



TRANSITION TO A LOW CARBON FUEL – PERSPECTIVES FOR THE REPUBLIC OF MOLDOVA

*International Online Conference "Risk
Management in Energy - 2021"*

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CHALLENGES IN REDUCTION OF GHG

The Republic of Moldova's responsibility in terms of greenhouse gas emissions is relatively low :

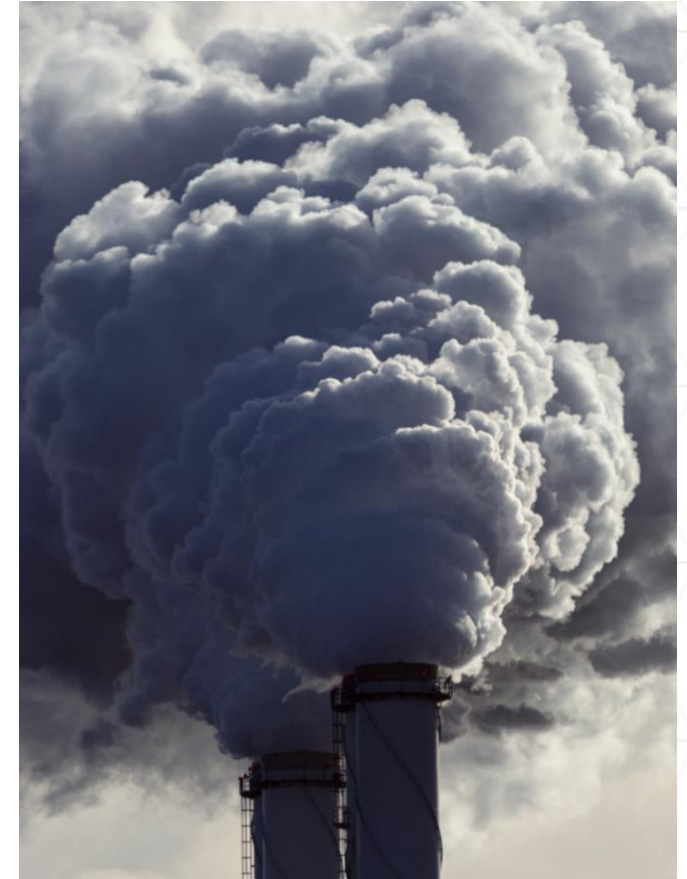
- In 2016*, the Republic of Moldova emitted :
 - **14.6 Mt** (without LULUCF)
 - **13.7 Mt** (with LULUCF), which is less than 0.026 per cent of current world's emissions.
- The total and net per-capita emissions were almost **50 %** lower than the world's average.
- **72.7 % of the national net direct GHG emissions originated from the Energy Sector.**

The greenhouse gas intensity ("CO2 emissions per GDP") indices have considerably decreased over the 1990-2016 period in the Republic of Moldova

- **2.2 times** - from 4.5 to 2.0 kg CO2 per real GDP 2010 US \$ (without LULUCF)
- **2.3 times** - from 4.4 to 1.9 kg CO2 per real GDP 2010 US \$ (with LULUCF)

These values are still among the highest among emerging economies from the Central and Eastern Europe and reveal a high mitigation potential of the Republic of Moldova to reach its GHG emission reduction targets.

* National Inventory Report: 1990-2016 Greenhouse Gas Sources and Sinks in the Republic of Moldova



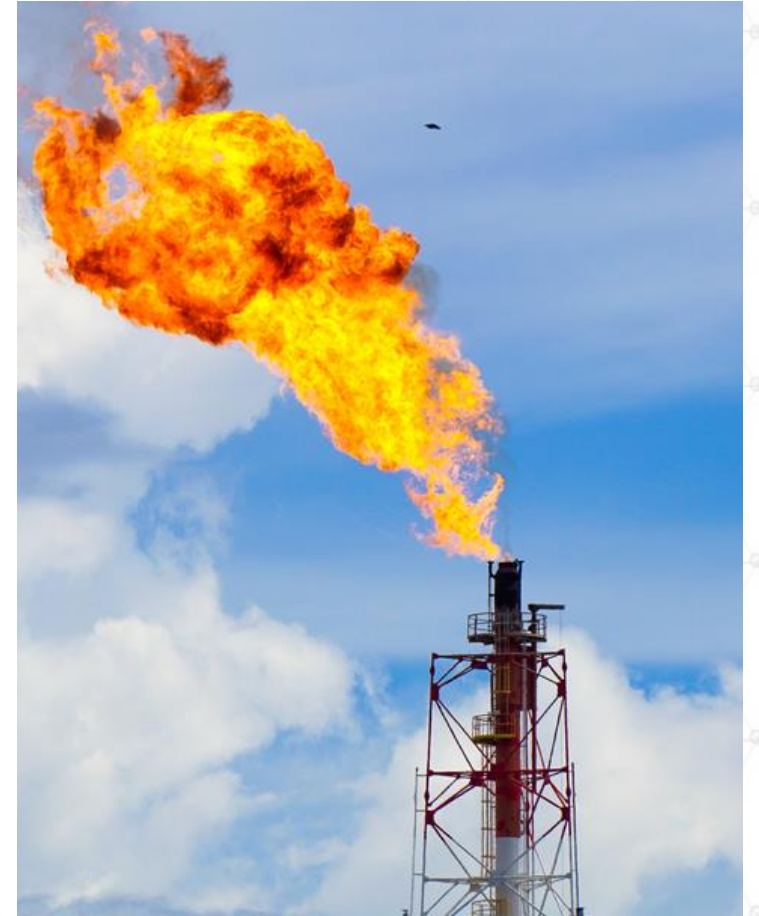
ENERGY, CLIMATE CHANGE AND ENVIRONMENTAL POLICIES IN THE REPUBLIC OF MOLDOVA

- Despite its very small contribution to the global greenhouse gas (GHG) emissions, the Republic of Moldova is committed to combatting climate change and contributing to maintaining the average global temperature increase below **2°C**.
- The Republic of Moldova is committed to an unconditional target of **70 % reduction of its greenhouse gas emissions by 2030** as compared to 1990 levels. **The GHG reduction commitment could be increased up to 88 %** as compared to 1990 level conditional to the access to low-cost financial resources, technology transfer and technical cooperation (NDC 2).
- As the energy sector is the key emitter of GHG and of air pollutants, energy policies are closely coordinated with both climate change and environmental policies. **The National Energy and Climate Change Action Plan is under development.**



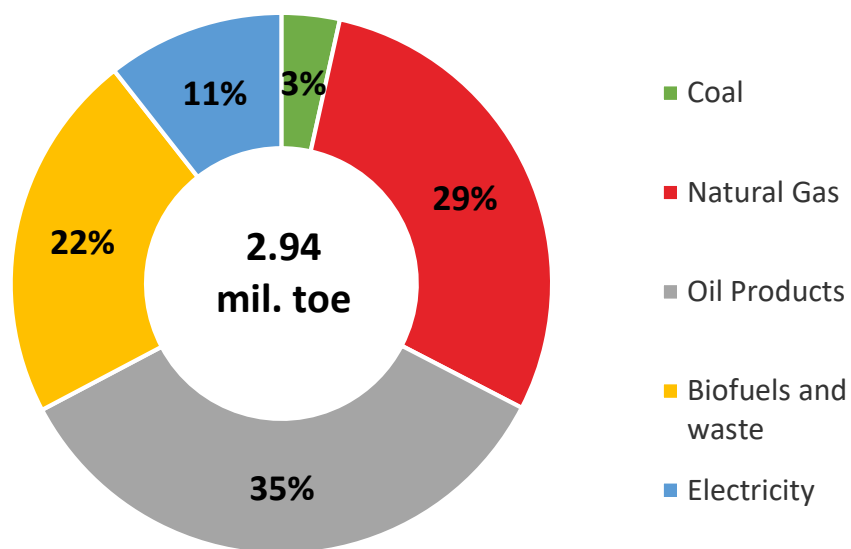
METHANE EMISSIONS REDUCTION POTENTIAL

- ✓ Fossil fuels (coal, oil, natural gas) are the biggest source of GHG emissions – either being emitted as methane (CH₄) or as carbon dioxide (CO₂).
- ✓ In the Central and Eastern Europe, **CO₂ accounts for 68 to 78% of GHG emissions**, whereas **methane (CH₄) contributes with 13 to 20%**.
- ✓ The International Energy Agency (IEA) estimates that it is technically possible to **reduce 75% of global oil and gas related methane emissions**, and by **up to 50%** only by implementing approaches with no net costs, taking into the account the value of saved gas.
- ✓ Possible measures to reduce methane emissions in gas sector:
 - Decreasing allowed network losses;
 - Setting minimum regular maintenance levels;
 - Fostering energy efficiency.



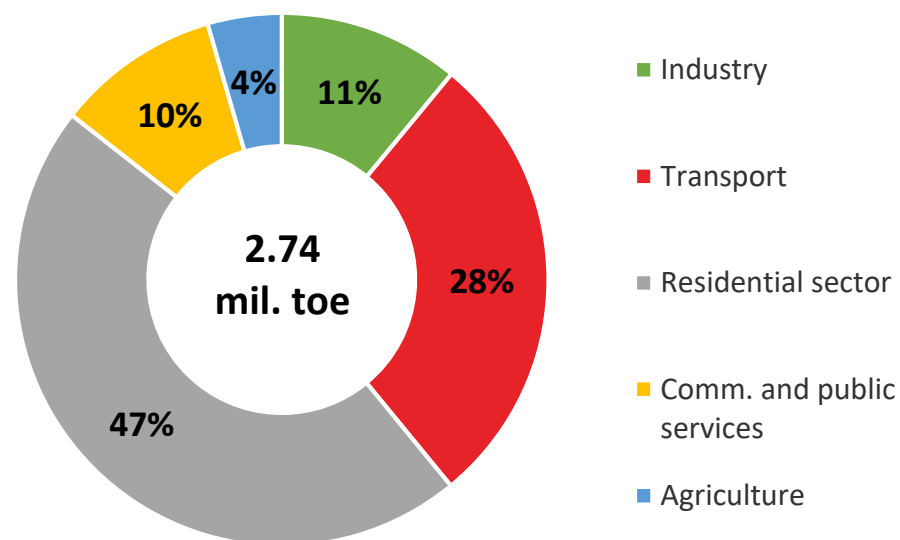
ENERGY BALANCE OF R. OF MOLDOVA - 2019

Gross consumption



35 % - oil products
29% - natural gas

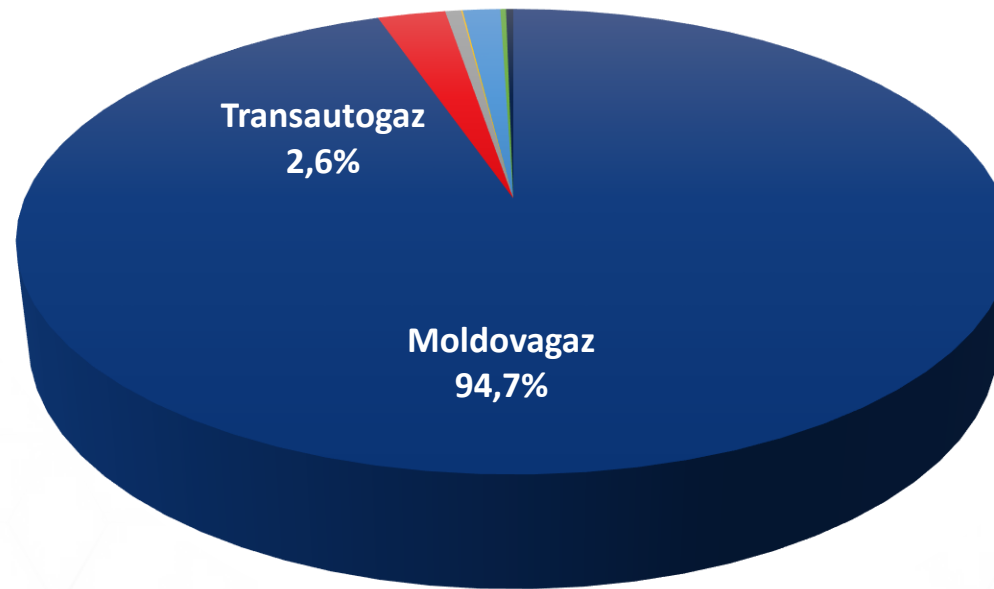
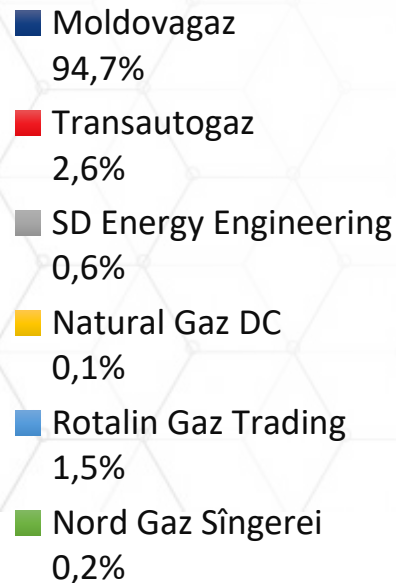
Final consumption



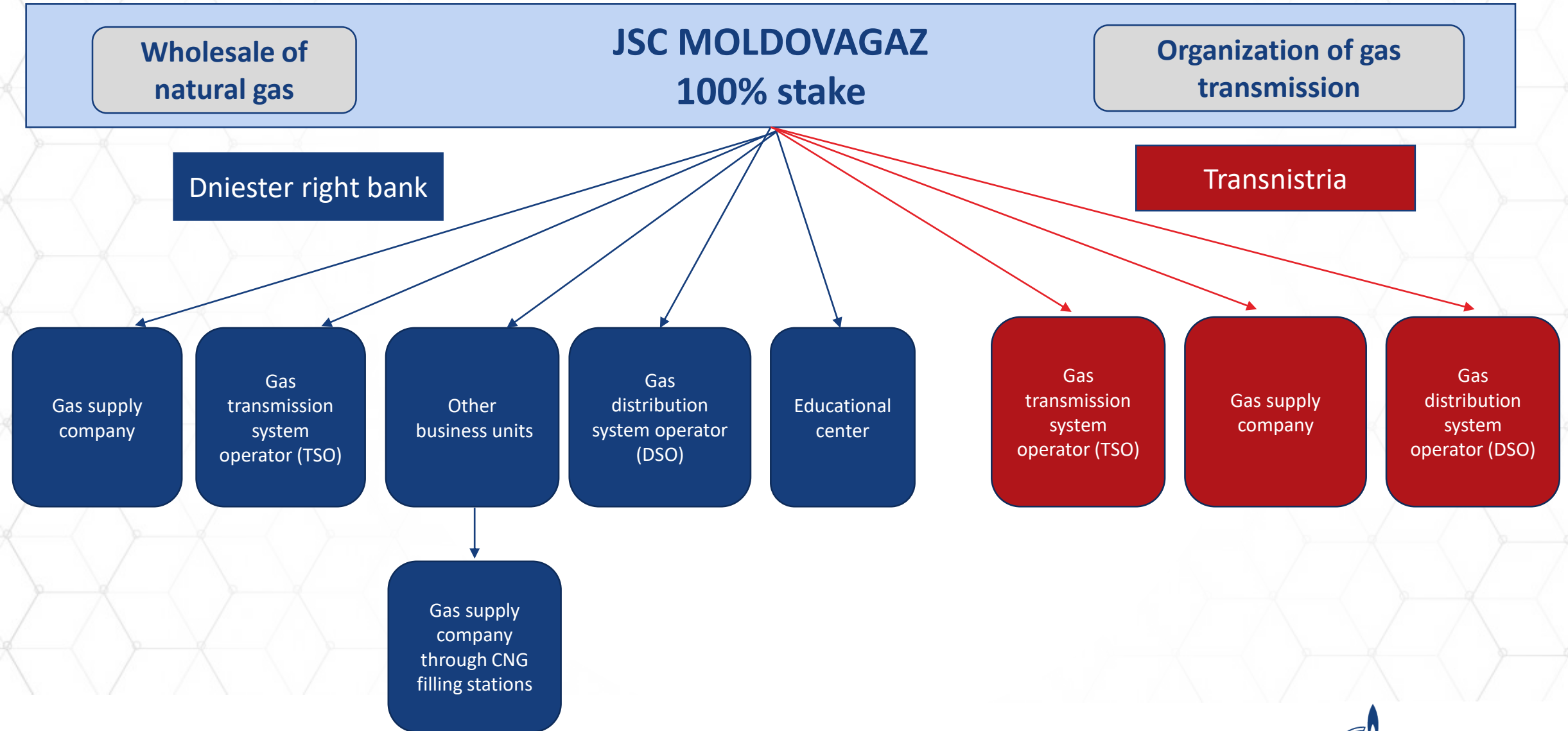
47 % - are consumed in the residential sector
28% - transport sector

THE NATURAL GAS SUPPLY MARKET OF THE REPUBLIC OF MOLDOVA IN 2020

- In previous years, natural gas was supplied only at regulated prices, and since 2020 the supply at unregulated (contractual) market prices has been initiated.
- The number of licensees for the supply of natural gas increased from 17 to 22 companies, due to the decline in natural gas prices in the region.
- The Moldovan-Russian Joint Stock Company "Moldovagaz" is one of the largest enterprises in the energy sector of the Republic of Moldova.



JSC MOLDOVAGAZ GROUP OF COMPANIES



THE COMPANY'S VISION FOR THE MEDIUM TERM

Maintaining leadership in the gas market of the Republic of Moldova by improving the quality and safety of provided services for the supply, transmission, and distribution of natural gas to customers in the Republic of Moldova and abroad;

Adaptation to changes on the regional energy market by expanding the company's traditional business and development of new environmental friendly and efficient technologies.



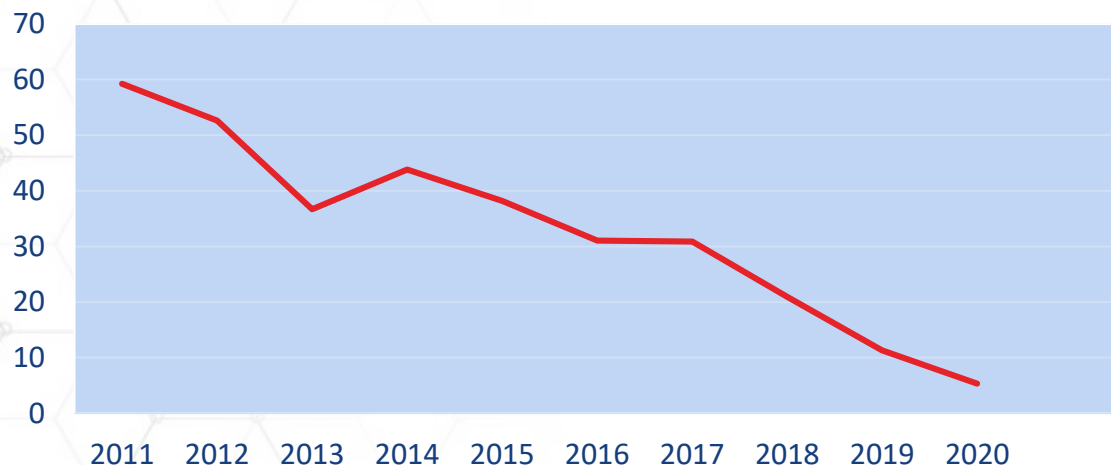
NATURAL GAS LOSSES

- There are almost no gas production and processing enterprises in the Republic of Moldova, therefore the distribution and transmission of gas leads to the main methane emissions, resulting from the activities of the gas industry.
- Despite the annual growth in the length of gas networks and an increase in the service life of gas pipelines, JSC "Moldovagaz" is implementing sustainable technologies in order to enhance the efforts for decreasing the methane emissions into the atmosphere.
- At the moment JSC "Moldovagaz" does not perform statistics on methane emissions. Although reporting on methane emissions and reporting on total network losses are not fully interchangeable processes and should be decoupled, the positive trend achieved by significant reduction in network losses of natural gas can be confidently attributed to methane emissions.

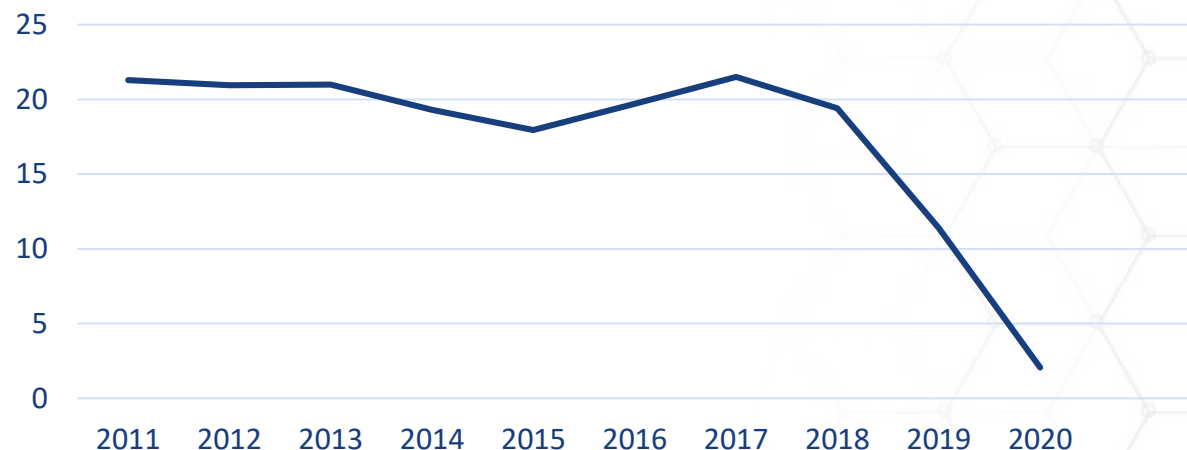


NATURAL GAS LOSSES IN THE TRANSMISSION NETWORKS OF MOLDOVATRANSغاز

Natural gas losses, mcm



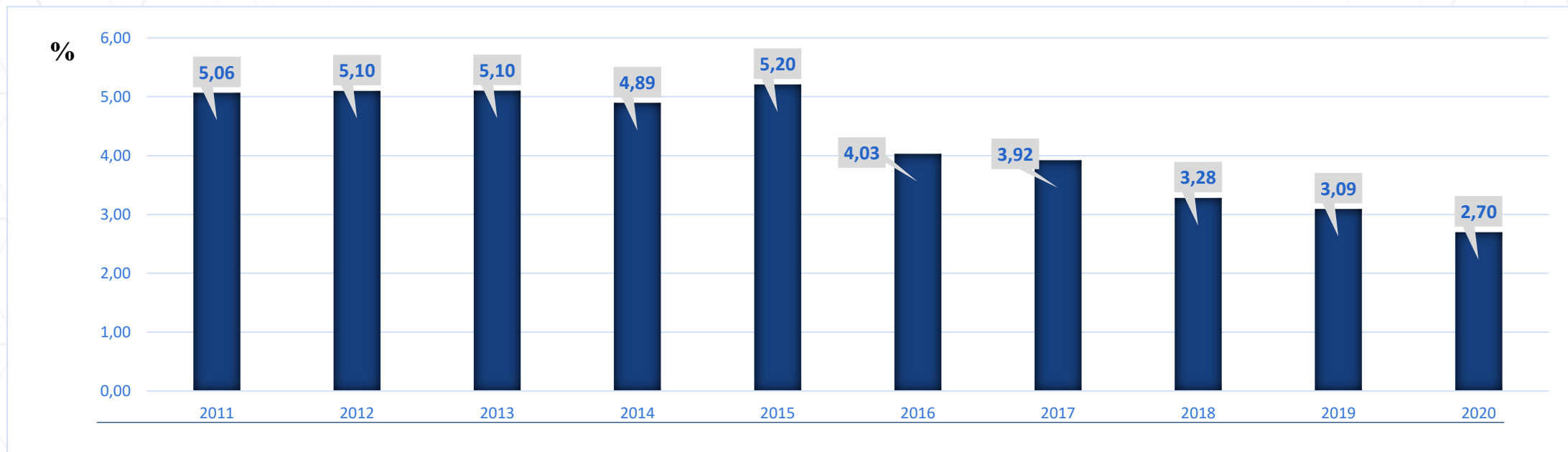
Volumes of transported natural gas, bcm



- ✓ Over the past 10 years, the volume of natural gas losses in transmission networks has **decreased from 59.2 mcm in 2011 to 5.3 mcm in 2020**.
- ✓ In order to reduce losses of natural gas in the transmission system, from 2011-2020, were provided investments for the construction, reconstruction, modernization and capital maintenance of gas pipelines and related facilities on the total amount of **85.8 mil. \$**.

For the past 10 years
the volume of natural
gas losses decreased by
more than 11 times

NATURAL GAS LOSSES IN THE DISTRIBUTION NETWORKS OF JSC "MOLDOVAGAZ"



- ✓ Over the past 10 years, the volume of losses in the gas distribution system has decreased from **54.4 mcm in 2011** to **28.0 mcm in 2020**.
- ✓ From 2011-2015 y. and 2016-2020 y., gas distribution enterprises of JSC "Moldovagaz" have developed and implemented action plans to reduce technical losses and the volume of gas consumption for technological needs in total amount of **30.5 mil. \$**.

For the past 10 years,
the volume of natural
gas losses decreased
by more than 48.5%

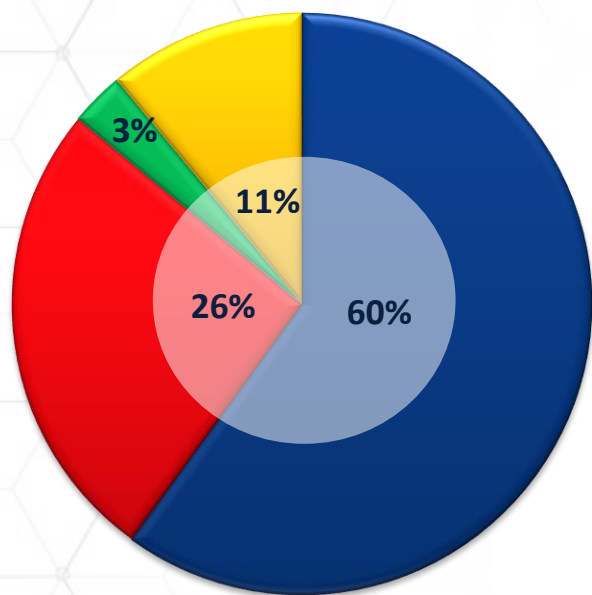
NEW DEVELOPMENT DIRECTIONS OF JSC "MOLDOVAGAZ"

In order to diversify its activities, JSC Moldovagaz is developing new directions for business, intending to implement several projects:

- **to expand the network of gas filling stations** selling compressed natural gas (CNG) fuel;
- **to promote ecological transport** through partnerships with local authorities;
- **Heat and power generation**, and others.



AUTOMOTIVE FUEL CONSUMPTION MARKET IN MOLDOVA



60% Diesel

26% Gasoline

11% LPG

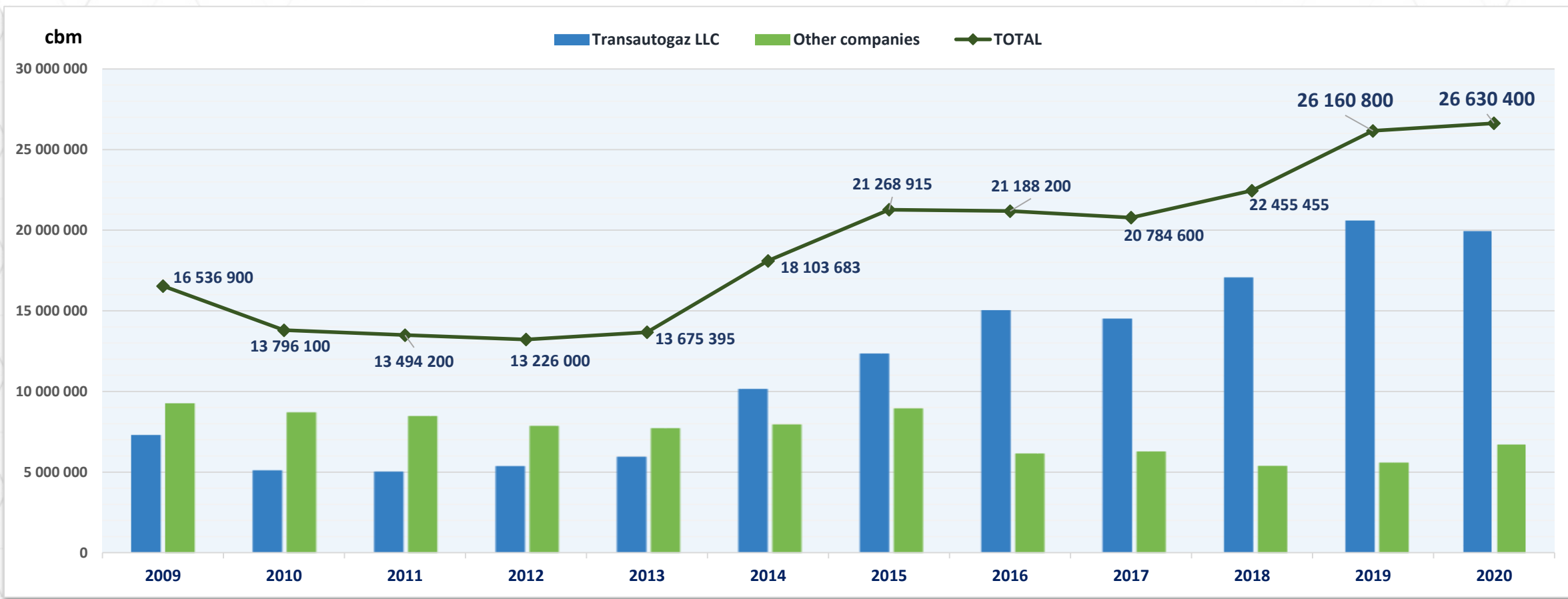
3% CNG



Vehicle Type	2012 (31 Dec)	2017 (31 Dec)	2019 (31 Dec)	Compound Annual Growth Rate
Cars	456 379	588 118	648 779	5,2%
Trucks	157 866	181 833	193 055	2,9%
Buses	21 433	20 944	21 087	-0,2%
Other vehicles (tractors, motorcycles, trailers, semi-trailers, others)	123 933	153 486	168 560	4,5%
TOTAL Vehicles	759 611	944 381	1 031 481	4,5%



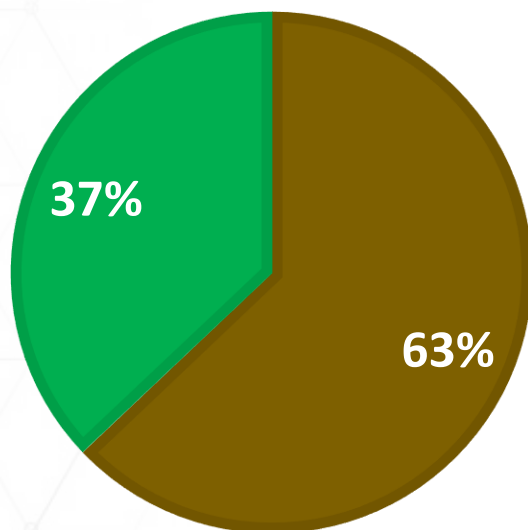
DEVELOPMENT OF THE CNG MARKET IN REPUBLIC OF MOLDOVA



CONVERSION OF MOLDOVAGAZ VEHICLES TO CNG and LPG

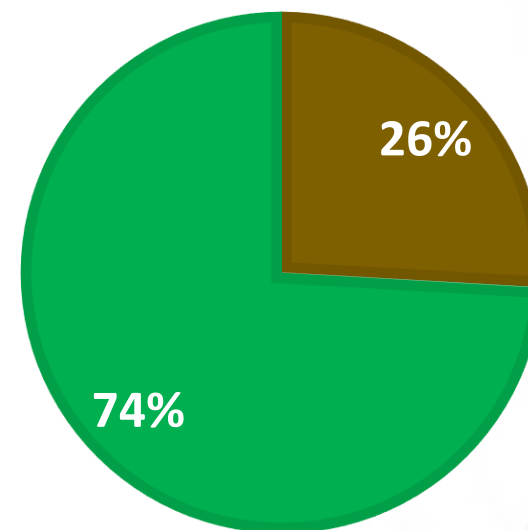
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■ Diesel and Gasoline ■ CNG and LPG

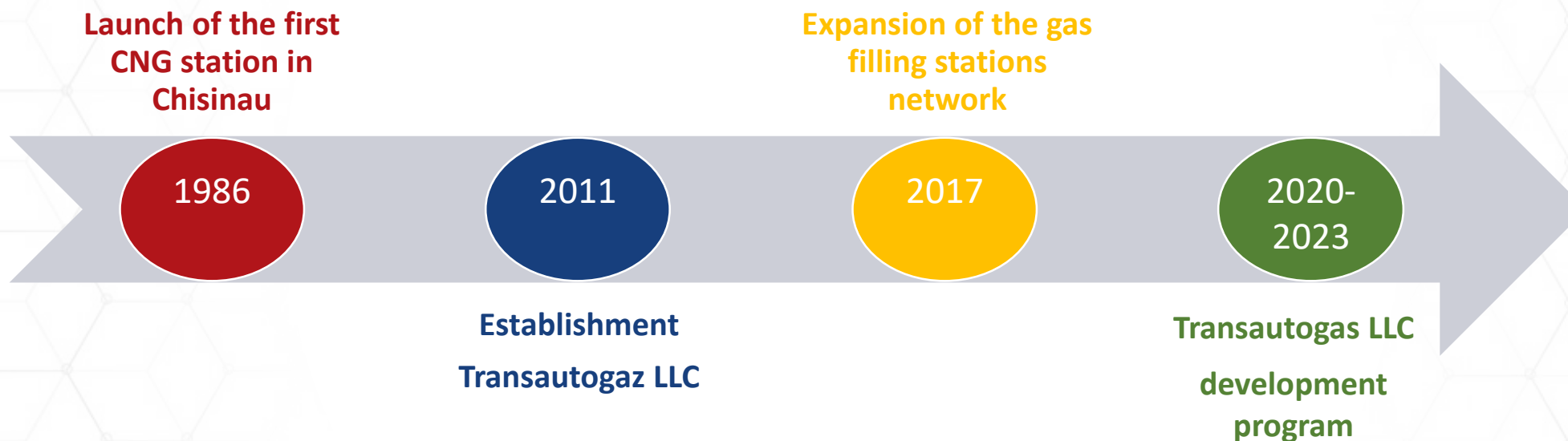


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■ Diesel and Gasoline ■ CNG and LPG

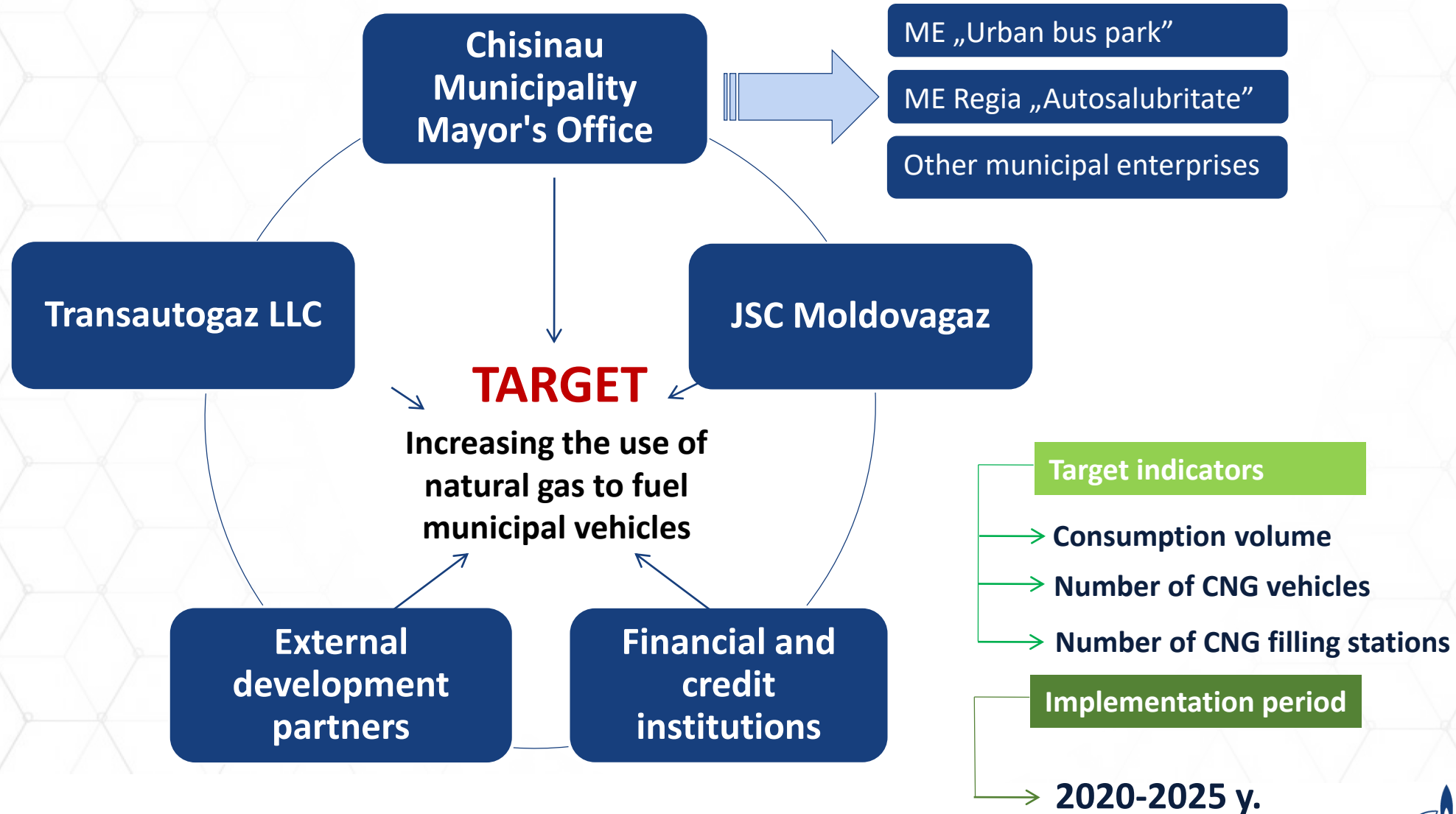


HISTORY AND PROSPECTS OF LLC “TRANSAUTOGAZ”



- More than 30 years of successful work in the CNG market of the Republic of Moldova
- 12 stations daily provide CNG in different regions of the country
- 100 employees refuel more than 5 thousand cars every day throughout the country

COOPERATION WITH LOCAL AUTHORITIES



COOPERATION WITH LOCAL AUTHORITIES

DIESEL FUEL or METHANE (CNG)

diesel price – 0,91 \$/L (07.05.2021 y.)
methane price – 0,45 \$/m3 (07.05.2021 y.)



SAVINGS

48 %

cost 1st week on diesel – 311,35\$
cost 1st week on methane – 162,15\$

438 \$

per month

Budget savings per one garbage truck!

5253 \$

per year

TARGETING THE DEVELOPMENT OF THE CNG MARKET

Successful implementation of the complex task of developing the CNG market in the Republic of Moldova would be achieved by:

- Application of modern technologies in the CNG industry for the construction of new CNG filling stations, modernization of the existing network and construction of vehicle service and repair centers .
- Educational project of for training of CNG market specialists.
- Establishment of a network of service centers for vehicles re-equipment and permanent qualified maintenance of gas cilinder equipment.
- Construction of new CNG filling stations in the south and north of Republic of Moldova, thereby building a transport "gas corridor" from border to border.



PROJECT FOR CONSTRUCTION OF A POWER PLANT

- ✓ Strengthening the energy security of the Republic of Moldova by generating local electricity at competitive prices;
- ✓ Allows the deployment of renewable energy sources ("green energy") by providing additional sources of balancing;
- ✓ Diversification of Moldovagaz JSC activities by assimilating of a new and prospective marketplace;
- ✓ Increase in sales of natural gas volumes;
- ✓ Generation of additional income for Moldovagaz JSC.



OUTLOOKS

Pipelined natural gas is a relatively low-carbohydrate fuel, the use of which in energy and transport contributes to the reduction of GHG emissions;

At the same time, the companies of the Moldovagaz group are considering options for:

- ✓ redirection of unused infrastructure for the transportation of low-carb fuels;
- ✓ supply and transit of low-carbon methane-hydrogen fuel (till 2030 y.), and in the future - hydrogen fuel (till 2050 y.);
- ✓ to develop new environmental friendly and efficient technologies.





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