigate the climate change impact. Once the effect of the climate pattern variation and the adaptation measures are assessed, the residual risk is estimated. The residual risk represents the risk that remains after efforts to identify and eliminate some or all types of risk have been made.

[10] Ministry of Energy and Ministry of Environment, Waters and Forests, Long-Term Strategy of Romania 2023 http://www.mmediu.ro/app/webroot/uploads/files/LTS%20-%20Versiunea%201.0%20-%20Eng%20-%2005.05.2023.pdf

[11] https://equator-principles.com/app/uploads/CCRA_Guidance_Note_Sept2020.pdf
[12] https://equator-principles.com/app/uploads/Guidance-CCRA_May-2023.pdf

4.1 TRANSITION RISKS ASSESSMENT

This Section presents an assessment of potential climate transition risks and opportunities. The assessment was conducted in line with the EP4 Principle 2: Environmental and Social Assessment requirements for conducting a climate change risk assessment relating to transition risks. In accordance with TCFD recommendations, transition risks shall be evaluated under four main aspects: Policy and Legal, Technology, Market, Reputation. The following lines provide an overview of how the Company is located under these perspectives:

- **Policy and Legal**: the use and consumption of natural gas is aligned with current policies for tackling climate change and integrating more energy from renewable sources since it is considered a transition solution towards more sustainable power systems (Article 10(2) of Regulation (EU) 2020/852)[13]; in case of stricter changes in the climate-related policies in the upcoming years, this may impact negatively on the operation of the Company;
- **Technology**: the adopted technologies are aligned with the best international standards and it suggested to evaluate regular market studies for identification of emerging new technologies or consumer preferences for different energy sources;
- **Market**: an increase in the demand for natural gas is expected in the upcoming years that can impact positively the financial profitability, however the potential strong increase of market availability of electricity from renewable sources could constitute a reduction in market for conventional natural gas use;
- **Reputation**: a significant risk can be identified with reference to the change of community perceptions on the contribution to the transition to a low-carbon economy.

In this regard, the transition risk assessment was conducted based on the climate change scenarios under future mid-term horizons (until 2100), considering as 'favourable case scenario' the Net Zero 2050 scenario in alignment with the objectives of the Paris Agreement and the recommendations by the IPCC, and as 'Reasonable worst-case scenario' the Nationally Determined Contributions Scenario.

The Nationally Determined Contributions scenario assumes that the moderate and heterogeneous climate ambition reflected in the conditional NDCs at the beginning of 2021 continues over the 21st century (low transition risks). Emissions decline but lead nonetheless to 2.6 °C of warming associated with moderate to severe physical risks. [14]

[13] https://ec.europa.eu/info/publications/220202-sustainable-finance-taxonomy-complementary-climate-delegated-act_en

[14] https://www.ngfs.net/ngfs-scenarios-portal/explore/

5 STAKEHOLDER ENGAGEMENT PLAN

The overall aim of the Stakeholder Engagement Plan (SEP) is to ensure that a consistent, comprehensive, coordinated, and appropriate approach is taken in conducting stakeholder engagement and TDS disclosure activities related to the decarbonization strategy of Transgaz. It is further intended to demonstrate the commitment of Transgaz to an 'international best practice' approach to engagement.

In order to develop an effective SEP, it is important to understand how stakeholders are related to the TDS and their needs and expectations for engagement and consultation. This information can then be used to tailor engagement to each type of stakeholder.

Different issues are likely to concern different stakeholders and so stakeholders have been grouped based on their potential connections to the TDS. Having an understanding of the connections of a stakeholder group to the TDS helps identify the key objectives for and best approaches to engagement for differing groups and individuals.

Deciding on which mechanism to use is dependent on the level of feedback required, as well as on the ease with which participants can be involved in the engagement activity. Stakeholders meetings may be more appropriate for directly affected stakeholders where a two-way information flow is required to understand opinions and concerns. Press releases might be more appropriate for the general public (who are not directly impacted) where the engagement is more about information dissemination as opposed to seeking opinions and concerns.

A list of the organisations identified to date is provided below, together with a plan for their involvement in the various phases of engagement. This list will be kept up to date as new stakeholders are identified or express an interest in the TDS.

Table 5.1: List of Stakeholders Identified

Stakeholders and Groups	Connections to the TDS
Government and Regulators	
Secretary General of Romanian Government	Responsible for coordinating and implementing energy policies, fostering stakeholder engagement, and ensuring the alignment of energy-related legislation and regulations to support a secure, sustainable, and competitive energy sector.
Ministry of Energy • **General Directorate for Energy Policies**	Responsible for formulating and implementing energy policies at a national level
Ministry of Energy • **Energy Efficiency Directorate**	Responsible for promoting energy efficiency and implementing measures to reduce energy consumption
National Regulatory Authority for Energy (ANRE)	Responsible for regulating and overseeing the energy sector in the country
The Ministry of Environment, Waters and Forests / the National Agency for Environmental Protection (ANPM)	Responsible for environmental protection, natural resource management, and sustainable development
International Energy Agency (IEA)	Works to promote decarbonization by providing policy advice, facilitating technology collaboration, and advocating for clean energy technologies and practices to mitigate climate change and achieve environmental sustainability.
European Commission	Responsible for shaping and implementing decarbonization strategies and policies at the European Union (EU) level

Stakeholders and Groups	Connections to the TDS
National Gas Producers	
OMV Petrom	Largest energy company in Romania
Romgaz	Largest natural gas producer in Romania.
Academic and Research institutions	
National Institute of Research and Development for Environmental Protection (INCDPM)	Conducts environmental research, monitoring, and assessment, provides policy support, and engages in international cooperation to address environmental issues and promote sustainable development.
The Petrolium and Gas University of Ploiesti (UPG)	Provide education, research, and innovation focused in the fields of petroleum engineering, gas engineering, and related energy sectors
COMOTI	Romanian research institute focused on gas turbines, aero-engines, and related technologies
Politehnica University of Bucharest	One of the leading technical universities in Romania. Its scope encompasses various fields of engineering, science, and technology.
Technical University of Cluj-Napoca	A renowned technical university in Romania. Its scope encompasses various fields of engineering, computer science, architecture, and related disciplines.
Non-Governmental Organisations (NGOs)	
Greenpeace Romania	A non-governmental environmental organization that focuses on environmental advocacy, campaigns, research, and direct action to promote sustainability, address urgent environmental issues, and drive policy and behavior changes for a greener future.
World Wide Fund for Nature (WWF) Romania	A non-governmental environmental organization that focuses on the conservation and sustainable management of biodiversity, ecosystems, and natural resources in Romania, promoting environmental protection, sustainable development, and the reduction of human impacts on nature.
The Intelligent Energy Association	Non-profit organization that focuses on promoting energy efficiency, renewable energy, and sustainable development through research, education, advocacy, and collaboration with various stakeholders.
The Federation of Energy Utilities Association (ACUE)	Organization that represents and promotes the interests of energy utility companies in Romania.
Romanian National Council	Advisory and consultative body that serves as a forum for dialogue and cooperation between the Romanian government and civil society organizations.
European Association for the Promotion of Cogeneration (COGEN)	Association that focuses on promoting and advocating for the development of efficient and sustainable cogeneration technologies and practices, while raising awareness and influencing policies at the European level.
Customers	
Bucuresti CET Vest	Main supplier of heating for the District Heating System of Bucharest
Termoficare Oradea	The district heating supplier of Oradea, the second largest DH system in Romania
Azomures, Chimcomplex	The main gas user in Romania
SC Liberty Galati, Veolia Energie Prahova Brazi, Colterm Timisoara etc	Other relevant top gas users for industrial or heating purposes in Romania

Stakeholders and Groups	Connections to the TDS
Commercial Consumers	Romanian population that uses Transgaz services for commercial purposes
Residential Users	Romanian population that uses Transgaz services for living purposes
Energy Sector Associations	
Romanian Energy Center (CRE)	Association that focuses on research, policy development, capacity building, and advocacy to promote sustainable energy practices and address key challenges in the energy sector in Romania.
Romanian Association for Petroleum Exploration and Production (ROPEPCA)	Association that focuses on representing and promoting the interests of companies involved in the exploration and production of petroleum resources in Romania.
Romanian Wind Energy Association (RWEA)	Association that focuses on the development, promotion, and advocacy of wind energy in Romania.
Gas Distribution Operators	
Delgaz Grid	Main gas distributor in the northern part of Romania.
Distrigaz Sud Retele	Main gas distributor in the southern part of Romania.
Others	
Local Communities	Communities that could be directly impacted by Transgaz Decarbonization measures (i.e. development of renewable plants)
TRANSGAZ suppliers and contractors	Companies and workers that will be directly affected by TDS activities
Media (television, radio programmes, newsapers)	Media that can be used to engage stakeholder and inform them about TDS.

Transgaz Decarbonization Strategy stakeholders differ in what and how they should receive TDS information. In light of this, engagement materials and tools used have been tailored towards the target audience. For instance, different materials have been designed and adapted to engage local communities, Government officials and NGOs.

The following methods will be used to ensure effective participation of the potentially affected people:

- **Public Consultations**: Transgaz will organize public consultations to engage with local communities, environmental organizations, and interested citizens. These consultations can be held in the form of public meetings or online surveys, allowing stakeholders to express their views, provide feedback, and ask questions regarding the decarbonization strategy.
- **Stakeholder Workshops**: Transgaz will conduct workshops with key stakeholders such as government agencies, regulatory bodies, renewable energy companies, and industry associations. These workshops can serve as platforms for discussing the decarbonization strategy, sharing information, exploring potential collaborations, and identifying challenges and opportunities.
- **Expert Panels and Advisory Groups**: Transgaz will establish expert panels or advisory groups consisting of specialists from academia, research institutions, think tanks, and other relevant organizations. These panels can provide valuable insights, technical expertise, and guidance on the decarbonization strategy, helping Transgaz make informed decisions and develop effective solutions.

- **Partnerships and Collaborations**: Transgaz will actively seek partnerships and collaborations with other stakeholders, such as renewable energy developers, transmission system operators, and international organizations. These collaborations will permit to share resources and develop joint initiatives to accelerate the decarbonization process.
- **Educational Campaigns**: Transgaz will launch educational campaigns to raise awareness about the decarbonization strategy and its importance. This can include public awareness programs, workshops in schools and universities, and the distribution of informational materials. By educating the public and stakeholders, Transgaz can foster a better understanding of the decarbonization efforts and garner support for the initiative.
- **Reporting and Transparency**: Transgaz will ensure transparency by regularly reporting on its progress, targets, and challenges related to decarbonization. This can include publishing sustainability reports, hosting public webinars to share updates, and providing a platform for stakeholders to access relevant information. Transparent reporting allows stakeholders to stay informed and hold Transgaz accountable for its commitments.
- **Continuous Engagement**: It is important for Transgaz to maintain continuous engagement with stakeholders throughout the decarbonization process. This will involve establishing channels for ongoing communication, such as dedicated email addresses, social media platforms, and online discussion forums. By encouraging two-way communication, Transgaz will address concerns, gather feedback, and adapt its decarbonization strategy based on stakeholder input.

All of the above will be supported and connected to Transgaz internal procedures and trainings aimed at educating relevant workforce to engage stakeholders in an appropriate manner.

6 CONCLUSIONS

In line with the EIB PATH framework and in close collaboration with key stakeholders, the Transgaz Climate & Decarbonization Strategy (TDS). The TDS is compliant with both national and international regulations in the climate change area as well as with broader environmental management areas.

The main aspects of the Transgaz Decarbonization Strategy, i.e. the baseline GHG emissions inventory, the GHG emissions reduction targets and the short-term and the medium/long-term action plans, are presented.

The Transgaz Climate Strategy is elaborated considering Physical and Transitional Risks in line with the Equator Principles' Guidance Note on Climate Change Risk Assessment (EP IV) issued in October 2020 and the latest update released in May 2023, as well as the Recommendations of the Task Force on Climate-related Financial Disclosures.

In addition, a Stakeholder Engagement Plan (SEP) is accompanying the Transgaz Decarbonization Strategy (TDS). This SEP outlines the relevant stakeholders identified, as well as future engagement activities.

The SEP overarching goal is to make sure that the stakeholder engagement and TDS disclosure efforts linked to Transgaz' decarbonization strategy are conducted in a consistent, thorough, coordinated, and acceptable manner. Moreover, it aims to show Transgaz' dedication to an engagement strategy that follows "international best practices."

The implementation of the projects included in the approved Plan for the Development of the National Gas Transmission System 2022-2031, in line with the measures identified in the Decarbonization Strategy, will substantially contribute to the decarbonization of the natural gas transmission activities carried out by SNTGN Transgaz SA in the coming period, when natural gas will remain a transitional fuel for a long time.

In Romania, major gas-fired power generation projects are being developed and implemented to replace decommissioned coal-fired power plants according to the committed schedule, and the implementation of the decarbonization strategy measures undertaken by Transgaz for the implementation of projects of national and European interest under the Development Plan will contribute substantially to the reduction of the carbon footprint.

A detailed breakdown of the proposed measures provides a clear roadmap for the company's initiatives. For the short term (2030), with an allocated investment of more than EUR 16.2 million, Transgaz aims to achieve a tangible reduction of the greenhouse gas emissions of 50,200 tCO2/year. By 2040, as part of its medium-term measures, the company will invest EUR 19.3 million to achieve a further reduction in GHG emissions of 12,456 tCO2/year. Looking to the long-term horizon, up to 2050, an additional investment commitment of EUR 18.6 million is estimated to result in an additional GHG emission reduction of 37,723 tCO2/year.

The long-term vision, which targets 2050, underlines the company's commitment to pioneering sustainable solutions with the clear aim of achieving decarbonization. By then, the adoption of the latest re-compression technologies and the transition to sustainable transport methods are expected to further reduce the carbon footprint.

From a financial point of view, although the capital costs shown may seem significant, they reflect an investment not only in technology but also in a sustainable future.

7 REFERENCES

Climate Change post, "Romania - Droughts": https://www.climatechangepost.com/romania/droughts/

EEA, greenhouse gases — data viewer-Romania https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer

EIB, "The EIB Group PATH Framework", 2022
https://www.eib.org/attachments/lucalli/20220007_the_eib_group_path_framework_en.pdf

EPRS, Climate action in Romania
https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/696185/EPRS_BRI(2021)696185_EN.pdf

Eurostat, Population change - Demographic balance and crude rates at national level
https://ec.europa.eu/eurostat/databrowser/view/demo_gind/default/bar?lang=en

European Commission, Assessment of the final national energy and climate plan of Romania (2021)
https://energy.ec.europa.eu/system/files/2021-01/staff_working_document_assessment_necp_romania_en_0.pdf

GFDRR, ThinkHazard! tool - Romania: https://thinkhazard.org/en/report/203-romania

GIE, IOGP, Marcogaz, "Guidelines for Methane Emissions target setting", 2020
https://www.gie.eu/wp-content/uploads/2021/05/Guidelines-for-methane-target-setting_Final.pdf

IPCC, "Climate Change 2013: The Physical Science Basis", http://ipcc.ch/report/ar5/wg1/

IPCC, Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (2012)
https://www.ipcc.ch/report/managing-the-risks-of-extreme-events-and-disasters-to-advance-climate-change-adaptation/

Meteoblue: Romania:
https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/romania_romania_798549

Ministry of Energy and Ministry of Environment, Waters and Forests, Long-Term Strategy of Romania 2023 http://www.mmediu.ro/app/webroot/uploads/files/LTS%20-%20Versiunea%201.0%20-%20Eng%20-%2005.05.2023.pdf

Ministry of environment, waters and forests, Romania's Fourth Biennial Report under the UNFCCC (2020)
https://unfccc.int/sites/default/files/resource/BR4_Romania.pdf

Romania's 2021-2030 Integrated National Energy and Climate Plan
https://energy.ec.europa.eu/system/files/2020-06/ro_final_necp_main_en_0.pdf

SBTi, "Oil and Gas Project: Expert Advisory Group Review Evaluation Report", 2023
https://sciencebasedtargets.org/resources/files/SBTi-OG-EAG-Report.pdf

SBTi, "Criteria and Recommendations", Version 5.0, 2021
https://sciencebasedtargets.org/resources/files/SBTi-criteria.pdf

SBTi, "Guidance on setting science-based targets for Oil, Gas and Integrated Energy companies", working-in-progress document, 2020
https://sciencebasedtargets.org/resources/legacy/2020/08/OG-Guidance.pdf

TPI, "Methodologies and indicators report", 2019
https://www.transitionpathwayinitiative.org/publications/65.pdf

"TPI's methodology report: Management Quality and Carbon Performance", 2021
https://www.transitionpathwayinitiative.org/publications/90.pdf?type=Publication

UNFCCC, Romania's Fourth Biennial Report under the UNFCCC https://unfccc.int/documents/267635

UNFCCC, The Paris Agreement, 2015
https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

World Bank Group – Climate Change Knowledge Portal "Romania" climate-data-historical: https://climateknowledgeportal.worldbank.org/country/romania/climate-data-historical
World Bank Group - Climate Change Knowledge Portal "Romania" - climate-data-projections: https://climateknowledgeportal.worldbank.org/country/romania/climate-data-projections
World Bank Group – Climate Change Knowledge Portal "Romania" trends-variability-historical: https://climateknowledgeportal.worldbank.org/country/romania/trends-variability-historical
World Bank Group – Climate Change Knowledge Portal "Romania" vulnerability: https://climateknowledgeportal.worldbank.org/country/romania/vulnerability
World Bank Group, Global Solar Atlas - Romania: https://globalsolaratlas.info/detail?c=45.958733,23.321777,6&r=ROU
World Bank Group, Global wind atlas (Romania): https://globalwindatlas.info/en/area/Romania