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POLICY PAPER

SOLID WASTE MANAGEMENT SECTOR IN GEORGIA: CHALLENGES AND RECOMMENDATIONS

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INTRODUCTION

This policy paper was prepared by Policy and Management Consulting Group (PMCG) within the frame of the USAID Economic Security Program¹, in conjunction with the Environmental Protection and Natural Resources Committee of the Parliament of Georgia. By supporting sectors showing strong potential with respect to creating jobs, increasing incomes, boosting micro, small, and medium enterprise (MSME) revenues, and attracting investment, the Program seeks to accelerate broad-based growth across the Georgian economy. Apart from supporting diversification and engagement in more productive economic activities, the Program helps to develop a conducive ecosystem in which priority sectors and value chains such as solid waste management², light manufacturing, tourism, creative industries, and shared intellectual services can flourish. Other aspects on which the Program places emphasis are workforce skills development, strengthening institutions that support priority sectors and value chains, and establishing partnerships that catalyze investment.

Using effective dialogue, the “Developing Policy Papers in Priority Sectors and Facilitating Public-Private Dialogue” project set out to determine the best ways to overcome the identified challenges, as well as devise and implement concrete measures to address them. To do so, all of the main stakeholders were informed about the existing difficulties and the need to resolve them, while their active participation in the public-private dialogue was also ensured. Thus, the research methodology encompassed a wide range of stakeholders at all project stages. While arranging the public-private dialogue, the main mechanisms used were the multi-sectoral working group formed at the initial stage and an interactive process conducted in cooperation with the Parliamentary Committee. With the assistance of the Program, the working group identified the priority challenges, discussed solutions to them, and assessed their potential impact.

The Waste Management Code of Georgia defines “waste” as any substance or object that the holder of waste discards, intends to discard, or is obliged to discard³. This pivotal legislation differentiates between various types of waste according to their physical nature, origin, hazardousness, and other criteria. It also clarifies numerous terms and economic/legal relationships that concern waste management, prevention, separation, collection, processing, and reuse. Meanwhile, every type of waste comes with its own specific economic and legal circumstances, economic incentives, environmental risks, and other factors. Taking these into close consideration, the most suitable scope for the research was determined to identify the areas where clear, action-oriented recommendations based on specific criteria could be developed in a relatively short period. One of the criteria applied was economic value/potential, which is explained in detail in the relevant section of this document.

In the Georgian economy, solid waste management is a relatively new sector, albeit some processing and recycling practices are already up and running for several types of waste. Today, the sector encompasses a wide range of activities related to waste processing, including the processing of plastics, paper, cardboard, wood, metal, glass, used oil, tires, electrical and electronic equipment, batteries, vehicles, and hazardous waste⁴.

¹ For the purposes of this research, Policy and Management Consulting Group (PMCG), including its research center (PMC Research Center), represents the USAID Economic Security Program as a subcontractor.

² The Waste Management Code of Georgia does not mention the term “Solid Waste Management,” while a key player in this sector is the state-owned “Solid Waste Management Company of Georgia.”

³ <https://matsne.gov.ge/ka/document/view/2676416?publication=12>

⁴ Sector and Value Chain Analytics, The First Analytical Report, USAID Economic Security Program, January 2021. The report is available at: <https://pmcg-i.com/publication-category/reports/>.

According to a World Bank study⁵, the sector has made significant progress in developing an integrated solid waste management system since 2015, following the entry into force of the Waste Management Code. However, serious problems are still to be addressed if the country is to achieve the objectives laid out in the National Waste Management Strategy, incorporating EU standards. In particular, the challenges here include: the need to improve waste collection coverage and reduce the amount of waste in landfills; managing waste according to recognized environmental protection principles; eliminating illegal waste dumping through having in place better waste collection, monitoring, and law enforcement; transforming municipal solid waste management service delivery organizations from almost fully subsidized entities into autonomous, self-sufficient organizations; and implementing circular economy principles such as waste prevention, reuse, redesign, recycling, and recovery⁶.

This policy paper also relies on the findings of quarterly analytical reports on the aforementioned priority sectors, prepared by PMC Research Center (PMC RC) and the International School of Economics at the Tbilisi State University (ISET) between 2020 and 2022 as part of the USAID Economic Security Program⁷. These reports provide overviews of current trends in the solid waste management sector and stakeholders' views regarding the challenges therein. Notably, the problems faced by private sector representatives were found to be more or less the same for almost all types of waste for nearly the entire study period. According to many stakeholders, the main obstacle for most waste-processing companies is the constant shortage of raw materials, which they attribute to the insufficient enforcement of the Waste Management Code. In addition, a lack of foreign and local investment is also reported to have significantly hampered the sector's development. In this respect, most stakeholders asserted that the reason behind the lack of interest among Georgian investors is their low awareness of the sector in general and the opportunities it holds. Another key factor cited here is a lack of access to finance, which restricts companies from making the necessary technology updates to improve productivity.

This study's interviews and desk research revealed that numerous challenges were facing the sector. Relatedly, a working group of stakeholders then identified the two highest-priority factors hindering both the private and public sectors. Addressing these challenges is expected to yield significant economic benefits, and there are ample technical, financial, and administrative resources available for short- and medium-term implementation. The two highest-priority challenges were ultimately **LACK OF ENFORCEMENT OF THE EXISTING LAWS ON WASTE MANAGEMENT and SHORTAGE OF RAW MATERIALS FOR WASTE PROCESSING**. In response to these challenges, the Program developed recommendations with the active participation of the aforementioned working group, focusing on informing the private and public sectors about the severity of the existing problems and finding results-oriented solutions through public-private dialogue.

This policy paper consists of the following parts:

- **METHODOLOGY** – This part describes the main stages of the research, including a review and summary of the policy paper creation process and the outcomes of the public-private dialogue.
- **SECTOR OVERVIEW** – Here an overview is given of the main development trends in the solid waste management sector, the legislative and regulatory framework, institutional arrangements, and the main economic indicators. It also discusses the most important goals and actions set by the

⁵ Georgia Solid Waste Sector Assessment Report, World Bank, May 31, 2021.

⁶ Ibid.

⁷ Sector and Value Chain Analytics Reports are available at: <https://pmcg-i.com/publication-category/reports/>

Georgian government including corresponding hindrances and prospects, while also describing challenges identified during the first stage of the research.

- **PRIORITY CHALLENGES** – A detailed analysis of the priority challenges identified by the working group is provided in this part, including their causes and their impact on the sector’s development.
- **CONCLUSIONS AND RECOMMENDATIONS** – Finally, the research findings are summarized, and the highest-priority challenges are presented, while measures to address the identified challenges are also outlined, taking into account best international practices.

METHODOLOGY

The main objective of this policy paper is to impress upon stakeholders the urgent need to resolve the identified challenges in the solid waste management sector to ensure meaningful and effective engagement. Therefore, active stakeholder participation at all stages of the research and dialogue was central to the paper's development.

The methodology applied in the development of the paper comprised the following main stages:

I. IDENTIFYING THE EXISTING CHALLENGES IN THE SECTOR. At the initial stage, to study the current situation and existing problems in the solid waste management sector, PMCG's researchers conducted desk research and 20 individual in-depth interviews with stakeholders, which included representatives of both the private and public sectors as well as those of non-governmental and donor organizations, and industry experts (Appendix 1).

The desk research evaluated the solid waste management sector's legal and regulatory framework, institutional arrangements, and main economic characteristics. The latter include dynamics concerning turnover, employment, value-added, and other indicators in the sector in recent years, as well as information on the largest waste streams and an assessment of the sector's economic potential.

II. SELECTING PRIORITY CHALLENGES. The next stage of the process involved forming a working group composed of stakeholders⁸ (Appendix 2), which engaged in virtual public-private dialogue to discuss the four main challenges identified in the first stage.

Based on pre-developed criteria and selecting from a wide range of challenges, members of the working group identified what they deemed to be the two most important problems, which ought to be solved as a matter of priority to help the sector to develop both in the short and longer term. To this end, working group members completed an electronic questionnaire to assign scores to the identified challenges. Using a five-point scale, where 1 represents the lowest priority and 5 represents the highest priority, they rated each challenge on the following CRITERIA: economic effect; political feasibility; administrative feasibility; technical feasibility; and time needed to solve the issue.

III. DEVELOPING THE POLICY PAPER. Next, PMCG's researchers developed the policy paper, including an overview of the problems and possible solutions thereto, as well as highlighting the potential effects of these solutions on the development of the solid waste management sector. A working version of the paper was presented to the working group for its consideration during the second virtual meeting. Once the views and comments of the working group members had been considered, PMCG proceeded to compose the final version of the paper.

IV. PUBLIC-PRIVATE DIALOGUE. The Program and the Parliamentary Committee organized a broad interactive session between the public and private sectors, to discuss the results of the study and to enrich the recommendations.⁹ Pertinently, the results of this dialogue are reflected in the paper.

⁸ The working group was composed of respondents of the interviews conducted during the first stage of the research.

⁹ For more information about the session, please follow the links: <https://parliament.ge/en/media/news/garemos-datsvisa-dabunebrivi-resursebis-komitetshi-mqari-narchenebis-martvis-sektorshi-arsebuli-gamotsvevebisa-da-mati-dadzlevis-gzebze-imsjeles>; https://www.facebook.com/EconSecProgram/videos/882662459569916/?extid=NS-UNK-UNK-UNK-IOUS_GK0T-GK1C

1. SECTOR OVERVIEW

1.1. LEGAL AND REGULATORY FRAMEWORK

Georgia has embarked on the establishment of a legal framework for solid waste management, a process which, despite being incomplete, is progressively evolving.

The most consequential legislative text in this regard is the Waste Management Code, which entered into force on 26 December 2014. It aims to construct a comprehensive foundation for waste management, encompassing prevention and reutilization strategies, environmentally friendly waste processing, extraction of secondary raw materials, energy reclamation, and the secure disposal of waste. The Code elucidates key terminologies, establishes a waste management hierarchy, explicates management principles, and identifies competent bodies responsible for oversight.

The Code also delineates Extended Producer Responsibility (EPR), an imperative concept that compels manufacturers or vendors to minimize environmental damage and decrease waste produced during manufacturing and product usage phases. In addition, the Code mandates the recuperation and disposal of product-generated waste. The adoption of EPR, although delayed by a year in 2021, has been effectuated, bringing Georgia's legislative landscape and business practices in line with the EU norms.

Technical regulations for specific waste types, including municipal waste, batteries, accumulators, waste oils, tires, and electrical and electronic waste, are adopted. However, the regulations for managing end-of-life vehicles and packaging waste await implementation.

The Code also identifies the roles of competent authorities, such as local governments, in managing solid waste, stipulates landfill management rules, and outlines penalties for infringements.

The inception of the National Waste Management Strategy 2016-2030 and its accompanying action plan have significantly propelled the progression of solid waste management in Georgia. The Strategy, in compliance with the Waste Management Code and the EU-Georgia Association Agreement, aims to align Georgia's waste management practices with the EU's policy. Meanwhile, the action plan, designed to actualize the Strategy, is slated for a quinquennial review.

Supplementary legislative acts include the Law of Georgia on Environmental Protection, which, along with Article 6 of the 'Waste Management Code,' establishes the principle of waste minimization and assigns responsibility for waste management to the Ministry of Environmental Protection and Agriculture (MEPA). Additionally, it mandates that all entities adhere to ecological standards concerning waste management, encompassing prevention, collection, recovery, and disposal.

The authority of municipalities in managing municipal waste is established by the Organic Law of Georgia Local Self-Government Code and Article 6 of the Waste Management Code.

The Law of Georgia on Import, Export, and Transit of Waste governs the transboundary movement, export, and transit of non-hazardous waste. The same law defines waste materials that are prohibited from being imported, exported, or transited through Georgia. Permits for these activities are granted through a straightforward administrative procedure in accordance with the Law of Georgia on Licenses and Permits and the Basel Convention. The Ministry of Environment Protection and Agriculture of Georgia is the issuing authority for these permits.

Sanctions for violations in waste management are specified in the Waste Management Code. Additionally, the Code of Administrative Offenses of Georgia outlines penalties for environmental protection violations, while the Criminal Law Code of Georgia defines criminal liability for specific infractions.

1.2. INSTITUTIONAL STRUCTURE

At the heart of Georgia's waste management system, the MEPA fulfills a pivotal role by designing and executing state policy, managing waste accounts, and overseeing the operation of a comprehensive database. Moreover, the MEPA spearheads the formulation and implementation of the National Waste Management Strategy and its action plan, while also coordinating its progress and reporting to the Government. Beyond these tasks, the MEPA bears several crucial responsibilities. In particular, it presides over issuing and recording waste management decisions, fostering and promulgating measures or mechanisms aimed at waste prevention, separation, pre-treatment, reuse, and recycling. Furthermore, it exercises state control in the realm of waste management.

In tandem with the MEPA, the Ministry of Internally Displaced Persons from the Occupied Territories, Labour, Health and Social Affairs of Georgia manages and supervises the control of medical waste.

The Ministry of Economy and Sustainable Development works collaboratively with the MEPA to prescribe standards for waste transport vehicles and containers, and sets qualification requirements for drivers tasked with transporting hazardous waste.

With respect to issues relating to the transboundary transportation of waste, the MEPA and the Ministry of Finance coordinate their regulatory actions.

The Solid Waste Management Company of Georgia LLC, under the administration of the Ministry of Regional Development and Infrastructure, shoulders the responsibility for the establishment, management, and closure of non-hazardous waste landfills. This company also oversees post-closure maintenance and waste transfer station management across Georgia, with the exception of landfills located within the municipality of Tbilisi and the Autonomous Republic of Adjara (Adjara AR).

Municipalities take on the critical role of managing municipal waste, which includes collection, transportation, and treatment, except for establishing and operating landfills and transfer stations. In Adjara AR and Tbilisi, responsibilities for non-hazardous waste collection and transportation, transfer station establishment and operation, landfill establishment, operation, closure, and post-closure maintenance fall on the respective governing bodies, with City Hall (Batumi and Tbilisi) taking a leading role. These authorities also have the duty of managing waste pollution within their jurisdictions.

Finally, detecting infringements in waste management protocols is a shared responsibility of the Ministry of Internal Affairs, the MEPA, and the relevant municipalities. Each of these bodies performs a vital part of the regulatory mechanism ensuring that waste management complies with the established standards.

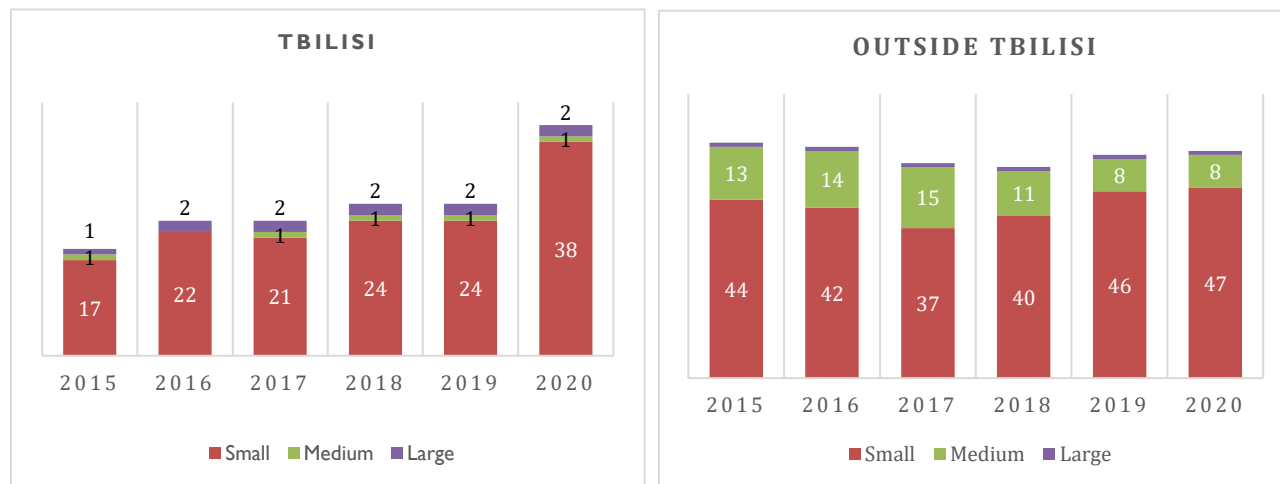
1.3. MAIN ECONOMIC INDICATORS

This sub-chapter was prepared on the basis of the quarterly sectoral analytical reports developed by the USAID Economic Security Program, and examines the main economic indicators for solid waste

management¹⁰, and the relevant aggregated sector of waste collection, treatment, disposal activities, and materials recovery¹¹.

According to the GeoStat Business Register, 97 active enterprises were operating in solid waste management in Georgia as of 2020 (Figure 1), less than half of which (41) were registered in Tbilisi. The number of enterprises operating outside Tbilisi has been growing steadily over the last few years, while the number of companies in Tbilisi increased markedly (by 51%) between 2019 and 2020. In terms of size, most companies operating in this sector in Georgia are small.

Figure 1: Number of active enterprises operating in the solid waste management sector in Georgia (2015-2020).



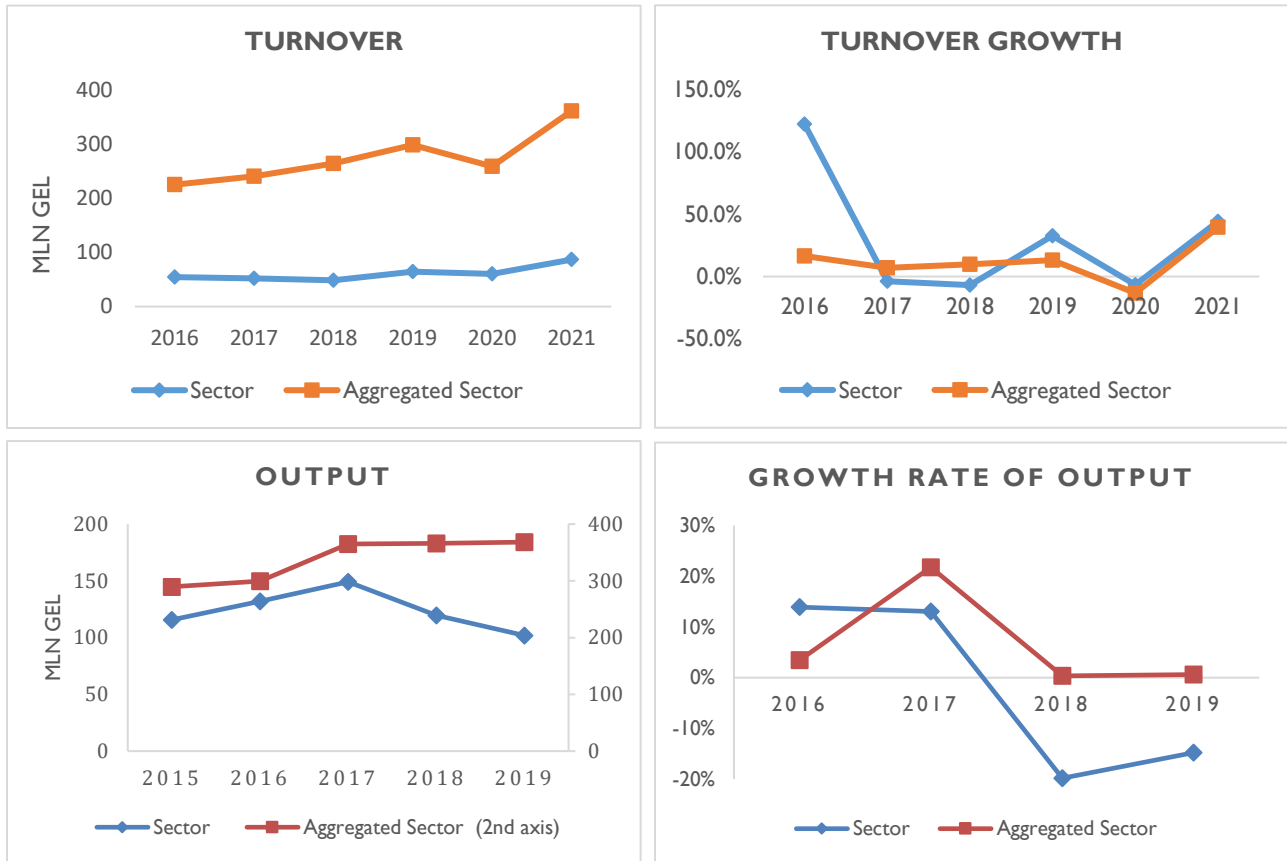
Source: GeoStat

After years of uninterrupted growth since 2015, turnover in the solid waste management sector reached GEL 54 million in 2019. However, the average rate of increase was relatively low at 8% for the given period (2015-2021), largely propped up by the results for 2021, when turnover rose by 44.3% and reached GEL 86.6 million. Prior to that, in 2015-2019, turnover in the aggregated sector grew steadily, with an average growth rate of 7%. Similar to the waste management sector, turnover increased sharply (by 39.5%) in 2021 after a decrease in 2020, reaching GEL 361 million. In contrast, the output of the aggregated sector increased in 2015-2017 but then dropped from GEL 149 million in 2017 to GEL 101 million in 2019.

¹⁰ Data are analyzed based on the following divisions of the Statistical Classification of Economic Activities (NACE): Division 38 – “Waste Collection, Treatment and Disposal; Waste Utilisation”; and Division 39 – “Remediation Activities and Other Waste Management Services.”

¹¹ For research purposes, NACE Section E – “Water Supply, Sewage, Waste Management and Remediation Activities” is taken to be the aggregated sector.

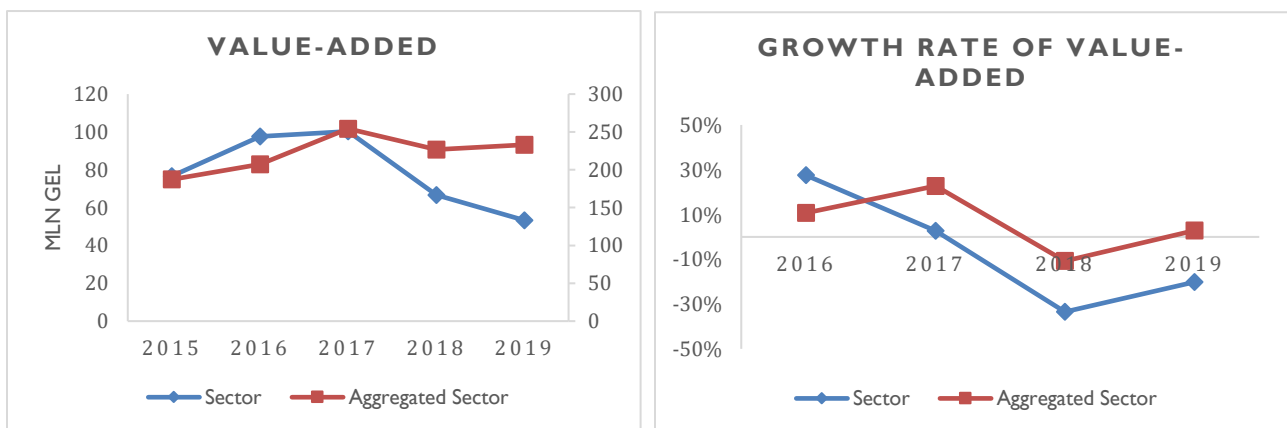
Figure 2: Dynamics of turnover (2015-2021) and output (2015-2019)



Source: GeoStat

Value-added in the solid waste management sector has significantly decreased since 2017. According to most stakeholders participating in this study, the main reason behind this is the increase in exports of raw materials required for production. As for the aggregated sector (water supply, sewage, waste management, and remediation activities), value-added also decreased in 2017-2019, albeit not to the same extent.

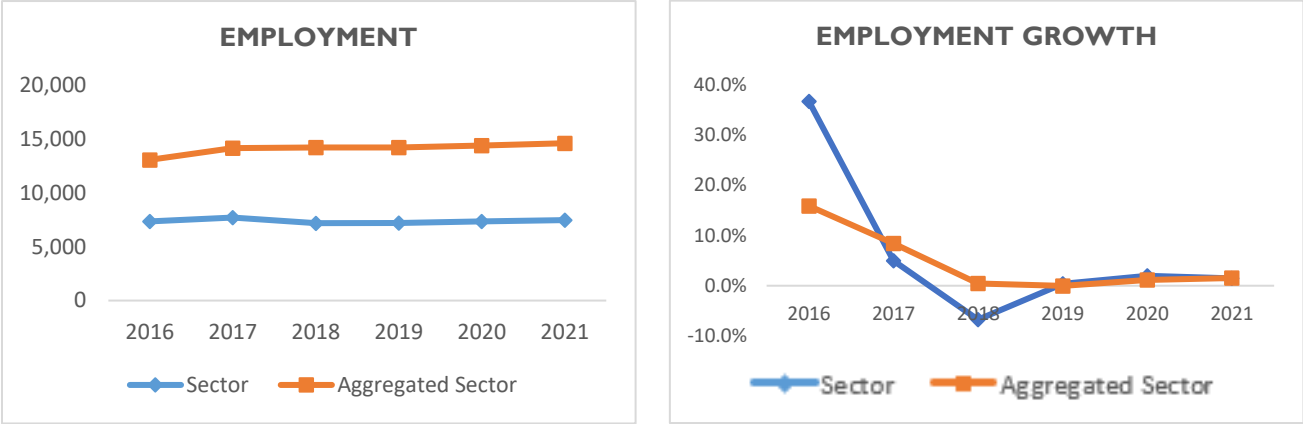
Figure 3: Value-added and its growth rate, 2015-2019



Source: GeoStat

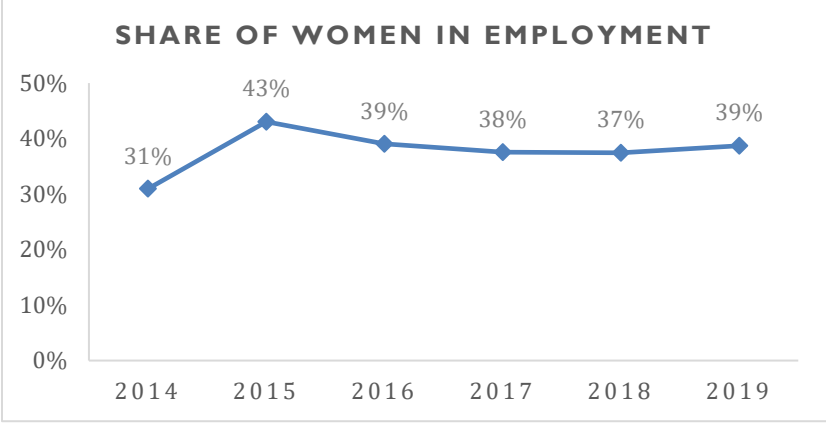
The number of hired employees in the solid waste management sector has remained essentially unchanged in recent years. Notably, unlike in most other sectors of the economy, there was no decrease in 2020. Indeed, in 2021, the number of hired employees increased slightly (by 1.5%) year-on-year, to 7,469. A similar dynamic can be observed in the aggregated sector, where the number of hired employees increased by 1.6% in 2021 and reached 14,616 (Figure 4), with 39% of the employees being women (Figure 5). Meanwhile, the share of women employed in the SWM sector decreased slightly between 2016 and 2019, dipping to 39%.

Figure 4: Employment and employment growth, 2015-2021



Source: GeoStat

Figure 5: Share of women employees in the solid waste management, 2014-2019

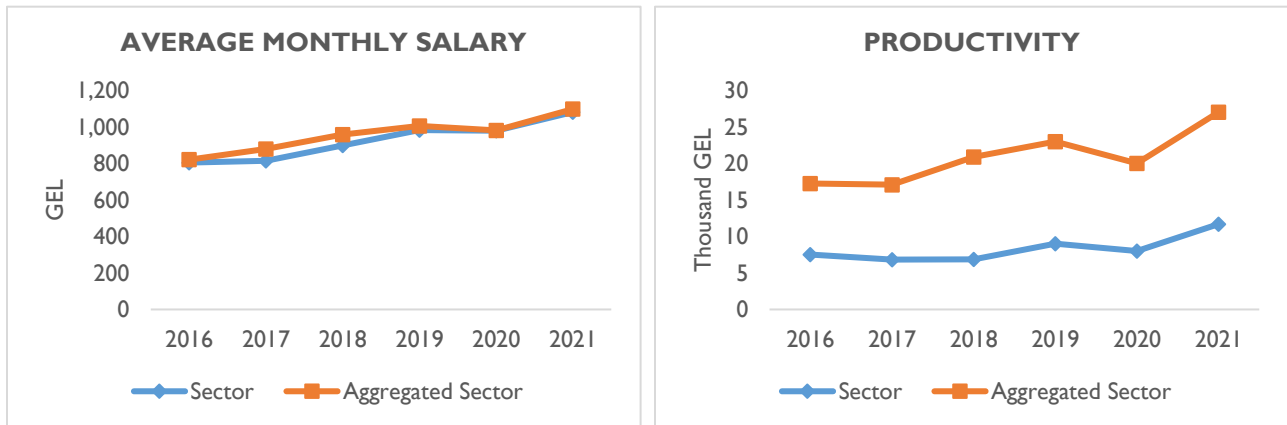


Source: GeoStat

The average monthly salary in the solid waste management sector increased steadily in 2014-2019 (CAGR¹² 9%), in line with the aggregated sector (CAGR 8%). After a slight decrease in 2020, the average monthly salary in the solid waste management sector increased by 10.3% to GEL 1,083 in 2021, while the equivalent figure in the aggregated sector was GEL 1,100 (an 11.8% rise compared to the previous year). Similar dynamics were observed in both the solid waste management and aggregated sectors regarding productivity: after a decrease in both sectors in 2020, productivity increased in 2021 by 45.8% year-on-year to GEL 11,708 in the solid waste management sector, and by 34.9% to GEL 27,000 in the aggregated sector.

¹² CAGR - The Compound Annual Growth Rate

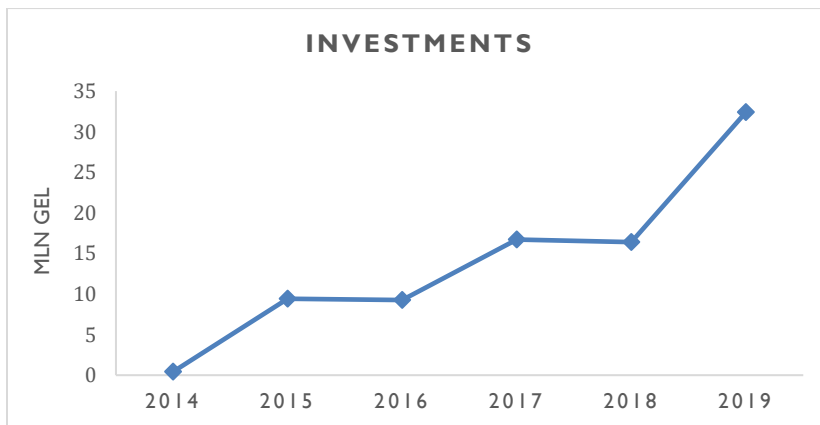
Figure 6: Average monthly salary and productivity, 2016-2021



Source: GeoStat

Investments in fixed assets in the aggregated sector have increased significantly in recent years, reaching GEL 32.4 million in 2019 (a 244% rise compared to 2015).

Figure 7: Investments in fixed assets, 2014-2019



Source: GeoStat

Since the adoption of the Waste Management Code in 2015, Georgia has made significant progress in implementing integrated solid waste management systems. Nevertheless, significant problems remain. The National Waste Management Strategy 2016-2030, which focuses on harmonization with EU standards, was designed to solve these issues, and set some quite ambitious targets both for the reduction of waste itself and for the improvement of waste management systems.

Considering the current rates of economic development, especially in the cities and areas popular with tourists, the World Bank expects the volume of solid waste to increase. Assuming that the waste generation index (the physical volume of municipal solid waste per inhabitant per day, measured in kilograms) does not change, the volume of municipal waste will still increase from 1,117,396 tons in 2019 to 1,212,538 tons by 2025, largely due to the higher number of tourists. If, however, the waste generation index increases by 1.6% in cities and by 0.8% in rural settlements, the volume of municipal waste would reach an estimated 1,252,855 tons by 2025. It would also be logical to expect an increase in the costs related to waste management, in line with the dynamics of economic development. These safe predictions allow us to conclude that the waste

management system in Georgia faces serious challenges, not only from a regulatory and institutional perspective but also from an economic point of view.

If we look at the entire territory of Georgia, waste management practices differ significantly from the five-step practice established in the EU, in which prevention is favored ahead of reuse, recycling, and other forms of processing, and where landfilling is considered the worst form of waste disposal. Contrarily, Georgia's municipal waste management systems are still oriented toward disposing of waste via landfills. Although there are two EU-compliant landfills in Georgia (including one in Tbilisi) and several currently under construction, their total capacity does not meet the national demand. Significantly, almost all biodegradable waste is currently landfilled together with municipal waste, leading to leaching into the soil and worsening greenhouse gas emissions¹³.

It should also be noted that currently, in Georgia, there is no separation of household waste from waste generated by commercial organizations. However, after the full implementation of Extended Producer Responsibility (EPR), commercial organizations will become responsible for managing specific types of waste generated in their own production processes. It is widely hoped that this will lead to an increase in both the supply of and demand for recycled waste.

According to international experience, improvement in economic well-being is usually accompanied by an increase in the volume of waste, which should logically be followed by growth in waste processing in one form or another. According to World Bank¹⁴ (Table 1), rising income is accompanied by a decrease in the share of organic waste in the composition of municipal waste, while the shares of paper, plastic, and other types of waste grow.

Table 1: Composition of municipal waste by groups of countries

Income Level	Organic	Paper	Plastic	Glass	Metal	Other
Low income	65%	5%	8%	3%	3%	17%
Below-average income	59%	9%	12%	3%	2%	15%
Above-average income	54%	14%	11%	5%	3%	13%
High income	28%	31%	11%	7%	6%	17%

Source: World Bank, 2020.

Based on World Bank's economic development criteria, Georgia is currently categorized in the group of countries with above-average income, indicating that the shares of paper and plastic components in waste will increase in the future. It is also worth noting the dramatic decrease in the share of organic bio-waste in correlation with an increasing income, which is likely to be mainly achieved through better separation.

In the context of Georgia's Association Agreement with the EU, the National Waste Management Strategy 2016-2030 and the National Action Plan 2022-2026, it is also important to understand how waste disposal methods are expected to evolve over time. Based on the aforementioned World Bank study, economic development is usually accompanied by the near-complete disappearance of unorganized landfills and an increase in the prominence of organized waste disposal methods such as composting, recycling, and incineration (Table 2).

¹³ Tbilisi Municipal Solid Waste Strategy, Inception Report Baseline Study and Future Projection, Tbilisi Solid Waste Project, European Bank for Reconstruction and Development (EBRD), April 2020

¹⁴ What a Waste: A Global Review of Solid Waste Management, World Bank, March 2012

Table 2: Municipal waste disposal methods by groups of countries.

Disposal Method	High Income	Above-average Income	Below-average Income	Low Income
Unorganized landfills	0.01%	32.41%	48.46%	12.50%
Organized landfills	42.51%	58.92%	10.95%	58.51%
Composting	11.22%	0.96%	2.87%	1.33%
Recycling	21.94%	1.40%	5.20%	0.53%
Incineration	20.75%	0.13%	0.22%	1.33%
Other	3.57%	6.19%	32.30%	25.80%

Source: World Bank, 2020.

Georgia will have to bear increasing costs to enhance its waste management methods and bring its legislation and economy more closely in line with the EU. Such rising expenses will be due to both the new regulations and the natural increase in demand for relevant services. Pertinently, most high-income countries have gradually developed their waste management systems over a longer period. In the case of Georgia, this pressure is greater since the goals outlined in the National Waste Management Strategy 2016-2030 and the National Action Plan 2016-2020 were very ambitious even for countries more economically developed than Georgia. These circumstances are better appreciated in the updated National Action Plan of 2022-2026, which sets more realistic goals for recycling paper, glass, metal, and plastic (Table 3).

Table 3: Recycling goals according to the National Action Plan 2022-2026

Minimum Recycling Goals for Paper, Glass, Metal, and Plastic	2026	2030
Paper	50%	80%
Glass	50%	80%
Metal	80%	90%
Plastic	50%	80%

Source: National Action Plan of 2022-2026

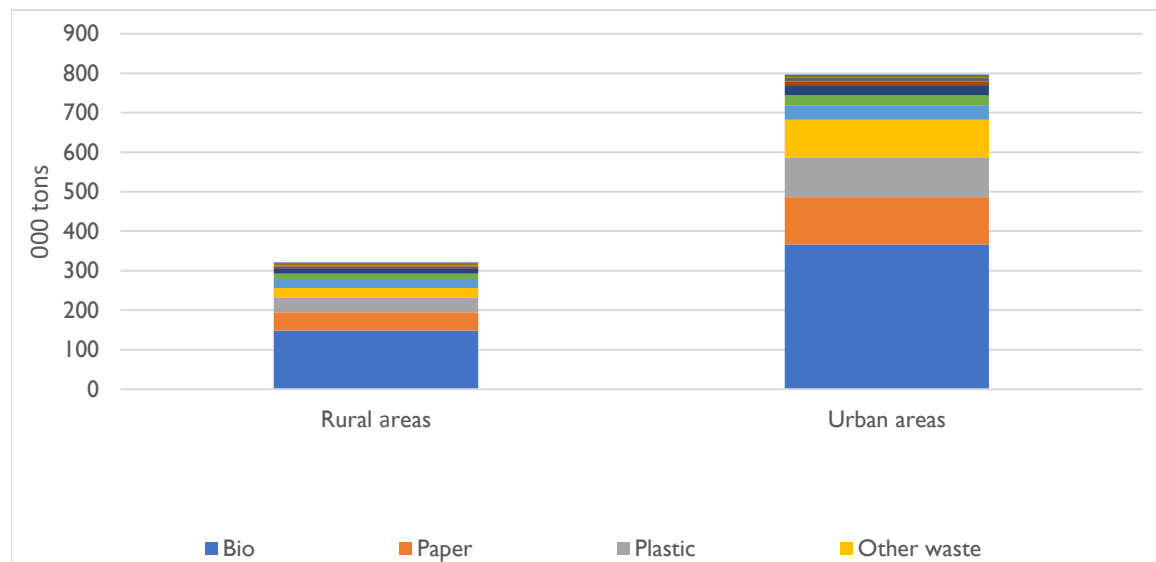
Moreover, the National Action Plan of 2022-2026 defines quantitative goals for the handling of the following specific waste streams: recycling and collection of batteries and accumulators; and collecting, restoring, reusing, and recycling electric and electronic devices/appliances. Quantitative targets for recovery, energy recovery, and recycling for used oils and tires are also stipulated in the Action Plan, as well as for disposable and non-disposable packaging materials and fully worn-out motor vehicles. Although the updated targets are more realistic and better detailed than those set previously, their implementation has proved quite difficult. Specifically, it requires the proper functioning of the relevant legislation and institutional framework as well as close cooperation between the state, local authorities, businesses, and citizens, all of which are lacking in the Georgia context.

Quantitative analysis of municipal waste by region¹⁵ shows that Tbilisi creates almost 40% of the waste generated in the country as a whole, which illustrates the stark contrast between the capital and the rest of the country regarding economic development.

¹⁵ Georgia Solid Waste Sector Assessment Report, World Bank, May 31, 2021

Meanwhile, a comparison of municipal solid waste streams by weight is presented in Figure 8.

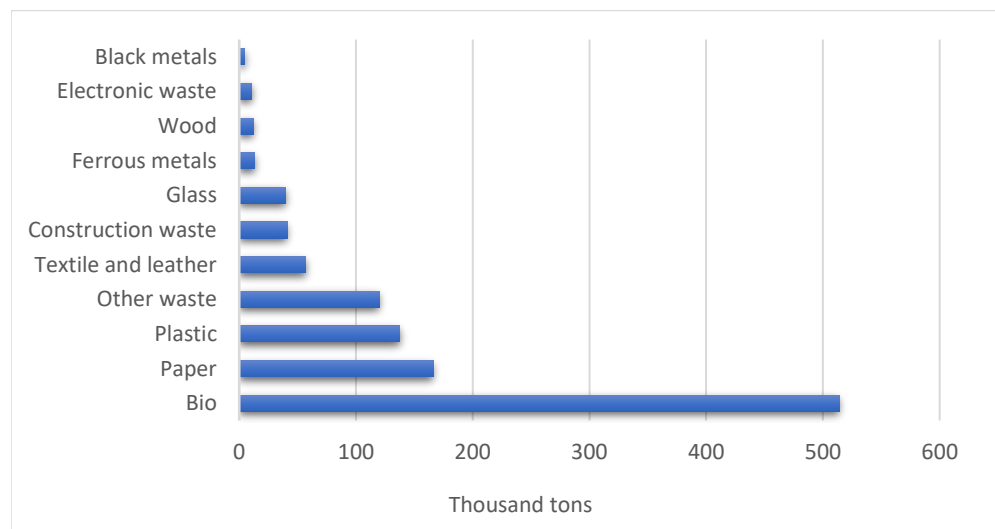
Figure 8: Volume of municipal solid waste in urban and rural areas by type, 2019.



Source: Georgia Solid Waste Assessment Report, World Bank, 31 May 2021

Municipal bio-waste (biodegradable waste, according to the research above) is the dominant type in urban and rural areas, followed by plastic and paper. The distribution of waste by type is further clarified by comparing their total mass in urban and rural settlements throughout the country, as is presented in Figure 9.

Figure 9: Total volume of municipal waste by type



Source: Georgia Solid Waste Assessment Report, World Bank, 31 May 2021

If we exclude textile and leather waste here, since neither are suitable for recycling, improving the handling of paper and plastic waste is likely to have the biggest economic effect on the country. Crucially, Georgia has the appropriate technologies in place and a sufficient number of enterprises equipped to process these types

of waste. Meanwhile, there are also good opportunities to enhance the treatment of other specific types of waste, such as glass and rubber products (including used tires).

Looking at the economic potential of individual types of waste, the CENN study “Potential of Waste Processing” assessed the potential volume of the market for 2015. As indicated in Table 4 below, plastic had the highest economic potential in terms of overall market size, while being easier to collect and more profitable than paper and glass.

Table 4: Market potential of individual types of waste, 2015.

Raw Material	Mass (Tons)	Economic Market Potential (Thousand GEL)	Potential per Ton of Raw Material (GEL)
Plastic	29,000	534,000	18.41
Paper	71,000	159,000	2.24
Glass	95,000	91,000	0.96

Source: CENN

Given the size of Georgia's economy, the prospects were seen to vary for the processing of the aforementioned specific types of waste. Encouragingly, several dozen enterprises are already operating in Georgia. Their total processing capacity is sufficient to deal with the aforementioned volumes of generated waste. Vitally, if separation is done correctly at the source, collection, and processing can be relatively smooth, and substantial investment in sophisticated equipment, which separates the specific types of waste from other types of waste at the plant, would not be necessary.

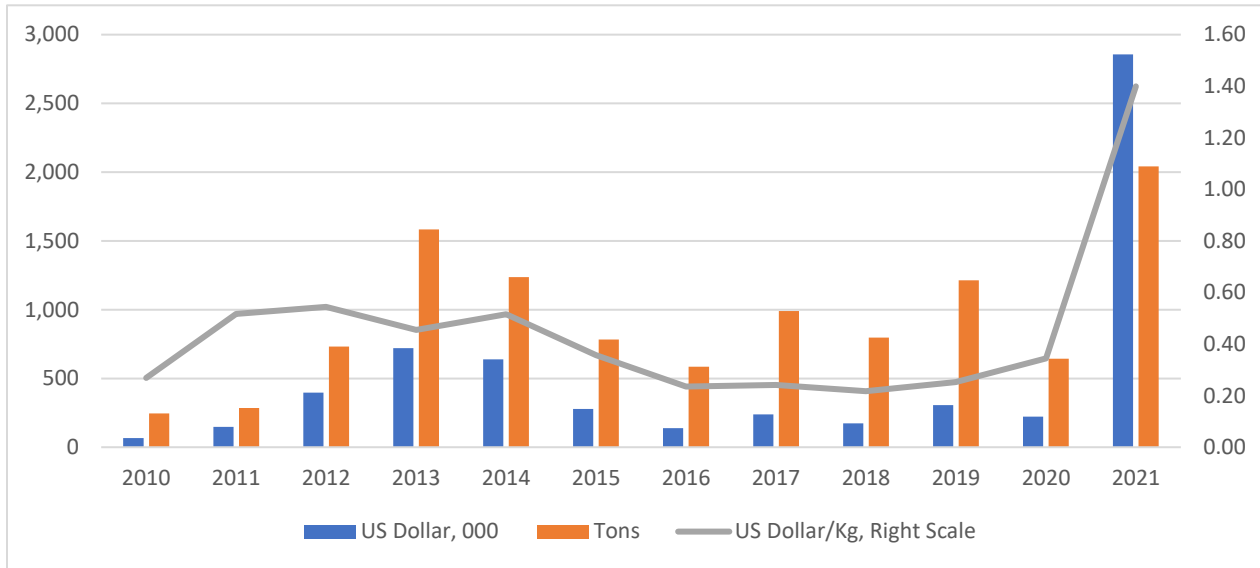
According to CENN's 2021 research, imports and local production of plastics are growing quite rapidly in Georgia. Specifically, the local production of PET granules from 2011 to 2020 increased approximately fourfold and amounted to 821,000 tons (valued at GEL 92 million). Local production of plastic packaging, pipes, sheets, and profiles is also growing quickly¹⁶.

According to the same research, from year to year, the physical volume of plastic waste is also increasing rapidly; however, its recycling is not being upscaled due to problems related to separation of and access to waste, as well as the lack of economic incentives for recyclers. In fact, a significant proportion of plastic waste is unaccounted for. This creates a raw material deficiency for manufacturers since they do not have access to separated waste of more or less acceptable quality.

In 2021, the value and volume of exports of plastic waste from Georgia increased dramatically, coinciding with a sharp increase in the unit price of exported plastic (Figure 10).

¹⁶ National Plastic Waste Prevention Program for Georgia, CENN, 2021

Figure 10: Exports of plastic waste from Georgia 2010-2021

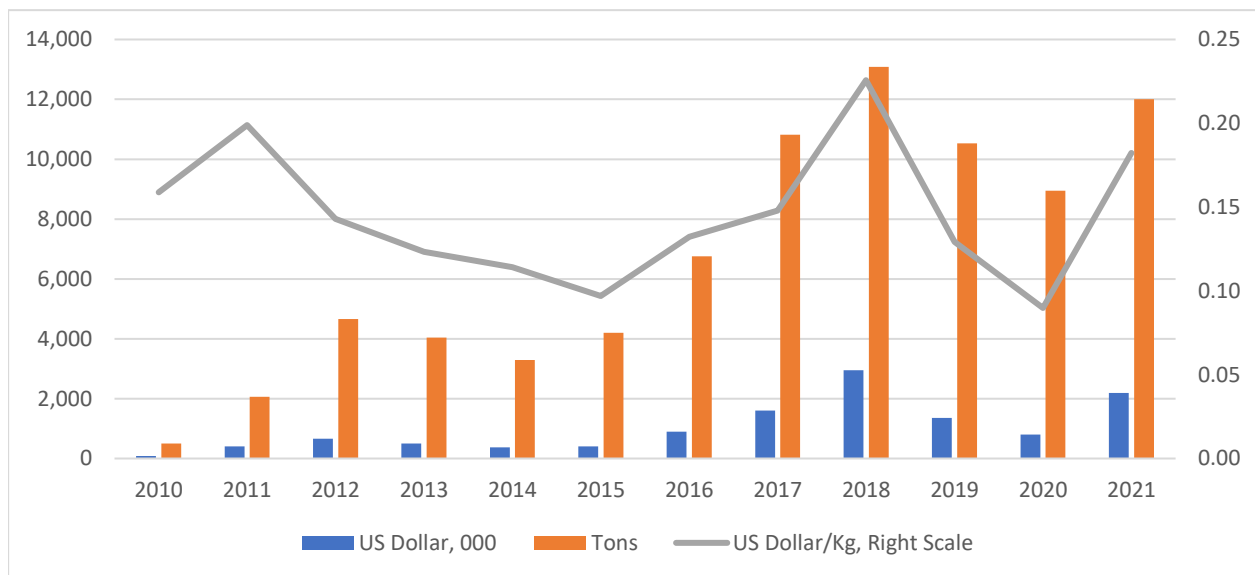


Source: GeoStat

It is possible that such a pronounced change was caused by the COVID-19 pandemic, and this assumption will be tested when we observe the dynamics of exports in 2022-2023. Based on the opinions of the experts and processing enterprises gathered for this study, the country's raw materials shortage was largely due to a high level of exports. If an increase in the export of plastic by about 1,200 tons creates a problem for processors at a time when the country generates about 140,000 tons of plastic waste annually, then it can be taken as read that the problems facing the organized supply of separated and sorted raw materials are genuinely acute.

Meanwhile, there are similar problems with regard to the processing of paper and cardboard, as depicted below (Figure 11).

Figure 11: Export of paper and cardboard waste from Georgia, 2010-2021



Source: GeoStat

In the case of paper and cardboard waste, the upward trend of exports observed in the last six years is problematic, even though the volume of paper and cardboard generated in the country annually is substantially more than what is being processed and exported in total. Similar to the case of plastic, GeoStat figures show that the exports of paper and cardboard waste from Georgia have been increasing in recent years, with Turkey the main destination. Unlike the case of plastic, however, an upward curve in paper and cardboard waste exports has been evident since 2016. At the same time, the value of exports has remained small (in 2021 it only just exceeded USD 2 million), and the unit price of products, despite some fluctuations, has stayed at nearly the same level for the last 11 years (approximately USD 0.17-0.18 per kilogram).

The paper and cardboard waste export figures, relative to the total volume of raw materials produced in Georgia, suggest that the organized collection of raw materials remains a problem in the country and that only a small proportion of the generated waste reaches a processing facility.

The lack of enforcement of the existing legislation continues to represent the main problem afflicting the waste management system in Georgia, with unsanctioned cleaning charges for waste pollution in the vast majority of the country's municipalities.

The 2021 UNDP study "Municipal Waste Management Services in Georgia"¹⁷ examined 37 municipalities across the country and calculated the composition of the collected cleaning fees by business and household, as well as the volume of subsidies received by each municipality. In terms of composition of costs, these were divided into the following components: transport/collection; street cleaning; administration; and capital costs¹⁸.

In the 37 surveyed municipalities, the average share of subsidies in the revenues of the waste management system was 86%. Out of 37 surveyed municipalities, the services are entirely subsidized in four of them, while in 22 the share of subsidies is 90% or more of the costs. Elsewhere, in five municipalities, the subsidies exceed 80% of the total income, in a further five it stands at 70-80%, in one it stands between 60% and 70%, and in one (Mtskheta) it is 50-60%. In Mtskheta municipality, where revenue collection primarily relies on businesses, they contribute over 98% of service fees.

These figures generally indicate that the 'polluter pays' principle is not being enforced. Across Georgia, the population covers only 13% of the costs on average (in 19 municipalities, ordinary citizens pay nothing at all), while businesses cover 86%. In total, the annual subsidies allocated to waste management in the selected 37 municipalities amounted to GEL 35 million (this does not take into account the real social cost of having a disorderly system, as well as private expenditures and other externalities¹⁹).

Meanwhile, capital expenditures accounted for an average of only 1% of total expenditures across the 37 surveyed municipalities (with the highest capital expenditures being 18%), while 34 municipalities recorded no capital expenditures at all. With regard to the composition of expenditures, transportation/collection accounted for an average of 46% (highest – 84%; lowest – 18%), street cleaning made up 34% (highest – 67%; lowest – 0%), and administration contributed 19% (highest – 65%; lowest – 3%). Such variability in the structure of expenditures is inexplicable and points towards serious inefficiencies. For example, transportation costs in the sparsely populated Chokhatauri municipality accounted for 75% of total expenditures, while the corresponding figure for the even more sparsely populated Lentekhi municipality

¹⁷ Municipal Waste Management Services in Georgia, UNDP, Tbilisi, 2021

¹⁸ The UNDP study is based on PMCG's baseline study of 2020. Represented in this study are the regions of Tbilisi, Shida Kartli, Samtskhe-Javakheti, and Adjara AR, as well as the municipalities of Kharagauli and Vani.

¹⁹ Externalities: Prices Do Not Capture All Costs, Thomas Helbling, International Monetary Fund, February 24, 2020. <https://www.imf.org/external/pubs/ft/fandd/basics/external.htm>

was only 24%. similarly, big differences can also be observed between densely populated municipalities. Meanwhile, there are some unusually large differences in administrative expenditures as well. for example, in Terjola, such expenditures accounted for 65% of the total expenditures, while in nearby Samtredia, they only accounted for 10%. in conclusion, it would appear that the municipalities generally lack the skills and motivation to create and implment long-term waste management plans.

Although there are still no reliable data on fines for environmental violations in Georgia, the scarce information that is available does not paint a promising picture. The table presented below provides a general overview of the actions taken against waste pollution, showing the number of detected violations for Tbilisi and the other regions of Georgia (Table 5).

Table 5: Number of recorded environmental violations, 2021

Region	Waste Pollution Violations	All Violations
Georgia	1,385	7,969
Tbilisi	97	331
Adjara AR	718	1,338
Guria	67	255
Imereti	91	1,098
Kakheti	57	1,766
Mtskheta-Mtianeti	72	362
Racha-Lechkhumi and Kvemo Svaneti	11	260
Samegrelo-Zemo Svaneti	28	665
Samtskhe-Javakheti	30	598
Kvemo Kartli	176	840
Shida Kartli	38	456

Source: GeoStat

The following information provided by GeoStat was gathered from the Ministry of Environmental Protection and Agriculture of Georgia, the Department of Environmental Supervision, and the National Agency of Mineral Resources. The municipality of Tbilisi is responsible for compiling statistics on waste pollution within the city. As a result, the data mentioned above may not provide a complete picture of the entire extent of waste pollution in Tbilisi.

Prevention is supposed to be the primary goal when issuing fines for waste pollution. With that in mind, it is important that the fine be appropriate to the given violation and that its execution be consistent. The information presented above in Table 5 suggests that not all violators are being appropriately punished.

2. IDENTIFIED CHALLENGES

This sub-chapter reviews the opinions of stakeholders, obtained from the interviews on the challenges in the waste management sector, including from the representatives of the private and public sector, business associations, and donor organizations, as well as industry experts. A summary of what they deemed the most critical challenges facing the sector is provided below.

1. INSUFFICIENT/INADEQUATE ENFORCEMENT OF THE CURRENT LEGISLATION

There was a general consensus among respondents that the current waste management legislation corresponds to Georgia's political and economic context. However, some problems were reported regarding enforcement as well as with regard to Georgia meeting its obligations towards the EU. More specifically, some respondents claimed that the law was not being enforced at all, or was being enforced insufficiently, thereby hindering long-term planning. For example, it was claimed by some respondents that violations of ecological norms (e.g. littering) were going unpunished. Furthermore, it was alleged that EPR principles were being neglected, leading to apathy in the private sector. One of the respondents also stated that according to EU standards, EPR precludes the existence of a monopolistic company in the sector. Furthermore, most respondents were of the view that new obligations and regulations were being introduced abruptly without sufficiently qualified human resources in place to implement and enforce them.

2. RESTRICTED ACCESS TO WASTE AS A RAW MATERIAL

Many respondents claimed that a lack of awareness about waste management limited their access to waste as a raw material. Relatedly, a shortage of raw materials leads to processing plants only operating at partial capacity, while some respondents cited several examples of potential raw material loss due to a lack of awareness and/or an absence of appropriate procedures in place at the local government level. More specifically, a representative of one of the surveyed companies stated that he could not access the raw materials obtained from the cutting and felling of trees in Tbilisi, because he had been informed by Tbilisi City Hall that this was not allowed. Other respondents referred to examples of raw materials (such as e-waste) being purchased from unlicensed persons and companies, even though e-waste is officially categorized as hazardous, and its sale to unlicensed entities is prohibited. In addition, access to plastic and paper raw materials is also problematic due to various factors including lack of separation and the existence of unofficial landfills.

3. LACK OF PUBLIC AWARENESS

According to most respondents, public awareness about solid waste management issues, including separation and citizens' rights and duties, is relatively low. However, some respondents pointed to examples of effective communication campaigns, highlighting their potential to alleviate this problem relatively quickly.

4. LACK OF QUALIFIED PERSONNEL

A shortage of qualified personnel hampers both the private sector (producers) and local self-government (potential suppliers). Moreover, the provision of time-effective training and retraining of human resources represents a significant shortcoming.

Apart from these four identified challenges, the following issues were also raised:

- **SEPARATION.** All respondents named separation as one of the greatest challenges facing the sector. In particular, it was outlined that waste is not being separated at the generation stage.

Therefore, unseparated waste ends up in landfills, creating an additional environmental problem and complicating the use of waste as raw materials.

- **LACK OF RECORDS AND INFORMATION.** The scarcity of the quantitative data on the sector was also described as a challenge by many respondents who lacked information about the volume and quality of raw materials as well as other important indicators when estimating expenditures.
- **PROBLEMS RELATED TO THE ACCOUNTING OF RAW MATERIALS FOR TAX PURPOSES.** According to many respondents, the current tax code does not allow for the accounting of waste as a raw material.
- **LACK OF FUNDING.** Many respondents asserted that for the sector to become fully developed, financial assistance from the state would be required, possibly in the form of tax benefits or the introduction of individual financial schemes. Meanwhile, some respondents claimed that to increase waste-processing capacity, individual companies would need access to significant financial resources that are currently unavailable.
- **INEFFECTIVE FUNDING SCHEMES.** With certain exceptions (e.g. Tbilisi), the solid waste management systems are almost entirely subsidized, which goes against the 'polluter pays' principle and erodes long-term sustainability. Many respondents outlined that the regulation of recycling and the system in general would be difficult without increasing tariffs and properly administering the collection of fees, and that delaying such measures would lead to tariffs eventually being raised more sharply, which would in itself present another problem.

3. PRIORITY CHALLENGES

According to the scores assigned by the respondents, the identified challenges were ranked as follows (see Appendix 3 for more details):

1. **INSUFFICIENT/INADEQUATE ENFORCEMENT OF THE CURRENT LEGISLATION** – 282 points
2. **RESTRICTED ACCESS TO WASTE AS A RAW MATERIAL** – 280 points
3. Lack of public awareness – 278 points
4. Lack of qualified personnel – 280 points

Based on the points totals and taking into consideration the specific aims of the project, “insufficient/inadequate enforcement of the current legislation” and “restricted access to waste as a raw material” were selected as the main challenges for which recommendations would be developed. This decision was made in light of the establishment of a Skills Agency by the Ministry of Education and Science of Georgia and the Chamber of Commerce and Industry in 2021, which is expected to increase the supply of qualified personnel in the labor market²⁰.

²⁰ <https://ka-ge.facebook.com/SkillsAgencyGeorgia/>

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. PRIORITY CHALLENGE I: INSUFFICIENT/INADEQUATE ENFORCEMENT OF THE CURRENT LEGISLATION

We examined gaps in the legislation and its enforcement and presented examples of effective practices from other countries in order to draw conclusions and devise recommendations to address the challenge of insufficient or inadequate enforcement of existing laws.

IMPLEMENTING THE 'POLLUTER PAYS' PRINCIPLE

- **WASTE MANAGEMENT CODE OF GEORGIA**

The Code serves as the legal basis for the waste management sector, aiming to promote waste prevention and increase reuse, including the treatment of waste in an environmentally safe manner. Ultimately, the Code is intended to protect the environment and human health.

Article 5, Clause 2, Sub-clause 'b' of the Code stipulates the 'polluter pays' principle, whereby waste producers or holders are responsible for the costs of waste management. It specifies that all waste producers, regardless of their legal status, must pay the appropriate service charge.

Chapter X of the Code governs administrative offenses and proceedings, including penalties for various forms of littering and different types of producers. The law clearly outlines the amounts and payment procedures for violations. However, official statistics (refer to Table 5) indicate that many offenders are going unpunished.

RECOMMENDATIONS

- **SET MINIMUM RATES FOR EACH MUNICIPALITY, IMPLEMENT AN EFFECTIVE REMOVAL SYSTEM, AND ENSURE DEVELOPMENT/IMPLEMENTATION OF LONG-TERM WASTE MANAGEMENT PLANS.** We do not consider it necessary to set the tariffs at the maximum marginal rate. At this stage, we find it important to determine a realistic rate for tax collection (perhaps as low as one-third) in order to ensure implementation of the fundamental 'polluter pays' principle as well as to create material resources and other incentives for waste prevention, separation, and proper collection and disposal in the systems.
- **INCREASE THE EFFECTIVENESS OF THE ENFORCEMENT OF CURRENT LEGISLATION.** It is not mandatory to increase the current rates for sanctions. Crucially, when using fines as a prevention mechanism, it is not their size that is decisive, but rather the awareness of potential violators that in cases of violation, fines are inevitable and that this process is consistent, transparent, fair, and continuous.

Potential recipients of the recommendations:

- Municipalities
- Parliament of Georgia
- Ministry of Finance of Georgia
- Ministry of Environmental Protection and Agriculture of Georgia

➤ GOOD PRACTICES

In order to improve collection of the waste management service fees, it is necessary to create an appropriate billing system and database, and to impose certain penalties in cases of non-payment.

In Georgia, it should be possible to replicate the approaches taken successfully by individual municipalities in other municipalities. For example, if we compare the municipalities of Lagodekhi and Lanchkhuti, which are similar in terms of population size and settlement type, the information obtained from a brief analysis of their municipal budgets reveals that fee collection is approximately 800% higher in Lagodekhi than in Lanchkhuti per capita²¹. This does not mean per se that Lagodekhi could be classed as a successful municipality. However, it does mean that some progress has already been achieved there despite limited human and financial resources. In the municipality of Lanchkhuti, all households pay service fees for water and electricity, which means the relevant information is available. In Tbilisi, monthly bills for waste disposal are “tied” to the monthly bills for other utilities, and residents receive their bill of waste disposal and other utilities simultaneously. The same billing mechanism can and should be implemented in other municipalities.

According to the "Local Self-Government Financial and Property Powers Research Report" prepared by the Association of Financiers of Local Self-Governing Units of Georgia in 2020, the reasons behind the low effectiveness of cleaning fee collection were the small amount of the fee and not having a single base of fee payers in the municipalities. To overcome this difficulty, rearranging fee collection is proposed. Specifically, it would be possible to integrate electricity, water supply, and cleaning into one system in the municipalities in the regions, in the same way that it is already done in Tbilisi. With that in mind, creating an electronic platform for each municipality to collate a database of fee payers would also be advisable. It should contain information about people living or owning property in the given municipality. To implement these changes, it would be necessary to introduce amendments to the decision of the National Regulatory Commission for Energy and Water Supply of Georgia "On implementation of Electricity Supply and Cleaning in Georgia Through a Single Integrated and Coordinated System."²²

International practice has shown that even in countries less economically developed than Georgia, it is possible to collect waste management fees when there is the appropriate political will and where prudent work, including effectively planned awareness-raising activities, is carried out. Pertinent examples here include the mountainous regions of Nepal, India, and Pakistan, as well as certain Latin American states that have managed to collect fees even from persons not formally registered. These countries have achieved good results by having local government bodies regulate the activities falling within their competencies, making their waste management systems transparent and predictable for users, and continuously working on regulating waste disposal facilities (including bins). Given the similarities in many respects between Georgia and these countries or regions, it would seem reasonable to expect that it would have the necessary resources to achieve similar results.

INTRODUCTION OF A NEW FEE THE LAW OF GEORGIA ON LOCAL FEES AND/OR OTHER NORMATIVE ACTS

Task 6.1, as defined by the strategy ("Development and step-by-step implementation of a system for fully removing waste management costs from the population in municipalities") includes Measure 6.1.3, which

²¹ <https://www.lagodekhi.gov.ge/ge/biujetis-proekti-0>

²² ადგილობრივი თვითმმართველობის საფინანსო და ქონებრივ უფლებამოსილებათა კვლევის ანგარიში; საქართველოს ადგილობრივი თვითმმართველი ერთეულების ფინანსისტა ასოციაცია, UNDP Georgia, 2020

focuses on the introduction of a “gate fee” as a service fee for landfills. However, there is no mention of a “gate fee” in the “Law of Georgia on Local Fees” or in any other normative act. This type of service fee, which is similar to the “landfill fee” applicable in many European countries, is intended to compensate the landfill operator for treating waste. This has proven to be an effective mechanism in creating an incentive for waste generators to reduce waste, and to lower the administrative cost for the municipality/state. Ordinarily, the “gate fee” would be imposed according to the physical volume of waste, while a similar “landfill fee” in EU countries is generally intended to cover the costs of building, operating, and closing a landfill.

RECOMMENDATIONS

- **INTRODUCE A “GATE FEE” (SERVICE FEE) IN THE NEAR FUTURE.** The national strategy document outlines the obligation to introduce a “gate fee” (along with a corresponding schedule), but this has not been implemented within the set timeframe.
- **DETERMINE A STRATEGY FOR THE GRADUAL INCREASE OF THE “GATE FEE” (SERVICE FEE).** This approach has been taken by most EU countries until the fee stabilizes once a high level of economic development, as well as the desired marginal rates for volume and composition of waste, have been achieved.
- **DETERMINE ADMINISTRATIVE RULES AND PAYMENT MECHANISMS.**

Potential recipients of these recommendations:

- Ministry of Regional Development and Infrastructure of Georgia
- Ministry of Environmental Protection and Agriculture of Georgia
- Municipalities

➤ BEST PRACTICES

Gate fees in the EU vary between EUR 3 per ton (Romania) and EUR 140-150 per ton (Germany and Luxembourg)²³. The amount depends on numerous factors, including the waste treatment type, administrative arrangements, and state strategy.

The gate fees are relatively low in Eastern European countries that have had less success in their waste management (e.g. Romania and Slovakia) compared to their more economically developed counterparts in Western Europe (e.g., Germany, Luxembourg, and Sweden), where the progress made in waste management has been substantial. Although Georgia, like many Eastern European countries, also has many other administrative, financial, institutional, and social problems to overcome, the introduction of a gate fee has now become necessary in the context of its approximation with the EU as this particular regulatory step is an official part in that process. This fee serves as an incentive to process as much of the waste generated as possible and to avoid using landfills. In the longer term, this approach costs a country less than the environmental damage that would have been caused by not introducing such a measure. Poland, Estonia, and Latvia are good examples in this regard. These countries have gate fees set at EUR 70, 40, and 30, respectively, all in line with their current level of economic development. Crucially, there has been a positive correlation between introducing the fee and waste reduction. Positive changes are

²³ <https://www.eea.europa.eu/data-and-maps/figures/typical-charge-gate-fee-and>

also being recorded in these three countries regarding waste composition (for example, reductions in the share of biodegradable waste).

THE NEED TO IMPROVE THE LAW OF GEORGIA ON LOCAL FEES

• INDIVIDUAL PROVISIONS OF THE LAW ON LOCAL FEES

The municipalities are given reasonable room for to maneuver by The Law of Georgia on Local Fees which outlines the following:

- The cleaning fee shall not exceed GEL 3 per capita per month, while a household shall be deemed to consist of a maximum of four persons. Notably, this maximum amount falls below the internationally accepted minimum of cleaning fee and equates to no more than 1.6% of revenues per capita.
- The fee amount must be differentiated for socially vulnerable families according to the poverty line indicators determined by Georgian legislation.
- The fee shall not exceed GEL 25 per cubic meter of waste for legal persons. Whether or not this provision is adequate in light of the clear economic and other differences between the regions of Georgia is subject to debate.
- Article 12, Clause 5 states that the waste producer can *"differentiate based on the weight, volume and/or waste accumulation norm, type of waste, as well as his income, property, number of employed personnel or/ and according to the number of consumers of goods (services)."* It is also permitted to use a combination of these indicators, which gives the municipalities some freedom to suit their own respective contexts. Nevertheless, these mechanisms are less common in Georgia.

RECOMMENDATIONS

- "The Law of Georgia on Local Fees" gives the municipalities the means to introduce tariffs differentiated by type and volume of waste. So-called "flat" rates should be implemented at the initial stage, **HOWEVER, IT IS IMPORTANT TO EXPLORE/PILOT DIFFERENTIATED TARIFF SCHEMES IF THE FEES DO NOT EXCEED THE ESTABLISHED THRESHOLD.**
- **THE MAXIMUM CLEANING FEE SHOULD BE INCREASED.** Currently, the maximum cleaning fee is set at GEL 3 per capita per month, which is less than 1.6% of the average disposable income for all regions. Generally, international experience shows that cleaning fees increase over time in correlation with economic development, and the fees should be acceptable to the consumers, as well as the central and local authorities. With this in mind, it is recommended to set the fee in accordance with annual inflation or economic growth. Furthermore, it is important to inform the population and businesses alike of the introduction or increase of fees in advance.
- **CREATE ECONOMIC INCENTIVES TO REDUCE WASTE.** The provision of the law that allows waste producers to differentiate waste is not currently supported by appropriate economic incentives, which could be established by setting a differentiated tariff for different types of waste and encouraging waste reduction.

The probable addressees of the recommendations:

- Parliament of Georgia
- Ministry of Finance of Georgia
- Ministry of Environmental Protection and Agriculture of Georgia
- Municipalities

➤ BEST PRACTICES

A classic local waste transit fee experiment was conducted in 1994 in the small town of Marietta, in the US state of Georgia²⁴, which later became a guide for cities and communities in many European, Latin American, African, and Asian countries²⁵.

As part of the experiment, the fee the residents had to pay for each bin full of waste was reduced from USD 15 to USD 8. Half of the residents were given the option to pay USD 0.75 per bag full of solid waste on top of the USD 8. The remaining population had to determine the maximum waste volume to remove during the month. Their fee was set according to the maximum volume of waste determined by the number of bins. This amount was fixed in the contract with the consumer and did not change for several months. The fee set was USD 3 per bin, or USD 4 per bin in cases where the household exceeded a certain number of bins.

Based on the fundamental microeconomic textbooks, the proposed scheme here should have led to a reduction in waste and an increase in recycling. This did happen, but the pay-per-bag fee (where there was a greater incentive for the resident to reduce their amount of waste) produced better results than the volume-based fee. The latter led to a 20% reduction in non-recyclable waste, while the pay-per-bag fee led to a 51% reduction, and municipal waste management expenditures decreased significantly.

The piloting of similar schemes has been documented in different locations in Italy, Austria, and Germany, as well as in some cities and countries of Africa, Latin America, and Asia where the institutional, financial, and human resources do not exceed those of Georgia²⁶.

A similar scheme could be piloted in individual municipalities in Georgia, where the given population would be given a choice to pay for their solid waste disposal by either volume or weight.

IMPLEMENTATION OF THE EXTENDED PRODUCER RESPONSIBILITY (EPR) SYSTEM

• SPECIFIC WASTE REGULATIONS FOR ALL RELEVANT CATEGORIES OF WASTE

Implementing the EPR system in Georgia is a key element in improving the waste management system. Having EPR in place at the national level is one of the provisions stipulated by the Waste Management Code, and this should have come into effect by December 2019. After some delay, the relevant mechanisms eventually began to be implemented for waste tires, waste oils, waste batteries and accumulators, and electrical and electronic equipment. In addition, producer responsibility organizations (PROs) have already been established.

The implementation of EPR brings the country's waste management system in line with the EU's institutional setup. However, along with some benefits, it also presents serious challenges to a country at Georgia's level of development, which is lacking in terms of the readiness of businesses and is in need of important institutional changes, including enhanced administration, improvement of management

²⁴ Environmental and Natural Resources Economics, Ninth Edition, Tom Tietenberg, Lynne Lewis, Copyright © 2012, 2009 by Pearson Education, Inc.

²⁵ Best Environmental Management Practice for the Waste Management Sector, Learning from frontrunners Dri, M., Canfora P., Antonopoulos I. S., Gaudillat P., European Commission, May 2018

²⁶ Best Practices for Solid Waste Management: A Guide for Decision-Makers in Developing Countries, Environment Protection Agency, October 2020

quality, the establishment of economic incentives, as well as a high level of cooperation and dialogue between the state, businesses, and the civil society.

RECOMMENDATIONS

- Not all of the EPR regulations have been fully implemented yet. It is especially important that the Technical Regulations on Waste Oils, Waste from Electrical and Electronic Equipment, Waste from Tires, Waste from Batteries and Accumulators are supplemented by the regulation on **FULLY WORN-OUT MOTOR VEHICLES** and **WASTE FROM PACKAGING MATERIALS**, to ensure the system's smooth operation. **TIMELY IMPLEMENTATION OF THESE REGULATIONS IS STRONGLY RECOMMENDED.**
- Together with the full implementation of the EPR regulations, it is important to determine **THE ROLE OF THE PRODUCER RESPONSIBILITY ORGANIZATIONS (PROs) IN PACKAGING WASTE MANAGEMENT**, including with respect to landfills and the "gate fee," taking into consideration the best European practice.

Potential recipient of these recommendations:

- Government of Georgia

➤ BEST PRACTICES

According to the 2017 Extended Producer Responsibility Guidelines, experience in the EU has not yet revealed which type of organizational setup for EPR is best from an economic point of view. However, it has been noted that since 2001, a total of 96 organizations have been established in Slovakia for the processing and recycling of electrical and electronic devices, batteries, vehicles, and oils, employing 2,500 people. Although Georgia's auto industry and other industries are not as developed as their equivalents in Slovakia, it is nevertheless also a transit country where car ownership, sales of equipment, and turnover from services are all increasing rapidly. It would also be promising to establish PRO organizations based on market principles for tires as well. The relevant ecosystem in this field has existed for a long time, and addressing the problem of tire pollution has become an urgent necessity.

LACK OF PRIVATE SECTOR INVOLVEMENT IN SOLID WASTE MANAGEMENT

- **WASTE MANAGEMENT CONDUCTED BY MUNICIPAL ENTERPRISES WITH 100% STATE EQUITY PARTICIPATION (THROUGH NON-ENTREPRENEURIAL (NON-COMMERCIAL) LEGAL ENTITIES (NNLEs))**

At present, the practice of waste management being conducted by state-owned enterprises is widespread in Georgia. This leads to a situation where the state establishes the legislation, enforces it, and carries out its own practical implementation and monitoring. We believe that such a system cannot be financially sustainable for the state in the long term since this practice hinders competition and cost-effectiveness.

As the economy grows, both the composition of waste and the waste generation and management processes become complicated. An analysis of the literature on waste management shows that this process comprises about 20 different stages, from disposal to recycling. It is unlikely in most cases that the state would be more competent and efficient than private sector actors at all stages.

At present, there appears to be good potential for private sector involvement in the waste management system in Georgia. In this regard, a necessary condition for the success of such involvement would be the actual implementation of the 'polluter pays' principle, which is likely to materialize in the near future.

No specific legislative or institutional gaps prevent private sector engagement at the municipal level. Therefore, it is necessary to consider implementing specific engagement mechanisms, taking into account the municipalities in which such schemes are already more or less active, such as Tbilisi, Rustavi, and Gurjaani.

RECOMMENDATIONS

- We should already be considering **MECHANISMS FOR PRIVATE SECTOR INVOLVEMENT**. When the state actually implements and enforces the 'polluter pays' principle, certain services or combinations thereof can be **HANDED OVER TO THE PRIVATE SECTOR**, providing the following prerequisites are in place:
 - Political will;
 - Trust between stakeholders;
 - Local circumstances are taken into consideration;
 - Suitable environment;
 - Process planning and monitoring system implemented by the municipality; and
 - Fair and transparent mechanisms in place.
- Public-private partnership is complex and often ends in failure. However, it is recommended to take the following tried-and-tested steps to minimize such risks and **OBTAIN MAXIMUM RESULTS FROM THE INVOLVEMENT OF THE PRIVATE SECTOR**:
 - Understand and exploit the objective advantages of the private sector;
 - Take into account different risk and engagement levels for different components and stages of the waste management process;
 - Develop budgets in advance through a transparent, unbiased, and consistent methodology;
 - Focus on establishing an integrated and functional solid waste management system; and
 - Implement measures step-by-step, involving public sector representatives and allowing them to sculpt their own roles and functions before participating in a public-private scheme.

Potential recipients of these recommendations:

- Municipalities
- Ministry of Environmental Protection and Agriculture of Georgia
- Private Sector

➤ BEST PRACTICES

In developed and developing countries alike, private companies are involved in many components or stages of the solid waste management system in a public-private partnership format. Examples of successful schemes can be found in different cities and regions in the EU, most of which have been based on the simple principle that municipalities act independently, as well as ensuring the collection of fees and engaging the private sector in providing services in fair competition.

To illustrate how the involvement of the private sector can lead to success even in a relatively poor country, the research team looked at the experience of the town of Panchgani in India²⁷. The town's governors, concerned about illegal dumping and the fact that pollution was seriously harming local tourism potential, introduced a system of mandatory segregation of waste at source and imposed stiff penalties for violations. Circulation of certain materials, such as polystyrene (plastic foam) and single-use bags thinner than 50 microns, was completely prohibited. Banned materials were confiscated, and the enforcement of fines was consistent. Specifically, a private company became involved in waste collection and transportation and received protective clothing, equipment, and insurance from the municipality. The company operated through door-to-door collection, while the municipality gathered resources through property tax. In a fairly short period, Panchgani became one of the cleanest towns in India, with a separate waste collection rate of almost 100% and a recycling rate of 90%.

Other interesting forms of involving the private sector through public-private partnerships have been observed in Pakistan, Mexico, and many other countries. In this case, private companies are given the opportunity to convert the collected segregated recyclable material into items such as food, specially created 'green points,' promotional literature, and more. Such efforts can bear fruit once the public sector cracks down on illegal dumping and unaccountable waste practices, thereby encouraging the private sector to also get involved.

4.2. PRIORITY CHALLENGE II: RESTRICTED ACCESS TO WASTE AS A RAW MATERIAL

In order to present conclusions and recommendations on the challenges associated with the availability of waste as a raw material, this sub-section contains a discussion on the extent to which current practices respond to the problems identified in the study. Shown below are the three key components of this priority challenge, along with relevant recommendations and examples of best practices from other countries. In general, the problem of access to waste as a raw material is closely intertwined with legislative issues, enforcement, awareness raising, lack of finance, and many other problems. Therefore, while developing the recommendations for this sub-section, we employed a practical approach and tried to put forward ideas that can realistically be implemented in a relatively short period of time and are related to (and can alleviate directly or indirectly) many other issues to have been identified during the research. Most importantly, according to our detailed study as well as many experts/actors in the field, waste prevention and separate collection at source serve the following three key objectives at the same time: a) reduction in the total volume of waste; b) separation of biodegradable waste; and c) increasing the share of waste already suitable for processing as a raw material.

LACK OF INNOVATIVE SCHEMES FOR MUNICIPAL WASTE COLLECTION

- **PILOTING INNOVATIVE WASTE COLLECTION SCHEMES**

Generally, waste management as an economic activity is highly complex as many visible and invisible factors interact, including the peculiarities of the given country's stage of development. This makes it difficult to replicate, incorporate, or follow successful examples from elsewhere. Clearly, innovative approaches in the field of waste management and recycling in Georgia are lacking. It should also be noted that such approaches are often perceived as purely technical improvements achieved by using computer applications, with limited effect in reality. However, the long-term effects of innovation (along with technical improvements) become visible when principles and relationships between people and groups

²⁷ Good Practices for Sustainable Solid Waste Management in Mountainous Areas of India, Nepal, and Pakistan, World Bank, January 2021

of people change in a way that allows them to derive more economic and environmental benefits therefrom.

The current legislation neither restricts nor facilitates the implementation of such innovation at the municipal level. For example, regardless of the quantity and quality of waste produced by a person, they still pay a fixed fee for its disposal. Meanwhile, there are not enough incentives to separate waste at source, and municipalities do not use a combination of different schemes, which would almost certainly prove to be a more effective approach. At the same time, municipalities can cooperate under their own initiative to broaden the scale of impact and implement relatively large projects simultaneously.

RECOMMENDATIONS

- **IMPLEMENT FORMAL ACTIVITY-SHARING SCHEMES BETWEEN MUNICIPALITIES.** This could be effective in Georgia, particularly in high mountainous regions. The testing of such schemes would be justified by the fact that neighboring municipalities often greatly differ from each other in terms of population, public sector staff competencies and resources, quality of infrastructure, and management experience. Thus, it would be advisable, where possible, to **JOINTLY PLAN AND IMPLEMENT MUNICIPAL WASTE MANAGEMENT STRATEGIES.**
- **MUNICIPAL WASTE MANAGEMENT SCHEMES FOR INDIVIDUAL MUNICIPALITIES OR SETTLEMENTS WITH COMMUNITY INVOLVEMENT SHOULD BE PILOTED.** Such schemes ought to allow citizens to choose the optimal waste management strategy for themselves, with the municipality maintaining a key role in terms of implementation. For example, a certain amount of waste is removed exclusively by the municipality. With regard to waste collection, incentivizing waste reduction and encouraging separation, this includes collecting recyclable waste for a fee, composting, and processing.

Potential recipients of these recommendations:

- Municipalities
- Ministry of Environmental Protection and Agriculture of Georgia
- Ministry of Finance of Georgia
- Private Sector

➤ BEST PRACTICES

The “Technical Regulations on Municipal Waste Collection and Processing,” approved by Ordinance #159 of the Government of Georgia dated 1 April 2016, describe what are considered good practices in municipal waste management in great detail. In particular, the principles, rules, instructions, and recommendations on waste collection and transportation, as well as alternative treatment technologies and schemes, are presented in a corresponding methodical manual. The document offers an extensive range of choices, eliminating the need to seek additional good practices. The task now is to select the best option(s) from the provided choices through comparison or by adapting the relevant international experience to Georgia's current situation.

In terms of best practices, the following internationally tested innovative schemes may bring the following benefits:

- **COOPERATION BETWEEN MUNICIPALITIES:** This is particularly pertinent in the case of economically weak municipalities with small populations and difficult geographical conditions. Together, such municipalities could implement municipal waste management strategies. In some cases, this may entail one municipality transferring the relevant functions to another. For example, a certain village or settlement may be located further from the center of its own municipality than the center of the neighboring municipality, in which case it would be advisable to use the latter's resources.
- **USE OF COST-EFFICIENT, SMALL, AND LOW-EMISSION VEHICLES:** Such vehicles may include hybrid trucks whose cargo compartments are divided into sections to avoid mixing collected waste.
- **IMPROVEMENT OF LOGISTICS BY INTRODUCING PNEUMATIC PRESSURE EQUIPMENT (WHERE NEEDED) OR OPTIMIZING THE COLLECTION PROCESS BY USING A COMPUTERIZED VEHICLE MOVEMENT PROGRAM FOR PLANNING PURPOSES:** In such a scheme, it is very important to determine the measurement indicators correctly for fuel and other transportation costs. This involves analyzing fuel and other costs in relation to the mass of the collected cargo, as well as the transportation distance and other factors. When implementing such schemes, it is also necessary to introduce indicators to measure effectiveness, which may include total energy consumption, route optimization algorithms, and GPS control.
- **MANAGEMENT OF MUNICIPAL WASTE THROUGH AN ASSOCIATION OF COMMUNITY MEMBERS:** This involves transferring the initiative to the citizens; however, the municipality retains a coordinating role and the task of collecting and disposing of a certain proportion of waste. Training of participants in this scheme would have to be carried out by a third party.

It is worthwhile here to look at successful examples of innovative schemes from developing countries. In one case, a scheme was developed in the Kenyan settlement of Watamu, where local community representatives were involved in cleaning waste from beaches for a set fee. Separated waste was collected, plastic and rubber were recycled, and new items were produced. The scheme entailed free consultation and advertising, which were covered by the government and sponsors. As a result of the scheme, beaches were cleaner, tourism potential was improved, and several dozen small enterprises and jobs were created²⁸.

Another pertinent example is the Phu Quoc project in Vietnam, where participants were allowed to collect separated solid waste (mostly plastic) at the household level. Valuable items were then utilized on-site, organic waste was composted, and unusable trash was collected and removed exclusively by the municipality. Similar to the case in Kenya, training and technical consultation were provided by sponsors²⁹.

Similar schemes have also been established in the Croatian city of Dubrovnik³⁰, as well as other tourist destinations worldwide, especially those in mountainous and seaside areas.

²⁸ <https://www.createeducation.com/blog/rapid-foundation-eco-world-watamu-project/>

²⁹ <https://plasticsmartcities.org/blogs/media/a-community-based-approach-in-phu-quoc-vietnam>

³⁰ <https://blog.bigbelly.com/expanding-smart-waste-recycling-system-with-bigbelly-in-dubrovnik-croatia>

HIGH PROPORTION OF MUNICIPAL BIODEGRADABLE WASTE AND PROBLEMS REGARDING ITS SEPARATION

• PILOTING SCHEMES FOR SEPARATE COLLECTION AND USE OF BIODEGRADABLE WASTE

In Georgia, as is the case in most developing countries, the large share of biodegradable components in waste creates difficulties. If not separated properly, then other waste streams, including those useful for recycling, diminish in quality, leading to raw material losses. In addition, high concentrations of biodegradable waste pose other well-known environmental and health risks. However, if treated effectively, this type of waste can have some beneficial uses.

By signing the Association Agreement with the EU, Georgia undertook an obligation to fulfill the European Council Directive 1999/31/EC of 26 April 1999 on landfills, which was subsequently reflected in the approval of “The Technical Regulations on the Construction, Operation, Closure and After-Care of Landfills” on the basis of Ordinance #421 of the Government of Georgia dated 11 August 2015. Meanwhile, the National Waste Management Strategy of Georgia also refers to the objective of reducing municipal biodegradable waste disposal in landfills.

Effective biodegradable waste management also has potential benefits for agriculture, especially given the expected global crisis in the supply of raw materials and fertilizers. While biodegradable waste compost or other processing products are not fertilizers (they improve the soil rather than directly promoting plant growth), they can be used to enhance soil quality. This is particularly relevant in Georgia, where the need to improve soils is pressing.

RECOMMENDATIONS

- **MONITOR THE VOLUME AND DYNAMICS OF BIODEGRADABLE WASTE, INCLUDING FOOD WASTE, IN PUBLIC CATERING FACILITIES AND HOTELS, AND STUDY THEIR POTENTIAL USE.** This ought to be of interest as the reduction of food losses is an important step in the development of agriculture in Georgia. To this end, joint activities could be implemented with the Food and Agriculture Organization (FAO). In addition, it would be necessary to use specific approaches in the process of collecting waste from public catering facilities and to impose additional requirements on them in terms of separation, which if successful could be replicated elsewhere.
- **PROMOTE SEPARATION OF BIODEGRADABLE WASTE AT THE HOUSEHOLD LEVEL.** This could be achieved through an information campaign, pilot projects to test separation systems/approaches, and improvement of the biodegradable waste collection system. Special attention should be paid to specific types of waste such as animal remains, which cannot be viewed as normal biodegradable waste and require a tailored approach.
- **STUDY THE POTENTIAL FOR USING COMPOSTING OR ANAEROBIC TECHNOLOGIES FOR THE COLLECTED BIODEGRADABLE WASTE, AND SET UP APPROPRIATE LOCATIONS.** This would require careful economic and environmental analysis to determine whether such management of biodegradable waste would be more justifiable than current practices, where such waste is mainly landfilled (either legally or illegally).

Potential recipients of these recommendations:

- Municipalities
- Ministry of Environmental Protection and Agriculture of Georgia
- Private Sector

➤ BEST PRACTICES

Best practices in the management of biodegradable waste include awareness raising, improved separation in public catering facilities and households, and reusing certain types of waste. Until now, globally, and particularly in developing countries, a lack of appropriate technologies and knowledge has hindered the implementation of such measures. However, this is beginning to change - many countries have successfully transformed their waste management by diverting biodegradable waste from landfills towards treatment.

From an economic and environmental perspective, it is good practice to encourage composting at household and community levels, to record the number of people involved in a given scheme, and to distribute and monitor composting and other treatment facilities. Meanwhile, good practices when it comes to managing biodegradable waste include organizing meetings with stakeholders, and consultations, as well as providing illustrated materials and training in the use of technology.

The Solid Waste Management Rules implemented in some regions of India since 2016 can be considered a successful example in this field. These rules have imposed stricter requirements on catering establishments and hotels regarding the removal of biodegradable waste, whereby the collection services are instructed not to collect waste when biodegradable waste has not been properly separated from other types. At the same time, local organizations were established to engage in composting and recycling. As a result of these rules, the share of biodegradable waste in landfills has drastically decreased.

Another illustrative example comes from the experience of the Welsh region of Gwynedd, where recycling of biodegradable waste increased from 1% in 2006 to 12% in 2014, according to data from the UK Department for Environment, Food, and Rural Affairs. All kinds of food waste, including fruit, vegetables, cheese, bread, fish, meat, eggs, and even disposable tea bags, are now collected in biodegradable bags distributed by the council. Liquid waste, such as milk and oil, is excluded from this combination. Full bags are placed on sidewalks in special 22-liter containers collected by the cleaning service once a week.

RAISING AWARENESS AND TARGETING GROUPS OF WASTE PRODUCERS

• INCREASE THE AVAILABILITY/QUALITY OF WASTE AS A RAW MATERIAL BY RAISING AWARENESS

As in many other developing and transitional economies, the availability and quality of waste as a raw material remains an acute problem in Georgia. This was confirmed by the interviews conducted with stakeholders in this study and the results of an anonymous survey, while numerous international studies have also highlighted this issue. For a significant proportion of the Georgian population, the waste management principles are still unknown. Moreover, even when a person is informed about the differences between types of waste, this may not affect their waste disposal practices.

Some of this study's respondents confirmed that, when carried out correctly, information campaigns had led to a dramatic improvement in waste separation figures in urban areas. For example, waste separation bins placed in public spaces have produced some good results. However, the impact of such information campaigns on waste separation within the household setting is much more difficult to determine.

Presently, in Georgia, it would be possible to implement targeted pilot programs and broaden the impact thereof across a wide range of groups. It would be necessary to pick out the most successful examples and components of already carried-out campaigns, study them, and then replicate or modify them for

other locations. Special attention here should be paid to those measures proven to have achieved the set goals at minimal cost.

RECOMMENDATIONS

- **PLAN, IMPLEMENT, AND MONITOR THE RESULTS OF A TARGETED INFORMATION CAMPAIGN AIMED AT BROAD POPULATION GROUPS IN BOTH CONTROL AND EXPERIMENTAL MUNICIPALITIES.**
- **CARRY OUT TARGETED CAMPAIGNS FOR TEACHERS AND PUPILS OF DIFFERENT AGES.** This may be conducted in one municipality or in several different or similar municipalities, according to the ultimate goal of the campaign. For such programs, it would be necessary to determine suitable mechanisms for long-term monitoring and evaluation of results.
- **SYSTEMATIZE PREVIOUSLY IMPLEMENTED INFORMATION CAMPAIGNS AND PILOT PROJECTS,** identify key success components, and implement them systematically with consideration of cost-effectiveness criteria.
- **IMPLEMENT RELATIVELY INEXPENSIVE AND SIMPLE CAMPAIGNS AT THE NATIONAL LEVEL.** This would carry consistent and clear messages, particularly on waste prevention and the economic factors in the raw material creation process.

Potential recipients of these recommendations:

- Municipalities
- Ministry of Environmental Protection and Agriculture of Georgia
- Private Sector

➤ BEST PRACTICES

Best practices in awareness raising should encourage waste prevention while changing the population's behavior in the covered geographical area. This behavioral change should be reflected in improved generation and separation rates. To achieve this objective, the awareness-raising program should be based on the following elements:

- Continuous, consistent, complete, and clear communication with well-defined objectives.
- Careful selection of the target audience and relevant messages; and
- Effective implementation of measures through the suitable distribution of functions.

In the best-case scenario, an awareness-raising campaign can overcome two key challenges: a lack of information on where, when, and how to dispose of different types of waste; and a lack of motivation to reduce waste and recycle.

Campaigns could be implemented by waste collectors, specially hired organizations, or industry players, using various types of promotion or advertising, such as street advertising, television advertising, direct marketing, public relations, community engagement, online communication, social media, and product labeling.

To conduct a campaign properly, it is necessary to develop environmental target indicators in advance, including recycling rates and changes in the volume and composition of waste.

Campaign effectiveness can be measured through indicators such as communication costs per capita, the share of costs spent on awareness raising in the entire waste management program, and the number of people who received the campaign message. According to the study "Best Environmental Management Practice for the Waste Management Sector," prepared by the Joint Research Centre (JRC), the European Commission's science and knowledge service, the amount spent on an awareness-raising campaign in EU countries should be at least EUR 5 per capita for each target group. This figure might be even lower for Georgia due to its relatively inexpensive labor, administrative, and other costs.

An example of a successful information campaign is provided by the Ecological Recycling Society of Attica, which operates in a suburb of Athens, Greece. The organization conducted a door-to-door information campaign to encourage the recycling of packaging materials and the separation of bio-waste, batteries, and e-waste in a nearby municipality in 2007-2009. As a result, two years after the start of the campaign, the weight of collected packaging materials had increased by 72%.

Another valuable example comes from the City Hall of Vienna, Austria, which recorded a significant decrease in pollution between 2008 and 2012. This reduction was attributed to the use of provocative and humorous advertising that helped to substantially cut pollution associated with specific types of waste, including household appliances. It is noteworthy that a similar campaign, named "Trash Poetry" and involving popular poet Kote Kubaneishvili, was once carried out by the Tbilisi City Council. Lines from his poems were presented on waste bins on the main streets of Tbilisi as part of an initiative that was the first of its kind in Georgia.³¹

Meanwhile, the Institute for Global Environmental Strategies (IGES) and the United Nations Environment Program jointly developed a program of environmental lessons for pupils and teachers at a primary school in Cambodia, focusing on waste reduction, separation at source, recycling, and composting, and this knowledge was then to be applied in their everyday activities.

³¹ http://www.nplg.gov.ge/wikidict/index.php/ყუბანეიშვილი_კოტე

APPENDICES

APPENDIX 1: RESPONDENTS OF IN-DEPTH INTERVIEWS

#	Name(s)	Organization	Position(s)	Website	Date
1	Maia Bitadze	Parliament of Georgia	Chair of the Environment and Natural Resources Committee	www.parliament.ge	1/25/2022
2	Giorgi Guliashvili, Ana Tskhadadze	Waste Management Association	Head of Association; Association Manager	https://www.facebook.com/wmageorgia/	11/15/2021
3	Zurab Bazghadze	TRC LLC	Founder		11/25/2021
4	Samet Kilic	Euro Plast LLC			11/25/2021
5	Levan Kvirkvelia	Sanitary LLC	Executive Director	https://www.sanitary.ge/	11/26/2021
6	Vakhtang Askurava	Madanet LLC	Co-Owner	https://www.facebook.com/Madenat-Caucasus-109238063828464	11/30/2021
7	Murman Patariaia, Kakha Karchkhadze	Biodiesel LLC	Co-Founder, Director; Scientific Consultant	http://www.biodiesel.ge/	12/6/2021
8	Mikheil Mestvirishvili	GEO Mulch LLC	Director	https://www.geomulch.ge/index.html	12/6/2021
9	Valeri Kiladze	Oillio LLC	Director	https://business.facebook.com/Oillio/?ref=page_internal	12/7/2021
10	Nikoloz Khundzakishvili	EFES Natakhtari LLC	Director of Corporate Affairs	https://www.natakhtari.com/	12/14/2021
11	Solomon Pavliashvili	Ministry of Environmental Protection and Agriculture	Deputy Minister	https://mepa.gov.ge/En/	12/15/2021
12	Khatuna Gogaladze	Georgia's Environmental Outlook - GEO	Founder, Program Manager	https://geo.org.ge/	12/15/2021
13	Lika Sanikidze, Tinatin Tkeshelashvili	UNDP	Service Development Coordinator,	https://www.ge.undp.org/content/georgia/ka/home.html	12/16/2021

			Project Manager		
14	Nana Janashia, Nino Shavgulidze	CENN	Executive Director; Project Leader	http://www.cenn.org/	12/17/2021
15	Tamar Aladashvili	LEPL Environmental Information and Education Centre	Director	http://www.eiec.gov.ge/	12/21/2021
16	Giorgi Shukhoshvili	Solid Waste Management Company Ltd.	Director, Advisor	http://waste.gov.ge/ka/?lang=ge	12/21/2021
17	Nino Chkhobadze	The Greens Movement of Georgia	Founder	https://www.greens.ge/	12/22/2021
18	Malkhaz Adeishvili	United Nations Industrial Development Organization's (UNIDO) Resource Efficient and Cleaner Production Project	Program Coordinator		12/29/2021
19	Davit Advadze	Ministry of Economy and Sustainable Development of Georgia	Head of Sustainable Development Division	www.economy.ge	2/14/2022
20	Khatia Chkhetiani	Tbilisi City Hall	Environmental Project Consultant	https://tbilisi.gov.ge/	2/15/2022

APPENDIX 2: PARTICIPANTS OF WORKING GROUP MEETINGS

#	Name	Organization	Position
1.	Salome Kurasbediani	Environmental Protection and Natural Resources Committee of the Parliament of Georgia	Head of Apparatus
2.	Nana Gogitidze	Environmental Protection and Natural Resources Committee of the Parliament of Georgia	Employee of the Environmental Protection and Natural Resources Committee
3.	Ani Sisordia	Environmental Protection and Natural Resources Committee of the Parliament of Georgia	Guest Specialist/Lawyer
4.	Irma Gurguliani	Ministry of Environmental Protection and Agriculture of Georgia	Deputy Head of Waste and Chemical Substances Management Department
5.	Kristine Vardanashvili	Ministry of Environmental Protection and Agriculture of Georgia	Head of the Waste Management Policy Division
6.	Nino Tevzadze	CENN	Project Manager
7.	Vakhtang Baramia	Solid Waste Management Company of Georgia	Deputy Director
8.	Nino Shavgulidze	CENN	Project Leader
9.	Kakha Karchkhadze	Biodiesel LLC	Scientific Consultant
10.	Giorgi Guliashvili	Waste Management Association	Head of Association
11.	Khatia Chkhetiani	Tbilisi City Hall	Environmental Project Consultant
12.	Mariam Bakhtadze	Deloitte	Natural Resources Management Advisor
13.	Khatuna Chikviladze	Solid Waste Management Company of Georgia	Advisor
14.	Malkhaz Adeishvili	United Nations Industrial Development Organization's (UNIDO) Resource Efficient and Clean Production Demonstration Project	Program Coordinator
15.	Tamar Kvantaliani	KfW	Senior Project Coordinator
16.	Ekaterine Bendeliani	LEPL Environmental Information and Education Centre	Deputy Director
17.	Anuka Manjavidze	LEPL Environmental Information and Education Centre	Acting Head of the Environmental Information Service

18.	Mariam Darchia	Ministry of Economy and Sustainable Development of Georgia	Senior Specialist of Sustainable Development Division
19.	Aleksandre Svanishvili	UNDP Regional and Local Development Programme	Legal Expert
20.	Nino Chkhobadze	Greens Movement of Georgia	Founder
21.	Natia Katsiashvili	USAID Economic Security Program	Business Enabling Environment Specialist
22.	Lasha Dolidze	PMCG	Consultant
23.	Ketevan Babiashvili	PMCG	Consultant
24.	Eka Ghvinjilia	PMCG	Project Manager
25.	Mariam Khubashvili	PMCG	Project Manager
26.	Nutsa Dzandzava	PMCG	Intern
27.	Luka Lolua	PMCG	Intern

APPENDIX 3: RESULTS OF THE SURVEY CONDUCTED WITH THE WORKING GROUP

Indicate which sector you represent	Insufficient Enforcement of Legislation					Restricted Access to Waste as a Raw Material					Lack of Public Awareness					Lack of Qualified Personnel					
	EE*	PF	AF	TF	TNS	EE	PF	AF	TF	TNS	EE	PF	AF	TF	TNS	EE	PF	AF	TF	TNS	
1	Public Sector	3	3	3	4	3	3	4	4	4	4	4	4	4	3	3	4	4	4	3	
2	Public Sector	3	3	3	3	3	3	3	4	4	3	4	3	3	3	4	4	4	4	4	
3	Public Sector	4	3	2	2	3	4	3	2	3	2	4	4	3	3	2	4	3	3	4	
4	Public Sector	2	5	5	5	4	4	5	5	5	4	4	5	5	4	4	5	5	5	5	
5	Public Sector	5	4	5	4	2	5	3	3	5	4	3	3	5	3	5	5	5	5	3	
6	Public Sector	4	4	4	3	5	3	3	2	4	5	3	3	2	4	5	1	4	4	3	
7	Donor Organizations and NGOs	3	3	4	4	4	5	3	4	4	5	2	3	4	4	5	5	5	5	4	
8	Private Sector	3	3	2	2	3	3	3	2	2	2	3	3	3	3	2	4	2	2	2	
9	Private Sector	5	5	5					5	5		5								5	
10	Donor Organizations and NGOs	4	5	5	5	3	5	4	5	5	4	4	5	5	5	4	3	3	5	5	
11	Private Sector	5	5	5	5	5	5	5	5	5	5	5	5	3	5	5	5	2	2	4	
12	Donor Organizations and NGOs	4	3	3	3	3	5	4	3	2	3	4	5	4	4	4	5	4	4	3	
13	Private Sector	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
14	Donor Organizations and NGOs	5	5	5	5	3	4	3	4	4	3	5	4	4	4	4	5	5	4	3	
15	Private Sector	4	5	4	3	3	4	4	4	4	3	4	3	4	4	4	4	3	3	3	
	Total	59	61	60	53	49	58	52	57	61	52	59	55	54	55	55	58	54	55	59	54
	Grand Total	282					280					278					280				

*** ABBREVIATIONS**

Economic Effect EE

Political Feasibility	PF
Administrative Feasibility	AF
Technical Feasibility	TF
Time Needed to Solve the Issue	TNS

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