Long-Term Climate Action in Georgia's Transport Sector

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2020

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2 Initial situation and policy analysis

Climate-friendly economy development of Georgia directly is linked to efficient operation of the transport sector. Georgia is located at the crossroads of Europe and Asia and its economic growth largely depends on effective use of its transit function. Since the 1990s, Georgia's role as part of the transport corridor between Europe, Caucasus and Asia has increased significantly. This reinforces the interest in sustainable development of Georgia, which primarily involves the creation of a quality transit infrastructure in the country. One of the main priorities of the Government of Georgia is modernization and construction of transport infrastructure meeting international standards and harmonization of the national legislation with the international one. In order to achieve this, the government is implementing important infrastructure projects that will help to attract additional freight flows to Georgia and increase the efficiency of its transport system.

Strategic Objectives are:

- Full realization of Georgia's transit potential
- Development of transport infrastructure
- Enhancement of international cooperation
- Harmonization of national legislation with European one
- Development of logistics centres and value-added services
- Improvement of safety and service levels

Georgia intends to decarbonize transport sector through:

- Reducing car use by making alternative solutions more attractive (greater use of public transport, cycling and walking etc.).
- Change in the fleet composition, extensive electrification, use of greenhouse-gas-neutral fuels and greater efficiency across all vehicle categories (cars, commercial vehicles, heavy vehicles);

Transport Sector contribution to GDP

GDP (at constant 2015-year prices) and transport sector contribution insignificantly was changing from year to year[1] (table 1).

Table 1. GDP at constant 2015-year prices and transport sector contribution

Economic Activity	2011	2012	2013	2014	2015	2016	2017	2018	2019

[1] https://www.geostat.ge/en/modules/categories/23/gross-domestic-product-gdp

GDP at constant 2015-yr prices, billion. GEL	25.4	27.0	28.0	29.2	30.2	31.1	32.6	34.2	35.9
Transport contribution, billion GEL	1.557	1.698	1.640	1.755	1.850	1.725	1.925	2.012	2.160
Transport contribution	6.1%	6.3%	5.8%	6.0%	5.5%	5.5%	5.9%	5.9%	6.1%

Georgia's transport system comprises five modes - road, rail, sea, air, and pipelines. All provinces, cities, towns, and neighboring countries are connected either directly or indirectly by at least one of these modes. To improve these connections, since 2005 rules and regulations on the supply of transport infrastructure and services have been revised, the institutions have restructured, the authority for modernizing the transport system have been delegated to line agencies. This has helped draw private capital into aviation (airports and airlines), maritime services (ports and shipping), road transport (all freight and intercity passenger), and pipelines (oil and gas from Azerbaijan and Kazakhstan).

Road transport

The road network of Georgia consists of 20,000 km of roads divided into three categories: roads of international importance (1,455 km long), roads of national importance (5,446 km) and roads of local importance (15,415 km). The recent years have seen significant investments in the road infrastructure (roads of international importance above all), yet, further improvements are necessary, especially, at the regional and local levels. Passenger railway and secondary and local roads do not meet demands and expectations.

The European Union, Japan International Cooperation Agency (JICA), the Millennium Challenge Corporation (MCC), the European Bank for Reconstruction and Development (EBRD) and the World Bank (WB) support the development of the road network of Georgia, providing technical assistance for institutional strengthening and private sector development in such areas as project management, traffic safety, personnel development, elaboration of training programs, procurements for road maintenance needs, etc.

The number of vehicles (cars, busses, mini- busses, trucks, trailers) in total, registered in Georgia shows a steady upward trend (Figure 4.4.1), having increased in 2018 by about 2.2 times compared with 2008. Annual freight transport by road amounts to 25 million tons (around 59.9% of total freight traffic) and passenger traffic reaches 260 million people.

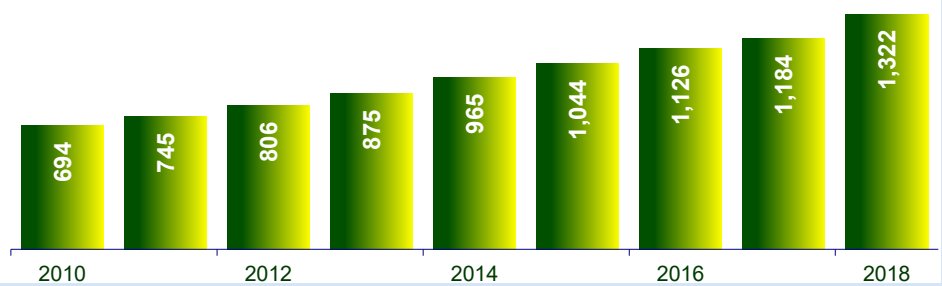

Figure 1. number of registered vehicles in 2008-2018 years

High volume of international road transport creates high traffic load. In the period between 2011 and 2018 international transportation volume ranged within 30 million, while in 2018 the figure increased to 31.1 million tons.

Due to low purchasing power, population and businesses prefer to buy cheap used/second- hand motor vehicles, imported mainly from EU, Japan and USA. According to the Ministry of Internal Affairs of Georgia[2], more than 90% of road transport in 2015 was old with low efficient engines. The situation insignificantly improved in 2019 (table 2).

Table 2. Distribution of road transport by age and production date

Year	Age (years)									
	1–3		4–6		7–10		11–20		>20	
	%	Production date	%	Production date	%	Production date	%	Production date	%	Production date
2015	1.4	2012-2014	2.1	2009-2011	5.6	2005-2008	45.5	1995-2004	45.4	Before 1995
2016	1.3	2013-2015	2.3	2010-2012	5.4	2006-2009	45.0	1996-2005	46.0	Before 1996
2017	1.2	2014-2016	2.5	2011-2013	5.4	2007-2010	43.0	1997-2006	47.9	Before 1997
2018	1.9	2015–2017	3.9	2012–2014	6.4	2008–2011	42.3	1998–2007	45.5	Before 1998
2019	2.2	2016-2018	3.8	2013-2015	7.3	2009-2012	38.7	1999-2008	48	Before 1999

2.1 Distribution of imported passenger cars by fuel

For the latest years the share of diesel oil-based cars and hybrid cars has increased. Distribution of imported passenger cars by fuel type is given in table 3.

[2]http://police.ge/files/pdf/statistika%20da%20kvlevebi_new/geo/sxvadasxva%20statistika/autoparki%202012.pdf

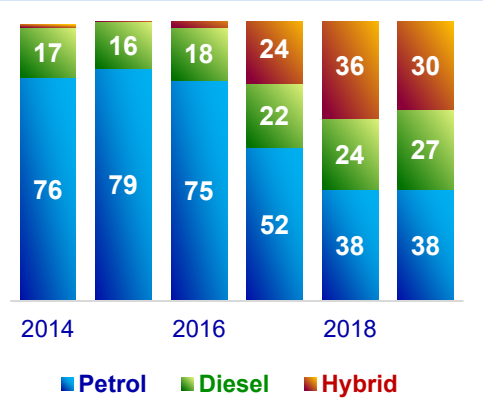

Table 3. Distribution of imported passenger cars by fuel type (in %)

Fuel	2014	2015	2016	2017	2018	2019
Petrol	76	79	75	52	38	38
Diesel	17	16	18	22	24	27
Natural gas	6	3	1	1	0	3
Hybrid	1	1	6	24	36	30
Electric				1	1	1

Motor fuel prices

Price fluctuations of motor fuel, sold in Georgia, was compared with the price fluctuations of crude oil. Fuel prices and the global oil price has been changing in the same direction. Motor fuel consumption in Georgia significantly depends on its prices. On Figure 2 dependence of diesel oil consumption on its prices is presented. According to these figures, increase in fuel price leads to reduction of fuel consumption.

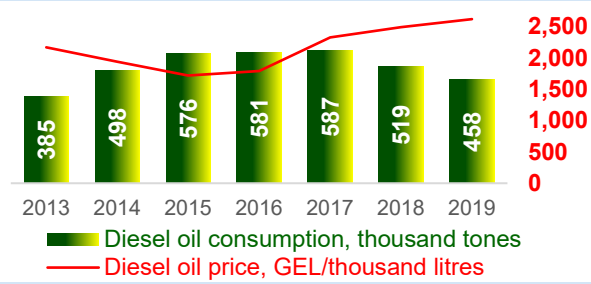

Figure 2. Dependence of diesel oil consumption on its price

Periodic Technical Inspection

The process of the technical inspection of vehicles in Georgia was launched on January 1, 2018. A driver having not passed the technical inspection will be fined 50 GEL. If the driver doesn't repair the vehicle, then he will have to pay 50 GEL monthly or 600 GEL a year. The fine must be paid within a month. If this fine is not paid, an additional 500 GEL will be charged. If such a punishment turns out to be ineffective, then the driver will be deprived his license for six months.

2.2 Georgian Railway

The railway in Georgia is the state property. Its length is about 1600 km and it plays a less significant role in the passenger turnover than roads, but is far more important in terms of freight traffic. Unfortunately, the railway infrastructure and the entire industry with its capacity and equipment are far behind the standards and parameters of the European railway system and need upgrading and development. Georgia's railway is fully electrified.

The Georgian Railway (GR) is one of the most important segments of the Eurasian transport artery stretching between the Black Sea and the Caspian Sea, connecting Europe and Asia in a beeline. The construction of the Georgian section of the Baku-

Tbilisi-Kars railway has completed. The mainline unites the railways of Azerbaijan, Georgia and Turkey into a corridor between the Caspian Sea and Europe.

2.3 Seaports and Terminals

There are two seaports and three terminals on the Black Sea coast of Georgia. These are: Poti and Batumi seaports, Kulevi and Supsa oil terminals and Batumi Sea Terminal. The Poti Seaport offers all conditions for shipping operations, its freight turnover constantly increasing. The seaport is connected to other Black Sea ports by means of vehicular ferries. The Batumi Seaport is the second largest port in Georgia, known for its favourable geostrategic location and conditions. The main factor contributing to the development of the Batumi Seaport is oil transportation from Baku to Batumi by rail. The port has long been known as an important part of the Eurasian and international transport corridors. The Batumi Sea Terminal and the port constitute a developed maritime infrastructure on the Black Sea coast of Georgia. The oil terminal has annual throughput capacity of up to 15 million tons. It is intended for processing crude oil and all types of cargo. The Kulevi Sea Terminal, located between Poti and Anaklia, opened several years ago. Its capacity is up to 6 million tons with potential increase to 10 million tons. The Supsa Terminal was established in parallel with the construction of the Baku-Supsa oil pipeline and became operational in 1999. It is one of the largest Black Sea terminals and is mainly intended for processing oil, supplied via the Baku-Supsa pipeline.

2.4 Air Transport

Georgia became a full member of the International Civil Aviation Organization (ICAO) in 1994. This means that the country's civil aviation operates in accordance with international standards and recommended practices. In 2005, Georgia joined the European Civil Aviation Conference (ECAC).

Currently, Georgia has two local and three international airports. Tbilisi International Airport is the busiest, accounting for more than 76% of total passenger turnover and operating most international and domestic flights. The airport can accommodate and serve all types of aircraft and the annual capacity of its passenger terminal is 4 million people. Kutaisi International Airport, operating since 2012, is the second largest airport in Georgia, which served 617,373 domestic and international passengers in 2018. The airport offers regular international flights to the CIS and European countries, as well as domestic flights, particularly to Mestia – one of the main tourist destinations in Georgia. Mestia Airport opened in 2011 to perform domestic flights, while Batumi Airport operates both domestic and international flights. Natakhtari Airport - a local airport in the village of Natakhtari, Mtskheta Municipality serves 30-50 passenger planes. Flights to Batumi, Kutaisi, Mestia and Ambrolauri from Natakhtari Airport are being completed.

3 State policy

Ministry of Economy and Sustainable Development (MESD) has jurisdiction over road transport, maritime transport, railways, and aviation infrastructure and services, with its Transport Policy Department serving as the coordinating body. The Roads Department of MRDI builds and operates roads classified as international and secondary. Local authorities are responsible for the other roads in the network, which are classified as local roads. The Land Transport Agency (LTA), Maritime Transport Agency (MTA), and Georgian Civil Aviation Agency are the technical regulators.

Synergies with the EU Association Agreement

The Association Agreement between the European Union and Georgia aims to provide a framework that allows deeper political and economic relationships between the EU and Georgia, including through the increased alignment to some key regulations and standards.

Compliance with the Association Agreement has particularly high political priority in Georgia since the European Union is viewed as a key strategic partner.

Despite the fact, that the Association Agreement is not binding Georgia to specific targets related to emissions trajectories or decarbonization indicators for transport, the document does include several elements for which the full implementation will most likely also lead to improvements for all key decarbonization indicators.

Law of Georgia on the Management and Regulation of Transport Sector determines the main organizational principles and legal basis as well as state policy and technical regulation bodies.

The road transport is regulated by the basic **Law on Road Transport,** which determines the main objectives, management of this sector and general rules for permit issuance. **The Law of Georgia on Traffi**c and **the Law of Georgia on Road**s are also applied to regulate the sector.

In the field of railway transport, the **Railway Code of Georgia** is in force which determines the basic principles for organizing transportation, general rules for freight carriage and registration.

In the field of Maritime transport, the following normative acts are in force: **Maritime Code**, **Law of Georgia on Maritime Space, Law of Georgia on Maritime Rescue Service, Law of Georgia on Education and Certification of Seafarers** and **Law of Georgia on Education and Certification of Seafarers and Fishermen.**

Land Transport Agency under the auspices of the Ministry of Economy and Sustainable Development (MESD) of Georgia represents the National Authority, responsible for:

- Carrying out activities within the framework of the authorities granted to it in accordance with the legislation of Georgia;
- Performing the functions delegated to it in the field of land transport, as provided by international treaties and agreements of Georgia.

Maritime Transport Agency under the MESD of Georgia represents the National Maritime Authority, responsible for the effective implementation of organizational and legal instruments in the maritime field derived from national and international requirements.

LEPL Georgian Civil Aviation Agency under the MESD of Georgia represents the National Authority, responsible for regulation, supervision, control and provision of relevant services in the field of civil aviation.

4 GHG emissions: actual profile

GHG emissions from transport sector and by transport modes are given in the table 4. For 1990-2010 years data are sourced from the National Inventory Report[3]. For 2015-2017 years GHG emissions are estimated applying „Energy Balance of Georgia“[4] for 2015-2017 years. According to this table, share of GHG emissions from road transport exceeds 90% of total GHG emissions from transport sector including pipelines and exceeds 99% excluding pipelines.

Table 4. GHG emissions from transport sector (in Gg CO_2-eq) and share of transport modes

Year	Total	Road transport						Civil aviation		Railways		National Navigation		Pipelines	
		CO_2eq		CO_2		CH_4 and N_2O									
		Total	Share	CO_2	Share	CO_2eq	Share	CO_2	Share	CO_2	Share	CO_2	Share	CO_2	Share
1990	3,901	3,678	94.3%	NE	-	43.58	1.12%	NE	-	101	2.59%	78	2.00%	NE	-
1995	863	844	97.8%	NE	-	0.89	0.10%	NE	-	NE	-	18	2.09%	NE	-
2000	965	945	97.9%	NE	-	0.04	0.00%	NE	-	NE	-	20	2.07%	NE	-
2005	1,571	1,537	97.8%	NE	-	0	0.00%	NE	-	NE	-	34	2.16%	NE	-
2010	2,630	2,390	90.9%	NE	-	0.02	0.00%	NE	-	190	7.22%	50	1.90%	NE	-
2015	4,208	3,965	94.2%	3,855	91.6%	110	2.60%	2	0.05%	18	0.43%	2	0.05%	221	5.3%
2016	4,500	4,239	94.2%	4,125	91.7%	114	2.54%	3	0.08%	34	0.75%	2	0.05%	222	4.9%

[3] https://unfccc.int/sites/default/files/resource/NIR%20%20Eng%2030.03.pdf

[4] https://www.geostat.ge/en/modules/categories/328/energy-balance-of-georgia

2017	4,472	4,240	94.8%	4,128	92.3%	112	2.50%	2	0.04%	34	0.77%	6	0.14%	190	4.3%
2018	4,153	3,875	93.3%	3,772	90.8%	103	2.48%	1	0.02%	34	0.83%	2	0.05%	240	5.8%
2019	3,995	3,669	91.8%	3,571	89.4%	97	2.44%	2	0.05%	32	0.80%	1	0.03%	292	7.3%

4.1 CO_2 emissions from Pipelines

Passing through pipelines natural gas is transported via compressor stations. The stations consume approximately 3-5% of the transported gas. Optimal operation of the compressors is important. During last (2011-2019) years CO_2 emissions from the natural gas pipelines constitute on average 220 Gg CO_2 (table 5).

Table 5. CO_2 emissions from pipelines in 2011-2019 years

Year	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Average**
CO_2 emissions, Gg CO_2	190	215	204	191	227	224	190	240	292	219

During 2021-2050, the natural gas consumption in pipelines will depend on amount of transported gas. CO_2 emissions from pipelines by 2050 will be projected based on envisioned amount of transported by 2050 natural gas.

In the table 6 GHG emissions from road transport by fuel 2013-2017 years are given.

Table 6: GHG emissions from road transport by fuel in 2013-2017 years

Year	**CO_2**					**CH_4 and N_2O in CO_2eq**	**Total in CO_2eq**
	Natural gas	**Gasoline**	**Diesel oil**	**LPG**	**Total**		
2013	518	1,147	1,226	6	2,897	84	2,981
2014	695	1,168	1,585	6	3,454	100	3,555
2015	723	1,298	1,834	1	3,856	110	3,965
2016	548	1,724	1,850	2	4,124	114	4,239
2017	498	1,751	1,870	8	4,127	112	4,240

5 Transport sector's share in national total GHG emissions

During last several years share of GHG emissions from transport sector in national GHG emissions has tendency to increase, from 8.8% in 2000 to 25.2% in 2017 (table 7).

Table 7. Transport sector emissions and their share in national GHG emissions

Year	National GHG, Gg CO_2eq	Transport	
		GHG, Gg CO_2eq	Share
1990	45,814	3,901	8.5%
1995	12,696	863	6.8%
2000	10,923	965	8.8%
2005	11,168	1,571	14.1%
2010	13,688	2,630	19.2%
2015	18,214	4,208	23.1%
2016	18,534	4,500	24.3%
2017	17,766	4,472	25.2%

5.1 Intended or likely future emissions trajectory or range (WoM / modeling of the baseline scenarios)

The GHG emissions by 2050 from the transport sector in case of baseline (WoM scenario modeling) are driven by the economic growth and the associated transportation demand. Georgia's GDP is expected to continue growing above 5% rates up to 2050 (on average by 5.7 % in case of optimistic scenario and on average by 5% in case of pessimistic scenario modeling), expanding its overall economic activity and increasing in a similar proportion the transportation demand of the economy. Economic growth, transportation demand and GHG emissions are highly correlated, as current economic practices and existent technologies are fossil fuel dependent.

Activity for both passenger and freight transport has been gradually increasing in Georgia, following a large fall in activity in 1991, and is projected to continue increasing in the future. Envisioned mileage of cars will constitute 28 km per day in 2030 and 40 km per day in 2050. Therefore, the emissions to 2050 will continue to rise, unless sectoral and national policies and practices are implemented and high efficient technologies are widespread in the country.

Projected GHG emissions from transport sector in case of WoM optimistic and WoM pessimistic scenarios are given on Figures 4.4.3 - 4.4.4. GHG emissions are projected to increase approximately by 133% from 2016 levels to 10,489 Gg CO_2-eq in 2050 under WoM optimistic scenario and approximately by 72% from 2016 levels to 7,704 Gg CO_2-eq in 2050 under WoM pessimistic scenario.

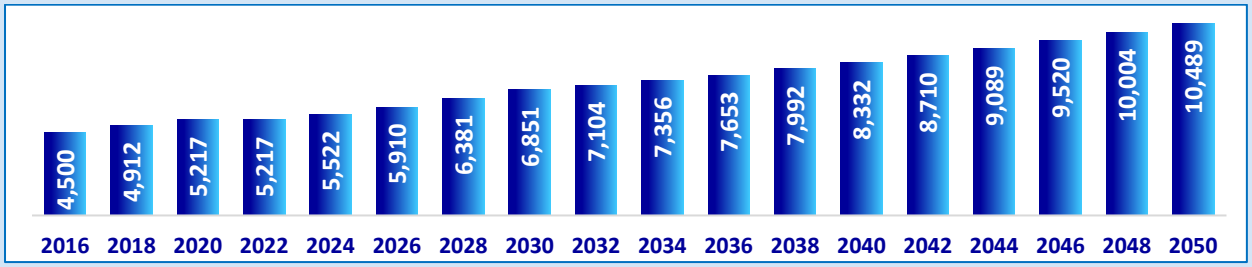

Figure 3. Projected GHG emissions from transport sector in Gg CO_2-eq (WoM optimistic scenario)

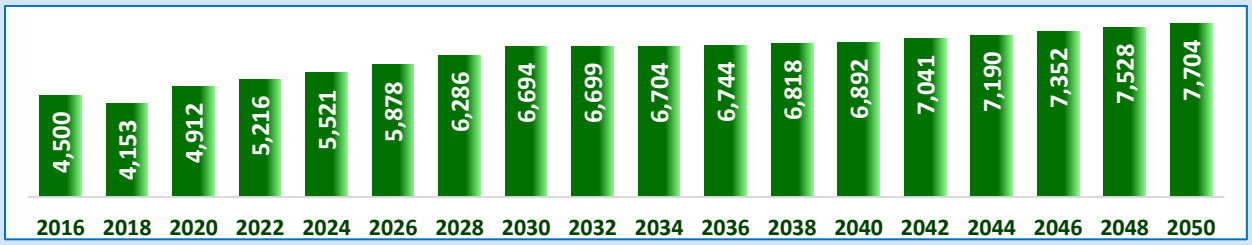

Figure 4. Projected GHG emissions from transport sector in Gg CO_2-eq (WoM pessimistic scenario)

5.2 Guiding principle for 2050 and transformation pathway. Technology needs assessment

All means of transport are imported in Georgia. Very likely situation will remain unchanged by 2050. During the last years technological transformation approach of urban roadway systems has been applied in big cities of Georgia (Tbilisi and Batumi).

Envisioned, that transport transformation pathway in Georgia will follow worldwide transformation pathway, which includes:

- Modal shift from private vehicles to public transport, walking and cycling
- By 2050, battery electric vehicle, plug-in hybrid electric vehicle and fuel cell vehicle sales will combine to eclipse internal combustion engine sales globally for light-duty vehicles;
- Despite the growing dominance of electric vehicles, global oil demand from light-duty vehicles is projected to reduce by only 24% over the next 30 years. Main reasons for this is slow erosion of internal combustion engine vehicles stock and an increased demand from emerging economies;
- Technological transformation of urban roadway systems;

- Introduction of the smart technologies and artificially intelligent transport systems for travel time reduction and easing congestions;
- Introduction of the smart technologies and artificially intelligent transport systems for travel time reduction and easing congestions;
- Replacement of private automobile trips from vehicle ownership to a rental service that is run on-demand. On-demand mobility can reduce around 90% or more GHG emissions and energy.

5.3 Milestones for 2030 and 2040 years

The WoM scenario does not consider the implementation of any policies and measures but is projected considering the main macroeconomic perspectives of Georgia. The total GHG emissions from transport sector by 2030 and 2040 would possibly reach 6,851 Gg CO_2-eq and 8,332 Gg CO_2-eq respectively in case of the optimistic scenario, and 6,694 Gg CO_2-eq and 6,892 Gg CO_2-eq respectively in case of the pessimistic scenario.

Table 8. GHG emission milestones for 2030 and 2040 in case of WoM scenarios

Year	**Optimistic scenario**	**Per cent of 1990 level**	**Pessimistic scenario**	**Per cent of 1990 level**
	Gg CO_2-eq.	**%**	**Gg CO_2-eq.**	**%**
1990	3,901		3,901	
2030	6,851	176	8,332	214
2040	6,694	172	6,892	177

The WeM scenario considers the planned and implemented policies and measures in Georgia and assesses how Georgia's mitigation pathway will respond according to these actions. The total GHG emissions from transport sector by 2030 and 2040 would possibly reach approximately 6,306 Gg CO_2-eq and 5,654 Gg CO_2-eq. respectively in case of the optimistic scenario and 6,095 Gg CO_2-eq and 5,411 Gg CO_2-eq. respectively in case of the pessimistic scenario.

Table 9. GHG emission milestones for 2030 and 2040 in case of WeM scenarios

Year	**Optimistic scenario**	**Per cent of 1990 level**	**Pessimistic scenario**	**Per cent of 1990 level**
	Gg CO_2-eq.	**%**	**Gg CO_2-eq.**	**%**
1990	3,901	---	3,901	---

2030	6,306	162	6,095	156
2040	5,654	145	5,411	139

The WaM scenario considers additional measures that are not yet taken into account in the planning process of Georgia and assesses how Georgia's mitigation pathway will respond according to these actions. The total GHG emissions from transport sector by 2030 and 2040 would possibly reach approximately 5,079 Gg CO_2-eq and 4,067 Gg CO_2-eq. respectively in case of the optimistic scenario and 4,909 Gg CO_2-eq and 3,892 Gg CO_2-eq. respectively in case of the pessimistic scenario.

Table 10. GHG emission milestones for 2030 and 2040 in case of WaM scenarios

Year	**Optimistic scenario**	**Per cent of 1990 level**	**Pessimistic scenario**	**Per cent of 1990 level**
	Gg CO_2-eq.	**%**	**Gg CO_2-eq.**	**%**
1990	3,901		3,901	
2030	5,079	130	4,909	126
2040	4,067	104	3,892	100

6 Intended or likely future emissions trajectory or range (Modeling of Mitigation scenarios)

The decarbonization of the transport sector will be driven mainly (a) by the change of technologies, from conventional fossil vehicles to highly efficient cars and low carbon technologies such as hybrid and electric, (b) by modal shift, e.g. from private transport to public transport, more use of rail and water transport etc.; and (c) by fuel economy improvement. National aviation and navigation, despite their small shares in GHG emissions, will also play a role in the decarbonization with the gradual increase shares of advanced technologies.

The mitigation scenario (WeM) is built from the baseline scenario (WoM) by considering the effect of the policies and measures that are adopted and planned in the country. The WaM scenario is built from the WeM by considering the effect of additional mitigation actions, which are feasible for the country given the policies and measures that are planned in the country.

Considering additional technologies and increased penetration of low carbon technologies, the emissions from the transport sector in WeM and WaM scenarios will decrease significantly compared to baseline (WoM scenario modeling). In the following

5-8 Figures the projected GHG emissions from the transport sector in case of WeM and WaM scenarios are given.

By 2050, the GHG emissions from the transport sector will be reduced by 19.8% in case of WeM optimistic scenario and by 81% % in case of WeM optimistic scenario, and by 9.7% in case of WeM pessimistic scenario and by 67.5% % in case of WeM pessimistic scenario.

Figure 5. Projected GHG emissions from transport sector in Gg CO_2-eq (WeM optimistic scenario)

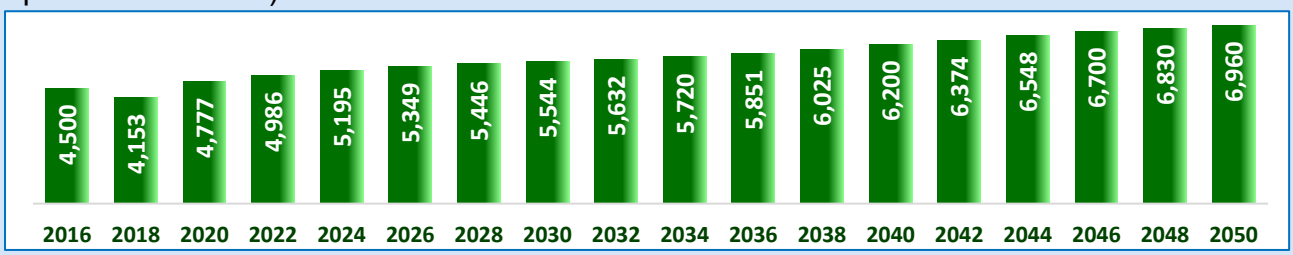

Figure 6. Projected GHG emissions from transport sector in Gg CO_2-eq (WeM pessimistic scenario)

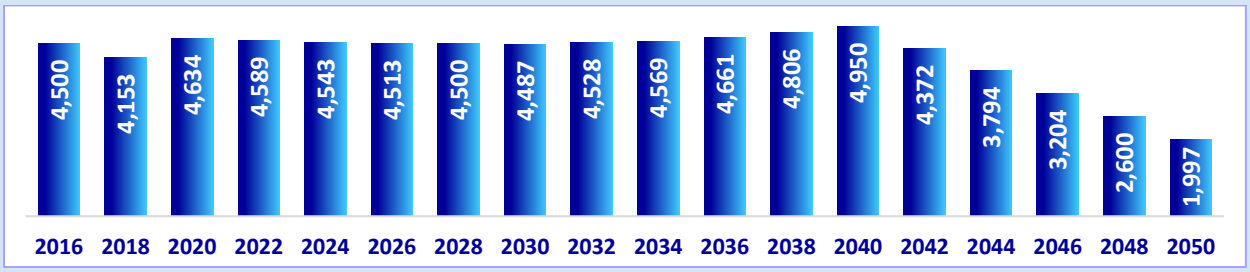

Figure 7. Projected GHG emissions from transport sector in Gg CO_2-eq (WaM optimistic scenario)

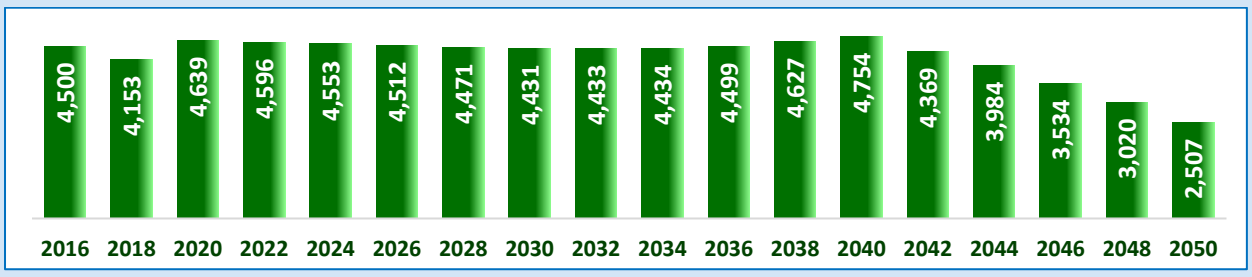

Figure 8. Projected GHG emissions from transport sector in Gg CO_2-eq (WaM pessimistic scenario)

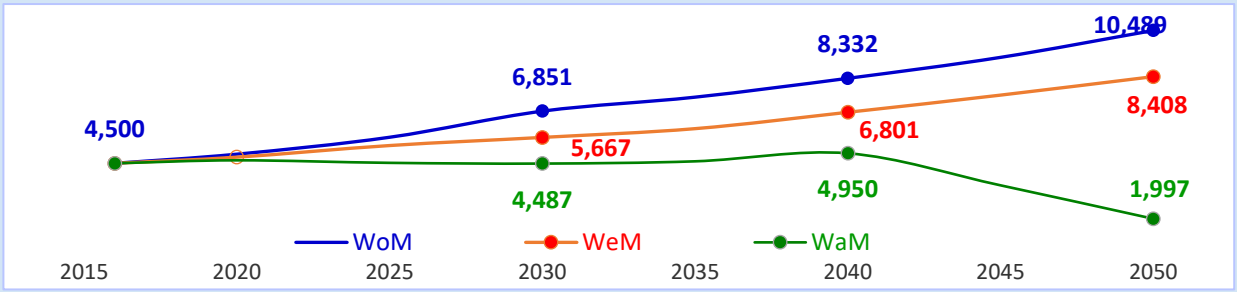

Figure 9. Projected GHG emissions from transport sector in Gg CO_2-eq (optimistic scenario)

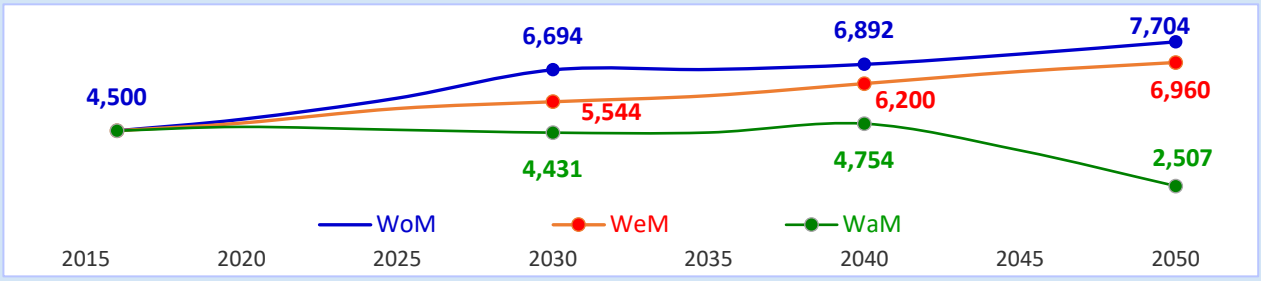

Figure 10. Projected GHG emissions from transport sector in Gg CO_2-eq (pessimistic scenario)

6.1 Planned and Potential Measures for mitigation and their prioritization

To estimate GHG emissions in case of mitigation (WeM and WaM) scenarios, following mitigation measures have been considered.

WeM scenario

- Make public transit faster, more reliable, more comfortable, and safer compared to private vehicles; improve the capacity, ridership, and efficiency of municipal public transport;
- Change in roadway infrastructure and operations: Green light priority for buses, queue jumping at intersections, the conversion of shared road space to dedicated bus lanes, placement of stops so that buses can easily re-enter traffic, reduce traffic delays and increase travel speeds;
- Improvements in pedestrian and bicycle networks to attract more people to walk, bicycle, and ride public transportation;
- Incorporate sustainable public transport development activities, walking/ cycling/ moped travel measures and parking policy and other restrictive measures in the CoM signatory cities;

- Removing least efficient vehicles from the vehicle fleet and upgrade fleet, improving average fleet efficiency;
- Decrease imports of old, inefficient vehicles, with greater market penetration for new models as well as hybrids and electric vehicles;
- Improving fuel quality - adoption of Euro 6 standard (by 2030) and Euro 7 standard (by 2040) for fuels;
- Provide a substantial tax credit for new electric and plug-in hybrid electric vehicles;
- Creating additional incentives through cash back, discount rate plans and other credits.
- Provide household and commercial electric vehicles charger installation grants;
- Non-cash incentives for electric vehicles, such as carpool lane access and free municipal parking;
- Creating alternatives to charging at home: public charging, workplace charging.
- Improving the quality of intercity passenger transport - Improving the service and quality of intercity public road transport;
- Increase the share of railway in freight turnover using relevant tariffs policy;
- Improve intercity passenger rail;
- Working out nationwide sustainable urban transport development policy; Development of national strategy for supporting municipal efforts;
- Conduct public awareness campaign for transport-Passenger and freight transport throughout Georgia.

6.2 Activities for WaM scenario modeling

- Use Bus Rapid Transit: dedicated lanes, segregated bus ways, traffic signal priority, off-board fare collection, etc.
- Avoid unnecessary travel activity through more effective spatial, logistical, and communication systems;
- Making private vehicle use more expensive or inconvenient: Introduce road pricing schemes that charge drivers for using their cars in city centres; introduce measures to make parking more difficult in target areas, by turning parking spaces into cycle lanes or pedestrian areas, or increasing parking fees; Use demand-based parking fees that increase when demand is high;
- Renewal of passenger railway infrastructure and increasing train fleet towards strategic directions;
- Promote freight transport shift from heavy truck to rail;

- Expanded capacity and ridership of the metro;
- Encourage cableway installation;
- Development of the legislative base for road transport eco-class awarding and labelling system, and calculating import tax with respect to transport eco-class;
- Conduct Eco-driving courses for drivers- Introducing the requirements of initial qualification and periodic training for drivers of certain types of transport;
- Ban import of vehicles older than 10 year;
- Encourage biodiesel production: Exempt biodiesel production and import from excise tax;
- Encourage production of canola oil / Increase canola production;
- Encouraging introduction (purchase) of electric and hybrid cars: Reduction of the excise tax on hybrid.

6.3 Estimated share of GHG emissions from transport sector in national GHG emissions

In the table 11 estimated share of GHG emissions from transport sector in national GHG emissions (including LULUCF sector) are given. In optimistic and pessimistic WaM scenarios share of transport sector drastically increased as national GHG emissions are small due to increase in GHG absorption by LULUCF.

Table 11. Share of GHG emissions from transport sector in national GHG emissions (including LULUCF sector), optimistic scenario

Scenario	2020	2025	2030	2035	2040	2045	2050
WoM	34%	31%	30%	28%	27%	25%	26%
WeM	50%	47%	42%	40%	40%	37%	38%
WaM	37%	44%	48%	51%	85%	113%	-3,678%

Table 12. Share of GHG emissions from transport sector in national GHG emissions (excluding LULUCF sector), optimistic scenario

Scenario	2020	2025	2030	2035	2040	2045	2050
WoM	25%	25%	25%	24%	24%	23%	23%
WeM	33%	32%	29%	28%	28%	27%	28%
WaM	26%	27%	27%	27%	33%	27%	19%

Table 13. Share of GHG emissions from transport sector in national GHG emissions (including LULUCF sector), pessimistic scenario

Scenario	2020	2025	2030	2035	2040	2045	2050
WoM	34%	31%	31%	27%	26%	24%	23%
WeM	39%	41%	40%	37%	38%	36%	35%
WaM	39%	44%	48%	52%	89%	145%	-514%

Table 14. Share of GHG emissions from transport sector in national GHG emissions (excluding LULUCF sector), pessimistic scenario

Scenario	2020	2025	2030	2035	2040	2045	2050
WoM	25%	25%	25%	23%	22%	21%	21%
WeM	28%	29%	28%	26%	27%	26%	25%
WaM	27%	27%	27%	27%	33%	30%	24%

6.4 Methodology of data collection for transport sector MRV (Monitoring, Reporting and Verification)

MRV for GHG Inventory

MRV of GHG inventory aims to assess current progress in reducing GHG emissions towards the LT LEDS overall target.

Table 15. Monitored parameters

No	**Monitored parameter**	**Value**	**Envisaged in monitoring year (2025)**	**Source/ methodology**	**Responsible entity**
1	Number of electric cars		30,982	Publication “Avtoparki” (Road transport fleet composition)	6.5 Information-analytical department, Ministry of internal affairs
2	Number of Hybrid cars		138,523		
3	Number of electric trucks		0		

4	Number of electric busses		68		
5	Number of electric mini busses		449		
6	Gasoline consumption, thousand tones		794	„Energy balance of Georgia“	National Statistics Office of Georgia
7	Diesel oil consumption, thousand tones		890		
8	LPG consumption, thousand tones		7		
9	Natural gas consumption, million m^3		140		
10	Electricity consumption, million kWh		85		
11	**Estimated GHG emissions, Gg CO_2eq**		**5,301**	**IPCC 2006 (estimated by equation 1)**	**MEPA**

Equation 1

$$Emissions_{GHG,\,fuel} = Fuel\ Consumption_{fuel} \bullet NCV_{fuel} \bullet GHG\ emission\ coefficient_{fuel}$$

7 MRV of Mitigation Actions

MRV of mitigation actions involves ex-post assessment of GHG emissions reduction – effects of policies and actions, as well as monitoring their implementation progress. It also involves assessing progress toward mitigation goals. While MRV of GHG emissions measures actual emissions,

MRV of mitigation actions estimates the change in emissions that results from those actions.

Table 16. Monitoring of mitigation actions

No	Mitigation action	Indicators to be monitored	GHG emission reduction ($Gg\ CO_2\ eq$)
			Envisaged in monitoring year
	Name of MA		
1	Improvements in pedestrian and bicycle networks	Number of new pedestrian and bicycle lanes	374
2	Removing least efficient vehicles from the vehicle fleet	Change in distribution of vehicle fleet by age	
3	Creating alternatives to charging electric cars at home: public charging, workplace charging	Increase in number of public charging stations	
4	Provide household and commercial electric vehicles charger installation grants	Number and amount of grants provided	
5	Ban import of vehicles older than 10 year-old	Change in relevant regulation	
6	Increase the share of railway in freight turnover	Share of railway in freight turnover	
7	Provide a substantial tax credit for new electric and plug-in hybrid electric vehicles	Change in Tax code of Georgia	781
8	Creating incentives for new electric car through cash back, discount rate plans and other credits	Change in relevant regulations	
9	Use Bus Rapid Transit	Number of streets and length in km with bus rapid transit	

10	Expand capacity and ridership of the metro	Increase in number of metro passengers	
11	Encourage cableway installation	Number of new cable ways	
12	Reduction of the excise tax on hybrid car	Change in Tax code of Georgia	