
GEORGIA

Solid Waste Sector

Assessment Report

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Executive Summary

Since 2015 – a year of the adoption of the Waste Management Code, Georgia has achieved significant progress towards an integrated solid waste management system. Regardless, there are a number of solid waste management challenges that the country struggles to overcome and is far from meeting the ambitious targets detailed in the National Solid Waste Management Strategy, which is harmonized with European Union standards. Some of the challenges include the need for improving waste collection coverage; reducing waste quantities in landfills; managing waste in an environmentally sound, safe manner; eliminating illegal dumping and littering through better waste collection, monitoring, and law enforcement; transforming municipal solid waste (MSW) management service delivery organizations from almost fully subsidized entities into truly autonomous, self-sufficient organizations with full cost-recovery; and introducing circular economy principles, including those for waste prevention, re-use, redesign, recycling and recovery.

With a view to identify key solid waste sector gaps looking at the sector holistically and suggest short to longer-term interventions together with required investments, in mid-January 2021 the World Bank launched a solid waste sector study. The study was carried out by a team of local and international experts using combined methods of a desk review of existing literature and data, interviews with key decision-makers (e.g. representatives of the Ministry of Environmental Protection and Agriculture (MEPA), Solid Waste Management Company of Georgia (SWMCG) and cleaning /amenity services of local municipalities), questionnaire surveys of local municipalities, a gap analysis and, a spatial analysis via application of Geo-Information Systems (GIS).

The study focuses on the following waste streams: i) MSW, ii) wastes of animal origin, including animal by-products (ABPs) and derived products and, 3) biodegradable wastes generated by non-municipal sectors (e.g. forestry and agriculture). In addition, other waste streams as hazardous municipal waste (HMW) and construction and demolition waste (C&D) are also discussed.

Thematically, the paper gives an overview and analysis of:

- Demographic and social-economic data
- MSW generation quantities, composition and projections for 2020-2040
- Potential for material recovery/recycling, energy recovery
- MSW collection and gaps in collection
- Plastic waste flow paths and hotspots and estimation of Georgia's contribution to marine littering
- MSWM legal-regulatory, policy and institutional frameworks and current practices, together with system, institutional and operational gaps
- Current financial arrangements for investments and operations, including the waste tariff structure, billing and revenue collection systems together with financing gaps and needs
- ABP legal-regulatory, policy and institutional settings, generated quantities, management practices, challenges, gaps and needs
- Legal-regulatory, policy and institutional setting for biodegradable wastes generated from non-municipal sectors (agricultural and forestry sectors), generated quantities, management practices, challenges, gaps and needs

Based on the gap analysis, the study suggests an operational road map and investment plan of short to long-term measures designed to fill existing gaps in the management of MSWs, ABPs and biodegradable wastes generated by non-municipal sectors.

Major findings of the study for MSW stream indicate that MSW generation is estimated to increase by 40 percent from 2019 to 2040. Average Waste Generation Index/rate (WGI) of 0.95 kg/inh/d (kilogram per inhabitant per day) for urban areas and 0.54 kg/inh/d for rural areas, taking into consideration changes in population size, urbanization and household incomes, MSW generation from

1,117,396 metric tons (t) at the 2019 baseline level will continue to grow to 1,252,855 t in 2025, 1,345,484 t in 2030, 1,450,343 t in 2035 and 1,568,949 t in 2040.

Current quantities of MSW in urban areas are almost 2.5 times as high as in rural areas and the total quantity of MSW collected, transported, and disposed of at existing unengineered landfills amounts to 988,905 t, covering only around 87-88% of total MSW generated. In rural areas only 64% of waste is collected. About 65% of the total waste collected is in three areas given the density of the main urban jurisdictions: Tbilisi, Imereti and Achara Autonomous Region. Collection coverage in urban areas ranges between 60 and 100 percent and between 25 and 95 percent in rural areas. The existing landfills are not engineered and do not have gas management or leachate treatment. It is typical to have poor or absent law enforcement and communications at the municipal level regarding collection and management, including dumping of waste.

The biggest stream is biodegradable waste, generating more than 64 percent of total MSW, with food and green waste making up 46.03 percent of total biodegradable waste, yet the waste is not used productively. For plastic waste generation, more than 36 percent of the 166,384 t/y plastic generated is accounted for by Tbilisi, followed by Imereti (13 percent), Achara (13 percent), Kvemo Kartli (10 percent), Samegrelo-Zemo Svaneti (7 percent), and Shida Kartli (6 percent). The major cities are gross producers of plastic waste, with Tbilisi, Batumi, Kutaisi, Gori, and Rustavi generating over 55 percent of the total quantity of plastic waste produced in Georgia. While most waste in urban areas end up in landfills, in rural areas, 20-30 percent ends up in dumpsites, on riverbanks and shores, on riverbeds and in drainage canals, and often goes directly in the Black Sea.

There is a high dependency on state financing with the Ministry of Finance covering 83 percent of operational expenditures and Ministry of Regional Development and Infrastructure subsidizing capital costs. The limited cost recovery due to low fee setting in combination with low payment rates will provide relatively less revenue in the future as the system transitions to a more expensive, environmentally-sound management approach and with waste generation expected to increase 40%. For the households billed, approximately 20 percent of fees are collected, and the public sector currently subsidizes the private sector with GEL 10.87 million as lost potential income given current tariffs. There is no incentive for municipalities to increase income given the current legislation and monitoring system.

Packaging waste is anticipated to be the most critical extended-producer responsibility scheme to achieve recycling targets and also provide another revenue stream; however, legislation and guidance is lacking. Rough estimates of the quantities of specific wastes already subject to EPR, are at around 550 t of “fresh” portable batteries, 5,500 t new accumulators, up to 31,272 t End-of-life tires (ELT) and over 12,200 t lubricant oils marketed annually. Concerning ELVs, the total number of de-registered cars in 2014 – 2018 amounted to 68,736 or approx. 13,700 cars per year.

For the other solid waste streams, the main analysis was understanding the scale of the problem due to limited information available. Total ABPs from animal husbandry/livestock farming is estimated at 67,550 t/y and biodegradable waste from non-municipal sectors is estimated at 4,047,000 m³ of forest residues and from 304,000 t (WEG) to 1,500,000 t (UNDP) of agricultural residues. For C&DW, the largest portion is generated by industries and businesses, depositing this type of waste in existing landfills or temporary disposal sites. A big portion of generated C&DW is dumped in gullies and river gorges. In mixed MSW from households, organizations, and public containers, C&DW averages about 3.69 percent. At present there is no organized system and proper infrastructure for collection, transportation and processing/treatment of these streams. Baseline data on the quantities generated per source category, collected and treated are mostly missing. Knowledge and capacities of government authorities and business operators in managing above streams are also limited or absent.

At the national level, existing laws, regulations and policies barely encourage service cost-recovery, waste prevention, re-use, recycling and recovery and private sector engagement. Certain critical

regulations such as packaging with EPR, which is an efficient and effective mechanism for private sector engagement in waste recycling, are missing together with methodological guidance documents; there is no consensus reached between producers and local authorities on the most feasible EPR implementation modalities/schemes so far. Meanwhile, there is a need to build knowledge and capacity of all relevant stakeholders, including GoG and businesses for the circular economy in general, and for EPR in particular. Most importantly, there is no integrated solid waste information management system, with a central data depository and relevant databases could support evidence-based decision-making and monitor performance management in the country.

Stemming from above, as short-term (2021-2025) remedies, the report suggests to focus on building local capacity to improve service delivery for waste collection and street cleaning, evidence-based planning, financial management, data collection, performance monitoring and reporting, closure and management of dumpsites, and effective treatment and disposal of waste. Municipalities will need to move towards universal waste collection and eventually source separation, undertake a regional approach to waste management, and face a more expensive system as a result of improved service coverage and modernization.

To support municipalities, there is a need to address infrastructure and equipment shortcomings to align with their responsibilities and conduct studies on operational efficiency, intermunicipal cooperation, dumpsite inventories, and institutional decentralization to improve financing, accountability and responsibility. Local capacity building can be complemented by pilots for source separation schemes.

At the national level, relevant legislation and policies encouraging sector efficiency, cost-recovery, source separation and recycling and private sector engagement into this endeavor should be put in place and stakeholder knowledge and capacities built in their implementation. Financial sustainability is critical to enable the waste management system to sustain. The central government will need to be prepared to support local governments to transition to a more technically complicated, expensive system and be able to heavily subsidize the sector during this period. Extended producer responsibility can be an effective mechanism to support municipalities in improving collection and management of recyclables but requires more national support for implementation arrangements. The current user fee should be revisited in the context of the transition to a more expensive management system and with the aim of more autonomous municipalities. In parallel, investment studies and design works for improving MSWM infrastructure including waste treatment infrastructure should be continued under ongoing solid waste management projects for the implementation phase in the medium to longer-term. An integrated SWM information management system, with a central data depository should be set at EIEC/MEPA and linked with other relevant databases.

For 2026-2030 and beyond, the roadmap suggests focusing on measures that provide implementation support to laws and policies encouraging service efficiency, cost-recovery, autonomous and more independent status of local municipalities; build a more circular Georgian economy, including through waste prevention, re-use, redesign, recycling and energy recovery; and continue mobilizing investments for remaining MSW collection, transportation, treatment and disposal infrastructure needs.

For the major streams, other than MSW, including C&D, HWM, ABPs, and biodegradable wastes generated by non-municipal sectors, as short-term interventions detailed baseline and pre-investment/feasibility studies should be carried out for establishing organized management systems, to be followed by the development of investment plans and stakeholder capacity building for management, planning, and performance monitoring, as a starting point. From 2026 through 2030 and beyond, the implementation of investment plans should be supported.

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Abbreviations and Definitions

ABP	<p>Animal byproduct, including animal waste and derived product – entire bodies or parts of animals, products of animal origin, products obtained from animals and not intended for human consumption. ABPs include:</p> <ul style="list-style-type: none"> • Animal feed – e.g., based on fishmeal or processed animal protein • Organic fertilizers and soil improvers - e.g. manure, guano, processed organic fertilizers/soil improvers on the base of processed animal protein <p>Technical products – e.g., pet food, hides and skins for leather, wool, blood for producing diagnostic tools</p>
ABPM	Animal byproduct management
ABPR	Animal byproduct regulation
Aerobic Digestion	A biological process that reduces and stabilizes the volume of organic waste through the activity of aerobic bacteria that rapidly consume the organic matter and produce single-cell proteins (SCP), water, and CO ² .
A.A.R	Achara Autonomous Republic
AMC	Accompanying Measures Component under EBRD and KfW regional solid waste management projects
AMEX	Amortization expenditures (depreciation and interest)
Anaerobic Digestion (AD)	A biological process in which microorganisms break down bio-degradable material in the absence of oxygen, creating biogas and digestate
AP	Action Plan
Biowaste	Biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, comparable waste from food processing plants
Biodegradable Waste	Any waste capable of undergoing anaerobic or aerobic decomposition, such as food and garden waste, and paper and paperboard (as in WMC Art. 3)
Biodrying	A variation of aerobic decomposition used in mechanical-biological treatment (MBT) plants to dry and partially stabilize residual municipal waste. Biodrying MBT plants can produce high-quality, solid recovered fuel (SRF)/refuse-derived fuel (RDF) high in biomass content
Biogas	The primary product of anaerobic digestion, a methane-rich, renewable gas composed of 50-65% methane and 35-50% CO ²
Biomethane	The methane-rich, renewable natural gas substitute left when CO ² and trace gases are removed from biogas
BMW	Biodegradable Municipal Waste is biodegradable waste from households and other waste which, due to its nature or composition, is similar to household waste
BSB	Black Sea Basin

Bulky Waste	Large waste such as appliances, furniture, and trees or branches, that cannot be handled by normal municipal solid waste processing methods
CAB	Conformity Assessment Bodies
C&D	Construction and demolition
C&DW	Construction and demolition waste
CABs	Conformity Assessment Bodies
CAPEX	Capital expenditure
CB	Capacity building
CBO	Community-based organization
CD	Capacity Development
CENN	Caucasus Environmental NGO Network
CIB	EU Comprehensive Institution Building (Support Programme)
CIIs	Companies, institutions, industries
CSP	Ceramics, stones, and porcelain – a glass quality criterion
Collection	The gathering of waste, including its preliminary sorting and storage, for the purposes of transport to a waste treatment facility (as in WMC Art. 3)
Collection Route	The path taken by a collection truck from its starting point (municipal garage) to the service area (collection), within the service area, from the service area to the landfill/ transfer station for unloading, from the landfill/transfer station to the service area or back to its starting point.
CSO	Civil Society Organization
DB	Database
DCFTA	Deep and Comprehensive Free Trade Agreement
DGG	Decentralization and Good Governance
Digestate	The remainder after organic matter is treated by AD, rich in nutrients and nitrogen, commonly used as organic fertilizer in agriculture
Disposal	An activity defined in, but not limited to, Annex II of WMC (as in WMC Art. 3)
DRS	Deposit Refund System
EAC	Environmental Assessment Code
EBRD	European Bank for Reconstruction and Development
EC	European Council
EE	Energy Efficiency
EEC	Energy Efficiency Center
EI	Economic Instrument

EIA	Environmental Impact Assessment
EIEC	Environmental Information and Education Center
ELT	End-of-life tire
ELV	End-of-life vehicle
EMBLAS	Environmental Monitoring of the Black Sea
EN 13432:2000	The EU standard on packaging; requirements for packaging recoverable through composting and biodegradation; the test scheme and evaluation criteria for the final acceptance of packaging
ENI	European Neighborhood Instrument
EPR	Extended Producer's Responsibility
EU	European Union
EUD	EU Delegation
Existing Landfill	Operational landfill
FRLD	Fostering regional and local development, UNDP Georgia
FAO	UN Food and Agriculture Organization
FWC	Framework Contract
GAARD	Georgian Alliance for Agriculture and Rural Development
GAC-TL	Certificate of the Georgian Accreditation Center for testing laboratories (TL)
GAP	Good Agricultural Practice
GCCI	Georgian Chamber of Commerce and Industry
GDP	Gross domestic product – the monetary measure of the market value of all the final goods and services produced in a specific time period
GEF	Global Environment Facility
GEO	Georgian Environmental Outlook (a local NGO)
GEOSTAT	National Statistics Office of Georgia
GEL	Georgian Lari (national unit of currency)
GFA	Georgian Farmers Association
GIS	Geo-Information System
Global G.A.P.	Private sector body that sets voluntary standards for the certification of agricultural products around the globe. Global G.A.P. is a business-to-business standard that is not visible to consumers
GNI	Formerly known as Gross National Product (GNP), GNI is the total domestic and foreign output claimed by a country's residents, consisting of Gross Domestic Product (GDP), plus factor incomes earned by foreign residents, minus income earned in the domestic economy by nonresidents; comparing GNI to GDP shows the degree to which a nation's GDP represents domestic or international activity

GoG	Government of Georgia
GPP	Green Public Procurement
Green Waste	Biodegradable waste (i.e., that can decompose naturally and organically) such as grass cuttings, hedge trimmings, or other material pulled or cut during gardening or work in parks
HACCP	Hazard Analysis Critical Control Point – a management system in which food safety is addressed by analyzing and controlling biological, chemical, and physical hazards from the production of raw materials, procurement, handling, manufacturing, distribution, and consumption of the finished product
Hazardous Waste	Waste which displays one or more of the hazardous properties listed in Annex III of the WMC (as in WMC Art. 3)
HDPE	High-density polyethylene
HMS	Hazardous municipal stream
HHI	Household income
HMW	Hazardous municipal waste
HW	Hazardous waste
HWM	Hazardous waste management
Household Waste	Waste generated by households (as in WMC Art. 3)
IC	Implementation measures (regional landfill projects)
ICMA	Caucasus and International City/County Management Association
IDP	Internally Displaced Persons
IFI	International Financial Institution
IHR	International Health Regulations
IMS	Information Management System
Inert Waste	Waste that does not undergo any significant physical, chemical, or biological transformation; inert waste will not dissolve, burn, or otherwise physically or chemically react, biodegrade, or adversely affect other matter in a way likely to give rise to environmental pollution or harm human health (as in WMC Art. 3)
ISO/IEC 17025	A company level accreditation based on a standard published by the International Organization for Standardization (ISO) titled "General requirements for the competence of testing and calibration laboratories". This accreditation is specific to a scope.
ITS	Innovative Technologies and Services
JRC	Joint Research Centre
Kg/d/inh	Kilograms per inhabitant per day
Kg/y	Kilograms per year

KfW	Kreditanstalt für Wiederaufbau – German state-owned development bank
KPI	Key Performance Indicator
Landfill	A disposal site for the deposit of waste on or beneath land; landfills include internal waste disposal sites (i.e., where a producer of waste disposes it at the place of production); the term is not used for temporary storage facilities and waste transfer stations (as in WMC Art. 3)
LDPE	Low-density polyethylene
LEDS	Low Emission Development Strategy
LEPL	Legal Entity of Public Law
LLC	Limited Liability Company
Ltd	Limited liability
LSG	Local Self-government
M&R	Maintenance and repair
Material Recovery	Any recovery operation, excluding energy recovery and reprocessing waste into materials to be used as fuel
MDF	Municipal Development Fund
MDPE	Medium-density polyethylene
MBT	Mechanical-biological treatment
MEPA	Ministry of Environmental Protection and Agriculture
Mineral Fertilizer	Fertilizer in which nutrients take the form of inorganic salts obtained by mining and/or by physical or chemical industrial processes
MoESD	Ministry of Economy and Sustainable Development
MoF	Ministry of Finance
MPS	Mechanical-Physical Stabilization
MPSF	Municipal Project Support Facility
MRDI	Ministry of Regional Development and Infrastructure
MRF	Materials Recovery Facility
MSFD	EU Marine Strategy Framework Directive
MSW	Municipal solid waste
MSWM	Municipal solid waste management
Municipal Waste	Household waste and other waste which, due to its nature or composition, is similar to household waste (as in WMC Art. 3)
MWMP	Municipal waste management plan
N/A	Not applicable
NEA	National Environmental Agency

NFA	National Food Agency
NGO	Non-governmental Organization
NPWPP	National Plastic Waste Prevention Program for Georgia
NREAP	National Renewable Energy Action Plan
NTC	New Technology Centre
NWMP	National Waste Management Plan
NWMAP	National Waste Management Action Plan
NWMS	National Waste Management Strategy
Operator	A natural or legal person granted the right to manage a waste collection facility, a temporary storage facility, a waste treatment facility, or a part of such facility (as in WMC Art. 3)
O/M	Operation and Maintenance
OECD	Organisation for Economic Co-operation and Development
OIE	World Organization for Animal Health
OPEX	Operational expenditure
Organic Fertilizer	Fertilizer in which nutrients come mainly from renewable, carbonaceous materials of plant or animal origin
PA	Polyamides
PAP	Processed Animal Proteins
PAYT	Pay-as-you-throw
PC	Polycarbonates
PE	Polyethylene or polythene
PET	Polyethylene terephthalate
PMCG	Policy and Management Consulting Group (a local company)
PMS	Performance Management System
PP	Polypropylene
Preparing for re-use	Checking, cleaning, or repairing recovery operations, by which waste is prepared to be re-used without needing further pre-processing (as in WMC Art. 3)
Pre-treatment	Operations performed prior to waste recovery and disposal, including preliminary processes such as dismantling, sorting, crushing, pressing, granulation, drying, shredding, re-packaging, separating, mixing, etc. (as in WMC Art. 3)
Prevention	Measures taken before a substance, material, or product has become waste that reduce (a) the quantity of waste, including through the re-use of products or the extension of the life span of products, (b) the adverse impacts of the waste on the environment and human health, or (c) the content of harmful substances in materials and products (as in WMC Art. 3)

PPP	Purchasing Power Parity – a measurement of prices of specific goods in different countries to compare the absolute purchasing power of those countries’ currencies; in many cases, PPP produces an inflation rate equal to the price of a basket of goods at one location divided by the price of a basket of goods at a different location; the PPP inflation and exchange rate may differ from the market exchange rate because of poverty, tariffs, and other transaction costs
PPT	PowerPoint Presentation
PRO	Producer Responsibility Organization
PS	Polystyrene
PUR	Polyurethane
PVC	polyvinylchloride
RCV	Refuse Collection Vehicle
RE	Renewable Energy
REAP	USAID's Restoring Efficiency to Agricultural Production project
RECC	Caucasus Regional Environmental Centre (a local NGO)
Recycling	Any recovery operation by which waste materials are reprocessed into products, materials, or substances; it includes the reprocessing of organic material but does not include energy recovery or the reprocessing into materials to be used as fuels or for backfilling operations (as in WMC Art. 3)
Recovery	Any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have fulfilled a particular function defined in, but not limited to, Annex I of WMC recovery includes recycling (as in WMC Art. 3)
Re-use	Any operation by which a product or its component, before it becomes waste, is used again for the same purpose for which it was conceived (as in WMC Art. 3)
QA/QC	Quality Assurance/Quality Control
SDC	Swiss Development Cooperation
Separate Collection	Collection that separates waste streams by type and nature to facilitate a specific treatment (as in WMC Art. 3)
SIEA	Services for Implementation of External Aid
Sida	Swedish International Development Assistance
Similar Waste	Waste comparable to household waste in nature and composition, excluding production waste and waste from agriculture and forestry
SLA	LEPL State Laboratory of Agriculture of the Ministry of Environmental Protection and Agriculture
SPS	Sanitary and phyto-sanitary norms
SRM	Specific risk material

SSF	Shareholder Special Fund
SUP	Single-use plastic
SWM	Solid waste management
SWMCG	Solid Waste Management Company of Georgia – a LLC under MRDI, managing regional landfills
SWSA	Solid Waste Sector Assessment
t	Metric ton
TA	Technical assistance
TCH	Tbilisi City Hall
TSG	Tbiliservice Group
TSE	Transmissible Spongiform Encephalopathies
Transfer Station	A facility where waste is reloaded for further transportation to waste management facilities (as in WMC Art. 3)
Transportation	The movement of waste to a waste storage facility or waste treatment facility (as in WMC Art. 3)
Treatment	Waste recovery or disposal under Annexes I and II of WMC, including pre-treatment before recovery or disposal (as in WMC Art. 3)
t/y	Metric tons per year
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission of Europe
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
USD	US dollar
UV	Ultraviolet
VAT	Value Added Tax
Waste	Any substance or object which a holder discards or intends or is required to discard (as in WMC Art. 3)
WB	The World Bank
WBA	Waste Batteries and Accumulators
WGI	Waste Generation Index
Waste Management	The collection, temporary storage, pre-treatment, transportation, recovery, and disposal of waste, including the supervision of such activities, measures, operations, and aftercare of disposal sites (as in WMC Art. 3)
Waste Producer	An entity whose activities produce waste (original waste producer) or who carries out pre-processing, mixing, or other operations change the nature or composition of this waste

WEEE	Waste Electronic and Electric Equipment
WEG	World Experience Georgia
WMC	Waste Management Code of Georgia
WMTR	Waste Management Technologies in Georgia
WWT	Wastewater Treatment
WWTP	Wastewater treatment plant

1 Introduction

Georgia—with its transitional economy—desires Euro-Atlantic integration and hopes to apply for EU membership in 2024.

Its population is 3.7 million, of which 2.2 million (59.04%) live in urban areas and 1.5 million (40.96%) in rural areas.¹ Almost one-third of the country's inhabitants—1.2 million residents—live in Tbilisi, the capital city. Since 2016, the total population has increased 0.01% annually on average, with a positive 2.36% urban population growth and a negative 3.23% rural population loss. Tbilisi has enjoyed the largest growth at 5.11%, followed by Achara with 3.8%, and the Kvemo Kartli region with 1.91%.

Georgia was classified an upper-middle-income country for the first time in 2015 and again in 2018 (based on Gross National Income—GNI—per capita). Between 2007 and 2016, the economy grew at an average rate of 4.5%. Consumption and high rates of investment drove this growth, while net exports dampened it. Between 2017 and 2019, the growth rate rebounded to five percent due to strong exports supported by regional recovery, coupled with fiscal reforms. The COVID-19 pandemic in Georgia, however, led to a steep economic contraction of six percent in 2020.² The initial economic shock caused by the COVID-19 lockdown prompted an economic downturn of 16.6% year-on-year in April 2020. As infections came under control, restrictions were gradually loosened during the following summer and the economy started to recover, with the Gross Domestic Product (GDP) contraction narrowing to 5.3 percent year-on-year by August 2020. The pace of recovery was again halted due to the pandemic's second wave and the nearly total country lockdown at the end of 2020 and beginning of 2021. Future economic prospects will depend on the duration of the pandemic, the availability and distribution of vaccines, and the restoration of international trade and investment flows. If subsequent waves of infection can be avoided, Georgia would see gradual economic recovery, with growth reaching four percent in 2021 and six percent in 2022. Nevertheless, real GDP under this scenario would be about 10 percent lower in 2022 than was projected before the pandemic.

Despite signs of gradual recovery, the pandemic's economic shock has impoverished 350,000 people in Georgia and forced more than 800,000 to suffer downward mobility according to the latest poverty projection by the World Bank.³ The 2020 poverty rate could increase by nine percent, from a projected 38 percent (counterfactual scenario) to 47 percent including the pandemic-related economic shocks (assuming an upper-middle-income class poverty line of USD 5.5 a day, 2011 PPP). Extreme poverty could more than double to 7.4 percent. The 2020 national poverty rate could exceed its 2013 level. The policy measures implemented by the Government of Georgia (GoG) to mitigate the COVID-19 economic shocks on household incomes have had progressive effects on the population. Combined, such measures are significant—though insufficient to reverse all pandemic-caused impoverishment, only reducing poverty by up to 4.7percent (national poverty line).

¹ As of January 1, 2020. Geostat.

² World Bank, 2021. Global Economic Prospects. <https://www.worldbank.org/en/publication/global-economic-prospects>

³ <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/456501608095974011/poverty-and-welfare-impacts-of-covid-19-and-mitigation-policies-in-georgia>

Georgia's ability to address its development challenges depends on how it manages risks, with regional development remaining a strategic driver for inclusive and sustainable growth.⁴ Before COVID-19, Georgia faced growing fiscal risks which prompted GoG to develop a fiscal consolidation program at the end of 2016 to secure a sustainable fiscal path. This commitment was a basis for an Extended Fund Facility approved by the International Monetary Fund (IMF) in April 2017. GoG policies bolstered short-term economic growth, and the IMF-supported program was designed to help Georgia reduce economic vulnerabilities going forward. But key sustainability challenges that remained in 2019 are likely to be exacerbated by the pandemic.⁵ The 2018 Systematic Country Diagnostic prioritized equalizing access to opportunities and investing in people. Today the country is an economic mosaic with islands of prosperity and opportunity (mostly in a few cities) and a vast rural hinterland characterized by limited mobility and low productivity. These regional disparities constrain inclusive growth, worsen with demographic changes, and impede Georgia's long-term growth prospects and ability to leverage its talent pool. Reform has been uneven across layers of government and sectors, and capacity constraints exacerbate institutional limitations. While, for instance, Georgia has developed excellence in key aspects of central government decision-making, this must be extended to lower, technical levels where connections are built between urban centers and rural areas.

On the environmental side, Georgia has performed well in recent decades and started to align national regulatory and policy frameworks and state institutions with the EU standards. The adoption of the Waste Management Code (WMC) in 2015 has substantially advanced Georgia's solid waste management (SWM) agenda. This was followed by the development of an overarching National Waste Management Strategy (NWMS) and associated National Waste Management Plan (NWMP). A number of implementing regulations and guidelines have been adopted to support SWM and their gradual implementation has begun. Local self-governments (LSGs) have officially adopted five-year Municipal Waste Management Plans (MWMPs) and their implementation has commenced. Furthermore, numerous waste-generating companies have submitted waste management plans to the Ministry of Environmental Protection and Agriculture (MEPA) for approval and have started annual reporting on their wastes per the requirements of WMC. MEPA and other relevant authorities have established a number of electronic waste registries and waste accounting by waste producers has significantly improved. MSW collection in Georgia has improved significantly, with rates reaching almost 100% in urban and about 64% in rural areas. Many small dumpsites have been cleaned up across the country—a number of operational landfills that posed high risks to public health and the environment have been closed and remediated, while those having lesser impacts have been rehabilitated and scheduled for closure and remediation. International financial institutions (IFIs) financed the construction of new, EU-compliant, regional sanitary landfills and provided support to set up relevant transportation systems and transfer stations. The recent introduction of the Extended Producer Responsibility (EPR) principle by enacting technical regulations on batteries and accumulators, used oils, end-of-life tires (ELTs), and waste electronic and electrical equipment (WEEE) is one of the more important reforms in the SWM sector. Draft regulations on packaging and end-of-life vehicles (ELVs) were prepared and are under discussion by various stakeholders. The EPR approach implies broader responsibilities for producers—including importers of specific products for waste management generated by use of products, either individually or collectively—through Producer Responsibility Organizations (PROs).

Notwithstanding GoG's significant progress towards integrated SWM, Georgia still faces many challenges to be addressed in the short-, medium-, and longer-terms. The sector can further benefit from better infrastructure and sustainable practices—including know-how, financing mechanisms, and

⁴ World Bank. FY19-FY22 Country Partnership Framework for Georgia.

⁵ World Bank, 2017. Georgia Public Expenditure Review.

improved capacity, especially at the municipal level. Additional support to implement full cost-recovery policies for MSWM and to reinforce newly adopted EPR regulations can advance SWM. The sector can reinforce high levels of participation and encourage specific waste producers, consumers, and local authorities to collaborate better on setting and implementing EPR schemes (especially for packaging wastes), and to start separate collection and recycling of dry recyclables and household hazardous wastes, as mandated by WMC. The public's SWM awareness can be deepened, as waste dumping and littering remain frequent practices, especially in tourist hotspots such as along the Black Sea shore and in rural areas, where MSW collection is fairly low.

Given the economic development trends in urban and tourist areas—with positive population growth rates and increasing numbers of visitors—total municipal waste generation is expected to rise from 1,117,396 metric tons (referred to as t or tons for remainder of document) in 2019 to 1,212,538 t by 2025 assuming 0 percent growth in the Waste Generation Index (WGI)⁶, and to 1,252,855 t if WGI grows 1.6% in urban areas and 0.8% in rural areas. With the introduction of regional sanitary landfills, managing the sector will get more expensive and will require more human and financial capital. To meet the sector's rising needs given the known challenges, donor and private sector support must be mobilized to identify and prioritize short-, medium-, and long-term investments effectively.

⁶ “The Waste Generation Index (WGI) is an estimated quantity of MSW generated per inhabitant per day and is measured as kilogram per inhabitant per day (kg/inh/d). This index is used as part of basic waste metrics to estimate waste generation quantity and make future projections.

1.1 About This Study

This paper seeks to assess high-level, solid waste management in Georgia to identify gaps in implementation of the National Waste Management Strategy (NWMS) and National Waste Management Action Plan (NWMAP) and to propose solutions linked to an operational roadmap and a program for short-, medium-, and long-term interventions for hard and soft investments.

Geographically this Solid Waste Sector Assessment (SWSA) covers all of Georgia. Following prior consultations with MEPA and other key stakeholders, the solid waste streams selected for detailed sector analysis include:

- Municipal solid waste (MSW) and its streams including household waste, household-like commercial and institutional waste, biodegradable waste (park, garden, and kitchen waste), and specific waste (e.g. packaging, WEEE)
- Higher level assessment of wastes of animal origin, including animal byproducts and derived products (ABP)
- Higher level assessment of biodegradable waste generated by non-municipal sectors, including agricultural and forestry biowaste

This study addresses:

- Inventory of demographic and solid waste⁷ data
- Assessment of solid waste generation quantities
- Assessment of waste composition
- MSW generation projections—2020-2040
- Assessment of the potential for material recovery/recycling, energy recovery, and composting.
- Assessment of solid waste quantities collected and gaps in collection
- Assessment of plastic waste flow paths and hotspots, and estimation of Georgia’s contribution to marine littering based on plastic waste generation, leakage points, and waste management paths
- Review of MSWM legal/regulatory and policy frameworks, and policy implementation mechanisms, including EPR and upstream plastic policies
- Review of MSWM institutional arrangements at national and local levels, including the engagement of the private sector
- Review of MSW management practices—collection, transportation, treatment/recycling (e.g., material recovery, energy recovery, composting, etc.), and disposal
- Review of financial arrangements in the MSWM sector for investments, operation and maintenance (including the waste tariff structure, billing and collection systems, and revenue collection processes)
- Assessment of operational challenges in MSWM, including institutional and financial gaps in collection, transportation, treatment, and disposal
- Review and analysis of ABP legal/regulatory, policy and institutional setting, generated quantities, management practices, challenges, gaps, and needs
- Review and analysis of legal-regulatory, policy and institutional setting for biodegradable waste generated by non-municipal sectors (agricultural and forestry), generated quantities, management practices, challenges, gaps, and needs
- Creation of a roadmap and investment measures covering 2021-2030

⁷ MSW, ABP, biowaste.

The methods used herein include:

- Collection and desk review of relevant data/information
- Interviews with relevant national authorities to discuss i) gaps and needs in national MSWM legislation, policy and institutional setting, and implementation, and ii) gaps in legislation, policy and institutional setting, implementation mechanisms for ABPs, and management of wood waste from the forest sector
- Interviews with amenity/cleaning service providers of municipalities
- Questionnaire survey of MSW collection and street cleaning services across the country
- Questionnaire survey of MSW disposal activities
- Qualitative analyses (e.g., critical, comparative, capacity needs assessment, and gaps)
- Quantitative analyses (e.g., descriptive statistics, mathematical calculations of baseline values for selected Key Performance Indicators—KPIs)
- Geo-Information System (GIS) data collection for spatial analysis (regional and, where possible, municipal distribution of selected KPIs, both absolute and normalized values)

Baseline values for all quantitative KPIs suggested for the assessment were calculated. For 39 municipalities in six regions of Georgia—Kvemo Kartli, Mtskheta-Mtianeti, Imereti, Racha-Lechkumi and Kvemo Svaneti, Guria and Samegrelo-Zemo Svaneti—the 2019 baseline values for the selected KPIs came from the UNDP/PMCG 2020 baseline study under the consultancy assignment: *Development of Municipal Solid Waste Management and Street Cleaning Performance Management Systems for 39 Municipalities of Georgia*, while the other values were calculated or obtained directly from the respective municipal authorities. Calculations used simple mathematical equations and the Municipal Waste Management Planning Tool—an Excel calculator developed in 2018-2019 for LSGs to support municipal waste management planning under the EU project: *Technical Assistance for the Improvement of Waste Management Systems in Georgia* (hereinafter the EU TA project).

For this study, the team adjusted recommended values of WGI⁸ according to (1) the actual MSW collection service coverage/waste collection rates expressed as a percentage of the number of people provided with a waste collection service, and (2) MSW quantities in t/y registered and weighed at landfills operated by the solid waste management companies. The default waste composition values used are:

Table 1 Default Waste Composition Values of the Waste Management Calculator

Waste stream	% share
Biowaste	45.00%
Paper	15.00%
Plastic	15.00%
Ferrous metals	2.00%
Non-ferrous metals	2.00%
Glass	4.00%
Wood	1.00%
Textiles & leather	1.00%

⁸ International standard recommended values of WGI for rural areas varies within the range of 0.3-0.6 kg/inh/d and for urban areas – within the range of 0.7-1.3 kg/inh/d

WEEE	3.00%
Construction & Demolition (C&D)	1.00%
Rest	11.00%
TOTAL	100.00%

The waste composition studies are currently available for Telavi, Batumi, Rustavi, and Khashuri landfills. There is also a Kutaisi Technical University study on container waste composition, however, its data collection methodology is unknown. A waste composition study from containers for Tbilisi City under the ongoing European Bank for Reconstruction and Development/Tbilisi City Hall (EBRD/TCH) Tbilisi Waste Strategy project was conducted in October 2020.⁹ Only the waste generation projections for Tbilisi City were considered, given the dramatically different socio-economic context of the city and the quantity and share of MSW generated and collected there. Rustavi’s waste composition was used as a prototype for larger, urban-type settlements having mixed commercial and residential areas and with a dominant number of multi-apartment, multi-story buildings in residential areas (e.g., Rustavi, Kutaisi, Poti, etc.). The waste composition of Gardabani municipality was used for the Kvemo Kartli region’s agriculture-based, rural municipalities having mostly single-family houses. The results of the Khashuri landfill studies were applied to Shida Kartli, Mtskheta-Mtianeti, and Samtskhe-Javakheti municipalities, based on their proximity and similarity. The paper used the results of the Telavi landfill study for the Kakheti municipalities. The average values of the Batumi landfill study for 2016 and 2019 were used for the Achara region. For the other regions with mostly agriculture-based rural municipalities, average waste composition values derived from all available landfill studies were used.

Because the Telavi, Batumi, and Khashuri landfill studies differed slightly from the Rustavi landfill study (e.g., metal was not divided into ferrous and non-ferrous metals, etc.) and did not exactly match the calculator’s default waste composition settings, these average values were adjusted.

⁹ Additional study will be conducted in June 2021 for Tbilisi and preliminary composition data for the fall season will be fine-tuned according to the results of this second study.

Table 2. MSW Composition Based on Available Studies

Region/Municipality	MSW Composition %											Source Study
	Biowaste	Paper & cardboard	Plastic	Ferrous metals	Non-Ferrous metals	Glass	Wood	Textile & Leather	WEEE	C&D	Rest	
Rustavi	52.69	8.85	14.42	0.71	0.23	2.76	1.60	5.05	0.20	3.89	9.61	Rustavi landfill study (Rustavi samples)
Kvemo Kartli (except Rustavi)	52.96	9.35	13.90	1.37	0.32	3.49	0.67	1.81	3.13	6.10	6.91	Rustavi landfill study (Gardabani samples)
Mtskheta-Mtianeti	46.70	12.00	14.50	1.50	0.40	3.30	0.40	8.80	1.00	4.40	7.00	Khashuri landfill study
Kutaisi	52.69	8.85	14.42	0.71	0.23	2.76	1.60	5.05	0.20	3.89	9.61	Rustavi landfill study (Rustavi samples)
Imereti (except for Kutaisi)	46.71	11.01	14.80	1.28	0.50	4.08	0.91	6.12	1.61	5.12	7.86	Average of all composition studies in regions
Poti	52.69	8.85	14.42	0.71	0.23	2.76	1.60	5.05	0.20	3.89	9.61	Rustavi landfill study (Gardabani samples)
Samegrelo-Zemo Svaneti (except Poti)	45.48	11.39	14.94	1.32	0.54	4.26	0.88	6.71	1.55	5.10	7.82	Average of all composition studies in regions
Racha-Lechkhumi Kvemo Svaneti	45.48	11.39	14.94	1.32	0.54	4.26	0.88	6.71	1.55	5.10	7.82	Average of all composition studies in regions
Guria	45.48	11.39	14.94	1.32	0.54	4.26	0.88	6.71	1.55	5.10	7.82	Average of all composition studies in regions
Kakheti (Kakheti)	42.70	11.20	12.80	1.70	0.60	6.00	1.11	9.40	1.20	3.20	10.09	Telavi landfill study
Samtskhe-Javakheti	46.70	12.00	14.50	1.50	0.40	3.30	0.40	8.80	1.00	4.40	7.00	Khashuri landfill study
Shida Kartli	46.70	12.00	14.50	1.50	0.40	3.30	0.40	8.80	1.00	4.40	7.00	Khashuri landfill study
Achara	32.30	15.45	19.15	1.20	1.15	5.65	0.80	9.05	1.75	7.55	5.95	Average of 2016 and 2019 Batumi landfill study
Tbilisi	47.15	13.64	14.54	1.01	0.24	2.51	1.47	2.25	0.05	1.16	16.00	2020 September-October container study

2020-2030 projections were based on two scenarios:

1. Scenario 1 (conservative) assumed zero WGI and population growth rates for 2014-2019.
2. Scenario 2 assumed a WGI annual growth rate of 1.6% (half the average monthly household income growth rate for 2014-2019) for urban areas and a 0.8% annual growth rate for rural areas through 2025, and then 1.2% in urban areas and 0.6% (a 25% decrease) from 2026 through the rest of the projected period.

For municipalities with small permanent populations but significant numbers of tourists and seasonal residents (such as in Achara), tourism data was added to the population projections. The study presumed seasonal residents are in the city and settlements for at least one season—or on average 90 days each year—and tourists stay an average three nights per year with slight regional variations (e.g., in Batumi, Kobuleti, etc. the figure is four to five nights).

Under the ABP waste category annually generated quantities of the following major ABP streams have been estimated based on limited available data: 1) livestock waste (manure, fallen/dead animals) from animal farms (large and household) and, 2) animal waste from meat production facilities, including slaughter houses, and 3) manure (detailed methodology in a separate chapter on ABPs).

Under the category of biodegradable wastes generated by non-municipal sectors (e.g. biomass from agricultural and forestry activities), a desk analysis of available national forestry, agriculture land use and productivity statistics as well as existing assessments and/or strategies (e.g. UNDP Georgia report: Biomass Energy Country Profile of Georgia; Draft Sustainable Energy Action Plan, https://unece.org/fileadmin/DAM/project-monitoring/unda/16_17X/E2_A2.3/NSEAP_Georgia.pdf, [UNEP study on food wastes](#)) has been carried out.

The financial analysis included a desk review of MSW collection and street cleaning revenues and expenditures in all municipalities. The financial performance of the Solid Waste Management Company of Georgia (SWMCG) and the Tbiliservice Group were analyzed for landfill management.

The team faced a number of challenges collecting and processing the baseline data. Therefore, the analyses herein rely on information provided by the respective stakeholders and, where information was not available, the data were extrapolated from municipalities of similar size, location, population, and other characteristics.

Absent data. Data were missing for quantities of MSW generated, the waste generation index (WGI), quantities of MSW generated and collected from household and commercial sectors, rural and urban areas, quantities of street residues and bulky wastes, including C&D, waste composition (most municipalities and regions), and dumpsite inventories (most municipalities). There is no inventory or registry of ABPs and biodegradable wastes generated from non-municipal sectors.

Substandard data quality. An inadequate MSW accounting system hampered data collection in all municipalities. The quantities of mixed, collected MSW in the municipalities were therefore estimated. Thirteen of 33 municipal landfills—including Tbilisi and Batumi—have weigh-bridges that measure MSW at the landfill entrance, but some 60 percent of operational landfills still lack scales.

Uncertainties related to WGI. Due to the current practice of mixed MSW collection and absent studies of container-based waste composition, data on the shares of waste generated by the residential (household wastes) and non-residential (commercial and institutional wastes) sectors are unavailable. Therefore, the WGIs set for target municipalities represent the sum of WGIs by these sectors, and often exceed the recommended household WGI values for urban and rural areas.

2 Municipal Solid Waste Management

2.1 Laws and Regulations

In Georgia, SWM—and, in particular, MSWM—issues are governed by:

- The Law of Georgia – Environmental Assessment Code
- The Organic Law of Georgia – Self-Governance Code
- The Law of Georgia – Waste Management Code (WMC)
- The Law of Georgia on Local Fees
- The Law of Georgia on Import, Export, and Transit of Waste
- National regulations supporting implementation of framework laws (see Table 8 below)
- Local regulations including resolutions of local councils on local tariffs, MSW collection and transportation, approval of five-year MWMPs, statutes of relevant structural departments, rules governing cleaning services, etc.

The WMC—developed with the support of EU Twinning Program and factoring key provisions of the EU Waste Framework Directive—defines waste as “any substance or object that the holder of waste discards, intends to discard or is obliged to discard” and, municipal waste as “household waste and other waste similar to household waste due to its characteristics and composition. Further classification of waste according to types and characteristics is laid down in GoG Resolution No. 426 of 2015 on Determining Lists and Classifying Waste according to Types and Characteristics. Below find the terms and definitions for MSW and major streams, based on Article 2 of the WMC.

Table 3. Key Terms and Definitions for MSW Based on the WMC

Terminology	Definition
Waste	Any substance or object that a holder of waste discards, intends to discard, or is obliged to discard
Municipal Waste	Household waste and waste having similar characteristics and composition
Household Waste	Waste generated by households
Hazardous Waste	Waste with one or more characteristics under Annex III of the WMC
Non-hazardous Waste	Waste that does not fall under the definition of hazardous waste
Inert Waste	Waste that does not under significant physical, chemical, or biological changes regardless of management method—i.e., does not dissolve, burn, or have any other chemical or physical reaction, biodegrade, or affect other material in a manner that causes environmental pollution or damage to human health
Biodegradable Waste	Waste that may undergo anaerobic or aerobic decomposition, including food/feed waste, garden/park waste, and paper and cardboard
Specific Waste	Product waste which, due to its characteristics and distribution, requires specific management and special care (packaging, oil, tires, means of transport, batteries, accumulators, electric and electronic equipment, etc.)

Annexes I and II of the Environmental Assessment Code of 2017 list all activity categories, including waste management activities, subject to EIA. More specifically, Annex I activities are subject to EIA without a scoping phase. Disposal, incineration, and/or chemical treatment of hazardous waste belong to this category. Annex II activities require EIA that depend on scoping results. Disposal of non-hazardous waste (via a sanitary landfill), recovery of waste, pretreatment of hazardous waste, and construction of temporary storage for hazardous waste (HW) greater than 10 t belong to this category.¹⁰

Article 16 of the Self-Governance Code assigns local self-governing bodies/municipalities (LSGs) their own powers, including i) the cleaning of public areas in the municipality's territory and ii) municipal waste management. LSGs perform municipal budgeting and expenditure reporting, disposal of budgetary funds, assets/property management and disposal, the imposition and abolition of local taxes and fees, the authority to set base rates within the limits described in relevant national legislation, and the collection of local fees.¹¹

The Waste Management Code (WMC) of 2015¹² establishes a general framework for implementing waste prevention, reuse, environmentally safe treatment, and disposal strategies. More specifically, the statute:

- Defines the waste management hierarchy as: prevention, reuse, recycling, recovery (including energy recovery), and disposal.
- Defines waste management as a process of collection, temporary storage, pre-treatment, transportation, recovery, and disposal of waste, the supervision of such activities, and the measures, operations, and aftercare of waste disposal facilities.
- Defines the roles and responsibilities of the competent authorities.
- Sets the requirements for waste management planning frameworks at the national, municipal, and individual levels, making paramount an overarching, 15-year national waste management strategy (NWMS) and associated five-year national waste management action plan (NWMAP), to be developed by MEPA together with other competent authorities and to be approved by the Government of Georgia. Moreover, the WMC requires the development and adoption of a National Biodegradable Waste Strategy (NBWS) designed to reduce organic waste at sanitary landfills. At the local level, the WMC obliges LSGs to develop five-year MWMPs—in line with the NWMS and the NWMAP and the general MWMP outline as set out in the WMC—to be submitted to MEPA for review and concurrence, and approved by local municipal council resolution. At the individual waste generator level, the WMC requires natural (physical) or legal (organization) persons producing more than 200 t of non-hazardous waste annually, more than 1,000 t of inert waste, or 120 kg or more of hazardous waste¹³ to prepare a company waste management plan that includes i) information about the waste generated

¹⁰ Source: Law of Georgia – Environmental Assessment. Legislative Herald of Georgia. Available at: <https://matsne.gov.ge/en/document/download/3691981/1/en/pdf>

¹¹ Source: Organic Law of Georgia – Self-Governance Code. Georgian Legislative Herald. Available at: <https://matsne.gov.ge/en/document/download/2244429/15/en/pdf>

¹² Source: Law of Georgia Waste Management Code, 2015. Georgian Legislative Herald. Available at: <https://matsne.gov.ge/ka/document/download/2676416/1/en/pdf>

¹³ Source: Initial requirement for the quantity of hazardous waste subject to company's planning and reporting, was any quantity of such waste. However, by latest amendment to the WMC, the limit for the quantity was set at 120 kg until 2025. After this date, company's generating any quantity of hazardous waste are required to develop and submit to MEPA a company's waste management plan.

(e.g., origin, types, composition, and quantity of waste as defined in the List of Waste); ii) information on measures for the prevention of waste generation and its recovery, especially hazardous waste; iii) the methods used to separate waste generated—particularly hazardous waste—from other waste; iv) the methods used and conditions for the temporary storage of waste, and v) the waste treatment methods applied and/or information on persons to whom waste is transferred for further treatment.

- Requires companies whose activities are subject to their waste management planning to i) submit such plans to MEPA for their concurrence; ii) make the plans available to the municipalities concerned and to other persons, upon request; iii) revise the plans every three years or when there are substantial changes in the types and quantities of waste generated, or in the processes used for waste treatment, and iv) nominate an environmental manager and notify MEPA immediately of such an appointment.
- Together with the Organic Law – Self-Governance Code, authorizes LSGs to manage municipal waste, excluding the management of municipal solid waste landfills. (The construction, operations, closure, and aftercare of municipal solid waste landfills and transfer stations are responsibilities of the Solid Waste Management Company of Georgia, the Tbiliservice Group, and the Achara Waste Management Company; however, the responsibility for construction and operations of a transfer station can be shifted to municipalities.)
- Obliges LSGs to introduce gradually and operate properly a source separation system for municipal waste.
- Obliges LSGs to clean up littered areas and eliminate dumpsites on their property when the polluter is unidentifiable.
- Obliges LSGs to manage inert waste separately from municipal waste. This includes the separate collection of construction waste, and the construction, operation, and maintenance of landfills for inert waste, subject to environmental assessment/EIA and environmental decision/former environmental impact permit (based on the Law on Environmental Assessment) except when inert waste is used for fill or landscaping purposes (beneficial uses).
- Obliges LSGs to establish a separate system for collecting and transporting hazardous household waste ending up in municipal waste streams.
- Obliges LSGs to keep a record of municipal waste (collection, transportation, treatment) and submit annually, and in an approved electronic format, a municipal waste report to MEPA.
- Authorizes LSGs—through designated LSG employees or natural and/or legal persons with authority delegated by LSG—to review/detect administrative offences and impose relevant administrative sanctions/penalties for the littering of municipal, construction, and other inert waste, the pollution of the environment or public spaces under LSG jurisdiction with animal waste, faeces, or sewage, the burning of non-hazardous waste, and the mixing of small amounts of hazardous waste with other waste and materials.
- Classifies landfills into i) non-hazardous municipal waste (sanitary) landfills, ii) inert waste landfills, and iii) hazardous waste landfills.
- Sets general requirements for the construction, operations, closure, and aftercare of landfills.
- Introduces Extended Producers’ Responsibility (EPR) for “producers” (including importers and larger retailers) of items which turn into the following specific wastes, including those that end up in municipal waste management streams: i) Packaging Waste (paper, cardboard, plastic, wood, metal, glass); ii) WEEE; iii) ELVs; iv) ELTs; v) Batteries and Accumulators, and vi) Used Oils. Producers of market-bound products or materials subject to EPR are responsible for the lifecycle management of their specific wastes. They may do so collectively by establishing and operating a non-profit “producers” association, a PRO, to manage specific waste streams subject to EPR. Although EPR is not a direct responsibility of LSGs, it is strongly linked to the separate collection of those aforementioned specific wastes that end up in municipal waste streams, particularly packaging waste.

Chapter V of the WMC is dedicated to hazardous waste (HW) management, including the HW generated by households and institutions and mixed with other streams of MSW due to current collection practices. Such management prohibits dumping HW outside specifically designed containers, burning HW without special incinerators, processing/treating HW in facilities lacking special permits, etc.; it requires physical persons/individuals to place HW they generate in special containers provided by municipal authorities where HW is collected separately, and mandates special registration of legal persons collecting and transporting HW, etc.

The Law of Georgia on Local Fees (1998)¹⁴ sets fees for municipal waste management and street cleaning, and obliges physical persons (households) and legal entities (commercial and non-commercial) generating municipal waste to pay such fees. Article 121 sets maximum fees of three GEL per person per month for households and 25 GEL per m³ for organizations (profit and non-profit) per month. The law caps the fee at 12 GEL per household, defined as a maximum four-family-member entity. LSGs can adjust their fee base rate according to waste weight, volume, generation index/rate, waste stream, number of personnel, customer incomes, number of employees and/or number of service/goods customer. Alternatively, LSGs may apply a combination of all the above criteria. The law also obliges LSGs to differentiate the fee base rate for individual persons/households based on their social status. However, the fee should not exceed the cost of municipal waste management and street cleaning (Revenue equals cost).

Specific aspects of SWM—including municipal solid waste management (MSWM)—are regulated by several GoG resolutions/ordinances and by orders of the Minister of Environmental Protection and Agriculture, listed in Table 4 below.

¹⁴ Source: Law of Georgia on Local Fees, 1998 available at:
<https://matsne.gov.ge/en/document/view/93778?publication=28>

Table 4. Regulations on SW—Including MSW and HW

#	Title	Description
1	GoG Resolution No. 426 of 2015 on Determining List and Classifying Waste according to Types and Characteristics	Classifies waste. It consists of nine articles: (1) Purpose; (2) Scope of application; (3) Definition of terms; (4) Obligations of the originator of waste; (5) Classification of waste; (6) Classification as hazardous waste; (7) Preparation of primary inventory document of waste; (8) Classification as non-hazardous waste, and (9) Transitional provision. The regulation includes Annex I on the List of Waste Groups, Annex II on the List of Waste, and Annex III on Conducting Primary Inventory of Waste.
2	GoG Resolution No. 421, effective 11 August 2015, Technical Regulation on the Construction, Operation, Closure, and Aftercare of Landfills	Sets acceptance and construction criteria and limit values for all types of landfills, including those for inert waste. LSGs are obliged to manage construction and demolition waste, including construction, operation and maintenance, closure, and aftercare of inert waste landfills in strict accordance with the technical regulation.
3	GoG Resolution No. 159, effective 29 April 2016, Technical Regulation on Collection and Processing of Municipal Wastes	Contains the criteria and guidelines for setting up and operating MSW collection systems, including criteria and recommendations on the type of collection, containers, vehicles, typical (average) generation index, and typical (average) waste density for Georgia.
4	GoG Resolution No. 144, effective 29 March 2016, Rules and Conditions for Registration of Waste Collection, Transportation, Temporary Storage and Pre-Processing	Obliges all for-profit and non-profit organizations—including LSGs—generating certain amounts of non-hazardous and hazardous wastes to register through MEPA’s on-line registry for collection, temporary storage (for over 50 t of non-hazardous municipal waste and 10-50 tons of hazardous waste), and pre-processing of waste. The Registration Form requires data on the company/operator, amounts of waste stored, parameters of storage facilities, pre-processing methods, etc.
5	GoG Resolution No. 145, effective 29 March 2016, Technical Regulation on Special Requirements for Collection and Treatment of Hazardous Waste	Establishes special requirements for the collection, treatment, tracking, packaging, labeling, and temporary storing of HW, as well as the requirements for persistent organic pollutants, used oils (EPR stream), asbestos, etc. The regulation does not cover municipal waste containing fractions of HW.
6	GoG Resolution No. 143, effective 29 March 2016, Technical Regulation on the Rules of Waste Transportation	Defines the rules for waste transfer/transportation. This regulation applies to LSGs, organizations opting for individual waste collection schemes, and waste transportation operators serving LSGs.
7	GoG Resolution No. 422, effective 11 August 2015, Technical Regulation on Waste Registration and Reporting Content and Format, and consequent Decree No. 2-11 of the Minister of Environmental Protection and Agriculture, effective 09 January 2018, on the Rule for Filling in Waste Inventory/Registration-Reporting Electronic Form	Requires the registration and annual inventory reporting by large, waste-generating companies and waste collection and transportation operators; defines the format and content of annual waste reports, and requires the submission of: Form 1 – Annual report on waste quantities: information on the company; waste classification; the amount of generated waste in tons, the amount of waste stored in tons, and the amount of waste transferred for treatment in tons; Form 2 – Annual report on waste treatment: information on the physical/legal person, the waste treatment facility (e.g., location, capacity, treatment/processing technological process, and disposal operations), and the amounts of waste received, pre-processed, and generated after pre-processing/processing. Form 3 – Annual report on waste disposal: Information on the landfill operator, the landfill (location, type, and capacity), the amount of waste received/accepted, etc. LSGs must submit only Forms 1 and 2 (in cases of pre-treatment/treatment of waste)
8	Technical Guideline for Municipal Waste Management Planning	Provides recommendations on the planning cycle, and stakeholder engagement, including data needs and templates.

9	GoG Resolution No. 324, effective 25 May 2020, Technical Regulation on the Management of Used Batteries and Accumulators	Sets EPR requirements for producers (including importers) on the management of used batteries and accumulators, and establishes 2022-2031 annual separate collection and recycling targets.
10	GoG Resolution No. 325, effective 25 May 2020, Technical Regulation on the Management of End-of-life Tires (ELTs)	Sets EPR requirements for producers (including importers) on the management of ELTs, and establishes 2020-2032 annual recycling and recovery targets.
11	GoG Resolution No. 326, effective 25 May 2020, Technical Regulation on the Management of Waste Electronic and Electric Equipment (WEEE)	Sets EPR requirements for producers (including importers) on WEEE management, and establishes 2022-2031 annual separate collection, reuse, recycling and recovery targets.
12	GoG Resolution No. 327, effective 25 May 2020, Technical Regulation on the Management of Used Oils	Sets EPR requirements for producers (including importers) on the management of used oils, and establishes 2022-2031 annual recovery and regeneration targets.
13	MEPA Order No. 2-772 – Rules for the Electronic EPR Registry on ELTs	Defines the rules for registering ELT products, their producers, and PROs through the ELT EPR registry.
14	MEPA Order No. 2-773, Rules for the Electronic EPR Registry on Used Oils	Defines the rules for registering products, their producers, and PROs through the EPR registry on used oils.
15	MEPA Order No. 2-774, Rules for the Electronic EPR Registry on WEEE	Defines the rules for registering WEEE products, their producers, and PROs through the EPR registry for WEEE.
16	MEPA Order No. 2-775, Rules for the Electronic EPR Registry on Batteries and Accumulators	Defines the rules for registering batteries and accumulators, their producers, and PROs through the EPR registry for WEEE.
17	GoG Resolution No. 472, effective 14 September 2018, Technical Regulation – Rule of Regulation on Single Use Plastic Bags and Biodegradable Plastic Bags	Bans single-use plastic bags and requires multiple-use, biodegradable/compostable bags. Regulates phased production, import, and trade for bringing permitted bags to market. Biodegradable/compostable bags should conform to the EN 13432:2000 standard and should be labeled properly. The National Environmental Lab of the Environmental Pollution and Monitoring Department of the National Environmental Agency (NEA) is preparing to meet the EN standard. Imported bags are checked based on certificate of origin (certificates from Italian and Austrian certifying bodies). Locally produced bags must comply with the regulation. MEPA's Environmental Supervision Department is responsible for certification and compliance checks. Control over products introduced to market falls to local municipalities. The Waste Code and other related regulations are only partially enforced. The capacity of national laboratories to check this properly is limited, and must be strengthened. Violation of the Regulation earns a 500 GEL penalty and the relevant product is confiscated.
18	GoG Resolution No. 346, effective 26 July 2019, Amendments to the Technical Regulation Rule of Regulation on Single Use Plastic Bags and Biodegradable Plastic Bags	Specifies exemptions from requirements of Regulation No. 472, including: A) Plastic bags intended to package goods and/or products, when the bag is used to place, store, transport, deliver, and remove raw materials or processed products in the supply chain from the manufacturer to the consumer. B) For the purpose of producing plastic bags, oxy-degradable plastic bags, and oxy-biodegradable plastic bags for export (except for the requirements provided for in Article 41 of this Technical Regulation). C) Plastic bags not less than 50 microns thick and not less than 45 x 70 cm in size. D) On the import and sale of plastic bags intended for goods sold in the free trade points defined by GoG legislation.

A recent breakthrough at the system level in Georgia is the introduction of EPR bylaws for four specific waste streams. The approved regulations cover used batteries and accumulators, used oils, ELTs, and WEEE. The draft EPR Regulation on ELVs has been finalized and the necessary legislative procedures have been carried out for GoG approval. EPR regulations include collection, recovery, and recycling targets for respective waste streams from 2023 through 2032. The approved targets for the EPR waste streams, are outlined in the tables below.

Table 5. Separate Collection Minimum Targets on Marketed WEEE¹⁵

Waste Category	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Temperature exchange equipment	20%	25%	30%	45%	50%	53%	55%	57%	58%	60%
Screens, monitors, equipment containing screens with a surface > 100 cm ²	5%	6%	7%	8%	9%	10%	12%	15%	18%	20%
Lamps	20%	25%	30%	35%	40%	45%	50%	60%	70%	80%
Large equipment with external dimensions > 50 cm	25%	30%	40%	55%	65%	70%	75%	80%	82%	85%
Small equipment with external dimensions < 50 cm	5%	6%	7%	8%	9%	10%	12%	15%	18%	20%
Small IT and telecommunication equipment with external dimensions < 50 cm	5%	6%	7%	8%	9%	10%	12%	15%	18%	19%

Table 6. Preparation for Reuse, Recovery, and Recycling Minimum Targets for Collected WEEE¹⁶

Waste Category	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Temperature exchange equipment										
Recovery	51%	56%	61%	66%	72%	76%	80%	83%	85%	87%
Reuse and recycling	50%	55%	60%	65%	70%	72%	74%	76%	78%	80%
Screens, monitors, equipment containing screens with a surface > 100 cm ²										
Recovery	12%	20%	25%	30%	35%	45%	55%	65%	75%	80%
Reuse and recycling	10%	15%	20%	25%	30%	40%	50%	60%	65%	70%

¹⁵ Source: Government Resolution # 326 on the Approval of Technical Regulation on the Management of Waste Electronic and Electric Equipment (WEEE), 25-05-2020. Available in Georgian language at: <https://matsne.gov.ge/en/document/view/4877952?publication=0>

¹⁶ Source: Government Resolution # 326 on the Approval of Technical Regulation on the Management of Waste Electronic and Electric Equipment (WEEE), 25-05-2020. Available in Georgian language at: <https://matsne.gov.ge/en/document/view/4877952?publication=0>

Waste Category	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Lamps										
Recovery	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Reuse and recycling	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Large equipment with external dimensions > 50 cm										
Recovery	58%	62%	67%	72%	75%	78%	80%	82%	84%	85%
Reuse and recycling	55%	60%	65%	70%	72%	74%	76%	78%	79%	80%
Small equipment with external dimensions < 50 cm										
Recovery	15%	20%	25%	30%	35%	40%	45%	55%	65%	75%
Reuse and recycling	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%
Small IT and telecommunication equipment with external dimensions < 50 cm										
Recovery	15%	20%	25%	30%	35%	40%	45%	55%	65%	75%
Reuse and recycling	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%

Table 7. Collection Targets for Batteries and Accumulators¹⁷

Waste Category	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Portable batteries and accumulators (brought to market)	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Automotive accumulators (generated waste)	80%	90%	95%	95%	95%	95%	98%	98%	98%	99%
Industrial batteries and accumulators (generated waste)	80%	90%	95%	95%	95%	95%	98%	98%	98%	99%

Table 8. Recycling Targets for Batteries and Accumulators¹⁸

Waste Category	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Lead-acid batteries and accumulators	50%	65%	65%	65%	65%	65%	65%	65%	65%	65%

¹⁷ Source: Government Resolution # 324 on the Approval of Technical Regulation on the Management of Waste Batteries and Accumulators, 25-05-2020. Available in Georgian language at: <https://matsne.gov.ge/en/document/view/4877915?publication=0>

¹⁸ Source: Government Resolution # 324 on the Approval of Technical Regulation on the Management of Waste Batteries and Accumulators, 25-05-2020. Available in Georgian language at: <https://matsne.gov.ge/en/document/view/4877915?publication=0>

Waste Category	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Nickel-cadmium batteries and accumulators	60%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Other batteries and accumulators	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%

Table 9. Recovery and Regeneration Targets for Used Oils¹⁹

Category	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Recovery	15%	18%	23%	25%	30%	35%	40%	45%	50%	50%
Energy recovery	7%	9%	10%	12%	15%	17%	20%	23%	25%	25%
Regeneration	8%	9%	10%	13%	15%	18%	20%	22%	25%	25%

Table 10. Recovery and Recycling Targets for Marketed Tires²⁰

Category	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Recovery	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Energy recovery	10%	12%	15%	18%	20%	23%	25%	27%	30%	32%
Regeneration	10%	13%	15%	17%	20%	22%	25%	28%	30%	33%

Targets for packaging waste—paper, plastic, metal, and glass packaging which collectively represent a significant share of MSW—are the subject of ongoing consultations with key stakeholders and, in particular, with local municipalities. Draft packaging regulation suggests two types of recycling mechanisms: i) recycling using a deposit-refund system (DRS) for plastic bottles and metal cans, and ii) recycling targets without DRS for all packaging except beverage bottles. Below are the recycling targets for packaging waste outlined in the draft regulation.

Table 11. Total Recycling Targets for Marketed Packaging Waste²¹

Packaging Material	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
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¹⁹ Source: Government Resolution # 327 on the Approval of Technical Regulation on the Management of Used Oils, 25-05-2020 Available in Georgian language at: <https://matsne.gov.ge/en/document/view/4877971?publication=0>

²⁰ Source: Government Resolution #325 on the Approval of Technical Regulation on the Management of Waste Tires (ELTs), 25-05-2020. Available in Georgian language at: <https://matsne.gov.ge/en/document/view/4877932?publication=0>

²¹ Recycling targets for packaging, subject to EPR will be enacted starting from 2023.

Recycling Rates	16%	26%	36%	45%	55%	55%	57%	59%	60%	65%
Paper	25%	34%	43%	51%	60%	63%	66%	69%	72%	75%
Plastic	37%	39%	41%	44%	46%	47%	49%	50%	50%	51%
Glass	10%	23%	35%	48%	60%	62%	64%	66%	68%	70%
Metal	16%	24%	32%	41%	49%	54%	59%	63%	66%	70%
Wood	5%	8%	10%	13%	15%	17%	19%	21%	23%	25%

Table 12. DRS Targets for Marketed Beverage Packaging

Beverage Packaging	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Recycling Rates	70%	73%	77%	80%	83%	87%	90%	91%	92%	93%
Plastic (Bottle)	70%	73%	77%	80%	83%	87%	90%	91%	92%	93%
Metal (cans)	70%	73%	77%	80%	83%	87%	90%	91%	92%	93%

Table 13. Recycling Targets for Marketed Packaging Materials, Excluding DRS

Packaging Material	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Recycling Rates	11%	21%	31%	41%	52%	53%	55%	57%	59%	61%
Paper	25%	37%	43%	51%	60%	63%	66%	69%	72%	75%
Plastic	5%	6%	8%	9%	10%	10%	10%	10%	10%	10.00%
Glass	10%	23%	35%	48%	60%	62%	64%	66%	68%	70%
Metal	5%	14%	23%	31%	40%	42%	44%	46%	48%	50%
Wood	5%	8%	10%	13%	15%	17%	19%	21%	23%	25%

Close cooperation between local authorities and PROs is key to successful implementation of EPR schemes, especially for packaging waste. Municipalities and PROs can together decide on the most appropriate separate collection system, taking into account local particularities while complying with the national requirements. The separate collection system determines the selection and operation of collection points, collection procedures and infrastructure, the transportation of collected waste to licensed waste management facilities, and its regular analytical reporting to end-users and the public. The costs of the separate collection of specific streams are incurred by the PROs and shall be specified in their agreements with municipalities. Municipalities are obliged to include in their MWMPs information on the separate collection schemes and the measures to be taken in cooperation with PROs in order to manage the specific waste streams, subject to EPR regulations.

In addition to national-level statutory documents, each municipality has waste management regulations adopted by its municipal council (Sakrebulo). These include:

- Statutes/charters of local cleaning/amenity services.
- Technical regulations on setting and implementing municipal waste collection, street cleaning fees, and the rules of municipal waste management.
- Local resolutions on the approval of five-year municipal waste management plans.

2.2 National Policies

The NWMS for 2016-2030 is a major policy document that sets SWM objectives and targets, including for MSWM. An associated NWMAP defines measurable indicators and actions for 2016-2020 around priority strategic objectives. The table below outlines SWM sector strategic objectives, indicators, and key targets as set out in NWMS and NWMAP.

Table 14. Regulations Governing Key Aspects of the Management of Municipal and Specific Wastes²²

Strategic Objective	Indicator	Target
Objective 1. Develop waste management legislation in compliance with EU and other international conventions	Reduction of illegal waste dumping	Reduction of illegal waste dumping by 2025
Objective 2. Establish waste management planning systems at national and local levels	Number of adopted MWMPs	Municipal Waste management plans developed by all LSGs by 2017
Objective 3. Design and implement an effective waste collection and transportation system	MSW collection/service coverage rate (%)	Collection of MSW: 90% by 2020, 100% by 2025 and 2030 Absence of illegal dumpsites
	Presence of illegal dumpsites	HW collection and transportation targets: 50% by 2020, 75% by 2025, 100% by 2030
Objective 4. Dispose of waste in a manner safe for human health and the environment	Number of illegal dumpsites closed and remediated	Elimination/remediation of illegal dumpsites by 2020
	Reduction rate (%) of biodegradable waste disposal on landfills	Reduction of municipal biodegradable waste disposed on landfills by 2025
Objective 5. Waste Prevention, reuse, recycling, and recovery	Presence of a source separation system for paper, glass, metal, and plastic waste by 2025	Establishment of a source separation system for paper, glass, metal, and plastic waste
	Separate collection/recycling rate (%)	Paper – 30% by 2020, 50% by 2025, 80% by 2030 Glass – 20% by 2020, 50% by 2025, 80% by 2030 Metal – 70% by 2020, 80% by 2025, 90% by 2030 Plastic – 30% by 2020, 50% by 2025, 80% by 2030

²² Source: Baseline Study for 39 Municipalities, UNDP/PMCG Project: Performance Management System for Street Cleaning and Waste Management Services in 23 Municipalities of Georgia, May 2020.

	Amount of waste used for energy recovery	By 2025 recovery of all waste not reused or recycled
	Number of waste recycling and recovery facilities	Construction of waste recovery and recycling facilities by 2025
Objective 6. Recover full costs using a “polluter pays” approach	Reduction rate (%) in government subsidies	Establishment and gradual implementation of a full-cost-recovery system for residents
		Establishment and gradual implementation of a full-cost-recovery system for companies
Objective 7. Promote and implement Extended Producer Responsibility	Recycling rate (%) for individual specific waste streams	Achievement of 2020-2025-2030 minimum percentage EPR/ recycling rate for: Batteries – 20%, 50%, 80% Oils – 50%, 75%, 90% Packaging materials – 40%, 75%, 90% WEEE – 20%, 50%, 80% ELTs – 50%, 70%, 90% Accumulators – 60%, 80%, 90% ELVs – 20%, 50%, 80%
Objective 8. Establish and implement a waste data management and information system	Presence of a functional waste IMS	Establishment of a waste data and information management system by 2016
	Functional IMS system and renewable database	The design and introduction of a publicly accessible waste Information Management System (IMS) by 2020
Objective 9. Develop the capacities of central and local governments and of private companies, and raise public awareness	Presence of qualified staff and fiscal remedies for MSWM	Development of LSG capacities
	Number of awareness campaigns carried out	Public awareness-raising about waste management

With technical assistance from a local nongovernmental organization, Caucasus Regional Environmental Centre (RECC), and financial assistance from the EU, MEPA is currently reviewing and updating the NWMAP to cover the period 2020 through 2025. Among other things, the document will include sub-plans for biowaste and HW management based on KPIs, percent targets, and actions suggested under the draft national biowaste strategy and the HWM action plan. These two documents were developed in 2019 under the completed EU project: Technical Assistance for the Improvement of Waste Management Systems in Georgia.

SWMCG has developed a separate corporate strategy with a longer-term vision and immediate objectives. This strategy calls for the construction and commissioning of new, EU-compliant, regional landfills with associated transfer stations, the improvement of existing landfills, and the closure and remediation of existing landfills posing high health and environmental risks.

2.3 Institutional Setting

2.3.1 Government Institutions

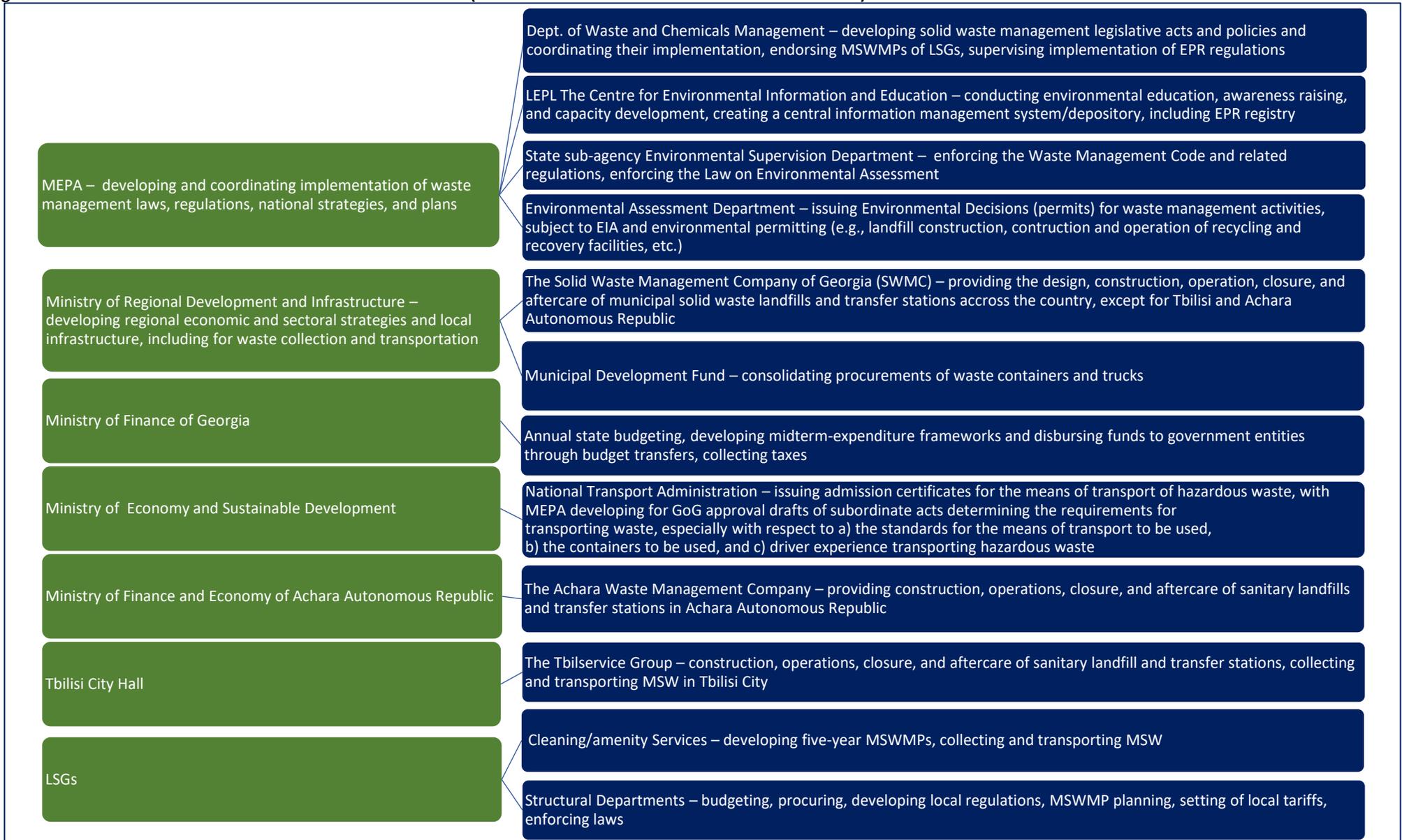
In the SWM sector—and particularly MSWM—line ministries play roles under MEPA leadership in developing national legislation and policies, budgeting, coordinating policy implementation, law enforcement, waste accounting and reporting and, database management. Responsibilities for managing non-hazardous SWM landfills and transfer stations are divided between state-owned SWM companies established under MRDI, the Ministry of Finance and Economy of Achara Autonomous Republic, and Tbilisi City Hall. These entities manage landfills in the regions of Georgia, in A.R.R., and in Tbilisi City respectively. Through their structural departments (e.g., economic, architecture and spatial planning, supervision, etc.) LSGs plan and coordinate implementation of MWMPs, and develop local regulations—for Sakrebulo (elected local council) approval—on cleaning tariffs, budgeting, procurements, collection of fees and, control and supervision. Municipalities' cleaning/amenity services—with legal status as “non-entrepreneurship (noncommercial) non-profit legal persons” or, rarely, as limited liability companies—carry out MSW collection, transportation, disposal, and street cleaning within the administrative boundaries of their respective municipalities. They are also responsible for establishing separate collection systems and meeting recycling targets for four major MSW streams (paper/cardboard, plastic, metal, and glass) and for municipal hazardous waste, in line with the NWMS. Moreover, through their cleaning/amenity services local authorities are responsible for dumpsite cleanup and remediation, as well as for establishing collection and disposal systems for C&D. In Achara, the LLC Sandasuptaveba (Cleaning Service) under Batumi City Hall not only collects and transports MSW generated in Batumi City, it collects and transports a major portion of MSW from all other Achara municipalities except Kobuleti and Keda.²³ Many municipalities have only one joint office for all amenity/communal services and nest the cleaning department/division within it, as is the case with the TbilService Group, the Rustavi Amenity Service, etc. Some operate cleaning services separately from other amenity/communal services. It is noteworthy that the larger, more urban municipalities with expansive green space (e.g., gardens, parks, boulevards, etc.) have separate services for greening public spaces and maintaining green areas. Park and garden waste from tree trimming, pruning, grass cutting, etc. are collected by them and disposed of in landfills. Bulky wood material generated by branch cutting is usually used as fuel wood and distributed among socially vulnerable families.

Law enforcement functions are shared by the: i) Environmental Supervision Department and its regional inspectorates under MEPA, ii) Patrol Police under the Ministry of Internal Affairs and iii) LSGs. The first is responsible for compliance assurance monitoring and control of the management of companies' wastes (mostly, compliance of companies with environmental permit conditions), the

²³ A separate management system for medical waste exists in the country and permits/licences for medical activities are issued and controlled by the Ministry of Ministry of Labor, Health and Social Defense of Georgia through its Legal Entity of Public Law (LEPL) Agency for the State Control of Medical Activities. Transportation means for hazardous waste including medical waste must be registered and certified through a special registry within the Transport Administration of the Ministry of Economy and Sustainable Development. Operators of HW treatment facilities, including medical waste, operate their facilities only if they hold Environmental Permits issued and controlled by MEPA.

second – for detecting and carrying out administrative proceedings related to waste dumping and littering on the roads and from transportation means and the third - for detecting and carrying out administrative proceedings against illicit actions by citizens and companies in the area of MSWM.

Figure 8. Flowchart of the Institutional Framework for MSWM (Source: Statutes of National and Local Authorities)



2.3.2 Non-public Sector

Non-governmental Organizations (NGOs). Georgia has several NGOs focusing on SWM at the national level, some of which have strong, grassroots networks across the country. These organizations are widely engaged in advocacy and public awareness activities and, to a lesser extent, in policy development and implementation. They also serve as thinktanks and provide analyses for many SWM topics, in particular MSWM.

One of the most active national NGOs with strong grassroots is the Caucasus Environmental Network (CENN) which—with assistance from USAID Caucasus and International City/County Management Association (ICMA) has supported central and local authorities in the Kakheti, Achara Autonomous Republic (A.A.R.), Shida Kartli, and Tbilisi City Hall to develop guidelines and other analytical tools as well as MSWM planning and implementation capacities at the organizational and staff levels. Currently, with financial assistance from the Government of Norway, CENN is developing a plastic waste program. The organization is a pioneer in extracurricular, environmental education of youth, focusing on schoolchildren and their teachers. Among the most effective, informal education mechanisms the CENN has promoted and supported are environmental clubs (so-called ecoclubs)—informal associations of teachers and students in secondary schools.

Greens Movement of Georgia helps build local authorities' knowledge, skills, and capacities and provides them policy and technical advice in MSWM planning and implementation. At the national level it organizes public events and campaigns in cooperation with MEPA and other stakeholders around such issues as MSWM planning and implementation, dumpsite cleanup and remediation, waste prevention and recycling, and EPR.

In close partnership with MEPA and with EU financial assistance, RECC is helping to update the NWMAP as well as implements the stakeholder engagement component of the Tbilisi Solid Waste Management Project aiming to improve the leachate collection and treatment system at Tbilisi sanitary landfill and transportation equipment for Tbilisi City. Moreover, as a sub-contractor of COWI, an international consulting group, based in Denmark it is engaged in developing regional landfills and effective MSWM systems in regions of Georgia.

Georgia's Environmental Outlook (GEO), a national environmental NGO, has for years partnered with various EU companies and research institutions to support development and implementation of EPR principles, focusing on WEEE. Its activities include conducting an e-waste inventory, developing WEEE-related EPR regulations and EPR guidelines, assessing financial feasibility for recycling e-waste, raising EPR awareness among the general public and businesses, and helping producers establish e-waste PROs. The organization is also involved in stakeholder engagement components of regional landfill projects supported by international financial organizations.

Some local environmental NGOs—including RECC, GEO, and World Experience Georgia (WEG)—are actively promoting the environmental and social safeguards of ongoing landfill projects by participating in the Environmental and Social Impact Assessments (ESIAs) of these initiatives.

Few NGOs and Community-Based Organizations (CBOs)/Community Incentive Groups are addressing MSWM issues at the local level. The only activities frequently supported by local NGOs and CBOs are awareness campaigns and one-time cleanup actions.

Private sector. Under existing legislation, private companies develop their waste management plans, implement them, and report annually to MEPA on the quantities, types, and handling activities if they generate quantities of non-hazardous, inert, or hazardous waste specified in the WMC. Numerous companies have registered in MEPA's special electronic registry and submitted their plans and annual reports.

Companies must conduct EIAs and acquire environmental permits ("environmental decisions" under current environmental assessment legislation) to treat waste (including waste recycling and energy

recovery). At present, a number of recycling industries hold environmental permits for the treatment and recycling of dry recyclables and specific wastes, including HW. Chapter 5.3 gives an overview of existing recycling capacities and facilities.

As discussed above, under Georgia's EPR system producers—including importers of packaging, EEE, oils, batteries and accumulators, passenger cars, and tires—establish and register PROs as non-profit associations. Key beverage and food industries producing and/or importing packaging materials and products—including Coca Cola, Nabeglavi (a mineral water company), Nikora, Barambo (The Georgian Confectionary Company), Nataktari (a beverage company), McDonald's, etc.—have established Georgia+, a PRO that participates in stakeholder consultations related to packaging EPR regulations, conducts lobbying and advocacy campaigns, and studies the waste composition in different regions of the country.

The environmental consulting market is quite thin in Georgia, especially with respect to SWM. Frequently, well-established environmental NGOs such as those mentioned above act as “private companies” to perform consultancies—from baseline studies to design and implementation of SWM systems and infrastructure. The only local company to expand its scope and presence significantly in the SWM sector is the Policy Management and Consulting Group (PMCG). As a local partner to international companies, it is actively involved in accompanying measures of the Integrated Solid Waste Management Projects for the Kakheti, Samegrelo-Zemo, Svaneti, and Kvemo Kartli regions, supported by KfW and EBRD. Moreover, the PMCG currently provides a TA to MRDI and local municipalities in six regions of Georgia for establishing electronic Performance Management Systems for MSWM and street cleaning.

Some local engineering, GIS, and construction companies are working on feasibility, conceptual, and detailed technical design phases of integrated solid waste management projects, aiming at constructing or rehabilitating sanitary landfills and establishing integrated solid waste management systems in Georgia's regions and Tbilisi City.

2.3.3 Government and Donor Initiatives

In general, the GoG lacks standalone SWM sectoral programs financed purely through public funding—except for routine MSW collection, transportation, and disposal, including existing landfill management and street cleaning costs in the form of both Capital Expenditures (CAPEX) and Operational Expenditures (OPEX). Capital costs for MSWM—including investments in the operations, closure, and aftercare of existing landfills—are frequently cost-shared through the loans and grants from key IFIs, including EBRD and KfW. In the vast majority of SWM-related projects, the GoG participates as a major counterpart and a primary recipient of funds (grants, loans, or mixtures thereof) and TA support from bi- and multi-lateral finance institutions and development agencies. Sometimes it co-finances certain SWM activities with assistance from donor organizations. EU, EBRD, KfW, Sida, USAID, and UNDP are key bi- and multi-lateral development agencies and financial institutions providing financial assistance to SWM and, in particular, to MSWM. EBRD and KfW are key donors financing construction of regional landfills across the country. More specifically, EBRD is supporting the construction of a new, regional sanitary landfill and purchase of its equipment as well as introducing or upgrading transportation equipment in Achara, Kvemo Kartli, and Central Georgia (Shida Kartli, Samtskhe-Javakheti, Mtskheta-Mtianeti); KfW is providing similar help to the regions of Imereti (including Racha-Lechkhumi and Kvemo Svaneti), Kakheti, and Samegrelo-Zemo Svaneti. In Tbilisi, EBRD is financing the creation of a leachate collection and treatment system, and upgrading landfill operations, transportation equipment, and facilities. All of the above activities are accompanied by technical assistance funded through grant mechanisms. A forthcoming EBRD loan to GoG is anticipated to set-up a HWM system, including a HWM facility.

Below is a list of completed and ongoing donor MSWM initiatives.

Table 14. Key SWM Initiatives in Georgia⁷

#	Title	Donor/Donor Projects	Implementing Partner	MSMW-related Activities	Duration and Status	Geographic Scope
1	Performance Management System for Street Cleaning and Waste Management Services in 23 Municipalities (PMS project)	UNDP – FRLD & DGG	The PMCG	Developing a Performance Management System (PMS) and e-tool for municipal solid waste management and street cleaning services; piloting PMS in eight municipalities, replication in 15 additional municipalities, and promotion in 16 extra municipalities	November 2019 - October 2021; ongoing	39 municipalities, Mtskheta -Mtianeti, Kvemo Kartli, Samegrelo-Zemo Svaneti, Imereti, Guria, Racha-Lechkhumi, and Kvemo Svaneti
2	Waste Management Technologies in Regions, Phase II (WMTR II)	USAID	CENN, NGO	Implementing an integrated waste management system; private sector-led recycling Illegal dumping penalties and tariff policy; public outreach	March 2017- March 2020; completed	Kakheti and Shida Kartli Regions, Achara Autonomous Republic, and Tbilisi
3	Technical Assistance for Improving Waste Management Systems	EUD	Enviroplan, S.A., Greece in cooperation with ICP, ICP Ingenieurgesellschaft Prof. Czurda und Partner GmbH, and C&E Consulting und Engineering GmbH	Supporting LSG municipal waste management planning and implementation through training and study tours, planning support tools; assisting in setting pilot separate collection and recycling schemes (composting green waste in Marneuli); developing a biowaste strategy; developing EPR regulations	October 2017 - April 2019; completed	Kvemo Kartli, Mtskheta-Mtianeti, Samtskhe-Javakheti, Samegrelo Zemo Svaneti
4.	Support to Reforming the Waste Management Sector	EU	NIRAS, Denmark	Piloting municipal waste management options for the high mountain areas; analyzing national waste management strategies and action plans from the viewpoint of circular economy; pilot study to reduce landfill waste volume; harmonizing background studies for all relevant waste streams; training trainers in municipal and hazardous waste management, implementing the Extended Producer Responsibility system	April 2019 - Fall 2020; completed	Mountainous Lentekhi, Adigeni, Mestia, Tusheti, Kazbegi; trainings for all municipalities
5.	Integrated Solid Waste Management System in Kutaisi	EU/kfW	Implementation measures re-tendered and winner recently selected;	The project provides training and consulting services to support and improve organizational and institutional capacities of SWMCG. Its main tasks and responsibilities are to support and improve the	2015 - 2024; ongoing	Imereti; Racha-Lechkhumi-Kvemo Svaneti

			PEM for accompanying measures (Consulting Services for Accompanying Measures Component - AMC)	<p>capacities of the Solid Waste Management Company of Georgia in the following fields:</p> <ul style="list-style-type: none"> – Organization and management – Financial management – Technical competences – Public relations, communication and public awareness activities. <p>The project also provides strong support to the municipalities in the project region (separate collection, composting, improvement of waste management system planning (financial, technical, logistical), intermunicipal cooperation). It also helps with organisation of several Southern Caucasus regional workshops and seminars on waste policy and waste management.</p>		
6.	Integrated Solid Waste Management Programme II, Kakheti and Samegrelo-Zemo Svaneti Regions	KfW	IC – CDM Smith AMC – Fichtner Germany/PMCG	Extending and improving street sweeping, waste collection, and waste transport; piloting projects in recycling and composting	November 2019 - November 2023; ongoing	Samegrelo-Zemo Svaneti and Kakheti regions
7.	Solid Waste Management in Kvemo Kartli	EBRD	IC – HPC AG/PMCG AMC – Seureca SA	Supporting street sweeping, waste collection, and waste transport; piloting projects in recycling and composting	ongoing	Kvemo Kartli
8.	Solid Waste Management in Central Georgia	EBRD	AMC – COWI/RECC	Construction support for street sweeping, waste collection, and waste transport; piloting projects in recycling and composting	2019 - 2024; ongoing	Mtskheta-Mtianeti, Shida Kartli, Samtskhe-Javakheti
9.	Achara Solid Waste Management Project	EBRD/Sida/ETC	Ministry of Finance and Economy of A.A.R. and LLC Achara Waste Management Company	Constructing sanitary landfill and associated facilities (e.g., sorting facilities); procuring landfill operations equipment and facilities; improving MSW transportation by establishing transfer station; procuring new transportation equipment	2010 - 2025; ongoing	Achara

10.	Supporting e-waste Management Capacity Development	UNDP/Sida	GEO	Finalizing the WEEE draft bylaw, supporting development of internal capacities of MEPA and facilitating establishment of the e-waste Producer Responsibility Organization (PRO); cataloguing informal WEEE stakeholders and strengthening their capacities; raising communication and awareness on the hazards of improper e-waste management	June 2019 - September 2020	Georgia
11.	Regional and Municipal Infrastructure Development project	WB/SDC	MRDI and Municipal Service Development Agency for establishing unified electronic services	Developing and implementing electronic/on-line municipal services, including cleaning municipal solid waste and cleaning services	2019 - 2021	21 municipalities in phase 1 and all municipalities in phase 2
12.	Networking for Efficiency and Development (N4ED) – a new modality for effective local self-governance	EUD	National Association of Local Authorities of Georgia (NALAG) in cooperation with the PMCG and the Latvian Association of Local and Regional Governments (LALRG)	Enhancing good governance and sustainable development by involving society, evaluating performance, and exchanging best practices between local authorities	2018 - 2021	Municipalities and local self-governing cities
13.	Keep Georgia Tidy	Sida	The Greens Movement of Georgia/ Friends of the Earth – Georgia, Keep Georgia Tidy, Georgian Society of Nature Explorers Orchis	Empowering CSOs and monitoring municipal waste management plans; establishing a public watchdog system, developing community skills, and participating in waste management; analyzing the waste management system and municipal waste management plans, and preparing recommendations; analyzing existing sanitation systems and developing examples of individual sanitation systems; registering illegal dumps and accounting of greenhouse gas emissions; consulting to local cleaning services; mapping circular economy activities	2019 - 2023	Kakheti, Imereti; all of Georgia
14.	Georgia Solid Waste Management Project	EBRD EUR 10 million loan/ EUR 2 million capital grant	MDF	Improving waste management practices and reducing health hazards of unsanitary waste handling by acquiring and assisting proper operation of solid waste collection vehicles and containers	2016 - 2020	Four regions of Georgia

15.	Georgia Solid Waste Management Project – Stakeholder Participation Programme, Environmental & Social Action Plan and Solid Waste Management Plans	EBRD EUR 450,000 technical assistance for project preparation and implementation	Particip GmbH, Germany in a partnership with Enviroplan SA, Greece and GEO, Georgia	Raising awareness of municipal waste management and supporting municipalities by developing and monitoring implementation of ESAPs and stakeholder awareness in target municipalities	2017 - January 2020	Four regions of Georgia
16.	Georgia: Hazardous Waste Management – Feasibility Study	EBRD	ACCIONA Ingeniería, S.A.U. in cooperation with RECC	TA for analyzing, planning, and preparing for construction of a national HWM Facility; proposals for managing the new facility Preparing a comprehensive feasibility study for the national HWM Facility; recommendations for completing the planning process (site selection, permits/documentation) Recommendations for successful preparation and contracting of HWM Facility contract(s)	July 2017 - April 2018	Nationwide
17.	Green Cities Initiative: Tbilisi Solid Waste Project	SSF EUR 14.85 million loan	The Tbilservice Group	Operating and maintaining vehicles and machinery (slice and package); upgrading existing waste transfer stations; upgrading the leachate treatment system at Tbilisi solid waste landfill	2019 - 2021 (36 months)	Tbilisi (Tbilisi landfill; transfer station; entire city)
18.	Green Cities Initiative: Tbilisi Solid Waste Project-Project Implementation Support (including engineering design services, supervising procurement and contract)	EBRD/Austria Municipal Fund EUR 388,000	The Tbilservice Group through consultancy with Geo Consulting (Latvia)	Assisting the TSG with preparing and evaluating all tenders, contract awards, and administration	2019 - 2021 (36 months)	Tbilisi
19.	Green Cities Initiative: Tbilisi Solid Waste Project – Tbilisi Municipal Solid Waste Strategy (technical cooperation)	EU's Municipal Project Support Facility (MPSF)	Tbilisi City Hall through consultancy with ICP, Germany in a partnership with Enviroplan S.A, Greece	Examining the status quo, researching existing waste disposal and recycling practices; evaluating the waste collection system, waste composition, recycling potential, and future projections; identifying gaps in the legislative and tariff systems; identifying needs for separate collection, developing an action plan for the prevention/reduction of waste generation; elaborating a strategy, new and optimal transportation schemes; developing a methodology for waste generation rates and tariffs	January 2020 - August 2020 (20 months)	Tbilisi
20.	Green Cities Initiative: Tbilisi Solid Waste Project – Stakeholder	SSF	The Tbilservice Group through	Designing and implementing a Stakeholder Engagement and Stakeholder Participation Programme (SPP) to raise awareness and	September 2020 -	Population around Tbilisi landfill and

	Engagement and Stakeholder Participation Programme (technical cooperation)		consultancy assignment with RECC	public participation in providing solid waste services; integrating poverty and social issues into the proposed tariff reforms	August 2022 (24 months)	transfer station; collection of household and commercial wastes
21	EU4Environment Action	EU	OECD, UNIDO, UNEP, UNECE, World Bank	Developing a draft action plan for waste management (national or municipal level) by RECC; conducting a biodegradable waste study.	2019 - 2022 ongoing	Armenia, Azerbaijan, Belarus, Georgia, Moldova, and Ukraine Georgia MSWM activities will be mostly in Tbilisi
22	Corporate Development and Regional Support Programs for the Achara Autonomous Republic and its Solid Waste Company	EBRD	Achara Waste Management Project/ through consortium of Tetra Tech, Integrated Skills and Tethys Consulting	Part I – Corporate development programme for the Solid Waste Management Company: Integrated Management System (IMS); computerized Management Information System; public service agreement; financial projections and tariff policy; public relations programme; medium-term corporate development plan; capacity building and training Part II – Regional support programme for A.A.R.: financial reporting; environmental monitoring; study tour for key stakeholders	2020 - 2021; ongoing	Achara

23.	Solid Waste Management Sector Assessment, Operational Roadmap, and Investment Program for Integrated Development in Georgia	World Bank South Caucasus Regional Office	World Bank	<p>Assessing the MSWM sector and developing an operational roadmap and investment program to address identified challenges for implementing the NWMS</p> <p>Assessing MSW generation and composition, and making generation projections across Georgia; determining MSW recycling and recovery potential; assessing the legal-regulatory policy and institutional frameworks for MSWM, and for financial arrangements for waste of animal origin and biodegradable waste (including non-kitchen biowaste); assessing MSWM, including financial practices and gaps; assessing management practices for waste of animal origin and biodegradable waste; assessing plastic waste flow paths and hotspots; assessing Georgia's contribution to marine littering; developing a roadmap and investment program to meet the needs in the SWM sector</p>	20/01 - 30/04/2021; ongoing	Nationwide
24	NPWPP – National Plastic Waste Prevention Program for Georgia	Norwegian Ministry of Foreign Affairs	CENN TA to (MEPA) in developing a National Plastic Waste Prevention Program for Georgia (NPWPP)	Developing the NPWPP via a multi-stakeholder participatory process to meet national legislation requirements and the EU-Georgia Association Agreement; capacity building and raising stakeholder awareness on the importance of plastic waste prevention	01/01 - 01/07/2021; ongoing	Nationwide

2.4 Legal-regulatory, Policy, and Institutional Gaps and Needs

2.4.1 Legal-regulatory and Policy Challenges and Gaps

Georgia faces several key MSWM challenges: i) to reduce MSW at landfills, ii) to make disposed waste safer for public health and the environment through treatment, iii) to curb or prevent illegal dumping and littering, iv) to achieve MSWM self-sufficiency through full cost-recovery, and v) to transition to a circular economy in order to turn waste into resources and products, maximize its value and the lifespan of waste materials and, minimize material consumption, paying particular attention to virgin materials, hazardous substances, and waste streams that raise specific concerns (e.g., plastics, food, electric, and electronic goods). Key to addressing such challenges is the cost-effective and efficient husbanding of administrative resources. Extended Producer's Responsibility (EPR) is a modern approach in EU countries that engages producers and importers in managing specific products—including packaging put on the market throughout a product's lifecycle—by organizing separate collection and recycling schemes for waste generated by the use of these products. When responsible businesses are obliged to spend their own financial and technical resources to establish and implement EPR schemes, they will seek the most efficient and cost-effective ways to do so, thereby relieving the MSWM administrative burden on state and public finances.

Worldwide, recyclable materials (dry fractions) generate 30-40 percent of total MSW, of which 50-90 percent is packaging waste—on average, 70 percent. In Georgia this stream currently ends up almost entirely in landfills and, to a lesser extent, at illegal dumpsites and marine waters off Georgia. Therefore, the adoption and implementation of a technical regulation establishing a EPR scheme for packaging waste is paramount for improving MSWM in Georgia. One of the greatest regulatory hurdles at present is the absence of a common understanding and agreement between producers and local municipalities—particularly large municipalities—regarding a packaging EPR scheme. This has significantly delayed the adoption of a draft packaging waste regulation, developed with EU assistance, that would conform to relevant EU directives and regulations and profit from the experience of EU countries. Producers of packaging waste prefer that the businesses themselves be fully responsible for achieving recycling targets, with the freedom to use the most technically and financially feasible ways to manage their packaging waste. This would allow them to procure separate collection and/or recycling services from any third party, including municipalities, depending on the costs of services. In addition, they want PROs to retain non-refundable deposit fees in order to further develop and expand EPR schemes geographically.

Meanwhile, local municipalities—especially the larger ones, which represent gross producers of packaging waste, are concerned that unmet recycling targets will add packaging waste to their landfills. They are unclear who will finance the collection and disposal costs of such waste under the terms of the draft regulation supported by producers. Furthermore, they believe businesses lack sufficient knowledge and the capacity to set up and implement EPR schemes outside centralized municipal collection schemes, particularly in large cities with complex transportation and waste collection systems. Therefore, these municipalities argue, PROs should be obliged to contract them for separate collection and recycling, and look for other solutions only when the municipalities refuse or fail to provide such services. When targets for both DRS and non-DRS schemes are not met, Tbilisi City Hall suggests money for the difference between the target and actual recycling rate should be payable by producers/PROs to municipalities through Georgia's central budget, based on a given municipality's share of total MSW generation. Non-refundable deposits are expected to also be distributed—through the central budget—among municipalities based on their respective shares of total MSW generated. The concern of large cities, particularly Tbilisi, over the technical challenges facing PROs wishing to organize separate collection and recycling schemes on their own, outside centralized waste collection systems, is legitimate. But this might not hold true for municipal services in regions—especially rural areas—that currently lack the capacity to deliver cleaning services to their entire population and

effectively collect fees from their customers, which renders them almost entirely dependent on government subsidies to provide such services. Furthermore, if PROs cannot choose the most cost-effective and technically feasible ways to reach EPR targets, they function simply as fund-collectors and EPR target monitors. Besides, it is administratively too complicated and costly for MEPA to enforce EPR implementation, since its mandate is to control all municipalities, whereas a given PRO would deal only with one or a few EPR organizations.

Regardless of how the EPR scheme is organized, it is vital that PROs, MEPA—in its regulatory and supervisory role, and service providers have a clear and common understanding of the quantitative values of recycling targets and the costs to be covered by the PROs. This will help all parties plan, monitor, and implement EPR schemes and set accurate fees for services. Therefore, a regulation creating a unified methodology for establishing appropriate, quantitative targets and a directive on calculating cost should precede implementation of any packaging EPR scheme. EU consultants have already developed—with help from the EU Waste Sector Reform Support project—a draft document describing optimal EPR target calculation, but its adoption is pending because the major bylaw on packaging waste mentioned above has not yet been enacted. Nevertheless, the EPR targets in the NWMS must be brought in line with the quantitative targets set out in new EPR regulations, including the draft regulation on packaging. Another issue which is not elaborated so far, is penalties for non-compliance to targets. Draft packaging regulation as well as adopted regulations on other specific streams do not include specific penalties for not meeting targets. Revisions should be made in the articles of WMC, related to law enforcement and specific provisions on penalties for non-compliance to EPR targets should be added there.

Apart from packaging waste recycling requirements to be implemented through EPR and DRS, the NWMS sets 2020, 2025, and 2030 national recycling targets for metal, paper/cardboard, plastic, and glass. However, neither the strategy nor the action plan describes how municipalities should quantify their respective shares of national targets. Moreover, the best and most feasible approaches available to attain recycling targets, including treatment options such as material recovery or energy recovery, are not addressed, despite the requirement in the WMC and Bylaw No. 421 of 2015—“Technical regulation on the construction, operation, closure and aftercare of landfills”—for waste treatment²⁴ before creating new landfills. In fact, the strategy does not specify whether municipality recycling targets include only separate collection/pre-treatment, or both separate collection and recycling; and it does not define whether “recycling” involves only material recovery, or energy recovery and export for recycling purposes as well.²⁵ Therefore, the strategy and action plan require clarification.

It is noteworthy that the quantitative values for both the recycling and the EPR packaging waste targets exceed comparable EU amounts. The 2018 revision of the Waste Framework Directive sets the total MSW recycling target at 55 percent by 2025, 60 percent by 2030, and 65 percent by 2035; whereas Georgia has set 50 percent for all dry recyclable streams except metals (80 percent) by 2025, and 80 percent for all streams except metals (90 percent) by 2030, far higher than the EU targets. The revised Packaging and Packaging Waste Directive introduces a new plastic packaging recycling target of 55 percent to be reached by 2030, while Georgia’s packaging recycling goals (assuming they enter into force from 2023) are set at 59 percent by 2030—four percent above the EU goal. Georgia may therefore wish to revise its recycling targets—especially those general recycling targets not subject to

²⁴ According to the WMC definition, “waste treatment” refers to recovery or disposal measures, including pre-treatment prior to recovery or disposal; “pre-treatment of waste” refers to operations prior to recovery or disposal, including pre-processing such as dismantling, sorting, crushing, compacting, pelletizing, drying, shredding, repackaging, separating or mixing etc.

²⁵ The WMC does not consider energy recovery as a part of recycling.

the EPR as described in the NWMS—to harmonize with the more realistic EU values. Perhaps a more flexible interpretation of “recycling targets” would encourage alternative paths to achieving them, including separate collection/pre-treatment, energy recovery, and even export for recycling purposes.

Given the status quo—with negligible material recovery, zero energy recovery, no MSW treatment, and insufficient local capacity to fulfill MSW collection and street cleaning needs—regional waste prevention and recycling strategies similar to those of the Tbilisi and Achara regions, which are developing such strategies with EBRD support, might be required. The strategies should look at both the waste collection and treatment sides of the equations and factor in the construction of regional landfills, supported by EBRD and KfW in Georgia’s regions.

Biodegradable waste with all its streams included (food, green waste, paper, wood and other biodegradable fractions) represents the largest fraction of MSW, exceeding 60 percent of total MSW quantity. Of this, 46 percent is organic waste, with some regions (such as Rustavi and Gardabani) exceeding 50 percent. Food waste from household kitchens and hospitality services constitutes the majority of organic waste. Biodegradable municipal waste (BMW) shortens sanitary landfill lifespans the most and has the greatest environmental impacts once disposed of, including greenhouse gas emissions and leachates. At present, Georgian waste management legislation and policy—unlike EU legislation—set no quantitative targets for either biodegradable diversion (reuse, recycling, composting, etc.) or landfilling, thereby ignoring opportunities to prompt treatment such as aerobic or anaerobic decomposition of this stream. Nor are there end-of-waste quality criteria for recyclable fractions of waste and biowaste to encourage proper treatment of these waste streams. Furthermore, existing laws, regulations, and policies do not foster food waste prevention through food donations to charitable organizations or reuse, high food safety and hygiene levels, or encourage “use by” or “best before” dates instead of expiration dates. (While Georgia allows all three options, producers consider “use by” and “best before” to be a bad marketing strategy). On the contrary, retail and hospitality services are dissuaded from donating food to charitable organizations or vulnerable populations because such transactions are subject to value added tax (VAT) and profit tax under current regulations. Recently, a Georgian food advocacy group composed of environmental and agriculture NGOs and the Georgian Retailers Association (GRA) proposed changes in the tax laws to exempt food donations by retailers and restaurants from VAT and profit tax if the cost of the donated food does not exceed one percent of the company’s annual turnover/income. This initiative has been discussed with representatives of the Agrarian and Environmental committees of the Parliament, who indicated high interest in pursuing it. Furthermore, business operators may be deterred from donating food due to the strict Sanitary and Phyto-sanitary (SPS) norms, set for food products that impose significant, food/feed safety costs and make donations far more expensive than disposal in landfills. Then, too, landfill operators have no commercial waste fee system to discourage the disposal of food and other waste that can be reused/recycled.

Meanwhile, present EU legislation focuses more on waste prevention than on its sustainable management, seeking to curb major, solid waste streams—including food waste—and raise product quality (including product’s durability, reusability, and recyclability). Georgia should move in this direction. The recently adopted EU Circular Economy Action Plan²⁶ supports the circular economy through the whole value chain—from production to consumption—by, inter alia, developing a common EU methodology to measure food waste, defining relevant indicators, and clarifying EU food

²⁶ Source: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A New Circular Economy Action Plan for a Cleaner and more Competitive Europe. Brussels, March 11, 2020. <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020DC0098&from=EN>

legislation. Under Directive 2018/851/EU (part of the Circular Economy Package), Member States shall adopt specific food waste prevention programs. The measures aim to reduce the generation of food waste—in primary production, processing, manufacturing, retail and other food distribution services, restaurants and food outlets, as well as in households—to contribute to the UN’s Sustainable Development Goal of halving the per capita global food waste at the retail and consumer levels and to cut food losses along production and supply chains by 2030. At present, intensive consultations on the definition of food waste and measures to encourage food waste prevention are ongoing. Many support expanding the definition of “food waste” to include both edible and nonedible parts, which can be recovered from the food chain or disposed of by composting, ploughing in/not harvesting crops, anaerobic digestion, bioenergy production, co-generation, incineration, disposal in sewers, landfills, or the sea. The objective is to manage the food supply chain as resource-efficiently as possible. Excluding inedible parts of foodstuffs may conflict with optimal management of the waste/food use hierarchy. Furthermore, capturing information on so-called inedible parts boosts their potential for exploitation, bringing them into wider food use, such as incorporating orange peel in marmalade.

Significant gaps exist in the legal requirements for MSWM planning, monitoring, and reporting. Although there is an official guideline/methodology for developing a MWMP—including a standard format/template—there is neither a regulatory basis for quality criteria nor an obligatory Performance Management System (PMS) for MSW collection and street cleaning that is linked to MWMPs and a national waste strategy that defines Key Performance Indicators (KPIs), targets, accountability, reporting lines and periodicity for municipalities, or rules for calculating baseline values and targets. Under current practice, the only quality criteria for MWMPs are the mechanical “presence or absence” checks by MEPA’s Environmental Supervision Department inspectors, measuring municipality compliance with planning and reporting requirements, and MEPA’s assessment of the conformity of MWMPs with national MWMS. According to the WMC, the responsibility for statutory approval of plans rests only upon local councils (Sakrebulo), which lack the legal mandate, sufficient knowledge, or interest in the subject to judge the quality of these documents. At the same time, MEPA’s endorsement of plans is not legally binding on local municipalities who frequently omit this step. Therefore, the quality of existing plans in the great majority of cases is sub-standard. Quality criteria must be set for MWMPs, MEPA quality assessment and endorsement of plans should be a legal requirement, and PMS and related performance monitoring and reporting requirements in MSW collection and street cleaning should be mandatory for municipalities.

Georgia has many operational challenges caused by factors that include legal-regulatory and policy gaps. One of the greatest of these is the cleaning tariff system, with a tariff setting methodology and base fee level unrelated to waste quantity/volume (the “pay as you throw” approach) and that do not encourage full cost-recovery of cleaning services. Moreover, the tariff setting methodology says nothing specific about the billing system, allowing municipalities to use ineffective and inefficient methods of collecting payments. Another key issue is “a gate fee” to deposit waste at the final treatment or disposal site, which the municipalities do not pay at present and for which no unified technical procedure has been developed or applied. Detailed analysis of tariff and cost related issues is included in Chapter 3 below.

Another critical operational challenge is inadequate law enforcement by local municipalities, preconditioned by such factors as regulatory gaps. Most municipalities lack local regulations on law enforcement of the WMC. Moreover, municipal supervision departments from the majority of municipalities, according to their statutes, have no legal requirements governing the control and supervision of implementing WMC stipulations regarding MSWM, which contravenes the law enforcement provisions of the WMC. Hence there is a need to adopt local regulations on inspections and supervision and/or to revise the statutes of municipal supervision departments.

Some municipalities—such as Tbilisi and Mtskheta—have local regulations, rules, and procedures for MSW collection and transportation that can be considered good practice and can be shared for replication in other municipalities.

Bulky waste is almost entirely unregulated by current SWM legislation, allowing local municipalities to ignore it and place nearly the entire burden of managing such waste on consumers, thus not discouraging dumping in the streets and other public spaces. The reuse of bulky waste can be encouraged by introducing a differentiated fee system for their disposal by households, commercial facilities, and institutions, based on the volume of the waste generated.

The WMC makes local municipalities responsible for managing construction waste. It allows for temporary (undefined) storage of C&D for backfilling operations, without any permit or environmental safeguards, and without end-of-waste and/or secondary products criteria. Moreover, there is neither a unified, countrywide fee system with differentiated rates for hazardous and non-hazardous fractions of C&D, nor any incentive system to minimize at source the reuse and recycling of C&D. The NWMS sets no C&D recycling targets. Only Tbilisi's Green Cities' Action Plan includes a 50 percent recycling target for C&D. Thus, there is a need to introduce quantitative strategic targets for C&D recycling, relevant incentive and enforcement systems, and initiatives to minimize or prevent C&D based on circular economy principles.

Georgia lacks a consolidated, comprehensive legal act or policy document on waste prevention. Existing national strategy lacks concrete prevention targets. While in the EU, the aforementioned Circular Economy Action Plan calls for implementing preventive measures during the entire lifecycle of products, focusing on their design, promoting circular economy processes, fostering sustainable consumption, and seeking to keep local resources and products in the EU economy for as long as possible. One key area targeted by the Action Plan is single-use plastics (SUP) and plastic bags. Degradation of plastic items that enter the environment can last for decades. Plastics in the oceans and on seashores endanger aquatic animals. Moreover, plastics are manufactured from non-renewable sources. Due to these environmental concerns, SUPs are currently subject, among other things, to:

- Restrictions on bringing to market SUPs that have readily available alternatives (e.g., straws);
- General reduction targets for products such as beverage cups and food containers that allow Member States to adopt their own measures to achieve the reduction, with implementation costs that depend on the choice and design of the measures adopted at the national level;
- Awareness raising and EPR schemes for all items not addressed by the market restriction measure, in order to contribute to the cost of prevention, waste management (including litter cleanup), excluding fishing gear;
- Labelling requirements to inform consumers about appropriate and/or inappropriate waste disposal;
- WMS-friendly product design measures, such as drink bottles with tethered (attached) caps;
- Taxing plastic bags—long targeted for reduction by national decisionmakers—at points of purchase, and
- Measures addressing the presence of plastic litter, including microplastics, in the environment.

Furthermore, the European Commission will investigate substitution by biodegradable or compostable plastics, where such uses can benefit the environment, and associated criteria. The assessment will aim to ensure that labelling a product “biodegradable” or “compostable” does not inadvertently cause consumers to dispose of it as plastic litter or pollute due to unsuitable environmental conditions or insufficient time for degradation.

Green Public Procurement (GPP) is a voluntary measure that stimulates market demand for more sustainable goods and services. GPP requires the inclusion of clear and verifiable environmental criteria for products and services in the public procurement process. These criteria are mostly based on the environmental footprint, resource use, and energy efficiency of the goods, and stress waste minimization/prevention, durability/reusability, and recyclability. In 2019, new voluntary EU GPP criteria for food, catering services, and vending machines were published to reduce environmental impacts, avoid food waste, and improve the overall management of waste. Tenderers must have

written procedures describing best practices for preventing the generation of food waste, and operational procedures to monitor whether food waste is sorted out and food waste (g/meal) is measured as kitchen, serving, or plate food waste.

Economic instruments (EIs) are effective tools for reaching some integrated waste management objectives through behavior change, such as reducing the quantity of waste generated or the content of hazardous waste, encouraging reuse and recycling of waste, improving product design (e.g., encouraging the use of recyclable materials in products), decreasing application of lower priority waste management options (e.g. incineration and landfilling). The EIs related to waste management may take the form of incentives (discounts/deductions, reward vouchers) or disincentives (taxes, fees, penalties) and may include a wide array of options, for example, waste pricing (such as unit-based pricing and pay-as-you-throw schemes), EPR/DRS, landfill restrictions/bans, recycling subsidies, VAT exemptions, and income and profit tax deductions.

The EU Ecolabel is awarded to products and services that reduced the environmental footprint by generating less waste and CO² during manufacturing or use, ensuring recyclability, and wiser use of energy, water, and raw materials. Personal care products, detergents, textiles, and papers are some of the categories eligible for certification. Tourist accommodations can also receive the Ecolabel if they offer green hospitality goods and services that avoid using disposable products and single-dose packages, and that sort waste, and provide environmental information to guests.

Mandatory and voluntary certification significantly reduces waste in the entire product lifecycle. A clear example of this exists in food chain management. EU legislation on food/feed safety sets a high level of public and animal health protection in order to safeguard consumption of foodstuffs and their diversion from the food chain into the animal feed chain. The Hazard Analysis Critical Control Point (HACCP) is a procedure that must be followed by business operators in order to implement good hygiene practice. Certification by a voluntary food safety management system, such as ISO 22000, not only complies with legal requirements, but improves kitchen logistics and reduces food waste.

It is noteworthy that, apart from adopting EPR regulations, Georgia has recently taken some positive steps to introduce circular economy principles. Sida's "Keep Georgia Tidy" project launched an assessment of the circularity of the Georgian economy that will identify and select key sectors of the economy for further action. This will be followed by the development and adoption of a policy document that will set national circular economy objectives, targets, and measures. In March 2021 the Minister of Environmental Protection and Agriculture of Georgia approved the Coordination Council—a GoG interagency working group—to achieve these goals.²⁷ Together these actions create a good start for implementing effective circular economy principles, approaches, and measures including those for waste prevention in Georgia.

2.4.2 Institutional gaps, challenges and needs

In Georgia, MSWM institutional gaps and challenges exist at all hierarchical steps (waste minimization, re-use, recycling, recovery, incineration, disposal) of the waste management pyramid and at both, national and local levels.

At the highest national policy setting level, one of the key gaps is a weak interagency coordination and integration of waste management considerations into decision-making by line Ministries. Regardless of formally established inter-agency coordination mechanisms (e.g. thematic boards, advisory committees, etc.) the cooperation of state authorities is by practice sub-standard and mostly confined

²⁷ Source: <https://www.facebook.com/MEPAGeorgia/>

with technical level interactions. This level of cooperation frequently is not enough for decision-making at the highest level especially, when it refers to broader sector reform (e.g. introduction of EPR and DRS systems, etc.) and adoption of circular economy approaches. Institutional Gaps related to circular economy are partially being addressed under Sida “Keep Georgia Tidy” project.

Moreover, the cooperation between central bodies and municipalities should be strengthened in all aspects of municipal waste management and in particular, translating national policy requirements into local context (e.g. recycling targets, municipalities’ role in EPR, etc.). With a view of moving forward towards waste prevention policies, including product’s quality approaches it will be crucial to strengthen interagency and central and local government cooperation in this regard. Moreover, producers, including importers of specific products subject to EPR as well as other business operators, active at any stage of product life cycle should be actively engaged in discussions of reforms related to end-of-waste criteria, product quality, mandatory or voluntary certifications, tax incentives, etc. Most importantly, inter-municipal cooperation which is extremely weak at present should be strengthened with regards to setting separate collection and waste treatment schemes and reaching national recycling targets. Alliances of municipalities at least within single regions should be thought for, similar to Water Alliance created in Achara.

Another gap in national-level coordination, is inadequate cooperation among donors and/or donor projects, active in MSWM field frequently overlapping their activities and acting without considering the results and lessons learned by others. MEPA should enhance donor coordination and ensure exchange of data and knowledge among donor community/donor projects. Donor coordination meetings may take place on a regular basis and may discuss both broader policy and specific project-related issues and experience.

One of the major institutional gaps for Georgia in MSWM is the lack of knowledge and capacities of sectoral ministries as well as business operators in circular economy and new EU measures in waste prevention and re-use, product quality, end-of-waste criteria, intermediary product quality, etc. Thus, awareness of central authorities (Customs Department of Revenue Service, MEPA, Ministry of Economy and Sustainable Development (MoESD), Ministry of Internal Affairs, etc.) and local municipalities as well as producers of various specific waste streams subject to EPR or with high potential for prevention, reuse and recycling should be further increased in relation with implementation of EPR requirements, feasible EPR schemes available in EU and practical implementation issues, through on-class trainings and study tours in countries with EPR and circular economy experiences.

With regards to institutional gaps for EPR, the gap analysis and the road map was developed in 2019-2020 under EU TA project Support to Reform the Waste Management Sector in Georgia (FWC SIEA 2018- LOT 1 EuropeAid/138778/DH/SER/multi). Based on the study, yet no proper governance structure and operational system have been established in both GoG and business sectors. Within the MEPA there is no separate EPR unit. Waste and Chemicals Management Department apart from EPR policy development and coordination of its implementation has many other functions in the field of waste and chemicals management. Therefore, with its current organizational structure, scope of work, limited number of staff and present staff qualification, the department may face significant challenges to operate effective EPR system. An additional EPR unit under the department is necessary to be established and properly staffed. Furthermore, the Department of Environmental Supervision is another unit, which will need institutional strengthening for compliance assurance monitoring and control of EPR implementation. A Waste Control Unit was abolished in 2017 as a result of reorganization. As a result, currently there is no specific unit controlling waste related aspects. Considering that EPR supervision will be task of the DES, it will be important to reestablish waste/EPR controlling unit.

At present, existing or potential EPR units in the MEPA need significant capacity building in: i) reviewing authorization requestion from PROs, including business plans; ii) monitoring and/or providing a

guidance to PROs on improving their performance; iii) defining market share and setting collection and recycling targets; iii) managing data; iv) ensuring proper reporting and avoiding free riders; v) inspecting PROs, producers and other business operators, etc. Special attention need to be given to the capacity development at the Ministry for administration of the EPR registry, as well as to ensuring integration of such registry with other existing databases related to waste management.

Concerning existing EPR institutional setting and capacities at local level, municipalities may play a role of service providers to PROs for separate collection/pre-treatment and even for treatment (in case of Tbilisi) of EPR streams in particular, packaging waste; or at least, they may negotiate with PROs proper collection schemes (methods, number and location of collection points). Moreover, they should know quantities of EPR streams in their respective municipalities as well as quantities of wastes to be collected separately to meet EPR targets in order to properly plan their activities, estimate service costs and negotiate them with PROs in case they service as service providers. Thus, knowledge and capacities will be needed especially in preparation of contracts as well as their monitoring and supervision. Relevant skills are also to be developed at the municipal level with respect to defining the costs for their services to PROs, conducting awareness/information campaigns etc.

As for private sector, there are no PROs in place so far. The only potential PRO is Georgia+ for packaging waste, which has not gone through authorization process, due to the delays in adoption of packaging regulation. The interest and knowledge of producers is very limited on basic concepts/principles of EPR and specific requirements for producers set out in existing EPR regulations. Their capacities should be also built in designing and implementing/oversighting separate collection and recycling/recovery schemes, DRS systems, calculating EPR targets and costs, negotiating, contracting and managing contracts with service providers.

Distributors/sellers (retailers) may play significant role in take back systems especially for collection of WEEE, batteries, ELVs and used oils. For packaging DRS, they may serve as points of collection of specific products for end-of life product recovery, or ensuring compliance by selling only from producers that comply with product requirements. Thus, awareness of retailers should be raised in EPR concept and their potential roles in it.

Regarding economic/business operators dealing with separate collection, recycling and/or recovery of specific wastes subject to EPR, their number and capacities are very low, yet uncounted. Currently, there is an informal sector for collecting metal scrap from both businesses and households, paper, plastic waste. Economic operators are obligated to implemented higher standards which will be introduced in newly drafted ordinance for EPR waste streams for collection and treatment improving environment performance and avoiding any risk for environment and human health. All collected waste shall be delivered for storage, treatment and recycling to waste management operators, that have the necessary authorization documents, issued pursuant to Georgian legislation. For disassembly operations, treatment facilities should comply with the minimal technical requirements specified in the by-laws on EPR waste. These by-laws provide the standards for treatment, recycling and recovery of materials from WEEE, WBA, ELV. It also outlines the requirements for the removal of hazardous substances and components to avoid risks to the health and damage to the equipment. Furthermore, export of waste for recycling, in compliance with the requirements of the Basel Convention on the shipments of waste, shall be considered for accomplishment of recycling targets, provided that the recycling is done in the conditions, the same as in the Georgian legislation.

At this stage, not all waste operators are registered in the electronic system of the MEPA. Their registration is essential for further system for target monitoring and control. Frequently they are not even aware on the legal requirements. Above described waste operators need a significant support in order to fulfill national legal requirements and at the same time keep their business profitable.

Institutional gaps at municipal level are well-documented by various donor projects, including USAID/CENN WMTR 1st and 2nd phases, Sida Clean-up and Keep Georgiya Tidy, UNDP/PMCG PMS and EBRD/TCH Tbilisi waste strategy projects. The Tidy-up project through Greens Movement of Georgia

monitors implementation of MWMPs by LSGs across the country and its report will be ready by the end of April of this year. EBRD/TCH Tbilisi waste strategy project assessed 2019 MSWM baseline for Tbilisi City Hall and its Tbilservice Group and UNDP/PMCG PMS project looked at 2019 performance of 39 municipalities of 6 regions, including Mtskheta-Mtianeti, Kvemo Kartli, Imereti, Samegrelo-Zemo Svaneti and Guria regions. All these assessments indicated at the lack of adequate knowledge, skills and resources, including simple decision-making support tools in all municipalities across the country in developing quality MWMPs in line with NWMS&NWMAP, precisely estimating their infrastructure needs, designing and implementing effective and efficient schemes for waste collection and street cleaning, including source separation, waste data collection/accounting and reporting and the most importantly, covering the costs of their services. The degree of capacity gaps varies case by case but overall, larger urban-type municipalities, including Tbilisi, Kutaisi, Rustavi, Batumi, Poti, etc. have greater knowledge, skills and resources for planning and delivering MSW collection and street cleaning services (operational and financial gaps and needs are discussed in a greater detail in separate parts dedicated to financial and operational performance and gaps).

Concerning MSW data management, in general LSGs either don't have critical input data necessary for planning and performance tracking of their services or have only rough estimates, with no plausibility checks (Information management issues are discussed in a greater detail in sub-chapter 3.6).

As for the non-public sector, measures implemented by NGOs in MSWM sector frequently represent one-time events with limited geographic scope and little replication potential and practice. These activities are pretty much dependant on donor project resources and once the project is completed it is very difficult to maintain achieved results or continue working in the same area. The market for local consultancy in MSWM, including waste management planning, policy, financial analysis and in particular, engineering design of MSW collection and transportation schemes, waste disposal and treatment facilities is very thin. Therefore, international donors, when procuring waste management services should include significant engagement of local consultants and/or consultancy companies as one of the minimum requirements.

2.5 Current and Projected Quantities of MSW

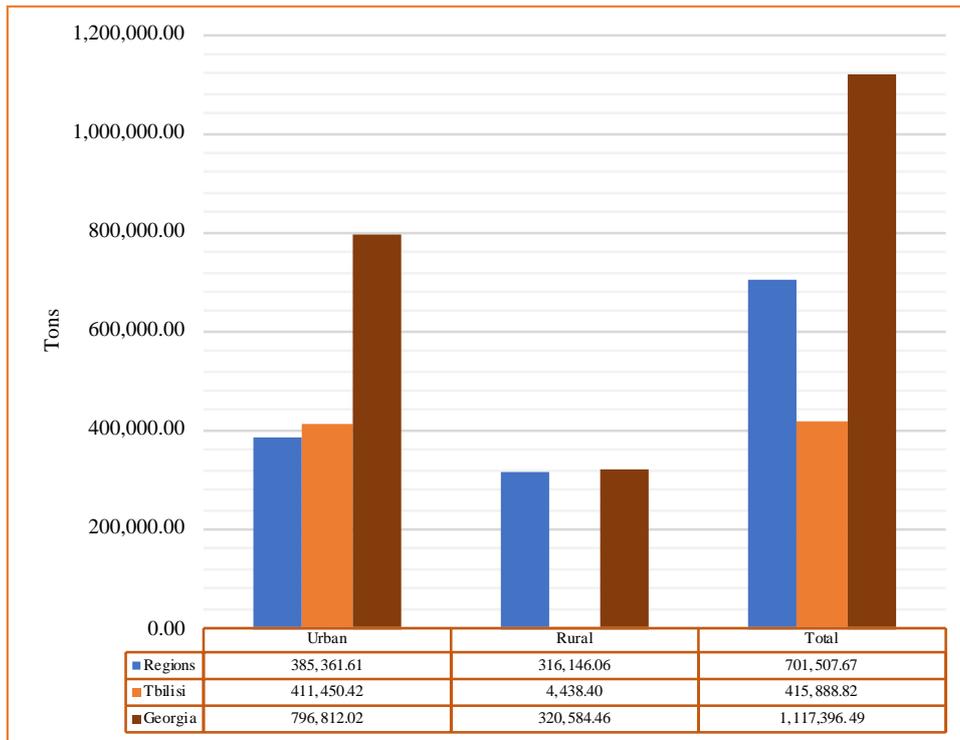
2.5.1 Current Quantities of MSW and Other Major Waste Streams

At present, there are no official data on MSW generation in Georgia. Therefore, under this SWSA, MSW quantities for 2019 were estimated using the WGIs for urban and rural areas. The index for each municipality relied on data on MSW quantities collected/landfilled, MSW collection/service coverage rates by urban and rural areas, population size by urban and rural areas and, for some municipalities, tourist numbers. This exercise was followed by regional and nationwide data aggregation²⁸.

The 2019 average WGI was 0.95 kg/inh/d (kilogram per inhabitant per day) for urban areas and 0.54 kg/inh/d for rural areas. The total MSW generated in 2019 was 1,117,396.49 t, with 796,812.02 t generated in urban areas and 320,584.46 t in rural areas.

Figure 1. MSW Generation Figures, t/y

²⁸ An excel MSW database by municipalities was developed under the given assignment and is available with WB upon request



Tbilisi generates the most MSW, followed by Imereti, Kvemo Kartli, Achara, Samegrelo-Zemo Svaneti, Shida Kartli, and Kakheti. Densely populated urban settlements have the highest MSW generation, including Tbilisi (~415,889 t/y), Batumi (~79,745 t/y), Kutaisi (~47,921 t/y), Rustavi (~ 32,780 t/y), Poti (~6,060 t/y), Khashuri (~16,048 t/y), Gori (~15,631 t/y), and Zugdidi (15,298 t/y).

Figure 2. 2019 MSW Generation by Regions

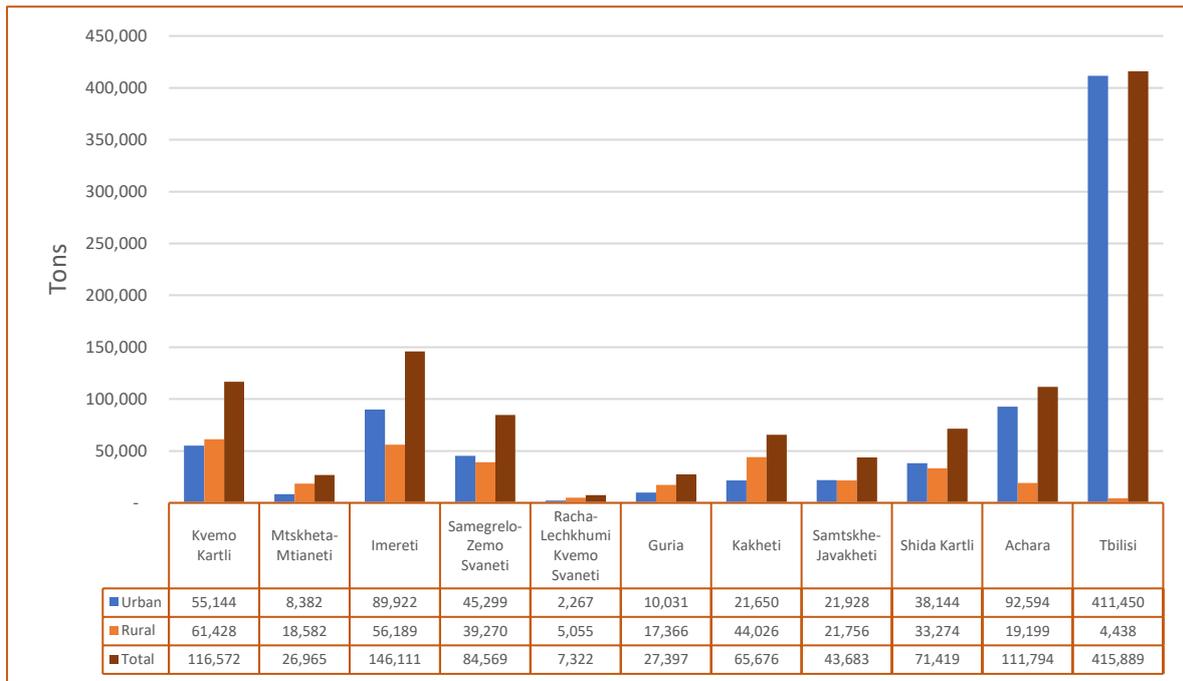
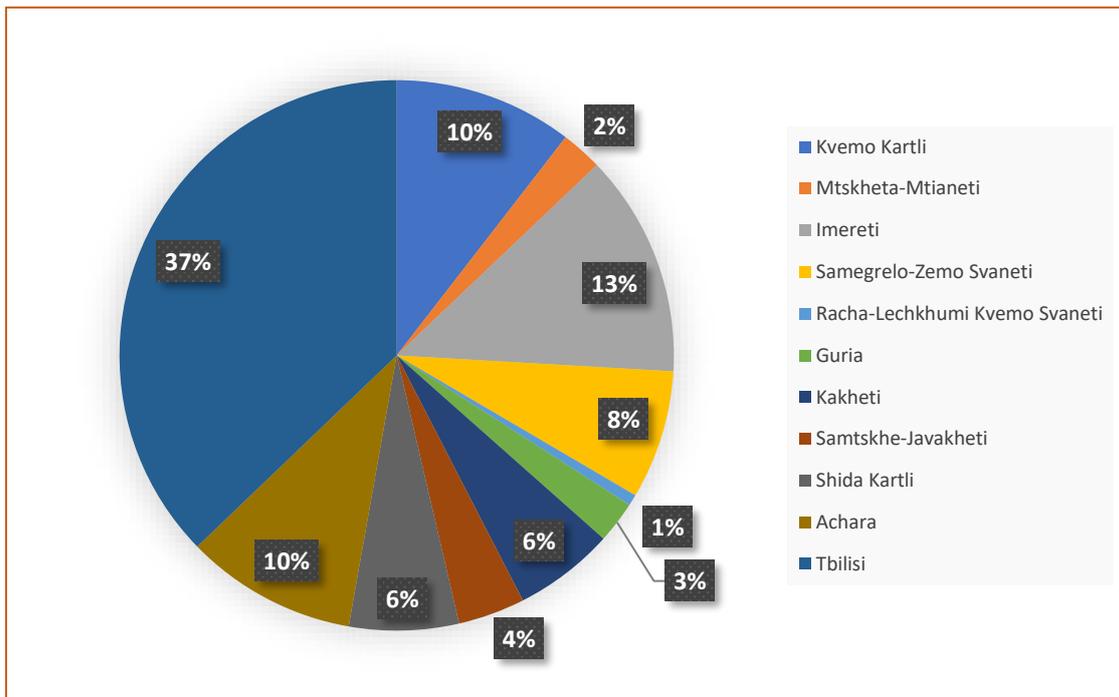
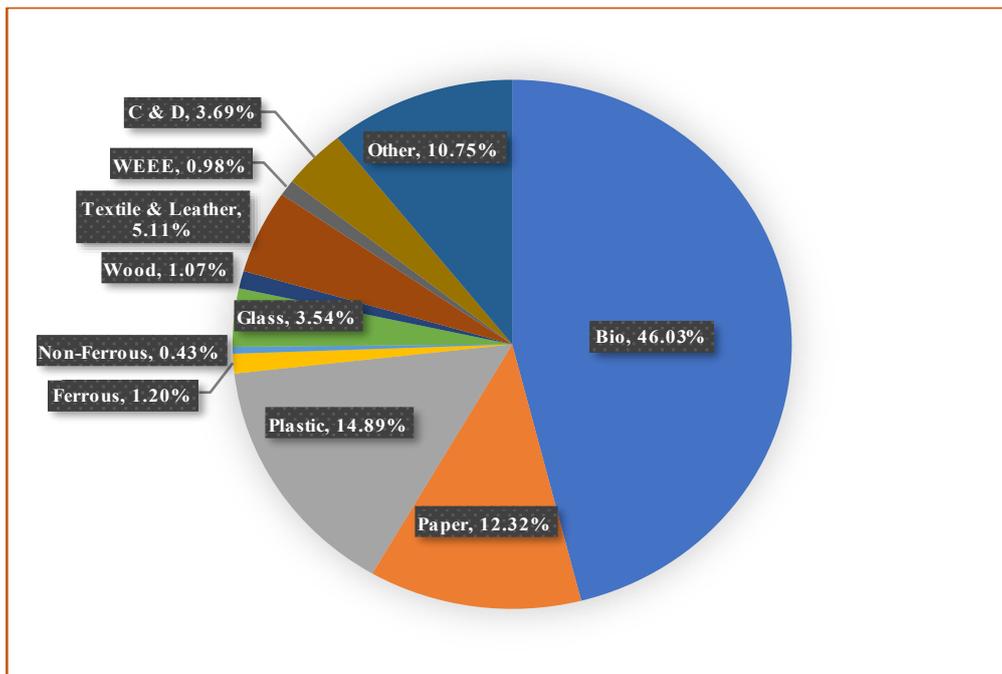


Figure 3. Percentage Share of Total MSW Generation by Region



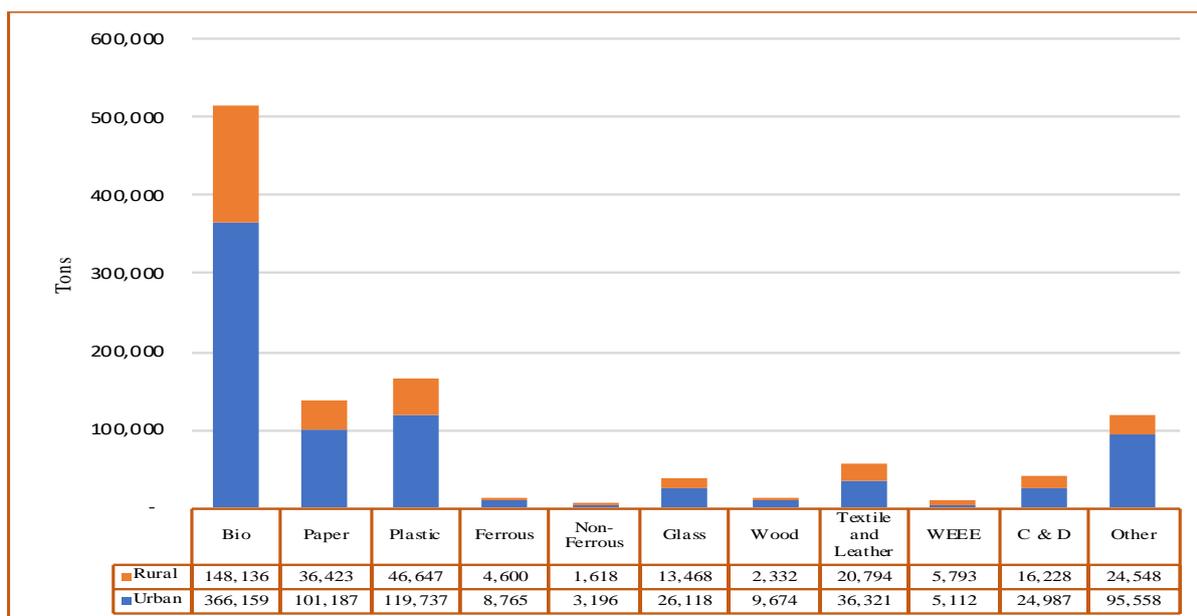
Quantities of individual MSW streams were based on available waste composition data and estimated MSW generation figures.

Figure 4. Average Waste Composition of Georgia



The above graph clearly shows that the largest stream is biodegradable waste, generating more than 46 percent of total MSW, with organic (bio) waste making up 46.03 percent total biodegradable waste. Plastic contributes 14.89 percent, paper/cardboard 12.32 percent, followed by smaller streams (e.g., diapers and sanitary napkins, bulk waste, etc.). Glass accounts for 3.54 percent, ferrous metal 1.2 percent, non-ferrous metal 0.43 percent, C&DW 3.69 percent, wood 1.07 percent, and WEEE 0.98 percent. The shares of the MSW streams were converted into waste quantities by individual municipalities and then aggregated at regional and national levels.

Figure 5. Quantities of MSW Streams Generated in 2019



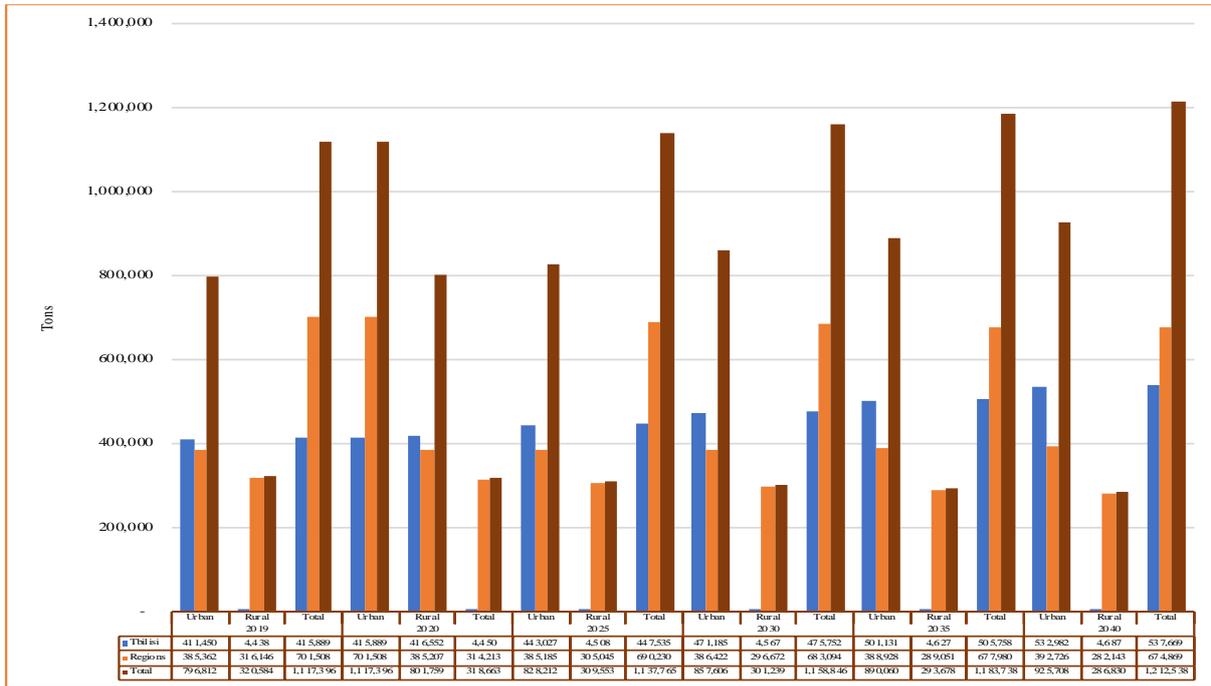
2.5.2 MSW Generation Projections Under Different Scenarios

MSW generation projections were made for 2020-2040, using two scenarios: i) Scenario One (conservative) assumes a population increase at the 2015-2019 average annual population growth rate and no WGI growth; ii) Scenario Two (realistic) assumes a population increase at the 2015-2019

population growth rate and a WGI growth of 1.6 percent annually in urban areas (half the average monthly HHI growth for 2015-2019) and 0.8 percent in rural areas until 2026, thereafter increasing at 1.2 percent annually in urban areas and 0.6 percent in rural areas.

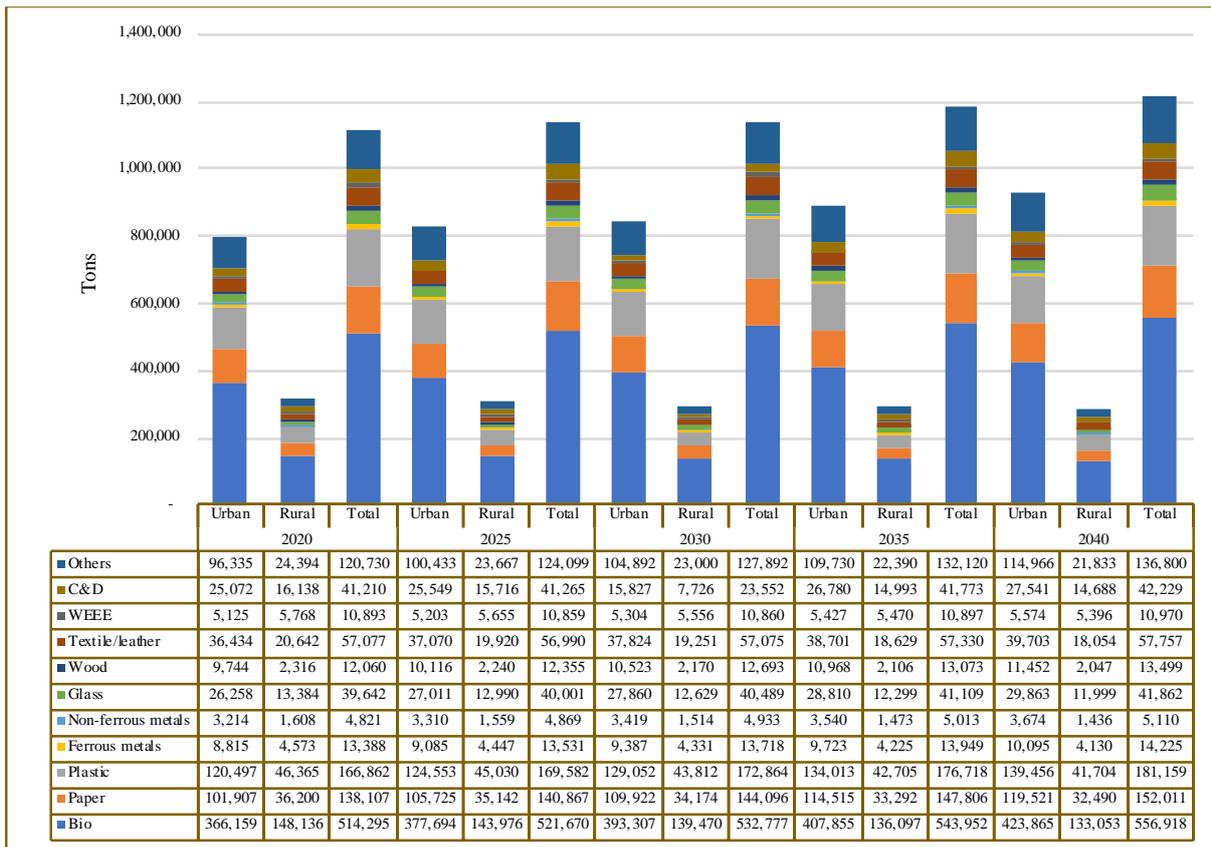
Under Scenario One the 2019 MSW generation figure of 1,117,396 t increases to 1,137,765 t in 2025, 1,158,846 t in 2030, 1,183,738 t in 2035, and 1,212,538 t in 2040.

Figure 6. MSW Generation Projections Under Scenario One



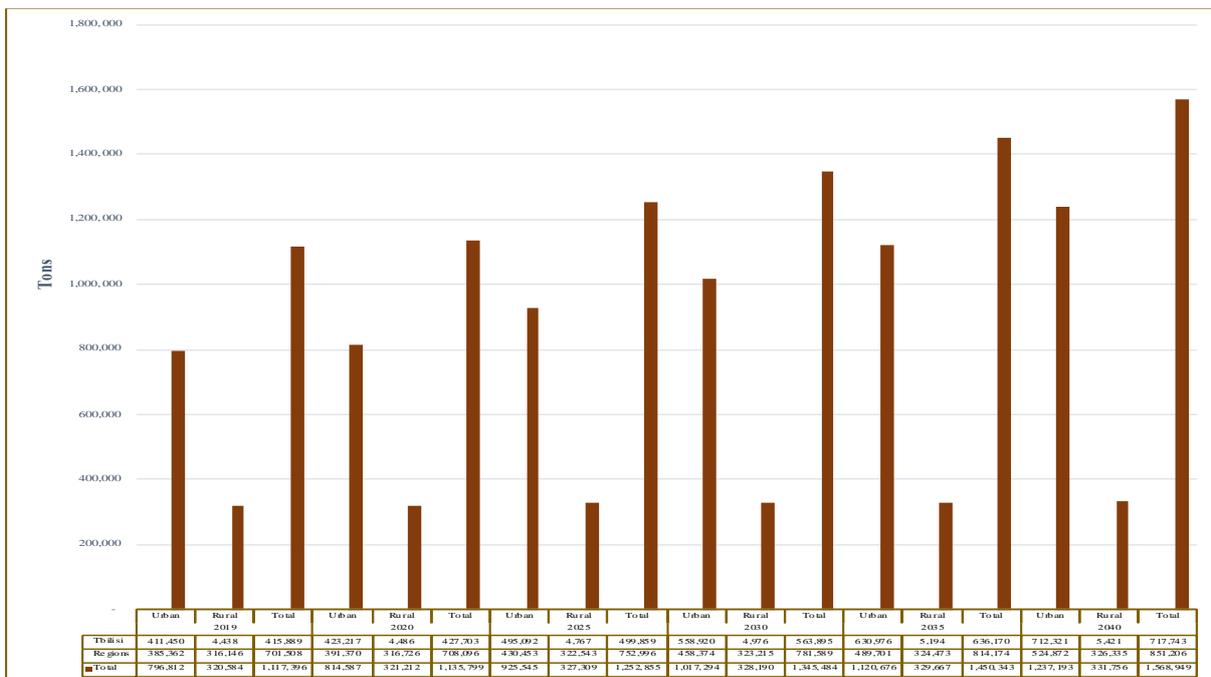
Individual MSW streams were calculated using available waste composition data.

Figure 7. Individual MSW Generation Projections Under Scenario One



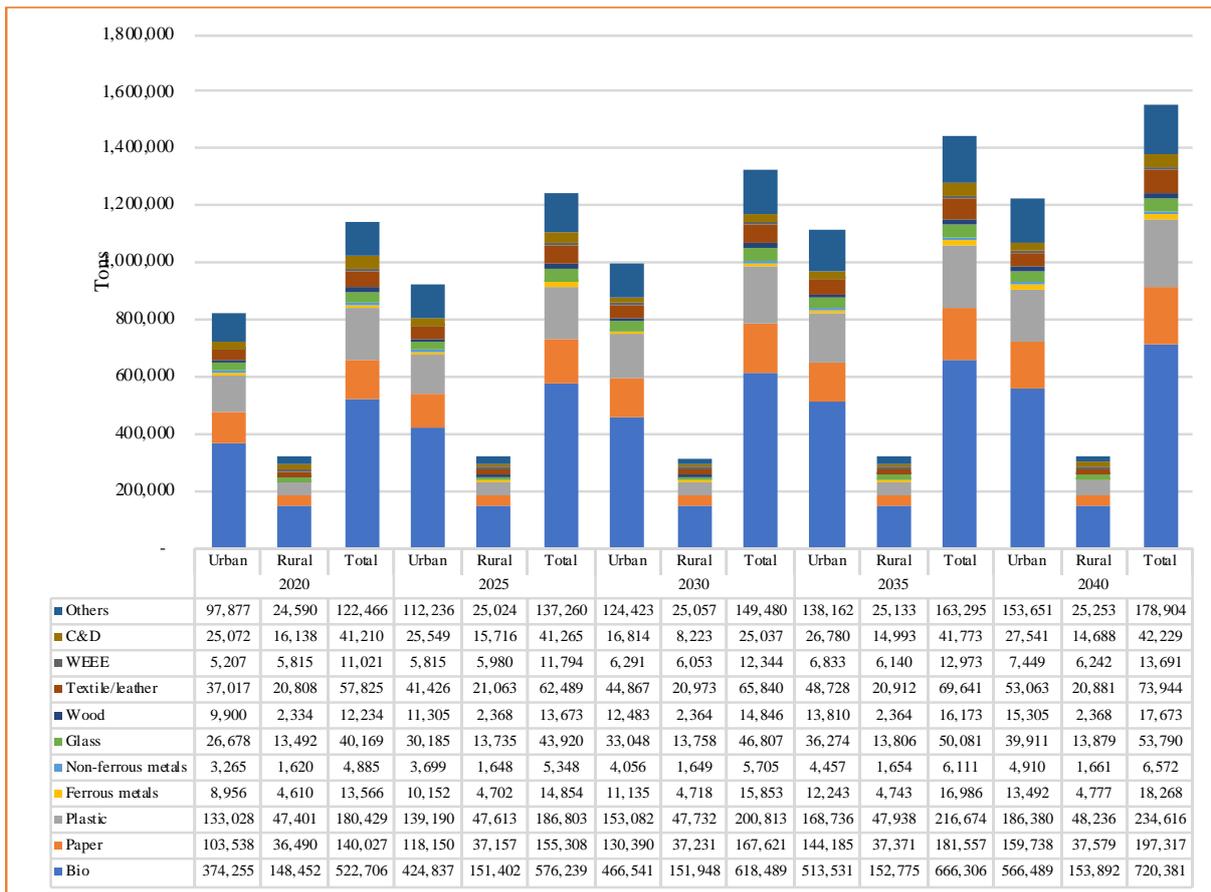
Under Scenario Two the baseline value of 1,117,396 t increases to 1,252,855 t in 2025, 1,345,484 t in 2030, 1,450,343 t in 2035, and 1,568,949 t in 2040.

Figure 8. MSW Generation Projections Under Scenario Two



The individual streams increase significantly, particularly biodegradable waste which is the largest fraction of MSW and will remain so in the future.

Figure 9. Individual MSW Generation Projections for 2020-2040 Under Scenario Two



2.6 MSW Management Practices

MSWM in Georgia has been well-documented and examined, including by the USAID/CENN WMTR-I and II and UNDP PMS projects’ baseline studies. This section analyzes current MSWM practices based on available reports, including MSWM collection, street cleaning, MSW transportation, treatment, disposal, prevention, recycling, and recovery practices.

2.6.1 MSWM Planning

Pursuant to the WMC, local municipalities develop MWMPs every five years. For this purpose, municipality mayors appoint MSWM planning task forces composed of the staff of cleaning/amenity services and relevant structural departments. Usually development of MWMPs needs stakeholder consultations and public participation, which in most cases is not done, or is done on a limited scale. MEPA informally concurs on draft documents that are then officially approved by municipal councils (Sakrebulo) through special resolutions. In practice, many municipalities do not seek MEPA quality checks and concurrence, instead directly submitting their plans to local councils for approval.

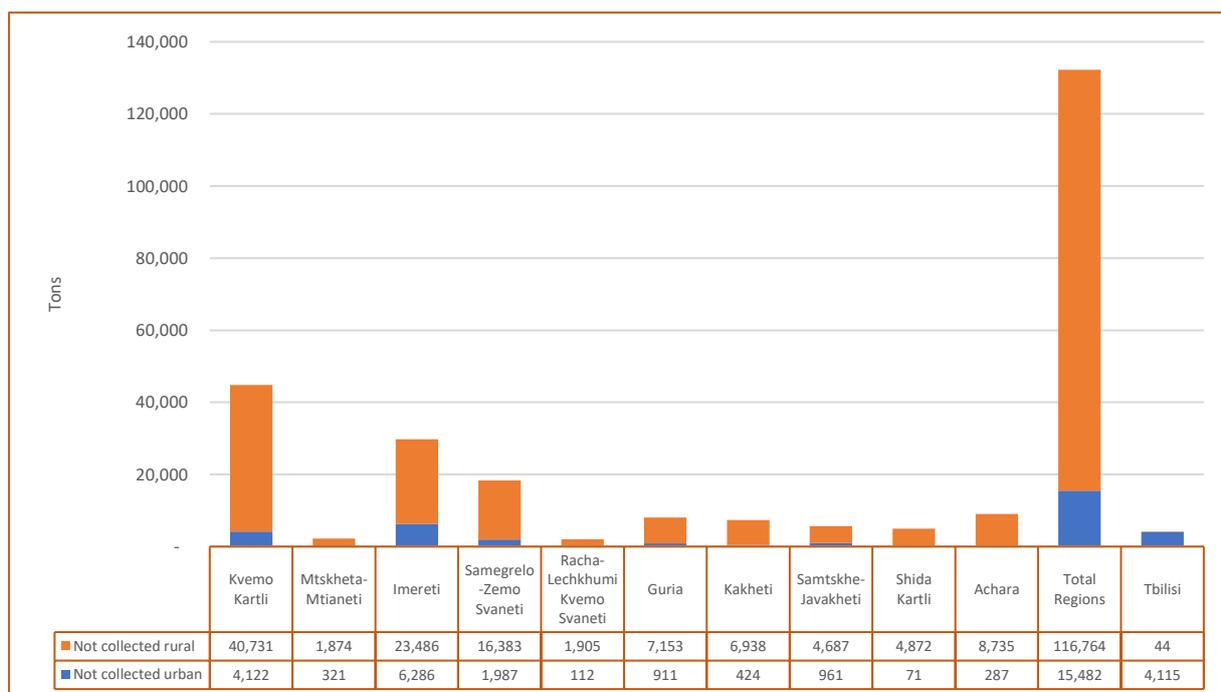
The first MSWM planning cycle covered 2018-2022, so municipalities should now be preparing for the next cycle. MWMPs are required to cover all aspects of MSWM—waste generation, composition, generation projections, collection, street cleaning, waste pre-treatment/treatment, dumpsites (inventory, clean up, and remediation), recycling-recovery, resources (including HR and infrastructure), finances (including tariff setting and growth forecasts), public awareness and participation, objectives and the quantitative and qualitative targets for reaching them, planned actions, budget, monitoring, and evaluation frameworks. The plans should conform to the NWMS and NWMAP quantitative and

qualitative targets, objectives, and planned actions. In practice, the overwhelming number of MWMPs lack the above critical information—particularly waste generation projections and composition, quantifiable targets in line with national strategic targets, and most importantly, tariff growth and revenue forecasts.

2.6.2 MSW Collection, Transportation, and Street Cleaning

MSW collection rate, quantities collected, and collection gaps. The current MSW collection/service coverage rate is 87.88 percent, with 97.56 percent reported for urban areas and 63.56 percent for rural areas. This value runs from 38 percent (Gardabani) to 100 (Poti and Batumi)²⁹ with Tbilisi at over 99 and Kutaisi at 98. Urban areas range between 60 and 100 percent, while rural areas report between 25 (Gardabani, Marneuli, Tchiatura) and 95 percent (Mtskheta and Khashuri).

Figure 10. Total Quantities of Uncollected MSW in 2019 by Georgia Region, t/y



The largest collection gap is reported for Kvemo Kartli (35 percent), especially in its rural areas, followed by Imereti (20 percent), Samegrelo-Zemo Svaneti (14 percent), Achara (seven percent) and Guria (six percent).

Quantities of other streams. One of the largest solid waste streams to enter containers as part of MSW is C&DW. It averages about 3.69 percent of mixed MSW, depositing 36,490.59 t in landfills in 2019. This C&DW is generated in small quantities by households and disposed of in public containers. However, the largest portion is industrial and business-generated, deposited in existing landfills or temporary disposal sites through direct contracts with landfill operators or with municipalities. Big portion of generated C&DW is dumped in gullies and river gorges (the quantity of dumped C&DW is unknown). For Tbilisi, this quantity is 600,000-700,000 t according to TSG’s estimates. (It is deposited in the Gldani C&DW temporary disposal site, which has no weighing scale.) In Batumi around 4,987 t of C&DW was collected by Sandasuptaveba and disposed of at Batumi’s landfill in 2019.

²⁹ In practice, it is almost impossible to reach 100%, but municipalities reported these values.

The quantities of hazardous municipal waste (HMW) collected are unknown. Rough estimates of the quantities of specific wastes subject to EPR, including hazardous waste fractions (e.g. WEEE, batteries and accumulators, used (waste) oils, ELTs, etc.) were made under 2018-2019 EU TA project. According to the baseline study of the mentioned project, around 550 t of “fresh” portable batteries were put on market annually in 2013-2017 (GEOSTAT data). In addition, there is a smaller unknown quantity of portable batteries that comes embedded in imported electrical equipment such as watches, laptops, cameras, toys, etc. Portable batteries are generated by households, are collected as part of mixed MSW by municipalities and are disposed of at existing landfills; in the future, they will be generated also in WEEE dismantling plants.

The dominant type of accumulators in both, Europe and Georgia are lead-acid type (96%) whereas NiCd (Nikel Cadmium) type’s share is only 2%. These devices are used for ignition/lighting of cars, on electric vehicles and other industrial applications. Geostat reports approx. 5,500 t of new accumulators put on the market annually (2013-2017 GEOSTAT data). An additional quantity enters the market via import of new or used vehicles to Georgia. A crude approximation follows: 85,800 new vehicles registered in 2015 x 15 kg average weight of accumulator = 1,287 t/y. Waste accumulators are generated in vehicle repair shops, gasoline stations and spare part shops; in the future, a part of them will be collected in old cars dismantling plants. Recycled lead has a high value. In Georgia, there are 7 small foundries collecting accumulators and operating intermittently; however, the level of operation and the adoption of pollution abatement measures is unknown (especially for lead dust and acid neutralization/disposal).

Regarding ELTs, they are imported from EU countries and Japan. In addition, they are generated at car dismantling shops or from abandoned vehicles. The quantity of the latter is unknown. As for the quantities put on market annually, it varied from 23,150.8 t in 2013 to 31,272.1 t in 2017. Currently, disposal of ELTs in existing landfills is banned. Therefore, ELTs are dumped in illegal sites. There are very few facilities recycling tires with negligible recycling capacities. Uncontrolled burning of tires by individual households and companies especially in rural areas is pretty common practice. This is an illicit action, subject to administrative penalties. However, law enforcement against these activities is very weak.

Lubricant oils are distributed to Georgia’s market via: i) importers, ii) manufacturers, iii) importers of vehicles. Approximately 50% - 60% of what is “put on the market” will become waste oil. The remaining is lost during use or through leakages, etc. According to information from GEOSTAT, the quantities of lubricating oils put on the market each year in the period 2013 – 2017 amounted to 12,300 t/year. To this amount, a quantity of around 400 t/y that is comes each year with the new registered vehicles, has to be added. Waste oils that arise are assumed to amount to 50% of fresh oils, since the remaining quantities are lost during use (during combustion, in engines, etc).

Waste oils have a positive market value, indicatively 100 – 120 /t and for this reason they are used as fuel in non-authorized applications. In Georgia, the Rustavi nitrogen plant regenerates small waste oils of its own production and reuses in the production process as raw material. Its capacity is sufficient to accept higher quantities from other sources. Waste oil can be also used as alternative fuel during cement production. Currently, Heidelberg cements is interested to use it as fuel in its cement kilns of Kaspi cement plant.

Concerning ELVs, Georgia has outdated car fleet, with used cars imported from Europe, Japan and US making up the largest share of total fleet. 90% of the cars were registered before 2004 although the number under the age of 3 years is increasing. In 2016, the total number of vehicles was 1,167,200, out of which 973,600 were passenger cars (83.4%). According to Geostat, total import from 96,574 vehicles in 2014 dropped to 55,965 in 2018, while export from 45,477 in 2014 increased to 47,624 in 2018. Total number of de-registered cars in 2014 – 2018 amounted to 68,736 or approx. 13,700 cars per year.

Practices. MSW collection and street cleaning activities in Georgia are separate from landfilling (except for Tbilisi City). Municipalities implement the first function, while the second is handled by the state-owned SWMCG under MRDI, the Waste Management Company (new landfill) of Achara A.R. in Achara. and the Tbiliservice Group in Tbilisi (which also collects and transports MSW for Tbilisi). The vast majority of municipalities provide MSWM and street cleaning services to customers through quasi-autonomous, nonprofit entities which in most cases represent sub-units of consolidated municipal amenity services. However, on rare occasions municipalities operate cleaning/sanitation services. A very few municipalities are serviced by limited liability companies (LLCs) with 100 percent municipality ownership (such as the TSG or the Sandasuptaveba-Batumi Sanitation Service). Cleaning/amenity Services often co-mingle MSW collection and street cleaning. Tsalenjikha Municipality has two amenity services, one for the town of Jvari and another for the entire municipality, but the operational need for two offices is unclear.

In a few urban municipalities the collection, transportation, and disposal of park and garden waste is carried out by separate, dedicated services. Such is the case for Tbilisi, Batumi, Kobuleti, etc.

Cleaning and/or amenity service personnel typically include management and administration staff, MSW collection teams (workmen), drivers and teams of street sweepers. A very few services have engineers and technicians on staff. Tbilisi, the largest service, has separate departments for MSW collection and street cleaning, MSW landfill operations, and operations of the C&DW disposal site. It also has five district departments more or less attached to the city's administrative districts, and one transfer station to optimize transportation routes. Municipality departments for infrastructure, transport, architecture, spatial planning, economic development, finance, etc. participate in budget planning, procurement, and development of MWMPs.

With a few exceptions, municipalities carry out MSW collection, transportation, and street cleaning directly, without involving third parties, including private contractors. Rustavi outsources about 60 percent of its MSW collection to Auto-2003, since the Rustavi Amenity Centre ("Service Centre") has too few RCVs. Zugdidi Municipality rents 11 RCVs, but uses its own drivers. In the Achara A.R., the Batumi-based LLC Sandasuptaveba (Batumi Sanitation Service) fully owned by Batumi City Hall, collects and transports MSW for Batumi and three other municipalities in the region—Khelvachauri, Shuakhevi, and Khulo.

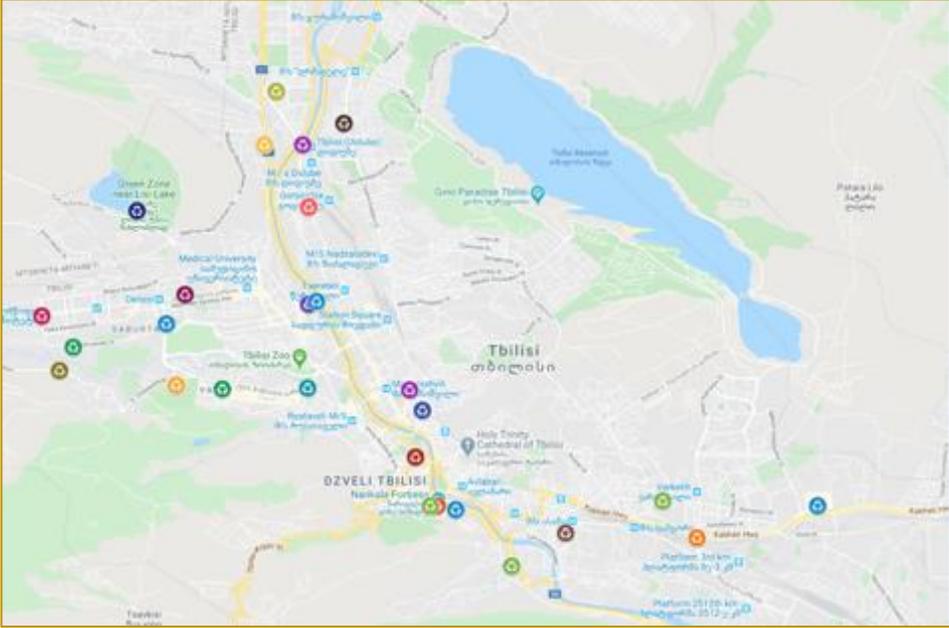
Despite the statutory requirement to start separate collection, the prevailing practice remains mixed MSW collection through public, so-called "communal," curbside containers. In some cities and municipalities (e.g., in Mtskheta), CILs (companies, institutions, industries) use individual containers. A few cities and many remote rural areas have a so-called "bell" service in which MSW is collected directly from customers on a schedule without using containers. The preference for this approach is based on road access (mostly in rural areas), the availability of containers and compactor trucks/RCVs, space for containers, and customer feedback. For instance, Poti Service has enough collection containers, but not enough space in certain districts, so local residents prefer scheduled pick-ups. A similar situation exists for some districts in Zugdidi City.

At present, the cleaning/sanitation services of Mtkheta, Kutaisi, and Tslaltubo are conducting pilot source-separating activities for dry recyclables. Mtskheta collects and sells around 100 t of paper the company Neoprint; Kutaisi collects more than 200 t of cardboard from shops. Tskaltubo and Kutaisi collect 20 and 43 t, respectively, of plastic bottles (2019 data) that are pressed and baled of for sale at public auctions.³⁰ SWMCG sorts and recovers some 200 t of plastic from mixed MSW at its manual

³⁰ Source: UNDP/PMCG, Baseline Study for 39 Municipalities, UNDP/PMCG Project: Performance Management System for Street Cleaning and Waste Management Services in 23 Municipalities of Georgia, May 2020.

sorting facility on the Rustavi landfill. In Tbilisi and Batumi, under the USAID/CENN WMTR project so-called “green stands” (separation points) and containers were put at public institutions and commercial facilities to collect an aggregate of dry recyclables, so plastic, paper, and aluminum cans could be collected by the Tbiliservice Group in Tbilisi and Sandasuptaveba in Batumi, and pre-treated by Supta Samkaro (Clean World). Tbilisi has about 25 separation points for paper and cardboard, aluminum cans, and plastic collection, with aggregate waste that contains 30-40 percent impurities.

Figure 11. Separate Collection Points in Tbilisi (Source: CENN)



On the private front, Supta Samkaro (Clean World) collects high-, medium-, and low-density polyethylene—HDPE, MDPE, and LDPE—plastic bags and cardboard from 54 commercial and industrial facilities. There are baling/pressing machines in each facility, which are operated and maintained the company’s workmen. Clean World pays a certain amount for each ton of waste collected from the contracted companies. Table 14 shows rough estimates of the monthly amounts collected from stands and in the city of Tbilisi.

Table 14. Monthly Quantity of Dry Recyclables Processed by Clean World (Supta Samkaro)³¹

Type of Collection Point	Number of Collection Points	Material	Amount, t/month
Industrial and commercial facilities	54	Plastic bags (HDPE, MDPE, LDPE)	6-10
		Cardboard	300
Stands	25	Plastic	~0.7-1
		Paper	~ 1-1.5
		Glass	~ 1
		Aluminum can	~0.4-0.5

Paper and glass go to local recyclers; aluminum and a large portion of PET bottles are exported.

In Akhaltsikhe, a private entrepreneur (Temur Tabunidze) separates plastic and cardboard for the municipality. In 2019, he collected 35 t of plastic and seven t of paper; in 2020, his haul was 25 t of plastics and five t of paper.³²

In 2019 Marneuli Municipality collected separately some 500 t of biowaste from agrarian markets, the local can factory, and greenhouses and delivered it to a composting plant owned and operated by the municipality. In 2020, the green waste collected increased to 750 t, according to Marneuli composting plant management. Kutaisi is beginning its separate collection and composting of park and garden waste. (See details in the recycling and recovery section of this report.)

Containers. The current volume of the containers operated by municipalities in both urban and rural areas is 1,100 l. Plastic and metal containers between 20 and 240 l are mostly in urban areas. While many municipalities resent the expense and difficulty of repairing metal containers damaged by frequent car accidents, others dislike the higher flammability of plastic. Almost all municipalities have sufficient numbers and volume of containers, including Tbilisi, Kutaisi, Batumi, et al. In some municipalities 10-20 percent of the containers need replacing, and most municipalities lack spares.

In many remote areas, the distance between containers is more than 150-200 m, a reference value in the guideline for MSW collection and which is based on international standards. In the worst cases, a container on a major, paved road is recorded as serving the entire settlement, which in practice it does not. Unserved or underserved populations often dump their MSW illegally in nearby gullies, drainage canals, and streams.

RCVs. The majority of RCVs in use are compaction trucks with volumes between three and 21 m³ and automated loading. The dominant volume/capacity of RCVs is seven to 13/14 m³. A few of the vehicles used are open trucks with volumes of one to five m³ and without compaction or automated loading. These are outdated (mostly Soviet) trucks are used for bulk waste, street refuse, and sometimes for C&DW transportation and disposal. As mentioned above, many municipalities have neither workshops nor garages in which to repair equipment. Therefore, one in every five RCVs is unavailable for use on average throughout the year.

³¹ Source: Inception Report – Baseline Study and Future Projection. 2020 Tbilisi Solid Waste Project – Tbilisi Municipal Solid Waste Strategy, ICP-ENVIROPLAN Consortium.

³² Source: Phone interview with representatives of Akhaltsikhe Municipality.

Collection frequency. Urban MSW collection occurs twice daily in most municipalities. Collection in rural areas is usually two or three times per week. Tourist areas see more frequent collection during high seasons, often exceeding twice a day.

Other streams. Companies—mostly urban development and construction firms—and, to a lesser extent, non-commercial organizations are the major generators of C&DW. Households generate a small amount, which often ends up in communal containers and, ultimately, in municipal landfills or dumpsites. However, some households and companies have contracts with cleaning services for collection and disposal of their C&DW. Companies often make direct arrangements with landfill operators and avoid centralized waste collection services altogether. This is true for the Tbilisi, Rustavi, Batumi, Poti, and other landfills. In such cases the contracting companies pay flat gate/disposal fees based on the amount of waste disposed.

Hazardous municipal wastes are currently mixed with other MSW streams and collected by municipalities in public containers. With the implementation of annual EPR targets (to start in 2023, portable batteries, used oil, and WEEE will be processed by “producers” through EPR schemes.

In general, households and companies take care of their bulk waste. Some bulk waste dropped on streets are collected together with other street residues through street sweeping operations. However, in certain municipalities cleaning/amenity services deal with such waste, based only on individual agreements with clients (either households or organizations/companies).

Street cleaning. In all municipalities paved streets and other types of public areas are swept manually by brooms. What is collected is mixed with other wastes and therefore, absolute majority of municipalities do not have separate RCVs for collection of street residues and park waste. Tbilisi and few other smaller cities, e.g., Zugdidi have special vehicles for street cleaning and Poti – vehicles for beach cleaning. Wet cleaning is rarely performed. Cleaning activities are mostly carried out in urban areas and resort zones. In cities cleaning is conducted on a daily basis, one or two times a day and more frequently when required (holiday seasons in tourist areas). In rural areas, cleaning activities are pretty much limited and performed twice or three times a week, if performed at all.

2.6.3 MSW treatment and disposal

MSW treatment. As a rule, MSW is not treated (including pre-treatment) before disposal in Georgia. Regardless, there are a few positive exceptions from the rule. Mixed MSW is sorted at Rustavi landfill before disposal, to recover small quantities of cardboard and PET, which then are baled and stored for public auctioning. Batumi new landfill has a building for sorting facility to treat maximum 75,000 t/y MSW. It is envisaged to design and procure sorting line (s) for dry fractions of MSW with a support of EBRD. Moreover, studies are ongoing to select the most economically and technically viable biological treatment options too. Similar study is ongoing for Tbilisi landfill with EBRD’s financial support. Other landfills do not have any types of pre-treatment/treatment stages for both dry recyclable materials and biodegradable waste. With introduction of new landfills, waste treatment before disposal will become mandatory.

Controlled waste disposal. Local municipalities are not in charge of landfill operations. All landfills serving municipalities are managed by SWMCG, except for Tbilisi and Achara municipalities.

In total, there are 33 existing landfills, of which 31 are located in regions, managed by SWMCG, one – in Tbilisi, managed by TSG under TCH and one in Batumi – managed by LLC Sever, hired on an annual basis by Batumi City Hall. By the end of this year a new sanitary landfill near village Tsetsklauri, Kobuleti municipality will be commissioned in Achara, which will be managed by Achara Waste Management Company under the Ministry of Finance and Economy of A.A.R. The landfill will serve two regions, Achara A.R. and the neighboring Guria.

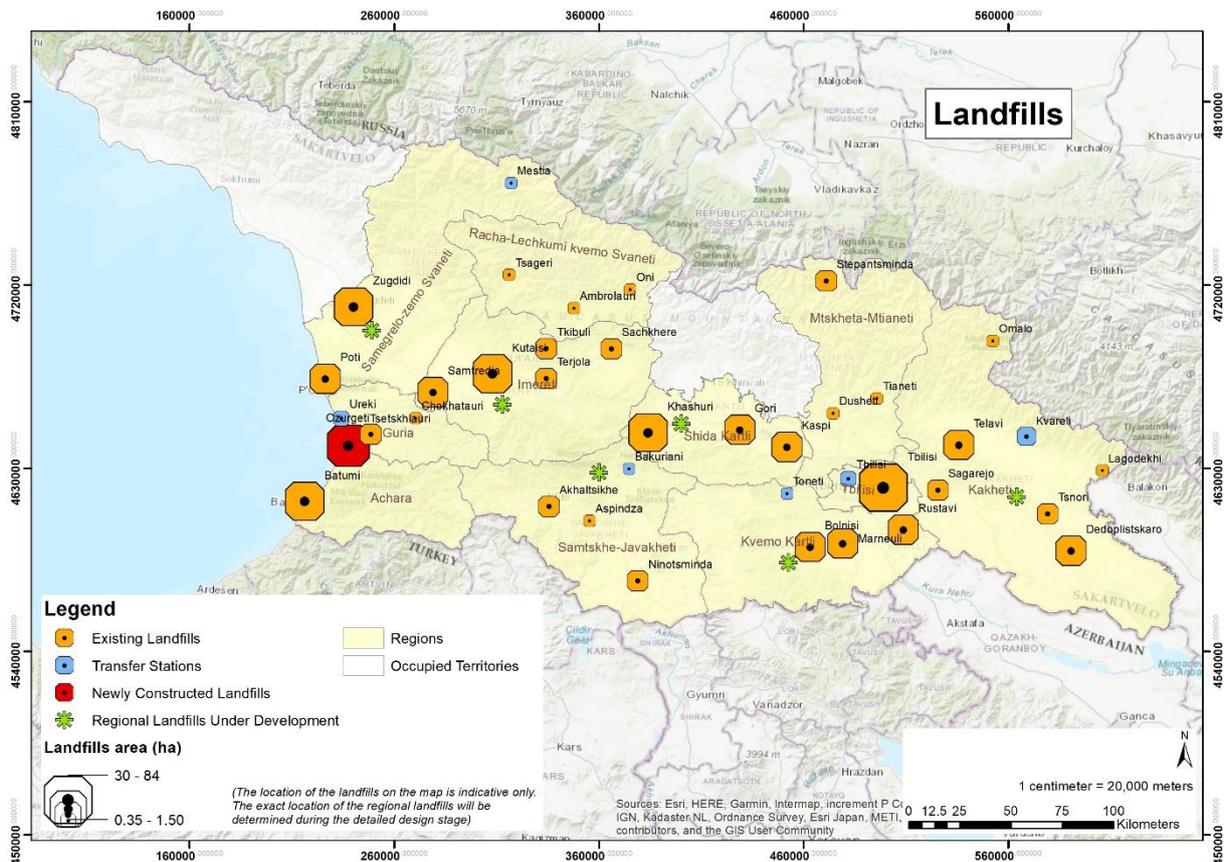
The majority of landfills operated by SWMCG serve multiple municipalities, even those municipalities, which are outside the administrative borders of respective regions. For instance, Zugdidi landfill serves Zugdidi municipality and several other municipalities of Samegrelo-Zemo Svaneti region, including Mestia, whose administrative centre is within few hours driving distance from the landfill. That's why there is a transfer station in Mestia. Rustavi landfill serves Rustavi and Gardabani municipalities. Samtredia landfill serves Samtredia and several nearby municipalities from Imereti and Samegrelo regions (e.g., Abasha, Samtredia), Marneuli landfill receives MSW from Marneuli, Tetritsaro and Tsalka municipalities. Mtskheta municipality transfers its waste to Kaspi municipality, which belongs to other Sida Kartli region.

Existing landfills are not EU-compliant sanitary landfills, operating without protective layers, leachate and gas collection and treatment systems. However, all landfills managed by SWMCG and the Tbiliservice Group are fenced and guarded 24/7. Scavengers and domestic and wild animals have no/limited access there. Regardless, many landfills have problems with birds, given food waste, including spoiled and/or expired food waste are sometimes disposed of at these landfills too based on contractual agreements between landfill operators and CIIIs. Batumi site is a typical dump, without any fence and guard. Hence, it has easy access to scavengers, stray and feral dogs and cats and cattle. Daily operations of existing sites includes waste compaction and covering the landfill with soil, except for Batumi, where only waste levelling by bulldozer happens.

Of total operating 33 landfills, only 13, including Tbilisi and Batumi landfills (the latter is typical dumpsite) have weighbridges on site, where daily data are logged and transferred to the central depositories at SWMCG, TSG in Tbilisi and Sandasuptaveba in Batumi.

With new regional landfills and associated transfer stations the situation will be changed dramatically in terms of disposal locations and travel distances. Also, it is envisaged to start waste treatment, including sorting and even biological treatment in some of the landfills (Tbilisi, Batumi, etc.). New Batumi landfill with 75,000 t/y designed capacity is almost completed and will be put into operations latest by September this year. Tbilisi landfill is being rehabilitated to upgrade leachate collection and treatment system. In addition, TSG considers putting on gas collection and treatment system too through its own and other donor resources. Figure 15 below shows the map of location of existing landfills and new landfill project sites, with indication of project status (for more maps on various MSW indicators by municipalities and regions please see Annex 11).

Figure 12. Map of the Landfills



There are five active transfer stations (Mestia, Ureki, Borjom-Bakuriani, Manglisi and Kvareli) operated by SWMCG and one (Beliashvili street) station operated by TSG in Tbilisi, serving three administrative districts/precincts of the city. With EBRD's assistance existing Tbilisi transfer station will be rehabilitated and a number of new stations will be built within the ongoing solid waste management projects.

Concerning disposal of C&DW, the vast majority of municipalities don't have C&DW landfills, subject to EIA and environmental permitting (decision). Regardless, the municipalities have an authority to allocate land plots without any environmental permit for storage of inert wastes for further beneficial uses (backfilling and landscaping). However, almost all municipalities don't have such plots therefore, C&DW are stored by companies on private lands, dumped illegally or disposed in municipal landfills by direct agreement with landfill operators. One of the largest C&DW site exists in Tbilisi, Gldani district where such wastes from CIs (Companies and Institutions) are disposed of together with park and garden waste.

Illegal dumping. Municipalities are in charge of carrying out inventories of illegal dumpsites and implementation of cleanup and remediation measures. Given the fact that MSW collection service coverage is poor in rural areas, local communities not connected to the centralized MSW collection service, dump their household waste in nearby locations (gullies, river banks, roadsides, etc.). In urban areas, the situation is better though there are few larger mostly, inert waste dumpsites that need sizable efforts for cleanup and remediation. Absolute majority of target municipalities do not have detailed dumpsite inventories. Of all existing inventories, only couple of them contain data on site locations with GPS coordinates, total area occupied by dumpsites and approx. quantities/volume of the waste accumulated there. According to various donor projects assessments (e.g., Sida Key Georgia Tidy, UNDP PMS, WB SWSA, etc.) there are over 1,100 dumps across the country with roughly up to 200 ha area. These are mostly dumps with accumulated mixed household waste and C&DW. The largest and the most dangerous dumpsite, which is currently operational as non-compliant existing landfill is Batumi dump, mentioned above. There are also two sizable dumps in Kobuleti municipality

with four to eight ha area each. Currently, preparatory works for the closure and remediation of these three dumpsites are carried out under EBRD Batumi Solid Waste Project Due Diligence Project. Tbilisi old Gldani landfill and Gldani C&DW temporary disposal site are also big dumps, which need proper closure and site remediation in the nearest future.

Table 15. Data on Illegal Dumpsites

Region/City	Closed Dumpsites	Existing Dumpsites	Approx. area, ha
Achara A.R.	96	244 small	1.2 ha
		3 large	~40 ha, including Batumi dump
Mtskheta-Mtianti	66	41 (50 according to UNDP PMS project baseline study)	4.4 ha (3.125 ha according to UNDP PMS project baseline study)
Shida Kartli	85	26	22 ha
Imereti	144	104 (103 according to UNDP PMS project baseline study)	1.7 ha (1.5 ha according to UNDP PMS project baseline study)
Racha-Lechkhumi Kvemo Svaneti	53	231	4.9 ha
Kakheti	66	164	41.5 ha
Samegrelo-Zemo Svaneti	131	156	1.9 ha
Guria	45	Unknown	7 ha
Samtskhe-Javakheti	80	51	17.1 ha
Kvemo Kartli	88	24 (22 according to UNDP PMS project baseline study)	17.6 ha (16.2 ha according to UNDP PMS study)
Tbilisi	Not available	9, including Gldani C&DW disposal site	Not available

Source: Sida Keep Georgia Tidy; UNDP PMS project; WB SWSA questionnaire survey

2.6.4 MSW Prevention

Food waste. In Georgia, waste prevention practices have limited application. The largest biodegradable stream – food waste (food remains) generated by households, green markets, supermarkets, hospitality facilities, organizations/services ends up almost entirely in existing landfills or illegal dumpsites. Legal-regulatory, policy and institutional barriers in the area of food prevention, discussed in section 3.4.1 above, including those related to food/feed safety and taxation, hinder wider application of food donation or use of food waste as an animal feed, except for cases when individual rural households feed their livestock and/or pets with food remains.

Some local municipalities operate social canteens, with Tbilisi having the largest number of such facilities (in total, 62 facilities in 10 districts of Tbilisi City), serving over 40,000 socially vulnerable people. However, they do not accept food donations. Some charity organizations, including Catharsis and Caritas Georgia have social kitchens (e.g., Humanitarian Soup Kitchen by Caritas Georgia), with

some food donation practices from citizens and schools. Georgian Orthodox Church, distributes food among numerous congregants as well as beggars after church services and holy days.

Recently, certain positive behavioral changes have been observed among Georgian customers, with increased application of taking away of remaining food (so-called “doggy bags”). Also, gradually traditional Georgian multi-meal dinners are being replaced by single meal ones. This is becoming a prevailing practice among Millennials³³ and representatives of Z generation³⁴ especially, in urban areas and tourist spots.

In some cases, remaining food is used for feeding the staff of restaurants and cafeteria. Under COVID-19 regulations, many hotels, cafes and restaurants have replaced their buffet menu with a single meal/meal package menu. With the latter, food order is more targeted and there is lesser chance to generate big amounts of food waste. Several supermarkets sell food products, which are close to the expiration date, at discounted prices. More better food planning is practiced by public kindergartens operated and funded by local municipalities as well as by event-managers. Some civil society organizations and civic activists have started practicing “Social Fridge”. Such facilities have emerged in the streets of different municipalities, with a purpose of fighting hunger among marginalized group members, through food donations.

Food and Agriculture Organization (FAO) of the United Nations is working towards this direction by bringing together governmental agencies, charities, and supermarkets to address financial implications of food waste, create effective redistribution models, and overcome the legal barriers. Caritas has cooperation with one branch store of the Carrefour Georgia and once in a week they are providing products with damaged labels at a very low price. Occasionally, Caritas receives food donations from population and/or schools.

Paper waste. With paper waste, there is some practice of source separation by couple of municipalities (e.g., Tbilisi, Batumi, Mtskheta, Tskaltubo, Kutaisi, Akhaltsikhe), public institutions, civil society organizations and CII. But this is done only at very limited scale.

So far, the largest source separate collection and recycling initiative for paper is attributed to Palitra Media Holding uniting 14 print editions, more than 20 information and e-commerce websites, radio, TV, publishing house, chains of the books and toy shops, printing house, paper distribution company, paper enterprise, advertising and event companies. Since 2012, the company has been actively engaged in environmental protection activities through the project “Maculiterature”, under which everyone can bring the waste paper to the collecting center. One kg of waste paper equals one point. The points are collected on the special card, which is provided by the company. Points can be exchanged in the new book. Up to 8,823 t of paper waste has already been collected through the project during the period of 2012-2020.³⁵

Apart from Palitra Media Holding, there are a number of smaller printing and publishing houses which collect and recycle paper waste.

³³ Millennials, also known as Generation Y (or simply Gen Y), are the demographic cohort following Generation X and preceding Generation Z, with early 1980s as starting birth years and the mid-1990s to early 2000s as ending birth years, with 1981 to 1996 being a widely accepted defining range for the generation

³⁴ So-called “zoomers,” the demographic cohort succeeding Millennials and preceding Generation Alpha, with mid-to-late 1990s as starting birth years and the early 2010s as ending birth years

³⁵ Source: <https://www.palitravideo.ge/yvela-video/eqskluzivi/119656-proeqti-qmakuliteraturaq-uprecedento-aqcias-itsyeb.html?fbclid=IwAR0ziWwbrLaQ4-Jrqrav5yI3zVxKonfpHccaorUPEjyZwtIwvJg-Ao7Br50>

One of the strongest paper prevention mechanisms worldwide is E-governance and E-participation. According to 2020 UN e-governance survey, Georgia's e-government score stands at 0.72, which puts it at the 65th place among 193 countries. In terms of e-participation, in 2018, Georgia scored 0.62 points and ranked 87th. By 2020 this figure has increased to 0.64, and the country's position in the global ranking has risen from 87th to 80th place³⁶. While e-decision making and electronic services are pretty much developed in Georgian private sector particularly, in banking sector (e.g., e-banking), e-governance in public sector is still underdeveloped especially, in rural settlements and municipalities. Moreover, only 63 percent of Georgia's population uses internet and other means of telecommunication, with the major portion of users concentrated in urban areas. In rural areas telecommunications infrastructure is still underdeveloped (Please see annex 2.3 for an indicative list of e-platforms, portals and databases).

In 2017, GoG launched a nationwide e-petition portal ICHANGE.GOV.GE, through which citizens have started submitting petitions to the government. That has been a remarkable step forward towards e-participation. However, the current level of application of the portal is very low, due to the inefficiency of the system and low awareness of population³⁷. It is noteworthy to mention that under COVID-19 restrictions, e-decision-making and e-participation have been gaining greater attention and application among government agencies and non-public sector. In 2020-2021 e-participation was and still remains a prevailing mode of public participation among all institutions. Georgia may catch a momentum and capitalize on this experience.

Bulk waste. Despite the absence of strong legal-regulatory, policy, and financial support for prevention and reuse of bulk waste, Georgian families usually keep their bulky items—including furniture, large electronics, and electric equipment—as long as possible. Due to the poor economic situation, average households do not tend to renew large items often. When they do, donation to other families or friends is the common practice. Less often used bulk items are sold online or in second-hand shops and markets (e.g., in Tbilisi). The government's bulk items are either donated to third parties or sold at state auctions.

Plastic bags. The annual per capita consumption of plastic bags in 2014 was around 525. Georgia businesses estimate between 60,000 and 100,000 bags/month are currently consumed, of which about 60 percent are produced locally and the rest are imported.³⁸

A technical regulation on polyethylene bags, enacted in 2018, prohibits single-use plastic bags (with few exceptions) and requires multiple-use bags/biodegradable/compostable bags. The regulation sets phased restrictions on the production, import, and trade in single-use plastic bags. Biodegradable/compostable bags must conform to the EN 13432:2000 standard and be properly labeled. The national environmental lab of the Environmental Pollution and Monitoring Department, National Environmental Agency (NEA) is preparing to meet that standard. Imported bags are checked based on their certificates of origin (certificates are issued by relevant Italian and Austrian certifying bodies). Locally produced bags must also comply with the regulation. MEPA's Environmental Supervision Department is responsible for overall control. Local municipalities have responsibility for

³⁶ Source: Georgia in the UN E-Government Survey – Review of 2020 Results. IDFI (Institute for Development of Freedom of Information). <https://idfi.ge/en/e-governance-e-participation-georgia-index-2020#:~:text=According%20to%20the%202020%20assessment,with%20a%20score%20of%200.69>

³⁷ Ibid.

³⁸ Source: Phone interview with Ms. Kristina Vardanashvili, Waste and Chemicals Management Department, MEPA.

products put on their markets. At this time the enforcement of the Waste Code and related regulations is inadequate. The capacity of national laboratories to check bags properly is limited, and must be expanded. Violation of the regulation carries a 500 GEL fine and the offending product is confiscated. Repeated violation is subject to a 1,000 GEL penalty.

There are no official economic incentives such as a product tax on plastic bags. However, some supermarket chains assess 0.01 GEL for plastic bags and others charge a higher price to discourage plastic bag use. At the cashier's counter of every supermarket customers are asked whether they want a plastic bag or not and pay accordingly. Big chain stores offer textile bags—hanging and visible—at the cashier's counter. In a few supermarkets, multi-use canvas/textile bags are given gratis when a customer buys a certain amount of goods. In other shops, shopping malls, or pharmacies, paper bags are offered as alternatives to plastic bags. A very few supermarkets have completely switched to paper bags (e.g., Europroduct). Customers do not pay for paper bags. The textile bags are gradually becoming more popular; but plastic bags still dominate in shops and markets, probably due to ease and habit.

The Environmental Information and Education Centre is an independent, legal entity of the Ministry of Environmental Protection and Agriculture responsible for environmental education, awareness, and training in Georgia. The Centre is in Tbilisi, where it hosts conferences and training. The Centre's activities reach all of Georgia. It cooperates internationally with various authorities and donors. The centre promotes the elimination of plastic bags through awareness and education campaigns. It has launched some isolated activities in Georgia, but these were not part of a comprehensive, on-going effort. A few private initiatives are underway. For example, the chain store "2 Steps" currently prepares and distributes fliers about the impact of biodegradable and textile bags, and their stores have informative posters on the subject.

Other plastic items and packaging. At present, there are no restrictions on the use of plastic packaging or SUP utensils. However, online shops and delivery services that have emerged and grown popular under COVID-19 restrictions (e.g., Bolt, Wolt, etc.), ask customers whether they need cutlery and packaging when ordering at restaurants and fast-food outlets.

With the enactment of a bylaw on packaging waste, a plastic packaging EPR system will be introduced for paper, plastic, metal, glass and wood packaging through DRS and simple recycling schemes.

The NGO "CENN" has implemented a social media campaign on plastic waste reduction called Say No To Plastic.

Thus far, most supermarkets have not conducted promotional or educational programs on plastic waste reduction.

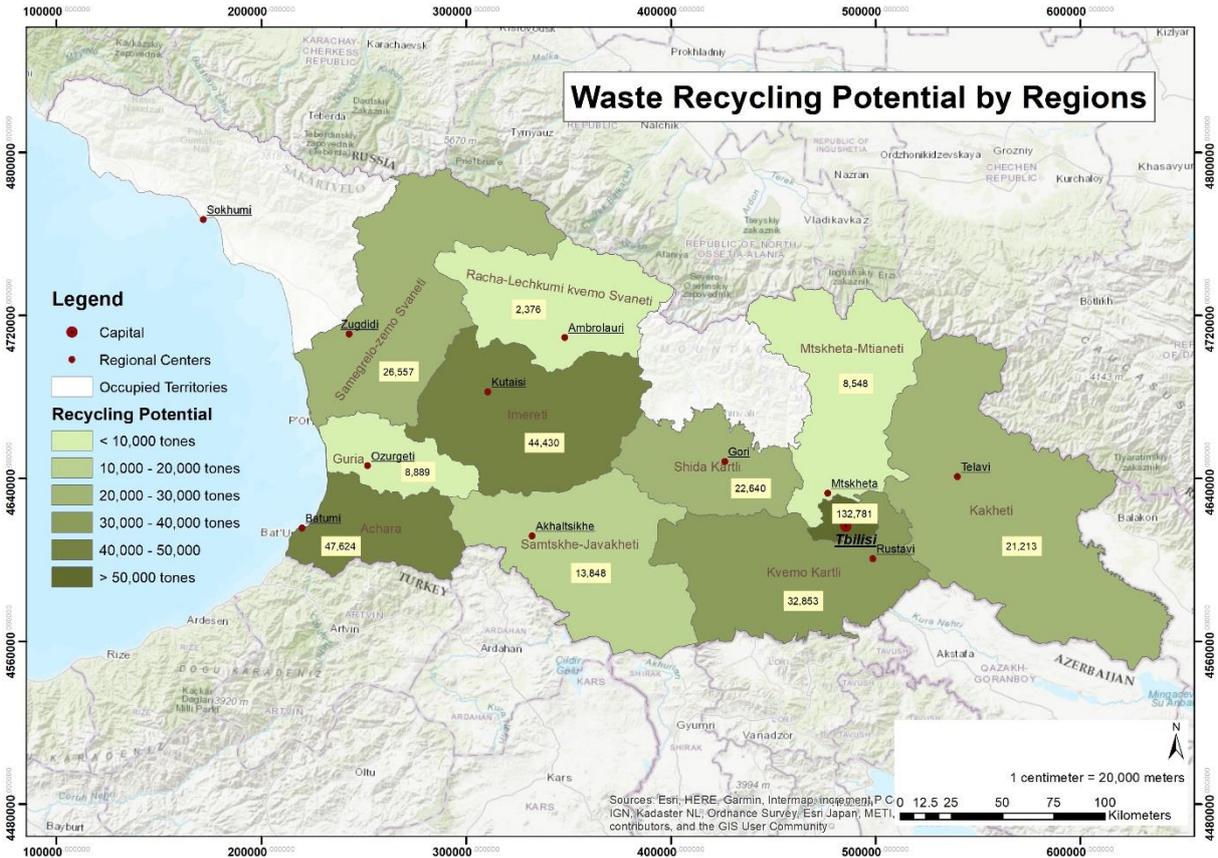
Recycled consumer goods and secondhand shops for various items. The secondhand business is thriving in Georgia, though it predominantly trades in clothes imported from the EU and the US. There are several goods exchange e-platforms—such as www.mymarket.ge. Through this and other Georgian websites people sell books, clothes, shoes, accessories, household equipment, and so on. Some of these products are old or used. There are also Facebook groups where one can sell and purchase used items, clothes, technical items, etc. The Dry Bridge flea market sells rare historical items, handmade jewelry, silver cutlery, and various knickknacks. There are also a few bookstores selling secondhand books in Tbilisi's old City center. The civil society sector has organized some campaigns to collect clothes for socially vulnerable people. Private sector initiatives also exist such as H&M (Hennes & Mauritz AB) clothing store offering customers a discount when they bring in old clothing for recycling.

2.6.5 Waste Recycling and Recovery

2.6.5.1 Recycling and recovery existing and potential capacities.

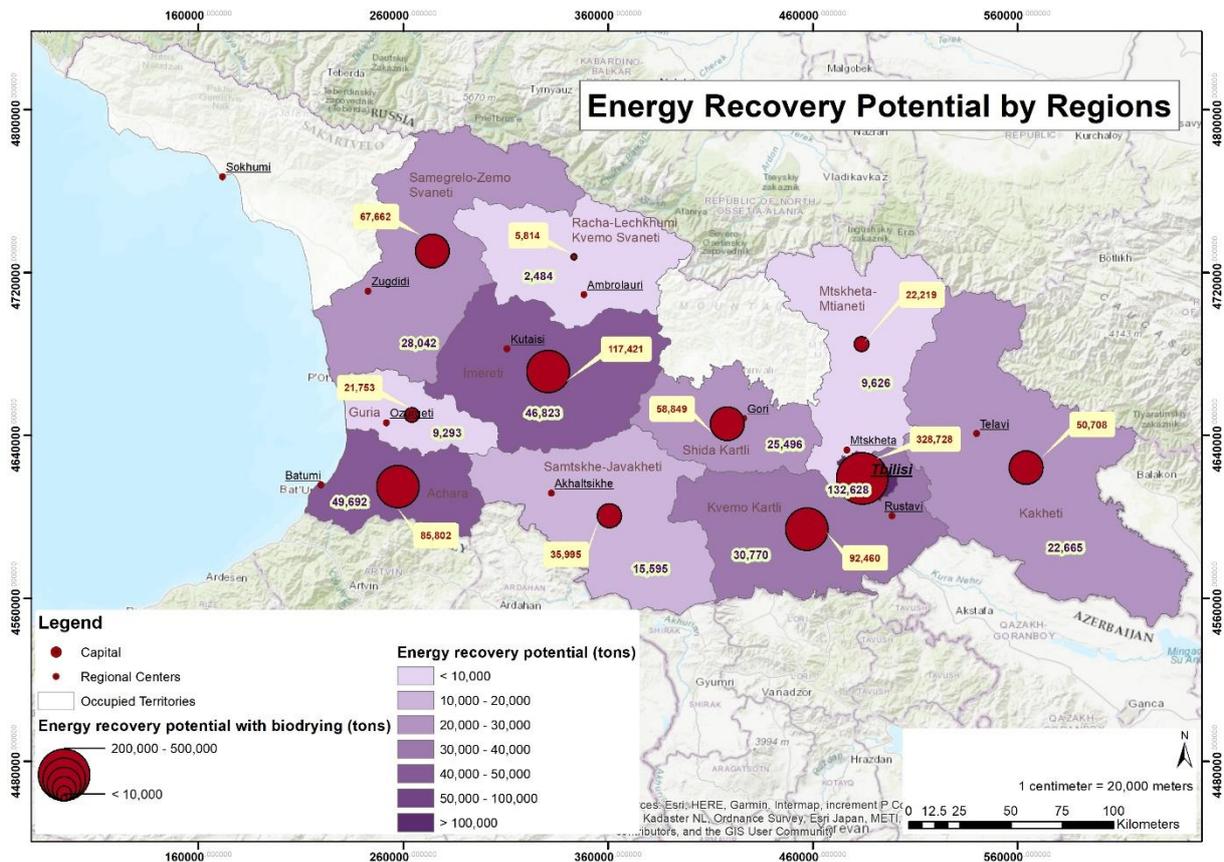
According to 2019 estimates, Georgia’s total recycling potential is 361,759 t of dry recyclables, of which 228,977 t (63.3 percent) is attributed to regions and 131,781 t (36.70 percent) to Tbilisi. Among the regions, Achara has the highest potential, followed by Imereti, Kvemo Kartli, Shida Kartli, Samegrelo-Zemo Svaneti, and Kakheti. By 2025 total recycling potential will increase to 406,233 t/y, with 246,642 t/y attributed to regions and 159,591 t/y – to Tbilisi (WGI urban 1.6% and WGI rural 0.8% annual average growth scenario).

Figure 13. Estimated 2019 Waste Recycling Potential by Regions, t/y



Energy recovery potential without biodrying is 373,115 t/y, of which 240,486 t/y (~64.45%) is attributed to regions and 132,628 t/y (~35.55%) – to Tbilisi. By 2025, total waste to energy recovery potential will increase to 418,273 t/y, of which 258,866 t/y (~61.89%) will be attributed to regions and 159,407 t/y (~38.11%) – to Tbilisi. For energy recovery with biodrying the potential makes up 887,410 t/y, of which 558,682 t/y (~62.96%) is attributed to regions and 328,728 t/y (~37.04%) – to Tbilisi. By 2025, total energy recovery potential with biodrying will increase to 994,512 t/y, of which 599,412 t/y (~60.27%) will be attributed to regions and 395,100 t/y (~39.73%) – to Tbilisi.

Figure 14. Estimated 2019 Waste to Energy Potential with and without Biodrying by Regions, t/y



Large municipalities—such as Tbilisi, Kutaisi, Rustavi, and Batumi—have relatively high recycling and energy recovery potential compared to smaller rural municipalities, and therefore may consider attracting investments for facilities to process waste from only their own municipalities. However, taking a regional approach is the most efficient way to acquire costly recycling and recovery technologies, and regional facilities can be built and operated only through intermunicipal cooperation or strong public-private partnerships. Also, material recovery efficiency depends on the type of waste collection system (e.g. mixed waste collection system, 2 or more-container collection system, etc.).

As mentioned above, few municipalities are conducting source separation of MSW streams, and the scale of these operations is quite limited. Therefore, there are no recycling and recovery plants for the MSW collected by these municipalities. There exist, however, several plants with the potential to recycle dry fractions of MSW in Tbilisi, Kvemo Kartli, Imereti, and Achara, or which are currently performing recycling activities which, in principle, can process dry recyclables from nearby municipalities. (See Annex 11 for a list of facilities with potential for handling dry recyclables or treating hazardous waste.) USAID/CENN WMTR-II recently provided up to 150,000 USD in grants to active and promising companies, including:

1. Ltd Zugo (plastic recycling, five to six t/m actual capacity)
2. Ltd Krialia (paper recycling, 290-320 t/m actual capacity)
3. Ltd Georgian Paper Production (paper recycling, 440-460 t/m actual capacity)
4. Ltd Ecogeo Pet (PET recycling, 50-60 t/m actual capacity)
5. Ltd Kere (glass recycling, 520-550 t/m actual capacity)
6. Ltd Clean World [Supta Samkaro] (dry recyclables separate collection, collection rates above).

2.6.5.2 Potential markets for compost and recyclables³⁹

In general, Georgia’s current recycling market is extremely thin. However, it should grow once EPR schemes for six specific waste streams—including packaging—are put into practice. Besides, with the commissioning of new landfills, treatment—including pre-treatment of waste before disposal—will become mandatory and will force landfill operators to set up on-site facilities, including Material Recovery Facilities (MRFs).

Today recyclables collected separately on-site by municipalities or recovered by SWMCG through MRFs (Rustavi landfill) are sold at public auctions.

Table 16. 2016 Auction Values of Recyclables from Rustavi (Source: 2016 data - KfW/PEM Project No.: 202061364; 2018 data - SWMCG)

Recyclable type	Average price, GEL/ton (including VAT)	
	2016	2018
PET (plastic bottles – not compressed)	250	260
Cardboard	120	125
Glass	70	-
Ferrous Scrap Metal (not compressed)	100	-
Non-ferrous Scrap Metal (not compressed)	1100	800
Plastic (other than PET)	300	312

Glass. The market for glass is good, due to a well-developed, local glass production industry with high demand for glass. Based on official statistics, annual local glass production grew from 33,300 t/y in 2013 to 86,900 t/y in 2017. JSC Mina—a glass producer in Ksani, Mtskheta Municipality, with a capacity of 60,000-70,000 t/y—has nearly 100 percent of local market share. It uses 9,000-20,000 t/y of crushed glass (cullets) in its production cycle. These cullets are currently produced from waste glass by LLC Kere. Georgia has nine glass producers, eight of which are small, individual entrepreneurs who essentially collect glass bottles. The largest glass importers are alcohol and drink producers.

Mixed waste glass currently sells for about 82 GEL/t. The quality of furnace-ready cullets is generally measured according to ceramics, stones, and porcelain (CSP) standards. Mina does not use CSP criteria yet, but this will change once higher percentages of glass are introduced to its furnaces.

Plastics. Local producers of plastic items/goods mostly use imported plastic material mixed with primary plastics. The main importers are plastic packaging materials’, food, and beverage producers.

³⁹ Source: 1) Market Review Recyclables. August 2016, PEM GmbH in association with INTECUS and Gamma, Integrated Solid Waste Management Kutaisi, Consulting Services for Accompanying Measures, German Financial Co-operation with Georgia, BMZ No.: 202061364; 2) Recycling Study, Options Analysis, December 2018, PEM in association with INTECUS and Gamma, Solid Waste Management Kutaisi. Consulting Services for Accompanying Measures, German Financial Co-operation with Georgia, BMZ No.: 202061364. 3) Baseline Report, January 2019, Technical assistance for the improvement of waste management systems in Georgia (EuropeAid/138609/DH/SER/GE).

Plastic from Turkey, Russia, Azerbaijan, and EU countries dominate imports. The majority of plastic materials are PET bottles. According to official statistics, local plastic production varied from 15,200 t/y in 2013 to 25,400 t/y in 2017.

According to a 2018 survey conducted by PEM consultants under the KfW Integrated Solid Waste Management – Kutaisi project, eight to 10 local companies sort, bale, grind (flakes), and extrude (pellets) plastic. Half their output is exported to foreign end-users. Prices of plastic recyclables range from 300-900 GEL/t (delivered) for plastic films to 200-500 GEL/t for bottles. Mixed films and bottles cost less than 100 GEL/t.

Table 17. Major Importers, Producers, and Recyclers of Plastic Materials

Producers	Importers	Recyclers
<ul style="list-style-type: none"> JSC Caucasus PET Company (Borjomi) Ltd Alfa PET Ltd Mega Plast Ltd PET Ltd CaucasPack Ltd GeoCep Ltd Georgian Plastic Production 	<ul style="list-style-type: none"> Ltd Alfa PET JSC Caucasian PET Company Ltd CaucasPack Ltd GeoCap Ltd Bumba Ltd GoldPack Ltd GreenPack 	<ul style="list-style-type: none"> Ltd LMY Ltd Eco Sphere Ltd Supta Samkaro Ltd Iga Georgia Ltd Zugo

Two recycling companies—Ltd L.M.Y and Ltd Zugo—can recycle about 7.5 percent of Georgia’s total plastic waste.

Paper and cardboard. Local production of different types of paper and cardboard (including packaging materials) is relatively well-developed in Georgia. Most raw material is imported. Production runs from 2,600 t/y (2013) to 10,000 t/y (2020). According to official statistics, in 2017 there were 49 registered paper-producing companies in Georgia. Of these, 27 (55.1 percent) were considered active. Five are individual entrepreneurs.

The main importers of paper and cardboard are food and beverage production companies, and big retailers.

According to 2017 estimates by the USAID/CENN WMTR-II project, some 12 percent of paper waste is collected and recycled in Georgia. Eight to 10 companies actively recycle paper and cardboard; most of them only sort, bulk, and trade. At least three of these companies actually create recycled paper products—mostly table tissue, toilet paper, and cardboard boxes. Their combined capacity is currently around 20,000 t/y, and they indicate they can grow.

Prices for paper supplies range between 100 and 350 GEL/t delivered and between 70 and 250 GEL/t for cardboard.

Minor contamination of the paper received is not a problem, but inspection and pre-sorting may influence prices paid.

Export and import of paper waste does not yet play an important role (by volume).

Table 18. Main Producers, Importers, and Recyclers of Paper in Georgia

Producers	Importers	Major Recyclers
<ul style="list-style-type: none"> Ltd Georgian Cardboard Ltd Tissue Paper Ltd Neo Print (Tserovani) Ltd Green Pack Ltd Legi Group 	<ul style="list-style-type: none"> Ltd Askaneli Brothers Ltd Kakheti Traditional Winemaking Ltd Tkbili Kvekana Ltd Teliani Valley Ltd Chirina 	<ul style="list-style-type: none"> Ltd To-pa Ltd Georgian Paper Production Ltd Legi Group Ltd Kaghaldi + Ltd Supta Samkaro

<ul style="list-style-type: none"> • Ltd Georgian Paper Production • Ltd Supta Samkaro 	<ul style="list-style-type: none"> • Ltd Dila Products • Ltd ADS Borjomi • Ltd Alfa PET • Ltd EcoPack 	<ul style="list-style-type: none"> • Ltd Tissue Paper • Ltd Neo Print • Ltd Roni
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Metals. While there are numerous schemes for scrap and other metal collection in Georgia, the quantity of metal deposited at landfills is negligible. Most collectors are either unregistered individuals or registered entrepreneurs who collect ferrous scrap for supply to local producers or exporters.

In 2017, there were 40 companies with a primary focus on collection and processing of ferrous metals. The overwhelming majority of these companies only collect and do not process/recycle metal waste. A total of 230 companies registered as local metal producers in 2017, of which 109 were individual entrepreneurs, 115 were limited liability companies, and four were joint stock companies. The main importers of metal packaging are beverage (alcohol and non-alcohol) producers and retailers.

Local metal production from 2013 to 2017 ranged between 19,500 t (2013) and 3,700 t (2017) . The 2013-2017 trade balance for scrap was negative, varying from -15,400 t (2013) to -1,000 t (2017). The import of scrap was insignificant, lagging by a dramatic factor of 1,000 behind export, meaning most scrap collected locally was sent abroad. Similar trends presumably prevail at present. Annual production of the biggest company (Ltd Geosteel) is 175,000 t, most of which is from scrap.

The Statistical Office does not separately record aluminum packaging production. According to the 2016 WMTR report, “Aluminum and zinc have never been produced in the country. However, a number of companies manufacture aluminum dross through recycling of aluminum scrap. The total annual output of these companies exceeds 4,800 tons.”

Table 19. Major Producers, Importers, and Recyclers of Metal

Producers	Importers	Recyclers
<ul style="list-style-type: none"> • Ltd Geosteel • Ltd Georgia steel miles limited • Ltd Lego Metal • Ltd MMG • Ltd Molds and Metals Georgia 	<ul style="list-style-type: none"> • Ltd Coca-Cola Bottlers Georgia • Ltd ADS Borjomi • Ltd Lomisi • Global Beer Georgia 	<ul style="list-style-type: none"> • Ltd Geosteel

Iron and steel scrap command 350-400 GEL/t and aluminium scrap sells for 500-800 GEL/t.

Wood. Producers of wood packaging materials are mainly small enterprises and individual entrepreneurs. According to the producers’ online registry maintained by Georgia’s National Statistical Office, in 2017 there were nine registered individual entrepreneurs, one larger joint-stock company (JSC), and three smaller limited liability companies (LLCs).

Table 20. Major Wood Pallet Producers

Company Name	Type of Ownership
Professional Viticulture Products	JSC
Chemi Otakhi (My Room)	Ltd
G.R. Busienss Group	Ltd
Agro Tara	Ltd

Wood pallets are the primary local product. They are mainly used pallets that are repaired/renovated and supplied to major consumers. Annual local production from 2013 through 2017 was 1,400-3,600 tons of product, with peak production reported in 2015. Most of the wood producers are in Khashuri and Gori municipalities, and produce pallets for the Ksani glass manufacturing plant Mina.

Biodegradable waste. The local market for compost is at present negligible because Georgia has neither enough demand nor supply of compost and its products.

Local municipalities and their cleaning/amenity services—with few exceptions—do not collect biodegradable waste separately. Park and garden waste, generated mostly in urban areas by tree cutting and trimming, lawnmowing, and grass cutting are transported directly to landfills and not placed in containers. Larger logs are donated to socially vulnerable families, schools, and kindergartens to be reused as wood fuel. Rural residents do not commonly produce backyard compost from biowaste, though in Kakheti and other rural areas many farmers apply mulching practices.

Recently, the Tbilisi Ecoservice Group/TCH—with the support of EBRD Tbilisi Waste Strategy Project consultants—has begun composting green waste generated by public green space maintenance. The company plans to produce mulch for reuse in parks and gardens. Furthermore, the Tbliservice Group is considering starting separate collection of green waste from single housing neighborhoods in the city, using separate green containers. The Batumi Greening Service—with help from EBRD consultants—plans to make compost similar to Tbilisi’s Ecoservice Group. Marneuli compost plant produces 40-57 t pure compost from green biowaste collected at local agrarian markets and a canned food factory. To accomplish this, it operates a municipal composting facility. The plant—which contains a mechanical mixer, a shredder, and a grading sieve—is located on two ha 10-15 km from Marneuli City. One ha is used for composting. The designed capacity of the plant is approximately 5,000 t/y of waste recycling (i.e., compost production). Aerobic decomposition is used, involving organic matter, moisture, oxygen, and aerobic bacteria. Maturation of the compost takes two to three months. The plant produces five types of products, including pure compost and its derivatives (e.g., pot plant soil, outdoor plant soil, etc.). Products are packed for market in five, 10, 20, and 30 l bags. The product is primarily sold in hypermarket Gorgia. Other similar hypermarkets as Domino, Agrohubs, and Goodwill are potential retailers for Marneuli compost and its derivatives. All the products of the Marneuli factory are certified by MEPA’s central laboratory. Marneuli compost sells for 0.9 GEL/l, peat compost is 0.7 GEL/l, and composted soil costs 0.4 GEL/l.⁴⁰

Under project BSB 457—“Rivers without Waste – Clean Black Sea”—in 2019 Kutaisi Municipality started construction of a green waste composting facility having a total area of 3,024 m². The plant is designed to produce 1,020 t of finished product by composting 10,000 m³ of green waste. The municipality has bought a tractor (with a mixer, shredder, and sieve) and a specialized, heavy-duty vehicle.

In addition to the above initiatives, donors have helped implement some pilot composting projects. In 2017-2018, UNDP’s Global Environmental Facility (GEF) gave grants to rural communities in Kakheti, Samegrelo, and Guria, including to schoolchildren piloting home composting. Ecoclubs in secondary schools and community-based organizations received microgrants to make home compost. Various USAID environmental and WMTR projects supported a number of awareness and on-the-ground pilot initiatives for home composting and vermicomposting (biohumus).⁴¹

C&DW. Although the rate of construction—especially in large cities and tourist destinations—and the quantity of C&DW are high in Georgia, the market for C&DW recyclables is virtually nil.

⁴⁰ Source: phone interview with the Marneuli composting plant director

⁴¹ Biohumus is a product of decomposition using various species of worms—usually red wigglers, white worms, and other earthworms—to create a mixture of decomposing vegetable or food waste, bedding materials, and vermicompost.

2.6.6 Law Enforcement, Public Awareness, and Participation

Law enforcement. Whether they have a police department or not, very few of Georgia's municipalities—Mestia, Tsalenjikha, Zugdidi, and Mtskheta among them—enforce the parts of the WMC that fall under local authority (such as levying administrative penalties for littering, illegal dumping, open waste burning, etc.) or keep statistics on such violations. Zugdidi Municipality stands out for its online citizens' monitoring mechanism through which residents can report illegal dumping and littering for further action by the Municipality.

Public awareness and participation. Almost no municipal cleaning/sanitation service has a separate public information unit or budget earmarked for public awareness and engagement. Public participation is generally limited to periodic (mostly annual) cleanups involving selected groups of civil society. Very few municipalities (e.g. Zugdidi, Mtskheta, Mestia)—hold periodic awareness programs and campaigns targeting the general public or specific audiences such as local businesses, schoolchildren, and teachers. These programs include consultations, seminars, media campaigns, printed outreach materials, etc. All ongoing donor projects in SWM—and particularly in MSWM—have sizable public outreach components, either as standalone projects or separate parts of existing projects. The largest current awareness and stakeholder engagement components are associated with the construction or rehabilitation of sanitary landfills, supported by EBRD and KfW. Local NGOs like RECC and GEO are actively engaged in such activities as implementing partners. The EU has recently completed a largescale awareness raising project, with a focus on waste littering and EPR. Moreover, the EU is currently preparing Terms of Reference (ToR) for the next phase of technical assistance to the GoG in the field of municipal waste management. Public awareness will be a key project component.

At the local level, most municipalities—except Tbilisi, Zugdidi, and Mtskheta—have no citizen reporting or grievance redress mechanisms and keep no records of citizen reports. Mtskheta Municipality keeps track of citizens reports related to MSW collection, street cleaning, and littering. As mentioned above, Zugdidi has an online reporting tool, though it does not keep official statistics on the reports received and addressed. EIEC/MEPA has a special page (<http://www.eiec.gov.ge/MenuCenter/ElectMess.aspx>) on citizens' notifications, where anyone can report alleged violations/illicit actions. The Tbilservice Group has a hotline, which needs an upgrade to meet the needs of customers. In addition, the company intends to establish an online help/support desk for citizens.

2.6.7 Knowledge Building, Learning, and Information Management

The following MSWM-related information/data and databases and/or registries are available in Georgia:

- Nationwide: a password-protected WMS electronic registry at MEPA (wms.mepa.gov.ge), where CIIs, municipalities, and the SWMCG post their annual reports on waste quantities collected and types, waste quantities treated, waste quantities landfilled, and data on waste treatment/recycling facilities holding environmental permits (<http://maps.eiec.gov.ge/>)
- Regions: an electronic landfill database managed by the SWMCG, including 2017-2021 data on landfills, CIIs and municipalities transferring and disposing MSW at landfills, registered vehicles disposing waste, daily, monthly and annual quantities of waste disposed and waste types/categories, payments made by CIIs, and resources: HR, finances, and infrastructure
- Tbilisi: a TSG-managed electronic landfill database consisting of information on daily, monthly, and annual quantities of waste registered and weighed at the landfill gate, RCVs transferring and disposing waste, quantities and types of CII waste—including C&DW and fee payments, an electronic GIS-compatible database on container numbers, type and locations, routes, odometer records and fuel consumption, and resources: HR, finances, and infrastructure, and revenues collected from households and CIIs

- Achara/Batumi: a landfill database managed by Batumi Municipality consisting of information on daily, monthly, and annual quantities of waste registered and weighed at landfill gates, RCVs transferring and disposing waste, quantities and types of CII waste—including C&DW and fee payments, container quantity, type, locations, and routes
- Municipalities: annual quantities of MSW collected, the MSW collection rate by urban and rural areas, dumpsites (partial data), number, type and locations of containers, resources, collection schedules and routes, and revenues collected

In addition to above, MEPA has recently launched a password-protected electronic producers' registry, which is currently undergoing Beta testing.

To build knowledge and stimulate learning, MEPA's Environmental Information and Education Center (EIEC) offers regular, certified training on waste accounting and reporting for Environmental Managers of CIIs. The program covers key legal-regulatory aspects of MSW and commercial waste, as well as aspects of core horizontal legislation—such as the Environmental Assessment Code, etc. In 2018-2019, under the EU TA project an electronic training package consisting of 10 modules addressing all key aspects of MSWM was developed. Training is presented in PowerPoint and video lessons in Georgian and English. In 2019, these materials were given to EIEC, but are not being used. It is noteworthy that each donor project has learning and capacity development (CD) measures integrated in its overall project design. The largest CD component on MSWM was implemented under EU's TA project in 2018-2019. It targeted Kvemo Kartli, Mtskheta-Mtianeti, Samtskhe-Javakheti, and Samegrelo-Zemo Svaneti municipalities (and their cleaning services). The project developed training modules (PPT presentations and video lessons) for MSWM planning and implementation, and planning support tools (e.g., an Excel-based automated calculator and a MWMP template-linked calculator), and trained relevant municipality and cleaning/amenity services staff in MSWM planning, implementation, and use of the support tools. In addition, MEPA and SWMC staff learned how to use the calculator to assess separate collection infrastructure (containers, RCVs, storages, etc.) needs and their costs. The UNDP PMS project is currently establishing electronic KPI-based PMS systems for MSWM and street cleaning for 39 municipalities in six regions of Georgia.

2.6.8 Operational Challenges, Gaps, and Needs for Improving MSWM Practices

MSW planning, monitoring, and reporting. Although all target municipalities have MWMPs, these documents nearly always omit critical data and elements, including quantitative targets linked to the NWMS, action plans, and monitoring and evaluation frameworks with SMART indicators. The UNDP PMS study revealed that of 39 target municipalities in six regions, only Kutaisi has a more or less complete and high quality MWMP. The widespread deficiencies in the types and quality of MWMP data and the impracticality of the actions proposed are major drawbacks of the existing plans. Then, too, these plans are only loosely linked to budgetary processes and, therefore, are often little better than rhetorical documents. Monitoring of progress in implementing MWMPs goes largely untracked, since almost none of the municipalities have PMS systems linked to their MWMPs or the NWMS. These gaps are due to the weak or absent capacities of local municipalities (especially in the regions) to handle waste accounting, information management, and performance management—including monitoring and reporting, setting quantifiable targets in line with the NWMS, defining exact needs for the planning cycle, designing viable measures, and estimating their cost. Hence, there is a need for more capacity-building of local municipality staff in waste accounting, including waste metrics, establishing and running PMS systems linked with municipal plans and national waste strategy, MWMP planning, monitoring and reporting. (Knowledge- and learning/capacity-building gaps and needs are further discussed below.)

MSW collection and street cleaning. Central and local authorities in Georgia face many operational challenges in MSWM at the current time. Despite the remarkable improvements in MSW collection and street cleaning practices, the 2020's national MSW collection target of 90% as set out in the NWMS

was not reached, falling two percent short of the required rate. That means 75,000 more Georgians than planned went without required MSW collection services, bringing the total number without MSW collection service to more than 440,000 people. While urban MSW collection rate/service coverage is around 98 percent, in rural areas it is only about 64 percent. Tbilisi (~99 percent), Shida Kartli (~93 percent), Achara A.R. (~92 percent), and Mtskheta-Mtianeti (~92 percent) exceed the 90 percent target, while Kakheti (~89 percent) and Samtskhe-Javakheti (87 percent) come close. Kvemo Kartli had the worst performance (especially in rural areas) with only around 62 percent, followed by Guria with 71 percent, and Racha-Lechkhumi Kvemo Svaneti with around 72 percent. These figures indicate that centralized MSW collection service is not provided in rural areas or is provided on a very limited basis. This might be explained by such factors as long travel distances to villages, high fuel costs, poor road conditions, lack of containers, and smaller capacity 4X4 RCVs.

The total volume of containers and RCVs available is more than enough to collect the quantity of MSW generated by most municipalities. This was confirmed for all municipalities in the Kvemo Kartli, Mtskheta-Mtianeti, Imereti, Racha-Lechkhumi Kvemo Svaneti, Samegrelo-Zemo Svaneti, and Guria regions as well as for Tbilisi under the ongoing UNDP PMS and EBRD/TCH Tbilisi waste strategy projects. However, container and RCV volumes are not utilized efficiently. In urban areas, due to redundant MSW collection frequency, most containers are filled with MSW at less than 80 percent of the internationally recommended value (container fill rate is only around 50-70 percent). The capacities of RCVs are similarly wasted. More efficient use will create opportunities to optimize collection frequencies and routes, reallocate containers from urban to rural areas, and reassign RCVs to rural areas. Remote areas would make good use of low-capacity, four-wheel-drive RCVs and drop-off (“bell”) collection systems. Moreover, routes and schedules should be digitized and stored in GIS formats as is done for Tbilisi. Nearly all municipalities fail to track collection routes by GPS (global positioning systems), making it almost impossible for managers to control drivers’ routes schedules. GPS can also facilitate recordkeeping of fuel consumption. Furthermore, 10-20 percent of most municipality containers need replacing, yet almost no municipalities stock a sufficient safety buffer (at least 10 percent). This safety factor should be considered at times of purchase. Almost all municipalities operate open, Soviet-era trucks without compaction as RCVs for collecting street residues, bulk waste, and waste from areas with “bell” systems. These trucks should be replaced. Rustavi and Zugdidi municipalities should analyze the cost-efficiency of outsourcing their collection service versus purchasing new vehicles.

Municipality cleaning of urban public spaces far surpasses the cleaning of rural areas, which makes sense given the greater percentage of paved spaces—streets, parks, gardens, etc.—in urban areas. However, in many cities and small towns only a small part of the settlement is cleaned, and this is done laboriously by sweeping with brooms. Wet cleaning and disinfecting are not common in Georgia. Cleaning services of municipalities—especially in urban areas—must upgrade their equipment and consider using more advanced methods including vacuum cleaning, wet cleaning by special vehicles, disinfecting streets, etc. to complement traditional sweeping. Although costly and inconvenient, COVID-19 makes such changes imperative for safeguarding public health.

Dumpsite management. Inadequate knowledge, skills, and financial resources pose major challenges to dumpsite management, cleanup, and remediation in most municipalities. Local authorities should have comprehensive dumpsite inventories—listing site locations (GPS coordinates), site descriptions, area totals, approximate quantities of waste, and plans for cleanup and remediation. Few municipalities have such inventories, which are prerequisite to preparing site cleanup and remediation plans and carrying out dumpsite closures. At present, there are no nationwide guidelines on closing illegal dumpsites, which makes helping GoG and/or local municipalities develop such guidelines a high priority.

While the total number of dumpsites includes many, smaller dumps with mixed MSW and/or C&DW sites, there are a few, large dumps which need closure and serious remediation and, therefore, significant technical and financial inputs. These are Batumi’s currently non-compliant landfill and

Tbilisi's old Gldani landfill. The Batumi dump will be closed and remediated with EBRD support in the near future, while the Gldani site closure and remediation needs new TA and public/donor financing. The latter was a top investment priority listed by TSG during the consultation with this company under the given study.

Municipalities should allocate land for temporary storage/stockpiling of C&DW, and might consider building and operating C&DW recycling facilities on such sites. (Horizontal measures are discussed below in the section on prevention.)

To prevent waste dumping, enforcement agencies—including MEPA's Environmental Supervision Department and local municipality inspection departments—should improve their performance and strictly enforce C&DW dumping.

Waste disposal/landfilling. The most critical issue facing landfills is their failure to control leachate waters and landfill gas, due to the nearly complete absence of leachate and gas collection and treatment systems and the failure to treat biological waste on site. New, regional sanitary landfills under SWMCG management will have proper leachate and gas collection and treatment systems. However, closure and remediation plans for existing landfills—especially the larger sites such as Gori, Khashuri, Kaspi, Kutaisi, Zugdidi, and Batumi—should also address leachate and gas collection and treatment issues. Proper design and execution of such plans may become a significant challenge. Batumi's existing landfill will be closed with financial assistance from EBRD to the A.A.R. government; others should be closed with GoG financing. Tbilisi's new leachate collection and treatment system will be established through a EBRD loan, while gas collection and treatment will go unaddressed until serious financial resources are mobilized. Batumi's new landfill has a lagoon-type leachate collection and treatment system, and gas collection and power generation units. However, its design capacity cannot serve the amount of rapidly souring waste generated in the Achara region. The landfill's design capacity is 75,000 t/y of waste, while the region currently generates about 111,000 t/y. There are plans to dispose of 27,000 t of MSW from Guria at the new Tsetsklauri landfill. However, the existing leachate system is insufficient to collect and treat leachate generated by so much waste; both dry and wet fractions of MSW must therefore be diverted from the landfill. This can be accomplished with mechanical-biological treatment (MBT), a viable solution for landfill diversion in Batumi.

Another operational issue of landfill management is poor waste accounting. This is because at present only 13 of 33 landfills have weighbridges. All new sanitary landfills will have weighbridges and unified IMS, automatically logging and transferring landfill data to a central depository at the SWMCG.

Source separation/pre-treatment, treatment. A key MSWM challenge in Georgia is to switch from mixed-waste collection to waste separation at the source. Currently no municipality is meeting the national separate collection/recycling targets for glass, plastic, metal, and paper/cardboard. This is due to such factors as:

- inadequate knowledge and capacities within municipalities to design source separation and waste treatment measures (especially needed are the knowledge and decision-making tools to calculate totals and projections of dry recyclables generated within municipal streams, to localize and quantify national separate collection/recycling targets, to assess and select the most feasible container systems, and to calculate the containers and vehicles required together with associated costs);
- insufficient finances to implement source separation and waste treatment/pre-treatment measures;
- negligible material recovery capacities;
- missing incentives to reduce waste to be landfilled (e.g., gate fees);
- a poor market for dry recyclables due to low absorption by local business operators/recyclers, decreasing export prices, and no statutory requirement for waste treatment before disposal in existing landfills;

- low public awareness and no incentives for households and CIIs to separate MSW;
- the reluctance of the general public and decisionmakers to switch from traditional mixed waste collection to source separation;
- technical/operational difficulties of introducing multi-container collection systems due to limited space in and around urban housing areas, especially in Tbilisi and
- the additional costs to be borne by households and municipalities.

Municipalities could take an incremental approach and start separate collection of recyclables from selected commercial sector(s) with high recycling potential (e.g., hospitality, chain markets, outlets, etc.) Instead of transitioning to a four-container system, a two-container system can be introduced for “dry” and “wet” (residual waste) MSW, utilizing available container volume to the maximum extent possible. N.B., it is easier to administer all sectors—households, businesses, and local municipalities—by collecting MSW as aggregates rather than separately.

Separately collected dry recyclable waste will require sorting—especially in a two-container system. Smaller municipalities with low recycling potential may find so-called material recovery facilities (MRFs)⁴² unworkable at local levels and, in which case a regional approach may be used. Municipalities can create joint MRFs with likeminded administrative units or agree with landfill operators to treat waste on site before disposal. Waste recycling strategies are currently under development in Tbilisi and Achara A.R. Similar regional strategies elsewhere may become strong decision-making support tools for designing and implementing effective and efficient source separation, treatment, and recycling measures.

Biodegradable waste—the largest municipal stream—also has negligible separate collection and treatment. There are neither legal requirements for treating biodegradable before disposal at existing landfills, nor quantitative national strategic targets. Once such targets are adopted, as is planned by the GoG, municipalities will face similar problems for biowaste as for dry recyclables. With two-container systems, recyclables and residual waste may be treated at new landfills. Dry recyclables go through a MRF while residual waste receives mechanical-biological treatment (MBT). MBTs combine sorting with selected forms of biological treatment. These systems recover materials contained within the mixed (residual) waste and help stabilize the biodegradable part of the waste. MBT plants are designed to process mixed household waste as well as commercial and industrial waste. The mechanical part of the MBT is similar to MRF activity, with its configuration pending on the type and the quality of material to be recovered. The biological part includes aerobic decomposition—open-air/closed (in-house) composting—and anaerobic digestion (biogas production). Composting—particularly open-air composting—is the simplest, most reliable, and cheapest process among the two biological treatment options. Anaerobic treatment is the most sophisticated, expensive, and sensitive to inputs and market demand.

There are basically three categories of MBTs: i) MBT—with aerobic/anaerobic treatment; ii) MBS (mechanical-biological stabilization)/MBT—with biodrying, and iii) MPS (Mechanical-Physical Stabilization).⁴³ The BMW diversion of these three categories varies from more than 30 percent (MBT

⁴² MRFs differ in complexity/configuration and costs. A basic configuration uses manual sorting, a medium configuration is semi-automated, and a high (complex) configuration is fully automated, using high-tech optical technologies (near infrared, laser, etc.)

⁴³ MBT with aerobic treatment aims at stabilising the waste and reducing the quantity of biodegradable municipal waste (BMW) going to landfill. A MBT plant could simply compost all waste without separation and landfill the remaining waste. This is the cheapest and simplest approach, having low sensitivity to input material. However, light odors might accompany the process—particularly with open-air composting—and

with aerobic/anaerobic decomposition) to more than 70 percent (MBT with biodrying). MBTs generally have high CAPEX and OPEX and should not be adopted until MSWM costs are fully recovered. Therefore, treating waste through MBTs is part of longer-term strategy. First off, regional waste prevention and recycling strategies should consider various MSW separate collection systems and treatment options and recommend/select the most economically and technically viable as well as environmentally sustainable choice.

Only Tbilisi has started composting park/garden green waste and producing a mulch in small quantities. Kutaisi is building a composting plant for its green waste. Similar to other biowaste streams, there are no quantitative statutory requirements for biowaste separate collection, treatment, recycling, and landfill diversion. Georgia's municipalities have neither knowledge of green waste treatment options nor greening services skills. There are no quality requirements for compost, and little or no market for compost and its products. However, municipalities can easily implement open-air composting with their own resources if they are equipped with proper knowledge and skills. If quantitative targets for biowaste are introduced, municipalities should be trained how to localize and quantify these targets. Strategies and action plans to reach such targets should be reflected in MWMPs.

Home composting and mulching is negligible due to low public awareness, poor knowledge and skills, and no incentive—such as a reduced waste management bill—to produce compost. Nevertheless, pilot initiatives can be launched to support composting and mulching by households, farmers, and communities, together with awareness and knowledge-building efforts. Similar pilot initiatives can promote household-level biogas production. Neither of these are commonly practiced at present in rural Georgia. Municipalities might consider adopting fiscal incentives for households to promote BWM reuse and recycling.

Waste prevention. Legal-regulatory and institutional gaps and barriers relating to waste prevention were discussed in detail above. In addition, a number of key financial, knowledge, capacity, and operational gaps and barriers hinder the wide adoption of waste prevention practices and implementation of relevant measures.

For food waste—the largest fraction of BWM—the impediments to prevention include: no tax incentives for food donations by commercial institutions; strong SPS requirements for food/animal

therefore the site should not be located near residential areas. Besides, significant land area and water demand might be required. Odors can be mitigated through indoor composting and by adding special filtration systems, which significantly increase the cost and the complexity of the process, or by using special membranes (Gore-Tex). Anaerobic digestion (AD) in MBT plants is the first stage of the biological treatment which focuses on the anaerobically degradable waste components. The biogas produced during digestion can generate internal electrical power and heating. Surplus power (and heat) can be sold as renewable energy. This approach has nearly the same landfill diversion potential as MBT with aerobic treatment, does not require significant land and emits no odors if designed, built, and operated properly and thus can be built near residential areas. However, it has higher CAPEX and OPEX than MBT with aerobic treatment and is more complex, sensitive to input materials, and requires highly skilled personnel to operate the plant. MBT with biodrying is a form of MBT in which heat produced by microbiological processes dries the waste to enable easier and more efficient mechanical separation and partially stabilize the waste. In this case the mechanical separation is performed after the biological treatment. The aim of the biological drying approach is to produce high-quality Refuse Derived Fuel (RDF) which can be burnt in industrial plants like cement kilns for a lower price or for free. The cost of the MBT with biodrying falls somewhere between MBT with aerobic treatment and MPS. MPS is similar biological drying, but the drying process requires external energy like oil or gas. Hence the operation costs are higher and the energy efficiency of the total process is lower. The advantage of MPS is a more compact design which might be relevant in areas where space is limited.

feed and low business operator capacities to meet such requirements or to establish and operate HACCP systems; low interest of GoG, donors, CSOs, and the private sector in food recovery and redistribution; weak cross-sector cooperation; inadequate CSO/NGO/charity knowledge, skills, resources, and experience in logistics and food safety (SPS/HACCP), including food collection, safe storage and preparation, refrigeration and reheating facilities; inadequate commercial institution knowledge of and skills for dealing with proper food product planning, self-monitoring, and reporting on food losses. A number of horizontal and specific measures can be designed and implemented to address these gaps and challenges. The first group of (horizontal) measures includes developing a food prevention policy/program, legal-regulatory—and, in particular, fiscal—policy changes to create tax deductions for donations of surplus food or “best before date”/“use by date” food products; general public and targeted stakeholder awareness raising; capacity-building of representatives of the entire food supply and service sector; training of NGOs and municipalities in food recovery and redistribution, SPS/HACCP, advocacy, lobbying and improved cross-sector cooperation. Specific measures may include such on-the-ground pilot activities as: training and support for social kitchens in selected municipalities—especially in densely populated, urban areas with well-developed chain markets and hospitality services, such as Tbilisi, Batumi, Kutaisi, Rustavi—in proper collection, redistribution, storage, and preparation of surplus food or food products close to their “use by date,” for conducting effective food planning, loss accounting, and reporting by selected gastronomic and hospitality facilities, and for assisting food banks (charities, various NGOs) with safe food recovery and redistribution.

For paper—the key impediments to prevention of paper waste include: a weak paper recycling market, low awareness by the general public, government institutions, and businesses of paper minimization and reuse, low stakeholder capacity for separate collection and recycling, and an underdeveloped e-governance infrastructure. Horizontal measures to address these hurdles include: developing a waste prevention program, setting clear quality criteria for recycled paper, implementing awareness campaigns on waste minimization and reuse, targeting both the general public and specific stakeholders such as public institutions (state agencies and local municipalities, academic institutions, etc.), corporations, and CSOs.

Regarding For plastic including packaging waste prevention, absent packaging EPR/DRS regulation and strong implementation mechanisms, regulation/policy on SUP and, plastic waste prevention program, thin local plastic recyclables market, low public awareness and consciousness can be considered as key impediments/barriers. Hence, adoption and implementation of packaging regulation introducing EPR/DRS system, adoption of plastic waste program, better enforcement of import, production and use (putting on market) of plastic bags, capacity building of enforcement agencies in compliance assurance monitoring and control of plastic bags regulation, setting of clear quality criteria for recycled plastic, adoption of regulation/policies on SUP and carrying out awareness raising campaigns can be considered as horizontal measures. As for concrete measures, assistance to large retail shops in promoting reusable bags, through advocacy and application of discounts or bonus points for customers, making voluntary agreements with fast food shops, cafes, dineries and hotels to replace SUP items with multi-use or biodegradable materials (e.g. paper, wood, etc.) and plastic packaging with paper material, promoting application of reusable tertiary containers and euro-pallets and establishment of take-back systems in commercial business and industries can be considered as effective means for plastic waste, including packaging prevention. The latter measures are also applicable for wood waste prevention.

For C&DW, absent/underdeveloped market and relevant quality criteria for C&SW recyclables, inadequate knowledge and capacities of developers and construction companies on C&DW prevention through proper design, application of easily dismantling materials and carcasses as well as on re-use and recycling potential and technologies, absent fees that would promote C&DW re-use, recovery and recycling, absent national-wide recycling targets for C&DW and weak low enforcement against dumping of C&DW wastes, etc. can be considered as gaps for C&DW prevention and recycling. Thus,

introduction of eco-labeling for recycled C&DW materials, revising existing gate fees for C&DW to promote recycling (differentiated gate fee for various fractions of C&DW, imposing higher fee base rates for mixed C&DW, than that for sorted/pre-treated waste), setting of quality criteria for C&DW recovered/recycled materials, supporting establishment of Bring Centres/Recycling Yards for C&DW with repair/recycling workshops and shops/markets for repaired/recovered materials, in conjunction with effective enforcement measures and awareness raising of developers, local municipalities and landfill operators in C&DW prevention, re-use and recycling can be considered as effective measures to fill the gaps in C&DW prevention.

5.7.5 For other streams, support to: awareness raising campaigns, establishment of EPR/DRS system and Bring Centres/Green Point to collect a wide array of items for further re-use, treatment/recovery of wastes, including WEEE, tires, batteries, clothes, CDs, furniture, books, rubber items, etc.; donations of various used and/or repaired items to socially vulnerable people; organizing street markets, etc. can be considered as viable prevention measures.

Law enforcement. Concerning law enforcement against dumping, littering, burning of waste by citizens and CILs, market circulation of single use plastic bags, etc. municipalities do not enforce these violations of WMC and relevant regulations (e.g. plastic bag regulation), due to weak/absent knowledge, skills and resources within enforcement authorities. Many municipalities even don't have inspection units/teams for law enforcement; furthermore, in overwhelming number of municipalities supervision departments, who by WMC should also enforce WMC relevant provisions and related regulations do not have such responsibilities defined in their statutes and thus, do not enforce WMC and relevant regulations. Very few municipalities who carry out enforcement measures, keep track records on violations detected, addressed and penalties paid. Thus, there is a need for: establishment of inspection teams/units within municipalities and/or their cleaning services, training them in WMC and related regulations enforcement provisions and enforcement tools, drafting inspection plans/protocols, developing inspection and administrative proceedings reports and creating on-line database on violations detected and addressed. Moreover, inspection units can be equipped with modern telecommunications systems (e.g. camera traps, etc.) to detect violations as well as with relevant transportation means.

In case of enforcement of plastic bags regulation, apart from local municipalities, Environmental Supervision Department under MEPA and Customs Department under the Revenue Service are responsible for controlling and supervising import (Customs) and local production of plastic bags. All these authorities lack relevant knowledge, skills and infrastructure for detection of frauds and violations. Meanwhile, capacities of national laboratories for checking the quality of plastic bags for their biodegradability is practically absent.

Awareness raising, public participation, information management, knowledge building and learning. Current awareness raising measures in the area of MSWM represent sporadic one-time measures and are not based on programmatic approaches. Municipalities do not usually have stand-alone 5-year awareness programs and annual action plans or measures under MWMPs. Budgets of cleaning services do not include separate lines for awareness and public participation and thus, if such measures are implemented they are unsustainable and do not result in significant impacts. Even EIEC does not have overarching annual awareness program in MSWM to target local municipalities. Thus, there is a need for developing national-wide and municipal level awareness raising programmes and associated actions plans, creating PR and communications units and/or teams, earmarking annual budgets for awareness and implementing annual awareness measures.

Concerning public participation in decision-making, the common practice is that consultations with local communities do not take place during development of MWMPs. Furthermore, only few municipalities have on-line citizens' reports handling/grievance redress mechanisms, but usually these are more of general type mechanisms, not specifically designed for MSWM.

Regarding information management, there is no national-wide unified MSWM IMS and database, with specific meta-databases linked to central depository as well as with analytical and reporting/data presentation modules, allowing for geographic aggregation and disaggregation and presentation of critical data (e.g. KPI values) on-line to be available to public. Existing databases are spread among various agencies and are not interlinked with each other. Stemming from this gap, there is a need for creation of unified MSW IMS with central depository/database and links with meta-databases. Existing on-line registration and reporting platform of MEPA can be used as a basis for such a system and further developed to include above elements. The depository should be maintained by EIEC, which is a key environmental information management agency in the country.

At the municipal level, electronic waste accounting and information management systems on MSW collection and street cleaning are practically absent. MSWM related information is not systematized and archived in a way to be easily retrievable. Moreover, some key data and information are missing for great majority of municipalities, including data on WGI, waste composition, waste generation and generation projections by total quantities and by streams, quantities of waste collected from urban and rural areas and household and commercial sectors, quantities of household hazardous wastes and C&DW and dumpsites. Existing MSW collection data kept by local municipalities are only estimates and frequently significantly differ from the data on disposed waste quantities, registered at landfill gates. Waste quantity data for landfills with weighing scales can be considered plausible and should be regularly shared with respective municipalities. Thus, it is necessary to equip target municipalities with knowledge and management support tools to calculate critical KPIs through simple waste metrics. Moreover, they should have an easy access to landfill data, maintained by SWMCG. MRDI may set a data flow system allowing sharing of annual landfill data with LSGs and their cleaning services too. Concerning waste composition data, which exist only for Tbilisi, Rustavi/Gardabani, Telavi, Batumi and Khashuri, there is a need to equip local municipalities with international-standard based methodologies for waste composition studies and train them in it. They should carry out representative waste composition studies for both urban and rural areas in order to better plan their recycling, recovery and waste disposal activities. Container study is preferable than landfill study therefore, the priority should be given to this method. In case of dumpsite data, there is a need for carrying out comprehensive inventories of illegal dumpsites preferably, with GPS systems, including site assessment and estimation of approximate volumes/quantities of wastes. After this, municipalities should prepare site clean-up and remediation plans and carry out dumpsite closure activities. At present, there is no national-wide guideline on closing illegal dumpsites and it is highly advisable to assist the GoG and/or local municipalities in developing such guidelines. PMS system and automated on-line analytical tool with embedded IMS, KPIs, baseline values, targets and reporting elements may serve as a strong mechanism for improvement of municipalities' performance and in particular, their data collection, storage, processing, analysis and reporting performance. Thus, pilot activities that are being implemented with UNDP's support with a purpose of creation of PMS systems should be disseminated across all municipalities and municipalities should be trained in setting and application of such systems. Furthermore, these PMS systems should be linked with landfill database as well as with central depository that should be established at EIEC/MEPA.

Concerning landfill data, as it was mentioned above, only 13 of total 33 landfills have weighbridges. All these without scales are operated by SWMCG. Thus, significant part of landfill data kept by SWMCG is inaccurate and is based only on estimates. Furthermore, existing landfill database does not allow for a detailed break-down waste quantities by types, due to inadequate codification system.

Concerning public access to information, the absolute majority of cleaning/amenity services of local municipalities do not have official web-sites. Those who have their own sites, do not post crucial MSWM information, including local regulations on cleaning tariffs, statutes of cleaning and/or amenity services, approved MWMPs. Such information is also unavailable on the majority of official web-sites of local municipalities as well as at MEPA's web-site. Very few municipalities have comprehensive document libraries on their web-sites, where local regulations are however, MWMPs and even local

regulations related to MSWM are not posted there for the majority of cases. The exceptions are Tbilisi and Zugdidi municipalities which ensure on-line public access to critical waste management-related documents.

As for any kind of annual progress/performance report, municipalities submit annual reports on their quantities and types of MSW to MEPA’s through on-line register which is password protected and is not available to general public. Moreover, some of the municipalities practice annual reporting by municipality Mayors, where waste-related information rarely can be found. Even if such information is there it is not presented based on certain indicators and is not visualized.

Concerning knowledge building and learning, the only official regular course with certification system is “Environmental Manager, designed for environmental managers of CIIs, subject to waste accounting and reporting to MEPA. The course is available at EIEC not for free. Meanwhile, there are significant capacity and knowledge gaps at local level for MSWM, requiring significant CD efforts for local municipalities. One of the biggest CD challenges is sustainability of local capacities and maintaining of institutional memory within local municipalities, due to the frequent changes of the staff. Thus, only one-time or even series of trainings are not sufficient to meet CD needs of local municipalities. Therefore, a mandatory learning course with certification system should be established for local municipalities and other relevant stakeholders as well as easily operable decision-support tools, like MWMP planning support calculator, should be developed for them. For this, MSWM course, with 10 theoretical modules and video lessons, developed under EU TA project and then handed over to EIEC can be applied. The course can be transformed into self-paced on-line course with pass-fail test and certification system. Video lessons can serve as learning material for the training course. The system should be managed by EIEC. For government employees including municipalities the course should be for free, but for other stakeholders and in particular, for CII representatives it should be provided at certain fee as it is done in case of training course for CIIs’ environmental managers.

2.7 SWM financing

2.7.1 Introduction

Financing is the backbone of successful municipal solid waste management. Following the “polluter pays” principle, the most common source of financing is collecting fees from households and commercial/institutional/industrial (CII) entities for services rendered. In addition, governments might subsidize—wholly or in part—waste management costs and/or use other financing instruments, such as the Extended Producer Responsibility (EPR) mechanism. The cost of waste management consists of operational costs (waste collection, transport, separation, treatment, and disposal) and the amortization (depreciation and interest) of fixed and mobile assets. All of these costs must be reflected in the fee in case of full cost recovery.

Waste management services and its technology are related to economic development and average household income. There is a direct relation between average income, waste generation, and the effectiveness of the waste management system. This is clearly shown in the EU by comparing the ability of northern, southern, and eastern member states (see table below) to meet the EU-WM targets.

Table 21. Economic Development Versus Waste Generation and Waste Management Effectiveness

2019	GNI (USD)/cap ¹	Household income (EUR) ²	Kg/cap ²	Recycling rate (%) ²	Household fee (EUR/yr) ³
Germany	48,580	26,106	609	66.7	
Austria	51,490	28,568	588	58.2	

Netherlands	53,100	27,352	508	56.9	
Denmark	63,950	34,332	844	51.5	
Average	54,280	29,090	637	58.3	360
Portugal	23,200	11,786	513	28.9	
Greece	19,750	9,382	524	21.0	
Spain	30,390	17,287	476	34.7	
Italy	34,530	19,528	499	51.3	
Average	26,968	14,495	503	34.0	225
Romania	12,630	4,419	280	11.5	
Poland	15,350	8,022	336	34.1	
Hungary	16,500	6,568	387	35.9	
Slovakia	19,210	8,523	421	38.5	
Bulgaria	9,570	5,551	407	--	
Average	14,652	8,270	366	24.0	120
Georgia	4,780	4,020 ⁵	283 ⁴	--	EUR 36 (maximum)

¹Source: www.data.worldbank.org; ²Eurostat (per year); ³Consultant's observations; ⁴see chapter 2.7.2.1 below; ⁵GEOStat (GEL 1,175/month)

In conclusion, Georgia still needs substantial time and economic development to implement fully the objectives of the WMC “based on the principles and approaches envisaged in the EU-Georgia Association Agreement and the need for further transposition of EU requirements.” This means that building up a sustainable MSW system must be carried out in steps, starting with the basic requirements of efficient collection and safe disposal. Shifting up in the waste hierarchy as a result of the EU Association Agreement will increase costs and should therefore factor in the ability to pay. The international standards for affordability are generally set at 1.0-1.5 percent of disposable household income (HHI). The average HHI in Georgia in 2019 was about GEL 1,175/month (source: Geostat Georgia). This would mean setting the maximum fee at GEL 140-210/year/household (EUR 35-53), which is substantially lower than the fees paid within the EU.

Methodology of financial analysis

The financial analysis used herein is based on the information in existing reports—especially the UNDP baseline study on 39 municipalities (May 2020), the Tbilisi MSW Strategy Inception report (June 2020), and the Audit Report of the SWMCG for 2019. The information on Tbilisi is presented separately from that of the municipalities (hereinafter also called “the Regions”) due to the size of Tbilisi. The analysis

will focus on evaluating the cost of current practices mainly in the Regions and will assess the financial impacts of shifting up in the waste hierarchy as required by the NWMS by introducing separation-at-source of dry recyclables—paper, plastics, metals, and glass—and the construction of regional landfills. The anticipated financial impacts will be based on consultant estimates in light of international practices.

2.7.2 Financing of MSWM and Street Cleaning

2.7.2.1 Analysis of the Status Quo

Municipalities are legally responsible for implementing and operating waste management systems. The municipalities collect municipal solid waste, transport it to the landfill, and perform street cleaning operations. These tasks are carried out by municipal organizations, and private sector involvement is practically nonexistent. The landfills are owned and operated by the Solid Waste Management Company of Georgia (SWMCG) under the Ministry of Regional Development and Infrastructure (MRDI). Municipalities do not pay a gate fee for waste disposal. Waste separation/sorting lines may be located at some landfills. The operational costs of the municipalities and the landfill operator are heavily subsidized by the State (Ministry of Finance) since income is quite limited due to low fees and poor fee collection. MRDI finances all capital investments and the assets are transferred to the municipalities and the SWMCG. During 2019-2020 the SWMCG financed about GEL 4 million for rehabilitation works at a number of landfills. The SWMCG can conclude loans with third parties and receive grants for (co)-financing of their facilities.

Tbilisi City is more autonomous. Its waste management organization is a Limited Liability Company (The Tbiliservice Group) owned 100 percent by the municipality and financed by Tbilisi City Hall. The tasks of the waste management company include maintenance of drainage systems and street lighting, specific contractual services such as the collection of construction waste, and maintenance of underground passages. The landfill is owned by the municipality and operated by the waste management company.

The Tbiliservice Group can conclude loans with third parties and receive grants for (co)-financing of their facilities.

In the Achara A.R., the operational and capital costs of municipal waste management services are financed by the Ministry of Finance and Economy, while Batumi is more autonomous and has its own LLC and operational and capital costs are financed by the City Hall.

(i) Costs/ton

The UNDP study assesses waste collection and street cleaning services in order to develop a Performance Management System in the Regions. This nationwide information will form the basis for analyzing costs. The study relies on data collected from 39 municipalities. Annex 1 summarizes the total operational costs (excluding capital costs and disposal costs) and the collected waste quantities. The costs include administration (19 percent), collection and transportation (46 percent), and street cleaning (35 percent). The total operational cost comes to GEL 35,293,000 in 2019 for collecting 301,647 tons, or an average cost of about GEL 117/t, comprising GEL52/t for street cleaning and GEL 65/t for waste collection (Annex 2).

The average cost/t for municipalities with fewer than 10,000 inhabitants would be about GEL 282/t, while municipalities with more than 100,000 inhabitants would have a cost of about GEL 125/t. The cost difference indicates the need for small municipalities to cooperate with other municipalities to reduce waste collection costs.

Tbilisi's 2019 waste management cost was GEL 56 million, or GEL 137/t (excluding landfilling), comprising GEL 70/t for street cleaning and GEL 67/t for waste collection. However, it is unclear whether any costs could be included for services unrelated to waste collection or street cleaning.

According to the UNDP study there would be about 104,951 tons of uncollected waste. This means the average waste generated could be estimated at $(301,646 + 104,951)/1,437,519 = 283\text{kg/cap/year}$ (Annex 1), or 0.78kg/cap/day (including households and CII). The population in the Regions is about 45 percent urban and 55 percent rural, and—since international experience suggests that rural waste generation is about half of urban waste generation—the urban waste generation rate could be estimated at $0.45U + 0.55U/2 = 283$, or $U = 390\text{kg/cap/year}$, or about 1.06kg/cap/day , and in rural areas it would be about 0.53kg/cap/day . These quantities include CII waste estimated at 20-30 percent, averaging 25 percent (according to international experience). An average family is assumed to have 3.3 persons, which would generate $0.78 \times 0.75 \times 3.3 \times 365 = 705\text{kg/household/year}$.

In Tbilisi the overall waste generation rate can be estimated by dividing 411,370 tons of landfill by 1,171,100 registered inhabitants, resulting in 352 kg/cap/year , or about 1 kg/cap/day assuming a collection rate close to 100 percent. However, there are some 135,440 unregistered people who are not included in the GEOstat statistics. Their inclusion would change the waste generation rate in 315kg/cap/year , or 0.86kg/cap/day , or $0.86 \times 0.75 \times 3.3 \times 365 = 777\text{kg/ household/year}$.

Table 22. A summary of the Waste Generation Rates (same as WGI)

	Registered population	Registered and non- registered population
Tbilisi	352 kg/cap/yr or 1.0kg/cap/day	315 kg/cap/yr or 0.86kg/cap/day
Households	0.75kg/cap/day	0.645kg/cap/day
CII entities	0.25kg/cap/day	0.215kg/cap/day
Regions	285kg/cap/yr or 0.78kg/cap/day	
Households	0.585kg/cap/day	
CII entities	0.195/cap/day	

Street cleaning

The following conclusions may be drawn concerning street cleaning costs (Annex 2):

- The average street cleaning cost/inhabitant in the 39 municipalities is about GEL 9.25 (EUR 2.3/inhabitant). This is rather low compared to comparable costs/inhabitant in EU countries, which range from EUR 54 (Spain) to EUR 12 (Bulgaria, Netherlands) and EUR 10 (Belgium). The low cost is mainly due to the low salaries of sweepers in Georgia, namely about GEL 5,000/year versus GEL 25,000 in East European EU member-states.
- There are a total of 1,919 sweepers in the 39 municipalities, or one sweeper per 770 inhabitants. This is in line with international experience as it applies to the urban/rural character of Georgian municipalities.
- Administration costs (overhead) are 18.7 percent of total costs. This is in line with international experience.
- The accuracy of the average street cleaning costs in the 39 municipalities can be checked as follows (See also Table 23):

Salaries: 1,919 x GEL 375 x 12	8,635,500 (70 percent)
Overhead	2,332,500 (19 percent)
Materials (clothing, bins, tools, etc.)	<u>1,309,255 (11 percent)</u>
Total (GEL)	12,277,255

Tbilisi’s (1,171,000 inhabitants) 2019 costs are reported at GEL 28.62 million—or about GEL 24.44/inhabitant (Annex 4)—but it is unclear whether services such as drainage or street lighting maintenance could be included. When the number of unregistered people is included, the cost comes to GEL 21.6/inhabitant. The wage component of street cleaning costs is reported at GEL 21,243,973. A 20 percent management cost would mean $GEL\ 21,243,973 \times 0.8 / 625 \times 12 = 2,266$ street sweepers (Tbilisi salaries for workers -GEL 625/month- are substantially higher than elsewhere in the country). This number is rather high since one sweeper per 1,000 inhabitants of an urban area is generally accepted as adequate, creating the need for about 1,300 sweepers. This suggests there is considerable street sweeper overstaffing in Tbilisi (unless it reflects social designs to reduce unemployment, etc.) The cost distribution in Tbilisi is 74 percent salaries, 12 percent overhead, and 14 percent other. which is in line with international experience (see Table 23).

In conclusion the average cost levels and the breakdown percentages in the 39 municipalities are acceptable and in line with international experience, although Tbilisi’s street cleaning services might be overstaffed.

Table 23. Breakdown of street cleaning costs (international experience)

Activity	% of total costs
Prevention (communication, information, enforcement)	3%
Execution (workers, management salaries)	80%
Materials (trucks, containers, clothing, etc.)	13%
Disposal (transport, treatment)	4%

Collection

Annex 3 gives an operational cost breakdown for waste collection (excluding street cleaning costs) in the 39 municipalities, resulting in a cost for collection of about GEL 65/t comprising 48 percent wages, 24 percent fuel, six percent M&R, 20 percent overhead, and two percent other costs (UNDP report).

The UNDP cost breakdown is compared with (Annex 4):

- Consultant estimates for waste collection (excluding landfilling) for a municipality with 40,000 inhabitants, divided into 45 percent urban and 55 percent rural populations, generating waste quantities of $40,000 \times 0.45 \times 1.06 \times 365 = 7,000$ tons and $40,000 \times 0.55 \times 0.53 \times 365 = 4,350$ tons respectively. The collection system is assumed to use communal containers (1,100 liters) and no separation. It shows an OPEX of about GEL 49/t (10km to the landfill), which contrasts with the GEL 65/t from the UNDP report.
- Analysis of the collection costs in the “Tskaltubo Financial report-May 2020”, prepared by KfW/EU, shows an estimated collection cost of GEL 85/t, which breaks down as 27 percent wages, 24 percent fuel, 32 percent maintenance, and 17 percent overhead.

The total operational collection costs in Tbilisi are given in Annex 4 (GEL 27.4 million excluding depreciation) resulting in GEL 67/t collected waste. This breaks down as 42 percent wages, 26 percent fuel, 15 percent maintenance, 14 percent overhead, and three percent other.

The Tbilisi wage component for collection is about GEL 11,512,376. A 20 percent management cost would mean $11,512,376 \times 0.8 / 12,000 = 768$ drivers and loaders. (Assuming one driver and two loaders per truck brings the average annual cost to GEL 12,000 per inhabitant. Tbilisi salaries are substantially higher than elsewhere in the country). The actual need according to international efficiency norms

would be 1.5 to two persons per 1,000 tons of waste collected or 617-823 persons. Therefore, the actual number of drivers/loaders is within efficiency norms.

The following conclusions may be drawn:

- The wage percentages in the UNDP report (48 percent) and the Tbilisi report (42 percent) are rather high when compared to the estimated costs (19 percent) and Tskaltubo (27 percent). This could mean overstaffing and thus less efficiency.
- The costs for fuel are very close to the estimated 23 percent—Tskaltubo report (24 percent), UNDP report (24 percent), and Tbilisi report (26 percent). This could indicate efficient truck route planning.
- Maintenance and repair costs are rather low in the UNDP report (6.5 percent) and Tbilisi report (15 percent). This could suggest that (i) maintenance is mostly paid by the municipality and not the collection organization, or (ii) maintenance is neglected by the collection organization, resulting in more frequent breakdowns, poorer availability, and thus lower levels of services.
- The cost/ton ranges between GEL 49 (the estimated cost), GEL 65 (UNDP), GEL 67 (Tbilisi), and GEL 85 (Tskaltubo). The high Tskaltubo costs could be due to the low annual quantities collected (reported at 6,840 tons for 50,000 people served). The higher cost/ton in Tbilisi and the municipalities in the UNDP report—when compared to the estimated costs—could reflect the higher wage cost percentage due to overstaffing (UNDP report) or higher salary costs (Tbilisi). Efficiency in the EU equates to 1.5 to two persons per 1,000 tons collected. According to the UNDP report, there are 959 persons (304 drivers and 655 loaders) in the 39 municipalities, whereas only 452-604 drivers/workers are needed to collect 301,647 tons.

In conclusion—the actual collection cost in the 39 municipalities (GEL 65/ton) would be about 33 percent higher than the Consultant estimates (GEL 49/ton) based on international practices. This would be mainly due to the high number of workers/drivers.

Landfilling

The 2018 audit report of the Solid Waste Management Company of Georgia (SWMCG)—responsible for managing 31 landfills—indicates an annual income of GEL 24,230,004 comprising GEL 23,672,911 from grants and subsidies, GEL 486,309 from gate fees paid by private companies disposing waste, and GEL 70,784 from selling recyclables reclaimed in Rustavi’s landfill. This would result in GEL 12.45/ton for waste disposed by private companies (39,058 tons) and GEL 230/ton from selling recyclables. No gate fee is charged to the municipalities. The annual operational expenditure is GEL 10,321,345, including GEL 1,647,596 for AMEX. The total waste disposed would be about 511,000 tons, including private sector disposal. This results in a cost of GEL 20/ton, comprising GEL 17/ton for OPEX and GEL 3/ton for AMEX. The audit report does not break down cost per landfill. However, gate fee calculations based on operational costs for new regional landfills carried out by the SWMCG indicate a range of GEL 27-41/ton, for annual quantities of 133,000 tons and 30,000 tons respectively (excluding leachate treatment).

The following conclusions may be drawn:

The gate fee paid by the private sector (GEL 12.45/t) is below actual cost (GEL 20/t) thereby in effect subsidizing the private sector. Revenues generated by SWMCG are 5.4 percent of operational costs and therefore the balance must be financed by subsidies and grants. The cost/ton is relatively low compared to international standards due to the absence of sanitary landfill provisions such as leachate treatment and gas collection.

The two landfills in Tbilisi are owned by the municipality and operated by the waste collection/cleaning organization of the city. One landfill is for C&D waste (25-person staff) and the other landfill is for municipal waste (75-person staff). The 2019 operational costs for the municipal waste landfill are reported as GEL 2,435,909 and the depreciation costs are GEL 570,844. This would result in GEL 5.9/ton (OPEX) and GEL 1.4/ton (AMEX) based on an annual landfill quantity of 411,437 tons. The costs break

down as 35 percent wages, 10 percent maintenance, 37 percent fuel, 16 percent overhead, and two percent other costs. These costs/ton are very low since essential services such as leachate treatment, gas collection, waste covering, environmental monitoring, and closure costs are not included.

In conclusion—the current costs at the Tbilisi landfill do not reflect sanitary landfill design and operational requirements.

(ii) Revenues

Reported incomes in the 39 municipalities comprise (Annex 5):

- Fees collected by the municipality from households: Not all municipalities charge fees. The maximum legal fee is GEL 3/person/month (with no more than four persons per household) which corresponds to $3 \times 4 \times 12 = \text{GEL } 144/\text{household}/\text{year}$, as compared to the affordable fee of $(1-1.5 \text{ percent}) \times \text{GEL } 1,175 \times 12 = \text{GEL } 141-212/\text{household}/\text{year}$. The actual fee charged in most cases is GEL 0.5/person/month, but the fees collected from billed households are about GEL 0.1/person/month—20 percent. Collected fees (with some exceptions) are transferred to the Ministry of Finance.
- Fees collected by the municipality from CII entities: Practically all municipalities collect these fees. The fee/year is based on a calculation of waste generated using a standard $\text{m}^3/\text{year}/\text{unit}$ such as m^2 or bed or seat or other unit depending on the type of business and respecting the legal maximum fee of GEL 25/ m^3 . (For example: the waste generation norm for a museum is $0.04\text{m}^3/\text{m}^2/\text{year}$ and the fee is 0.36 GEL/year; thus the museum pays $0.36/0.04 = \text{GEL } 9/\text{m}^3$). The actual fee varies per municipality—GEL 8/ m^3 (Rustavi), GEL 15/ m^3 (Tbilisi) or GEL 25/ m^3 (Zugdidi). The average fee would be about GEL 15/ m^3 assuming $200\text{kg}/\text{m}^3$ (Annex 5). These fees are transferred (with some exceptions) to the Ministry of Finance.
- Capital transfer (trucks, containers) by the MRDI: These costs (amortization) are not included in the operational costs of the collection organization. In 2019 a total of GEL 355,723 was reported as capital costs. During the period 2016/2017, MRDI procured and provided the municipalities with waste collection trucks (146) and containers (7,209) costing an estimated GEL 66,500,000.
- Budget transfers from the Ministry of Finance to the municipalities equal to the annual operational costs of the collection organization: In 2019 these amounts covered about 83 percent of the municipalities' costs, leaving 17 percent of those costs to be covered by collected fees. Annex 5 gives a summary of the revenues (GEL 5,960,441) and costs (GEL 34,519,000), concluding the MoF provided GEL 28.68 million in subsidies.

The main reasons for this high percentage of subsidy are:

- Low fees paid by households: The current billed fee for households in most municipalities is GEL 0.5/person/month. Assuming 3.3 persons per household yields GEL 20/household/year. The average household generates $3.3 \times 0.78 \times 0.75 \times 365 = 0.705\text{t}/\text{year}$ of waste. This would bring in GEL 28/t while the actual operational costs are GEL 117/t (GEL 65/t for collection and GEL 52/t for street cleaning).
- Low fee collection from households: Annex 5 indicates that a total of GEL 809,618 was collected from a population of 705,914, which equates to GEL 1.15/person/year or GEL 0.1/person/month, corresponding to 20 percent of billed fees (GEL 0.5/person/month).
- Fees collected for a quantity of 66,697 tons from CII entities was GEL 5,024,058 (Annex 5), corresponding to GEL 75/t compared to the actual costs of GEL 117/t. The maximum fee is legally fixed at GEL 25/ m^3 and the actual fee imposed is about GEL 15/ m^3 (based on $200\text{kg}/\text{m}^3$).
- The logic behind the fees set for households and the CII entities is unclear. The current Law on Local Fees dates from 1998 and has never been updated. There is no direct relationship between the quantities collected and the actual costs of collection. To make the system

sustainable and to meet the principle of “polluter pays,” the fee should equal the full costs involved (operational and amortization costs).

In conclusion—The fee level for both households and CII entities is too low to cover the actual operational costs, the fee calculation uses an out-of-date methodology from 1998, and the fee collection coverage is remiss (averaging 20 percent for households). Payment enforcement by municipalities is either weak or nonexistent. Consequently, the operational services are subsidized 83 percent through budget transfers from the Ministry of Finance, and assets are financed by capital transfers from the Ministry of Regional Development and Infrastructure.

The revenues in Tbilisi are collected by two electric companies. The customers are registered households (351,667), unregistered “persons” (135,440), and CII entities (24,539). The fee for registered households is GEL 2.5/person/month and charged for 3.3 persons/household, and GEL 2.5/household/month for unregistered persons. The fee that could be collected with 100 percent billing is estimated for registered households at $351,667 \times 2.5 \times 3.3 \times 12 = \text{GEL } 34,815,033$ and for unregistered persons at $135,440 \times 2.5 \times 12 = \text{GEL } 4,063,200$, or a total of GEL 38,878,233, which corresponding to GEL 80/household. The actual amount billed for households was GEL 29,158,070 or 75 percent of the potential amount. The reason for this might be the number of non-billed households in view of low income and the number of empty houses. The average billed fee is thus $0.75 \times 80 = \text{GEL } 60/\text{household}$ or GEL 77/t (one household generates $3.3 \times 0.86 \times 365 \times 0.75 = 777\text{kg}/\text{year}$) as compared to the actual costs of GEL 137/t + GEL 6/t = GEL 143/t. The fee collection is about 96 percent of the billing rate.

There are 24,539 CII entities in Tbilisi with a billed amount of GEL 20,748,228, corresponding to GEL 845/entity. The fee norm is GEL 15/m³ (legal maximum fee is GEL 25/m³) and a density of 200kg/m³ results in about GEL 75/t as compared to the actual cost of GEL 143/t. The average entity would thus generate about $845/75 = 11$ tons or 56m³/year. The fee collection is about 97.5 percent. However, the number of businesses reported to be in Tbilisi is about 297,440. This would mean that only one of every 10 businesses is being billed. The fees collected from CII entities go to the collection company and are not transferred to the state budget.

In conclusion—The fees for both households (GEL 77/t) and CII entities (GEL 75/t) are low and do not cover current operational costs (GEL 143/t). Moreover, the CII entities in Tbilisi pay a lower fee/ton than do households. The system of fee payment through the electricity/water bill produces a high rate of fee collection.

(iii) Financing

Table 24. A summary of the Current Operational Costs and Revenues

GEL/ton OPEX	collection	Street cleaning	Total	landfill
Tbilisi	67	70	137	5.9
Regions	65	52	117	20 (SWMCG)
GEL/ton Fee				
Households			28/77 ²	
CII			75/75 ²	
GEL/year OPEX	Quantities (ton)	Cost/ton	Total costs	Revenues ³

Tbilisi	411,370	143	58,825,910	49,906,298
Regions	511,000	137	70,007,000	11,434,575 ¹
Total	922,370		128,832,910	61,340,873

¹Extrapolation of GEL 5,960,441 for 39 municipalities with population of 1,327,088 to population of 2,454,900.

² Regions/Tbilisi based on 200kg/m³

³ Revenues from fees

In conclusion—There is a substantial difference between fee level and fee collection coverage for the households in Tbilisi and those in the Regions. About GEL 67.5 million/year budget transfer was needed to close the gap between revenues and operational costs. In addition, capital transfer is required from the MRDI to finance infrastructure and equipment.

(iv) Assessment of Shortcomings and Need for Improvements

The main shortcomings in the current system can be summarized as follows:

1. **Municipalities depend on state financing** for waste collection, disposal, and street cleaning. Revenues collected by municipalities must be transferred to the state budget. A high rate of state subsidies covers the gap between actual costs and collected revenues. The subsidy system reduces the incentive of municipalities to improve revenue collection. Needed: More financially autonomous municipalities would create a sustainable and efficient MSWM system based on the “polluter pays” principle. This would require the institutional, organizational, and operational strengthening of municipalities. Creation of an “Association of Municipalities” would improve the position of the municipalities by serving as a partner in discussions with the Government, and it would improve the information exchange among the municipalities.
2. **Fees from households and commercial/institutional/industrial entities are substantially lower than actual costs** for collection, transport, and street cleaning. Needed: A fee system based on cost recovery, and that takes into consideration the ability to pay, should be phased in. Gradual introduction of higher fees could start with full recovery of the operational costs for households and full cost recovery including operational and amortization costs for the commercial/ institutional/industrial sector. A governmental decision on fee levels is needed since elected mayors are generally reluctant to increase fees. Guidelines for fee-setting procedures would be helpful, but municipalities should be free to set fees.
3. **Fee imposition by municipalities on households is incomplete and fee collection is weak.** Needed: Fee billing and collection should be improved. An obligatory fee imposition system for all municipalities with minimum fee levels should be introduced as a condition for obtaining state subsidies. Fee collection should preferably be integrated in the electricity/water billing system. Fees should correlate to actual waste quantities collected from CII—not on waste generation norms per unit of business activity—and should fully recover costs.
4. **The SWM accounting system inside municipal waste management organizations is weak.** Costs are not clearly allocated for the various services and the efficiency of the services is not analyzed. Needed: A uniform cost accounting system for all municipalities and guidelines for analysis efficiency should be introduced. The exchange of information between MWM organizations should be promoted. The capacity-building of waste management organizations is required.
5. **Assessment of waste management services efficiency is a prerequisite for the upcoming regionalization and decisions on transfer/transport facilities.** Needed: The cooperation of (small) municipalities in regional waste collection should be explored. The number of staff/workers/drivers used for waste collection should be reviewed. The composition of the

waste collection truck fleet (by type, number, and capacity) must be assessed in relation to the introduction of regional landfills and the long-haul transport distances to disposal areas. The efficiency of Tbilisi’s transfer station should be analyzed to evaluate its operational costs and its long-haul transport capacity (tons/truck) to the landfill.

6. **The lack of reliable statistical information** on waste quantities, waste generation rates, number of commercial entities, etc. and the lack of detailed financial information on operations hamper the cost assessment and operational planning of waste collection and disposal services. Needed: Each municipality should be obligated to sample and analyze waste generation/composition annually each season in selected areas for households and commercial entities. Thereto a manual should be prepared with instructions based on international practices. Municipalities should publish an annual financial report on its operational achievements and their costs.

2.7.2.2 Future situation

(i) General

To conform to the recommendations of the National Waste Management Strategy the following basic infrastructural improvements are planned:

- The implementation of regional sanitary landfills serving several municipalities and replacement of the current municipal dumps. The landfills will be implemented and financed by the Ministry of Regional Development and Infrastructure (MRDI) and will be operated by the Solid Waste management Company of Georgia (SWMCG) under the MRDI. A gate fee will be introduced to be paid by landfill users to cover operational and amortization costs.
- The introduction of separation of dry recyclables to meet the targets set out in the NWM Strategy. Municipalities will be responsible for introducing the system and providing its infrastructure. After the EPR Scheme for Packaging is introduced the Scheme will pay municipalities the costs for meeting the legal take-back targets.

These improvements will increase the costs of the MSWM system and thus will affect the fees to be paid by polluters. The construction of a regional landfill will result in higher transport costs for the municipalities and they and other users will have to pay a gate fee to the landfill operator. The introduction of separation at source will increase collection costs as potential revenues from selling the recyclables will be insufficient to absorb the higher costs.

(ii) Regional Landfill Cost Impact

The effect on transport costs is estimated in Annex 4, where two waste collection options using 1,100-liter, communal containers are compared for a municipality with 40,000 inhabitants and a transport distance to the landfill of 10km and 30km respectively. Total costs are expected to rise from GEL 92/t to GEL 115/t—a 25 percent increase. The OPEX cost will grow by GEL 15.9/t—about 33 percent—due to longer transport distance, and the AMEX cost will increase GEL 7.12/t—about 16 percent—as more trucks will be needed.

Reliable information on current costs of landfills is unavailable due to the lack of a proper accounting system and cost allocation procedures. The available cost information is summarized below:

Table 25. Current Landfill Cost/Ton (2019)

Cost/ton	OPEX	AMEX	Total
Tbilisi	5.9	1.4	7.3
SWMCG	17.0	3.0	20

A study made for the SWMCG on Rustavi landfill rehabilitation receiving about 42,000 t/y contains calculations of a gate fee resulting in GEL 28.5/t for operational costs (OPEX) and GEL 38/t for amortization costs (AMEX), or total GEL 66.5/t.

Consultant cost estimate is given in Annex 6 for a regional landfill (Green field construction) receiving about 60,000 t/y (excluding Tbilisi and Achara). The estimate results in GEL 41/t for OPEX including closure costs and GEL 75/t for AMEX, or a total of GEL 116/t. The AMEX costs include the installation of a leachate treatment plant for GEL 6,000,000, but the final cost will depend on the effluent discharge requirements. This would increase fees by about GEL 82/household/year (each household generates about 705kg/year).

(iii) Waste Separation Cost Impact

Collection

Separation of dry recyclables can be carried out by means of:

- Separation at source, followed by sorting of the separated fractions. The sorting line could be at the regional landfill to guarantee sufficient input. This will have the advantage of using clean separated fractions that will command higher prices at the market. The separation-at-source percentage will fully depend on the willingness and commitment of the waste generator and the methodology of separation (e.g., deposit system on glass and plastic bottles). This will require substantial and continuous public awareness raising activities. Therefore, municipal funds should be made available. Relatively high percentages of separated fractions can be achieved.
- Separation after collection (mixed waste). This will have the disadvantage of polluted fractions getting a low price at the market. Moreover, practical experience teaches that its percentage of separated recyclables is low (two to six percent) and its operating costs are high. It might also cause MRF's (Material Recycling Facilities) to stand idle, especially when the input is small. Therefore, these separation lines should preferably be located at regional landfills. Such a mixed waste MRF is presently operating at the Rustavi landfill and another was planned for the Kutaisi landfill. Due to the low recovery rate of the Rustavi MRF (about three percent of the total input) and the anticipated introduction of EPR to be operated by the private sector, the Kutaisi MRF was cancelled.

The costs for separation at source in an average municipality with 40,000 inhabitants and transporting the waste to a regional landfill 30km away are estimated at GEL 127/t (Annex 7). That shows that collection and transport of separated recyclables is twice as expensive (GEL 221/t) as collection of the mixed waste (GEL 109/t). Due to the relatively small quantity of dry recyclables in the total waste flow, the cost increase effect on the total collection costs would be about 10 percent (Annex 4 and 7). Additionally, the dry recyclables separated at source must be sorted after collection and baling before sale. A summary of the collection cost estimates is given below.

Table 26. Estimated Collection Cost/ton for Separated Recyclables

GEL/ton	Mixed waste stream	Recyclables stream
Cost/stream		
OPEX	59	121
AMEX	50	100

Total	109	221
Costs/combined		
OPEX	69	
AMEX	58	
Total	127	

Sorting

The costs for sorting are estimated for various options in Annex 8, assuming 25 percent and 50 percent separation at source of the dry recyclables (31.7 percent of the mixed waste) and 25 percent and 50 percent rejected at the sorting line due to the poor quality of input dry-recyclables. The costs of sorting are estimated at GEL 201/t (25 percent separated) or GEL 118 (50 percent separated). Revenues will depend on the (strongly fluctuating) market prices for recyclables and savings on the landfill gate fee. In the case of 50 percent separation at source and 50 percent rejects, the financial result would be +GEL 42/t; 25 percent separation at source and 50 percent rejects would result in -GEL 40/t, and 50 percent separation at source and 25 percent rejects at the sorting line, would yield +GEL 122/t.

It can be concluded that the final costs of sorting will depend on (i) the input quantities at the sorting line, (ii) the input quality of the separated dry recyclables and (iii) the revenues from selling dry recyclables and the avoided landfill gate fee. Therefore, waste sorting lines should be implemented preferably at regional landfills to guarantee sufficient input quantities. Substantial efforts and costs have to be spent by the municipalities on communication and public participation to promote separation at source at a good quality.

Mixed waste treatment

In case future legislation will introduce the reduction of waste quantities to be landfilled the need may arise of installing an MBT plant at the landfills. This waste treatment installation will further increase the costs of waste management. The financial impact is estimated on basis of the following criteria for 2025:

- regional waste: 752,996 tons
- Achara waste: 160,000 tons
- separation at source (50%*32%): 92,996 tons
- mixed waste for landfilling: 500,000 or average 62,500 tons per regional landfill (8 landfills)

The mixed waste will be shredded and separated in fine fraction (50%) for bio-stabilisation and in coarse fraction (50%) for further separation of recyclables (no RDF production is foreseen). The final output will comprise at the bio-stabilisation line about 20% moisture loss and 30% stabilized soil for landfill covering and at the separation line about 3% dry recyclables, 5% moisture loss and 42% residual waste for landfilling. The total reduction on waste landfilling would thus become 58% including the stabilized soil (30%) for waste covering.

The investment costs for a plant with a capacity of 62,500 tpy is estimated at Euro 15 million. The annual amortization (depreciation and interest) costs are estimated at Euro 460,000 (civil works: 20 years/2%) plus Euro 580,000 (mechanical/electrical works:15 years/2%) resulting in Euro 16.6/ton or

GEL 66/ton. The operational costs (salaries, maintenance, energy, insurance, overhead) are estimated at Euro 700,000/year or Euro 11/ton or GEL 45/ton. The total cost increase would thus become GEL 111/ton.

Table 27. A summary of Current and Future MSWM Cost/Ton for Regions (excl. MBT)

Collection GEL/ton	Current situation			Future situation		
	current	estimates		landfill gate fee	Separation at source	
landfill	10 km	10 km	30 km		collection	Sorting ¹
OPEX	65	49	65	41	69	58-81
AMEX	--	43	50	75	58	60-120
Total		92	115	116	127	118-201
Street cleaning	52	52	52		52	
Total	117	144	167	116	179	118-201

¹ Depending on quality and percentage (25-50%) of separation at source.

(iv) Estimated future total costs (excl. MBT)

An estimate is given in Annex 10 for the expected costs in 2025 for nationwide Georgia (1,252,855 tons/year) and separate for the regions (752,996 tons excluding Tbilisi) assuming 50% separation at source and 25% rejects at the sorting line in 2025. The total costs for collection, sorting and landfilling (excluding street cleaning) in 2025 will result in about GEL 310.7 million/1.252 million tons = GEL 248/ton plus GEL 52/ton for street cleaning or a total of GEL 300/ton. Total nationwide cost for waste collection, sorting, landfilling and street cleaning in 2025 would be about 300*1.252 million tons=GEL 376 million (OPEX+AMEX).

The costs for the regions in 2025 are estimated at GEL 186.8 million or GEL 248/ton plus GEL 52/ton=GEL 300/ton and the estimated total costs would be GEL 300*752996= GEL 226 million.

(v) Financing options for the Regions

Fees

The main source for financing is the fee to be paid by the waste generator. However, the fee will be subject to the affordability to pay especially for households. The fee estimates assume of 100% billing and 100% fee collection to cover the estimated total costs.

To assess the affordability, the MSW stream is divided into waste generated by households and waste generated by commercial, institutional and industrial (CII) entities. As reliable data is lacking it is assumed that CII waste will be about 25% of the total waste quantities in the Regions. The waste generation in the Region is estimated at $0.75 * (752996/2502112) * 3.3 = 745\text{kg/household/year}$ in 2025 (Annex 10). This would mean a fee of $\text{GEL } 300 * 0.745 = \text{GEL } 224/\text{year/household}$ for full cost recovery (OPEX and AMEX). The average income/household is GEL 1,175/ month. The affordable fee would be 1-1.5% or GEL 141-211/year. This means that the estimated fee of GEL 224/household/ year

is above the affordability norm. In case only OPEX costs is considered the fee would be (86.2 million/ 0.75 million) = GEL 115/ton plus GEL 52/ton for street cleaning or GEL 167/ton or $0.745 \times 167 = \text{GEL } 124/\text{household}/\text{year}$ as compared to the affordable fee of GEL 141-211.

The maximum fee set by legislation for the CII sector is GEL 25/m³. With an assumed density of 200kg/m³ it would result in GEL 125/ton. This is well below the estimated total costs of GEL 300/ton in 2025.

It can be concluded that the current maximum fee for both households and CII entities has to be increased substantially to meet the future requirements of waste collection, separation/recycling, sanitary regional landfilling and street cleaning. This would mean for households of 3.3 persons about GEL 5.7/person/month for full cost recovery or GEL 3.0/person/month if only OPEX is considered as compared to the current GEL 0.5/person/month. The maximum fee for the CII entities should be increased up to GEL 60/m³.

Fee setting

The current system of fee setting and collection should be reviewed on basis of the principles of “Polluter pays” and “affordability”. The City Council (Sakrebulo) is setting the fees including the conditions for social reductions on the fee and thus the need for subsidies. The law on local fees allows differentiating the waste fee for socially vulnerable people, i.e. income below the poverty indexes. However, taking into account the required fee increase from current GEL 20/ household/year to GEL 224/household/year, it might be expected that governmental decisions are needed on (i) a procedure for gradual increase of the fee in coming years;(ii) activities to be included in the fee such as OPEX, AMEX and type of services and (iii) what should be subsidized. In Table 28 a comparison is given for a full cost recovery fee and a fee covering only OPEX costs.

Table 28. Fee Setting principles in Regions (excl. MBT)

Regions	2025 OPEX and AMEX	2025 OPEX	2019 OPEX
Waste quantity collected (tons)	752,996	752,996	511,000
Total costs GEL (Annex 10)	186.8 million	86.2 million	70 million
Cost/ton for collection etc.	248	115	85
Cost/ton for street cleaning	52	52	52
Total (GEL/ton)	300	166	137
EPR contribution (Annex 10)	27,349,517	27,349,517	n.a.
Contribution/ton (GEL)	36.3	36.3	n.a.
Net cost/ton (GEL)	263.7	129.7	137
Net fee/household (GEL/yr) ¹	196.5	97	20
Fee/person/month	5.0	2.5	0.5 (average)
Net fee/CII (GEL/m ³) ²	60		15 (average)

¹Household of 3.3. persons generates 745 kg/year in 2025; ² 1m³=0.20 ton

The fee increase for households and CII entities will need decisions at governmental level as elected Mayors are not keen to substantially increase the fee.

The fee should be based on an analysis of the actual costs (including any contribution from EPR Scheme) of the previous year and the budget for the next year. The municipalities should prepare annual activity reports with description of services, any changes/ improvements, planned investments, impact on fee, etc. This report should be published so the inhabitants have access to it in order to facilitate the acceptance of the fee. Current practices show that accounting and cost allocation systems are weak within the municipalities so it is difficult to assess the exact costs for each activity. The fees should be based on full cost accounting (operational and amortization costs) specifically for the CII entities while exceptions have to be introduced for low income households and decisions have to be taken which cost items should be included in the fee such as fully or partly the street cleaning costs as street cleaning waste is not fully consisting of municipal waste, any municipal overhead costs, social subsidies, etc. These decisions are up to the Sakrebulo and can differ per municipality.

VAT payment has to be harmonized with the EU legislation. Currently practically all MSW management is a public activity carried out by municipal organizations. Until now no VAT is charged on waste collection, transport, landfilling and separation services and VAT is only paid by legal bodies delivering their waste at landfills. It is recommended to carry out a detailed investigation to clarify the need for VAT payment considering the various options of service rendering such as by a public organization or by a legal body (with/without ownership by municipality) having a contract directly with the waste generator (CII entities) or with the municipality for households. In addition, the need for VAT charge should be clarified on the bills to be sent by municipalities to PRO's in case the EPR Scheme for Packaging is introduced and managed by the private sector. Decisions have to be taken on any reduced VAT rates on (imported) environmental goods such as waste collection trucks, waste treatment facilities, landfill equipment, etc.

The following basic system could be introduced based on international practices:

- **Households:** fee is a tax, no VAT imposed and municipality is the fee collector. The fee could be connected to municipal taxes or to electricity/water bill (extra costs). An enforcement team should be set up. Municipality will pay the waste collection organization on terms to be agreed upon.
- **CII entities:** fee will be subject to VAT and invoicing is by the waste management organization on basis of individual contracts with container size and frequency of collection. For small entities (putting their waste in communal containers) a fixed annual fee could be established on basis of expected waste quantities.

Subsidies

MSW management services are generally not entirely financed by billed fees. A part of the costs can be financed from other municipal budget lines and thus not to be included in the fee. This could be applicable for any social payments (no fee or lower fee for low income households), communication/public participation activities, part of street cleaning costs, support to specific environmental initiatives, etc. The level of co-financing will depend on the municipal budget availability and income from tax and other municipal services. Any deficits in the municipal budget are financed by transfers from the Ministry of Finance.

Currently all fee income is transferred by the municipality to the state budget where after the state transfers the total amount for WM operational costs to the municipality. This system is not encouraging any need at municipal level to improve the efficiency of waste management especially the setting of fee levels and collection of fees. The waste management costs (operational costs including street cleaning) are between 7-8.5% of the total municipal budget (Annex 9). Georgia is classified by the World Bank as a high middle- income country. According to World Bank report "What a Waste 2.0" the average percentage of SWM operational costs (excluding amortization and excluding

street cleaning) as part of the municipal budget would be 11% for a middle-income country. This means that the SWM budget in Georgia for waste collection and landfilling (excluding street cleaning) would be about 4-5% (about 60% of 7-8.5%) which is rather low and this will affect the technological level and quality of services.

Subsidies are distorting the market and the system should be reviewed to give municipalities more financial autonomy and incentive to operate on market-oriented principles. This might include (i) changing the current capital transfers from MRDI into a soft loan (no interest) system to be paid back by municipalities; (ii) introduction of a conditional subsidy scheme based on requirements such as a minimum fee to be imposed by the municipality and minimum percentage of fee collection coverage; (iii) subsidy items have to be specified such as social payments (low income groups), tax abatements for environmental equipment (e.g. reduced import duties, reduced VAT duties).

Extended Producers Responsibility

Importers/packers/fillers (“Obligated persons”) placing for the first-time packaging on the market will be obliged to take back a certain percentage for recycling. They can do it individually or jointly by becoming member of an organization taking over this responsibility (“Product Responsible Organization”-PRO). To finance this operation the members are paying to the PRO a membership fee and an amount per type and quantity of packaging material put on the market by them.

An indicative estimate is given for the year 2025 of the packaging quantities put on the market (Annex 10) resulting in about 406,230 tons (about 68.5% packaging material in dry recyclables) for Georgia and about 246,640 tons for the Regions (58.3% packaging material in dry recyclables). The take back obligations by the PRO/Obligated Persons are estimated at about 128,880 tons and 74,320 tons respectively. The PRO’s have to pay fully for the separate collection, sorting and landfilling. The PRO costs including operational and amortization costs, communication and overhead are estimated at GEL 64.4 million covering nationwide Georgia and GEL 37.8 million covering the regions. The revenues from sales of the recyclables are for the PRO’s and are estimated at GEL 22 million nationwide and GEL 13 million for the regions.

Without EPR involvement the total MWM costs (excluding street cleaning) for the municipalities would be GEL 310.7 million covering Georgia and GEL 186.8 million in 2025. The share of the EPR payments on reduction of total municipal costs is estimated at about 15 %. In case only operational costs are considered the share of the EPR payments would be about 32-33%.

The EPR costs minus revenues are estimated to be about GEL 330/ton. These costs have to be covered by the members of the PRO The most economic schemes in the EU are member states with one or two PRO’s. The best performing member state on basis of cost-effectiveness (recycling rate versus fees paid by members) would be Belgium with two PRO’s (household packaging and industrial packaging). The most expensive systems are in Austria and Germany.

Recommendations

Conclusions

Municipalities are the key to successful waste management. The following major financial problems need to be addressed:

- *The financial position of the municipality* considering the current centralized financing system versus a de-centralized and more autonomous position for the municipalities. This will require institutional changes at state level.
- *The “polluter pays principle”* as required by the Waste Management Code considering the current low fee level and low collection coverage and high level of subsidies
- *Reliable information* is needed for efficiency monitoring and planning considering the current weak accounting and cost allocation system inside the municipalities and the lack of data on waste generation by households and commercial/institutional entities

- *Operational efficiency* considering the landfill regionalization policy that will affect collection and transport costs, composition of the truck collection fleet, need for transfer stations

Actions needed

In view of the above it is recommended to carry out the following:

- **A study at Ministerial level** to investigate the advantage and disadvantages of de-centralization by creating a more financially autonomous position for the municipalities. Municipalities should become more autonomous and accountable in managing the financing of MWM services. Municipalities should have the opportunity to retain the income from waste management services. Municipalities should be allowed to conclude contracts with the EPR Schemes and retain the income. This will require major institutional and legal changes.

It is recommended to carry out a detailed assessment of changing the current centralized financing system into a de-centralized system. Advantages and dis-advantages have to be identified compared to international practices especially inside the EU including the financial impact on state and municipal budgets and the need for VAT charge on bills (cost increase). Need for any legislative changes have to be identified. A reporting and control system has to be developed on duty performance by the municipality. Current subsidy system of financing the total gap between expenses and revenues needs revision. The subsidy system should be defined into items eligible for subsidy such as social payment for low income households, PA and communications costs, VAT exemption on purchases of materials, conditions for receiving subsidy should be introduced such as a minimum fee and a minimum collection coverage, phased introduction of fee increase to meet the “Polluter pays” principle; the current capital transfer system could be changed into an interest free loan for the municipalities.

- **A study at Municipal level** to investigate in-depth the following aspects:
 - (i) **Setting up a reliable database** especially for waste generation and composition from households and commercial/institutional entities. Execution of waste sampling and analysis on an annual basis and a well-functioning system for registration (type, number) of waste generators are basic needs.
 - (ii) **Efficiency improvement of MSW operations** by monitoring the costs and effectivity. Cost monitoring inside the waste management department will require an accounting system with cost allocation per activity. Effectivity monitoring will require Key Performance Indicators for collection, separation and transport. The upcoming landfill regionalization program will have an impact on collection costs and the truck fleet composition and possibly the need for transfer stations. Furthermore, it has to be investigated if cooperation among municipalities is possible to introduce regional collection systems to reduce the costs/ton.
 - (iii) **Fee setting and collection** for households and for commercial/institutional/ industrial entities. The fee calculation methodology and the maximum amounts are laid down in legislation dating from 1998. Actual fee calculations are laid down in local regulations. It results in subsidizing both the households and the CII entities. Future fees should preferably be based on full cost recovery especially for the CII entities and should have a relation with actual waste quantities collected from the users. Billing and non-billing households have to be identified. Collection enforcement system should be improved.

A pilot project guided by MEPA and with advisory role of the MoF and MRDI is recommended in one or more selected municipalities to (i) analyze the internal organizational structure especially for the WM Department and the (financial) data information and management system/staff; (ii) introduce a suitable (standardized) accounting system for waste management

operations and an annual financial report publication; (iii) assess the current collection fleet and its Key Performance Indicators and develop recommendations for cost efficiency; (iv) investigate the need for cooperation with surrounding municipalities to achieve cost efficiency in collection and transport; (v) develop a capacity building program including an operational manual for the accounting system and the setting up of an analysis team and its tasks; (vi) revise and update the fee calculation methodology for households and for CII entities considering the actual costs and the actual quantities collected. Options for a phased implementation of revised fees have to be worked out; (vii) develop a fee collection system and its payment enforcement considering experience in other municipalities.

- “Low hanging fruit” action

Stop subsidizing the private sector. Currently the CII entities are paying average GEL 75/ton while the actual operational costs are about GEL 137/ton. This would mean in 2019 a lost potential income of about GEL 10.87 million (USD 3.265 million) or GEL 8.77 million compared to the current legal maximum fee of GEL 25/m³ or GEL 125/ton. Municipalities should start as soon as possible changing the fee setting and fee collection system for the CII entities.

Following basic actions are needed:

- Government should increase the maximum legal fee up to GEL 70/m³ and allow municipalities to retain the fee from CII entities
- Municipality should increase the fee up to full cost recovery level.
- Prepare a revised list of fees considering a flat fee for small businesses with waste into communal container and customized fees for big business receiving individual containers
- Update the municipal registration/licensing system for all CII entities
- Prepare a standard collection contract between waste collector and CII entity
- Set up an enforcement team

2.8 Plastic waste upstream policy and practices/contribution to marine littering

2.8.1 Plastic Waste Flows as a Part of Municipal Solid Waste

Plastic is a material formed by the reaction of small, organic molecules called monomers creating long polymer chains. Some polymers—such as polyethylene (PE)—are formed by additional polymerization. Others—such as nylon—are formed by condensation reactions in which small molecules, often water, are eliminated in the process of creating a longer chain. The polymers used to make a plastic are almost always mixed with additives—including colorants, plasticizers, stabilizers, fillers, and reinforcements. These additives affect the chemical composition, chemical and mechanical properties, and cost of the plastic. There are two general types of plastics: thermoplastics and thermoset plastics. Thermoplastics soften when heated, can be reformed, and then harden when cooled. This process can be repeated numerous times, which means thermoplastics can be recycled. Thermoplastics include PE (used in toys, shampoo bottles, pipes, polypropylene (PP—used in food packaging, snack wrappers, auto parts, etc.), polyethylene terephthalate (PET—often used for water and other beverage bottles), polystyrene (PS—used in foam food containers, eyeglasses, building insulation, etc.), polyvinylchloride (PVC—used in window frames, pipes, cable insulation, etc.), and others including polycarbonates (PC) and polyamides (PA). Thermoset plastics will not soften upon heating because permanent chemical bonds form between polymer chains (crosslinking). Thermoset plastics include polyurethane (PUR—used in building insulation, pillows and mattresses, insulating foams, etc.), epoxy resins, some acrylic resins and some polyesters. PE and PVC are used in water distribution mains and epoxy resins, PUR for relining existing mains, PP for various components, and PA as coagulant aids in water treatment.

Plastics are also used in membrane filters in water treatment systems. In the context of bottled water, PET is often used to make the bottles, and PP and PE to make bottle caps. These materials are often regulated to ensure they do not leach substances (e.g., monomers, plasticizers, or other additives) at concentrations of concern into drinking-water. Biodegradable plastics are plastics that can be decomposed by hydrolysis or ultraviolet (UV) light degradation or the action of microorganisms, usually bacteria. They can be made from either renewable raw materials or from petrochemicals. However, some “biodegradable” plastics require prolonged exposure to temperatures above 50°C to degrade completely. Such conditions exist in industrial composting but are rarely, if ever, met in the environment. Some plastics contain pro-oxidants which promote fragmentation, but there is some controversy as to whether there is any actual biodegradation of these plastics in the environment because they have the potential to form microplastics.

Worldwide plastic production has increased roughly exponentially since the beginning of large-scale, global plastic production, excluding fibers, from 322 million tonnes (Mt) in 2015 to 348 Mt in 2017. With fibers included, global production was estimated at 381 Mt in 2015 and with additives included, 407 Mt. Considering the estimated, worldwide population growth rate, current consumption and waste generation levels, and management patterns, plastic production is predicted to double by 2025 and more than triple by 2050. Of total non-fiber plastic production, 36 percent is PE, 21 percent is PP, 12 percent is PVC, and less than 10 percent is PET, PUR, and PS each. The production of polyester PAs and acrylic fiber is next largest group, much of which is PET. Together, these seven groups account for 92 percent of all plastics ever made. Intentional microplastic production represents <0.1 percent of total plastic production⁴⁴.

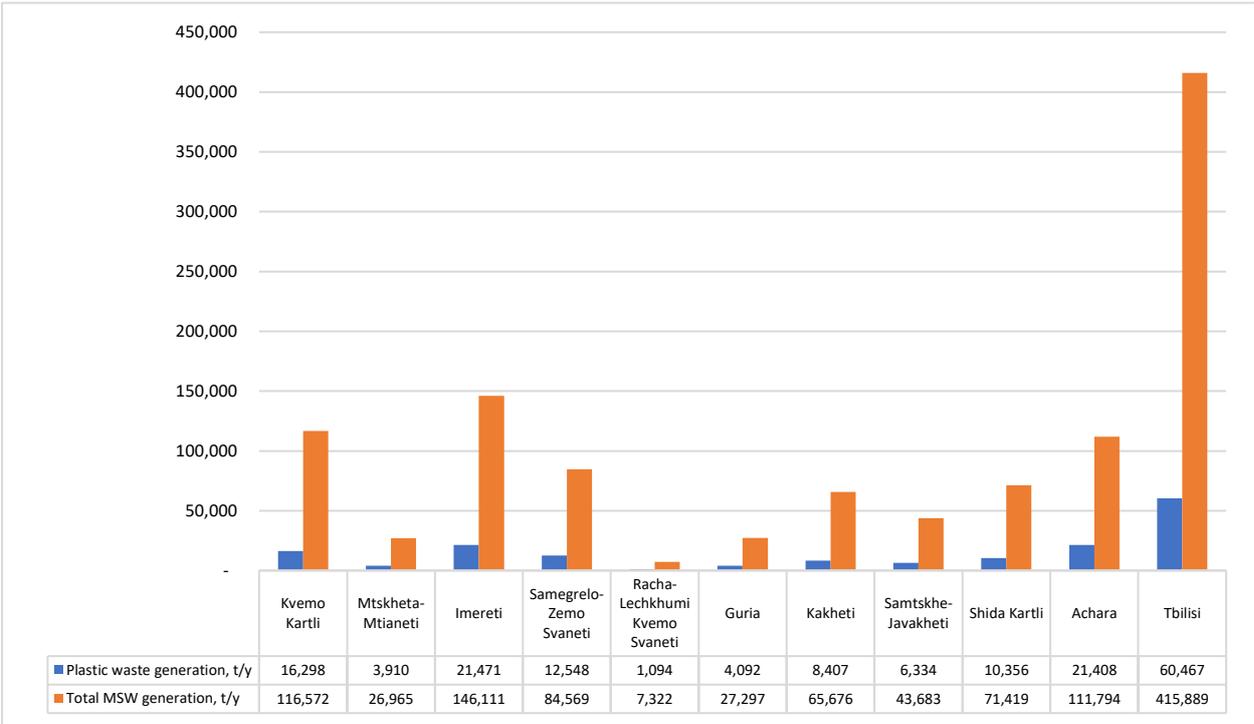
Producers in Georgia use mostly imported plastic material, which is mixed with primary plastics to make plastic items/goods.⁴⁵ The main importers are plastic packaging materials’ producers, and food and beverage producers. Imports from Turkey, Russia, Azerbaijan, and EU countries dominate total imports. The majority of plastic materials are PET bottles. According to official statistics, local production of plastic materials varied from around 15,200 t/y in 2013 to 25,400 t/y in 2017.

Plastic waste contributes from 12.8 percent (Kakheti) to 19.15 percent (Batumi, Achara) to total MSW generation. According to WB experts’ estimates under this study, in 2019, out of 1,117,396 t/y total generated MSW quantity, plastic waste made up around 166,384 t/y (~14.89 percent).

⁴⁴ Source: Micro-plastics in Drinking Water. WHO (World Health Organization). 2019.
<https://apps.who.int/iris/bitstream/handle/10665/326499/9789241516198-eng.pdf?ua=1>

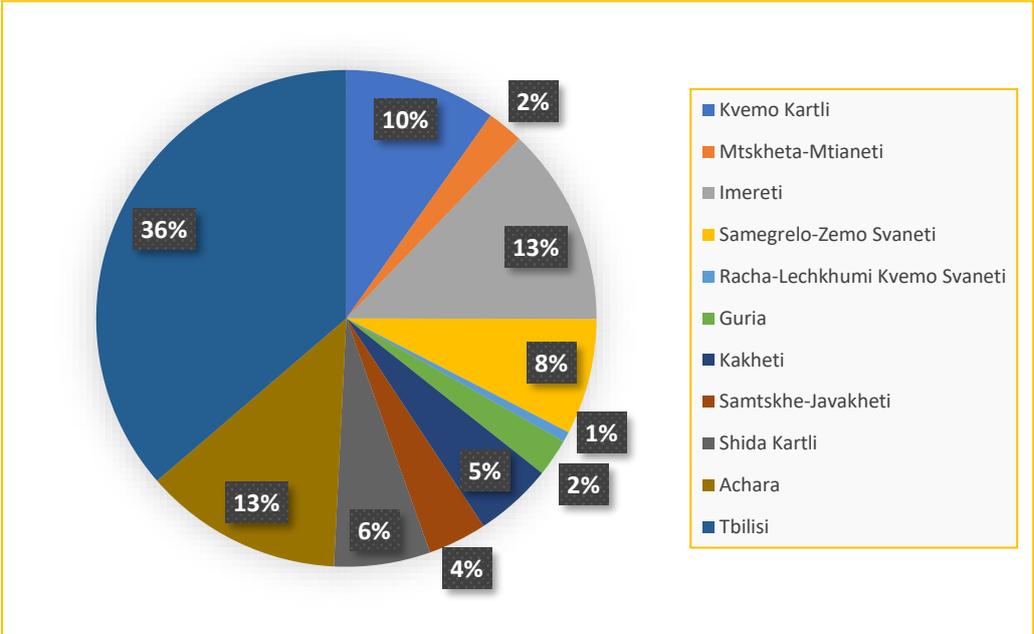
⁴⁵ Source: Baseline Study 2018, EU Project: EuropeAid/138609/DH/SER/GE “Technical assistance for the improvement of waste management systems in Georgia”

Figure 15. 2019 Quantity of Generated MSW and Plastic Waste in Georgia by Regions



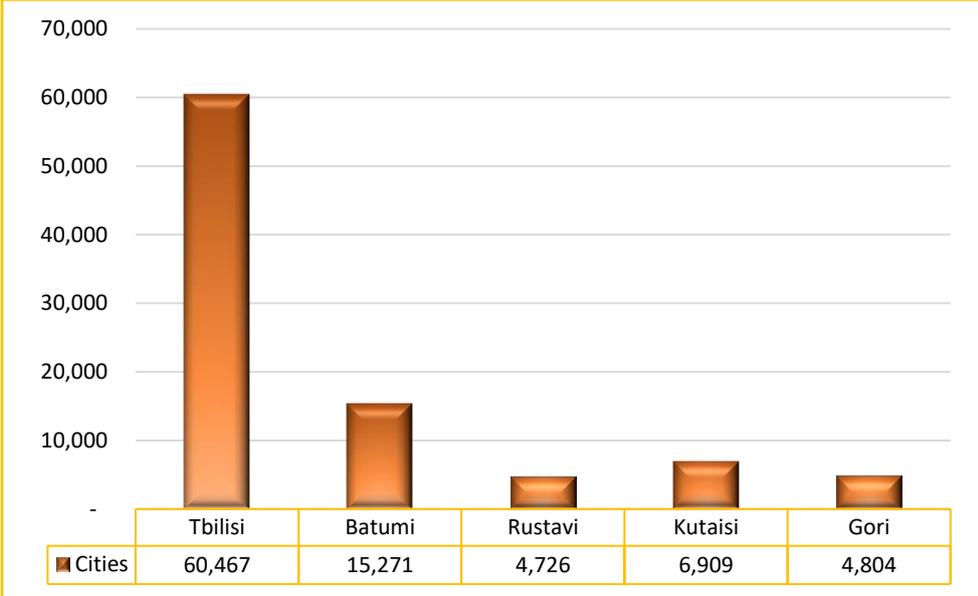
Of the total quantity of plastic waste generated, more than 36 percent is accounted for by Tbilisi, followed by Imereti (12.9 percent), Achara (12.87 percent), Kvemo Kartli (9.8 percent), Samegrelo-Zemo Svaneti (7.54 percent), and Shida Kartli (6.22 percent).

Figure 16. Percentage Share of Georgia’s Regions in Total Plastic Waste Generation, 2019



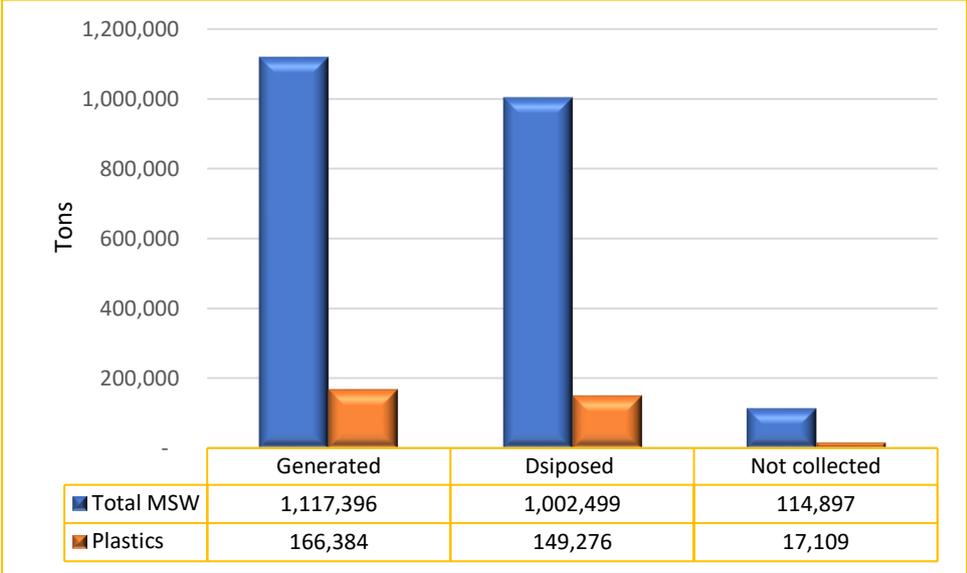
The major cities are gross producers of plastic waste, with Tbilisi generating 60,467 t/y of plastic waste, followed by Batumi with 15,271 t/y, Kutaisi with around 6,909 t/y, Gori with 4,804 t/y, and Rustavi with 4,726 t/y. Altogether these cities generate around 88,995 t/y plastic waste, which is more than 55 percent of the total quantity of plastic waste generated in Georgia.

Figure 17. Estimated Quantities of Plastic Wastes Generated by Major Cities of Georgia in 2019



Taking into account that the vast majority of urban areas in Georgia have almost 100 percent MSW collection rates, and that mixed waste collection is a single practice in Georgia, plastic waste from cities and towns almost entirely end up in landfills. From the regions representing rural areas, on average 70-80 percent of plastic waste goes to landfills and the remaining 20-30 percent ends up in dumpsites, on riverbanks and shores, on riverbeds and in drainage canals, and directly in the sea. More specifically, in 2019 out of 166,384 t/y generated plastic waste, 149,276 t was disposed in landfills and around 17,109 t was dumped in illegal dumpsites, on riverbanks and riverbeds, on seashores, in the sea, in drainage canals, and other areas.

Figure 18. 2019 Total Quantities of Mixed and Plastic Wastes disposed in landfills and Quantities not Collected



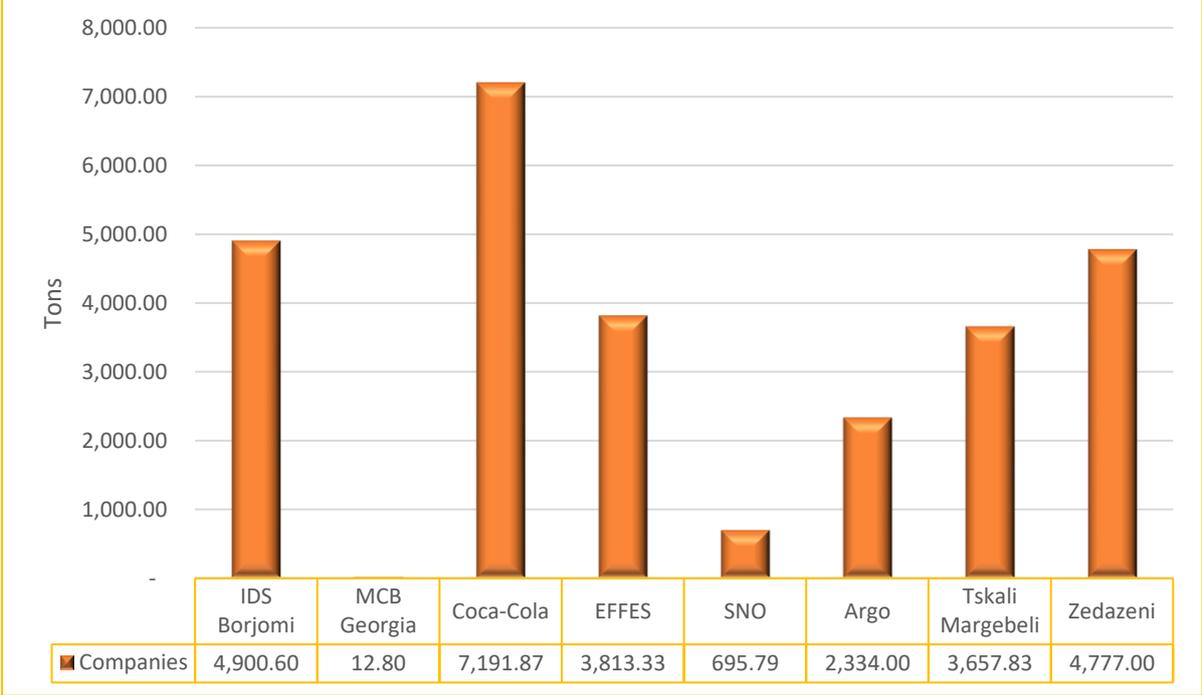
It is noteworthy that plastic waste is at least 50 percent—and on average 80 percent—of all packaging waste, and sometimes reaches almost 100 percent. For instance, an 2020 October container study for Tbilisi showed that of plastic waste—15.3 percent of all waste (63,631.02 t)—almost 100 percent is packaging: PET bottles (3.6 percent), plastic bags (7.3 percent), and other plastics (4.4 percent). Of total packaging, 47.4 percent is plastic bags, 28.9 percent other plastics (bottles of cleaning products, bath and shower products, cosmetics, etc.) and only 23.7 percent PET bottles. In practice, the share of plastic bags is less because water and organic waste residues remain in plastic bags due to the mixed

collection system. In a separate collection system (dry bin), the share of plastic bags should be lower and more realistic (approximately 1/3 of all plastics). Of total packaging plastic, only PET bottles will be subject to the DRS system once the packaging EPR regulation enters into force.

As far as practical implementation of recycling/material recovery measures is concerned, regardless of the legal requirement to introduce source separation systems for four dry recyclable streams (plastic, paper/cardboard, metal, and glass), only a few municipalities have started separate collection at pilot levels, mostly for plastic (PET) and paper. Achara Waste Management Company has already built a EU-compliant sanitary landfill in Tsetsikauri (near Kobuleti) with a sorting facility. The landfill will be commissioned in the summer of this year. Currently, the EBRD consultant team is helping Achara Waste Management Company develop its PIP (Project Implementation Plan) facility design and specifications. Today, material recovery is negligible.

The business sector, for its part, has started preparing for EPR. In the packaging sector, a non-profit association of beverage/packaging producers—Georgia+—was established under the leadership of Coca Cola and will apply for authorization to act as a PRO once EPR regulations are in force. The organization will include up to 20 medium- to large-size beverage companies. Several waste composition studies have recently been conducted by Georgia+. Of all beverage/packaging companies, eight are active members and constitute the largest share of the beverage market in Georgia. According to Georgia+'s own estimates, in 2020 their packaging waste came to 27,383.21 t. Of this, plastic waste was around 24,644.89—t almost 90 percent.

Figure 19. 2020 Estimates of Packaging Wastes by Companies, Members of Association Georgia+



Source: Georgia+

2.8.2 Leakage Leading to Mismanagement and Subsequent Marine Littering

Marine Litter is one of the most acute global environmental issues at present. UN’s International Maritime Organization defines it as: “any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment. Marine litter consists of items...made or used by people and deliberately discarded into the sea or rivers or on beaches; brought

indirectly to the sea with [sic] rivers, sewage, storm water or winds; accidentally lost, including material lost at sea in bad weather (fishing gear, cargo); or deliberately left by people on beaches and shores.”⁴⁶

It is well-documented that marine litter is predominantly plastic. Historically, more than 150 million tons of plastics have accumulated in the world's oceans, with 4.6-12.7 million tons added every year. According to estimates, the annual flow of plastic waste into the ocean could almost triple by 2040 and reach 29 million tons per year, equivalent to 50 kg of plastic for every meter of coastline on Earth. UN Environment estimates that 15 percent of marine litter floats on the surface, 15 percent remains in the water column, and 70 percent rests on the seabed. According to another study, 5.25 million plastic particles, weighing 268,940 tons in total, are currently afloat in the world's oceans.⁴⁷

Key pathways of this litter begin at both land-based and sea-based sources, including MSW dumping and littering of riverbanks, riverbeds, beaches, seawater, discharges of untreated sewage and stormwater from surface runoff and drainage systems—especially from coastal communities, fishing and aquaculture, illegal and accidental dumping from shipping, and offshore mining and dredging. On average, 80 percent of marine litter is land-based, with some regional fluctuations.⁴⁸

Marine litter causes serious, negative economic and environmental impacts, including losses to coastal communities, tourism, shipping, fishing, and threats to aquatic life. Sea creatures in marine waters polluted with litter may get trapped inside containers or strangled by nets or ropes. Microplastics (items smaller than 5mm), which have been gaining attention globally, are of particular concern due to their potential toxicity and size, and consequent harm to the animals that ingest them. Although the potential health impacts of plastic build-up in the food chain are not yet fully known, human-health concerns are being raised since many of the affected marine animals end up as seafood. Used directly in products (such as exfoliants in face and body scrubs or industrial abrasives), fragmenting from larger pieces of plastic waste, or generated during the use of products (e.g., clothes washing or car tire abrasion) and carried by sewage and stormwater, microplastics are released to accumulate in the aquatic and marine environment. These materials are indigestible when swallowed in the food chain.

While litter is a key marine environment/biodiversity challenge, its generation and prevention are strongly associated with human activities and policy measures, including waste and wastewater management, product design, shipping, fisheries policies, consumption, and behavioral patterns. Marine litter can be prevented or cut significantly through improved waste—particularly plastic waste—management, increased reuse, recycling, avoidance of single-use products and product eco-design (e.g., plastic products designed to prevent littering, avoiding the intentional use of microplastics in products), and intensive education and awareness actions and campaigns. All available EU legal and policy instruments—including the EU Marine Strategy Framework Directive (MSFD), Water Framework Directive, Waste Framework Directive, SUP Directive, Plastic Bags Directive, etc.—require planning and implementation to prevent or reduce marine littering.

The Black Sea, with its six riparian countries—Georgia, Bulgaria, Romania, Russia, Turkey, and Ukraine—is not an exception in terms of littering. The amount of marine litter in it is almost twice as high as in the Mediterranean Sea (90.5 vs. 50 litter items/km²), while concentrations of some pollutants

⁴⁶ Source: Marine Litter. International Maritime Organization. <https://www.imo.org/en/MediaCentre/HotTopics/Pages/marinelitter-default.aspx>

⁴⁷ Source: Marine Litter. International Maritime Organization. <https://www.imo.org/en/MediaCentre/HotTopics/Pages/marinelitter-default.aspx>

⁴⁸ Source: European Commission. https://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/index_en.htm

exceed the toxicity threshold value. The large rivers such as the Danube and the Dniester bring to the sea six to 50 items of litter per hour. Microplastics were found in Black Sea sediments on its shelf and in depths of more than 2,000 m. Surveys were conducted in 2017-2019 in the coastal waters of Georgia, Ukraine, and Russia, and in the open sea. On average, 85 percent of the litter found in the Black Sea is plastic—predominately packaging, including bottles, bags, and other plastic packaging. Of the most common types of litter brought to the Black Sea by rivers, about 20 percent are plastic bottles, while plastic bags and containers—two other key pollutants—account for 10 percent and nine percent respectively. Of the waste that contaminates beaches, 14 percent consists of plastic bottle caps, six percent wrappers, five percent bottles, and two percent straws and stirrers. All these are findings of marine litter monitoring were reached with support from the European Union as part of the “Improving Environmental Monitoring in the Black Sea” (EMBLAS) project, implemented by the United Nations Development Programme.⁴⁹

Major sources of marine litter in Georgia

Georgia is one of the smallest of all riparian states of the Black Sea region, with its six western regions – Racha-Lechkhumi Kvemo Svaneti, Imereti, Samegrelo-Zemo Svaneti, Guria, and Achara A.R.—as well as Abkhazia A.R., one of the breakaway regions of the country located within the river basins of the Black Sea. Georgia’s internal waters make up 1,474 km², territorial seas 6,506 km², shelf areas 10,886 km², shorelines 378 km, and seashore areas 6,429 km².⁵⁰ Total population of these six regions—excluding Abkhazia—is 1,287,167 (2020 GEOSTAT data). Abkhazia’s population is around 245,246 (2018 data, Wikipedia). Of the six regions, Racha-Lechumi Kvemo Svaneti and Imereti are upper and midstream regions. The rest have coastlines. The total population of coastal municipalities within these regions is 427,712, of whom 130,360 live in Abkhazia. Urban population makes up around 86 percent of all coastal communities, with 240,578 living in cities and towns on the Georgian side of the Enguri River borderline and around 126,715 in the coastal cities and towns of Abkhazia. The large cities of Batumi, Poti, Kobuleti, Sokhumi, and Ochamchire exert high anthropogenic pressures on coastal areas and marine water. All these areas—together with a few small towns and villages, including Ureki, Shekvetili, Grigoleti, Chakvi, Sarphi, Kvariati, etc.—are popular tourist destinations for both international and domestic travellers who contribute significant loads to plastic litter.

One of the largest sources of marine litter is the MSWM sector. A rough estimate for total generation of plastic waste generated by West Georgian regions is around 60,613 t/y for 2019 (excluding Abkhazia), with Imereti contributing the largest share, followed by Achara A.R., Samegrelo, and Guria. According to the SWMCG, in 2019 the total quantity of mixed MSW disposed of in West Georgian landfills amounted to 305,979 t/y, of which 46,070.37 t was plastic waste. Roughly 14,543 t (~23.99 percent) stayed uncollected—predominately in rural areas—due to the poor MSW collection rate percentage, and in tourist spots with increased numbers of visitors. This waste ends up in dumpsites, riverbanks and riverbeds, seashores, stormwater drainage canals, and ultimately in the Black Sea.

⁴⁹ Source: <http://emblasproject.org/archives/2906>

⁵⁰ Source: EMBLAS

Figure 20. MSW and Plastic Waste Generation in Black Sea (West Georgia) Basin Regions of Georgia

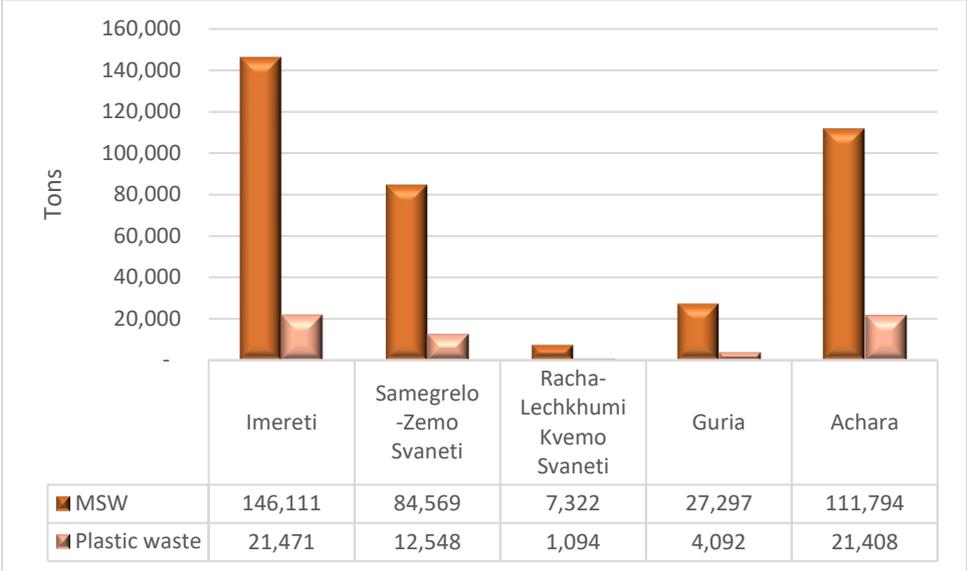


Figure 21. Contribution of West Georgian Regions to Total Plastic Waste Generation, %

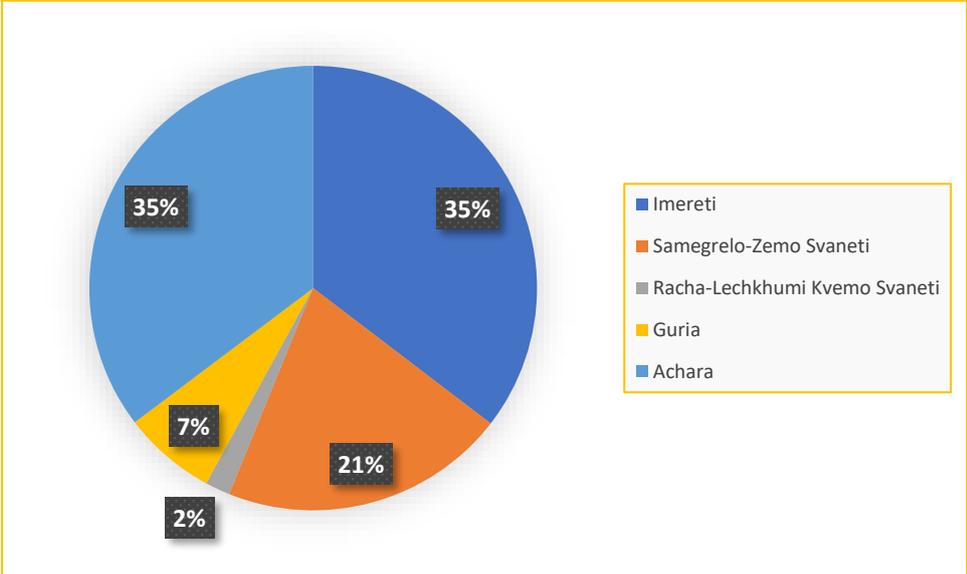
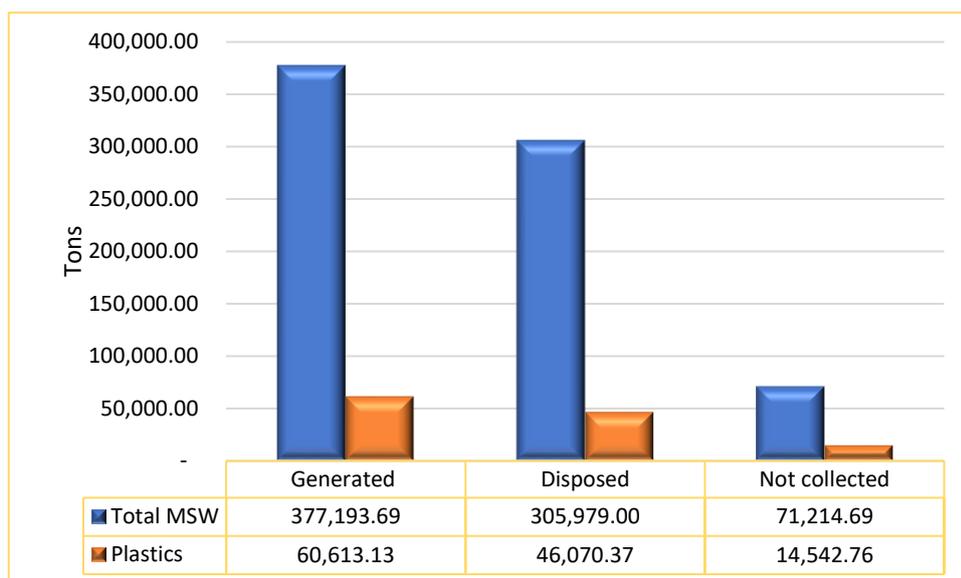


Figure 22. Total Quantity of MSW and Plastic Waste Collected and Collection Gaps in West Georgian Regions



Plastic waste projections for West Georgian regions, assuming a zero percent WGI growth rate, predict total quantities of plastic waste will be 59,502 t in 2025, and with 1.6 percent urban WGI growth and 0.8 percent rural WGI growth rates it will be 65,287 t. Of this, 38,264 t will be accounted for by plastics from coastal regions (Achara, Samegrelo-Zemo Svaneti, Guria) in the zero percent WGI growth scenario and 42,059 t in the 1.6 urban WGI/0.8 percent rural WGI growth scenario.

Table 29. 2025 Projected Plastic Generation Data for Western Georgian Regions

	Imereti	Samegrelo – Zemo Svaneti	Racha-Lechkhumi Kvemo Svaneti	Guria	Achara
0% WGI growth scenario, t/y					
Urban	12,498	6,299	320	1,454	18,841
Rural	7,760	5,551	660	2,436	3,683
Total	20,258	11,850	980	3,890	22,524
1.6% urban WGI growth /0.8% rural WGI growth scenario, t/y					
Urban	13,967	7,039	358	1,625	21,055
Rural	8,205	5,870	698	2,576	3,894
Total	22,172	12,909	1,056	4,201	24,949

The total plastic generation in coastal municipalities amounted to 30,973 t. Assuming zero percent WGI growth, 2025's projected plastics total will be 31,551 t; with 1.6 percent urban WGI growth and 0.8 percent rural WGI growth it will be 34,836 t.

Table 30. Total Quantities of Plastic Wastes for Coastal Municipalities

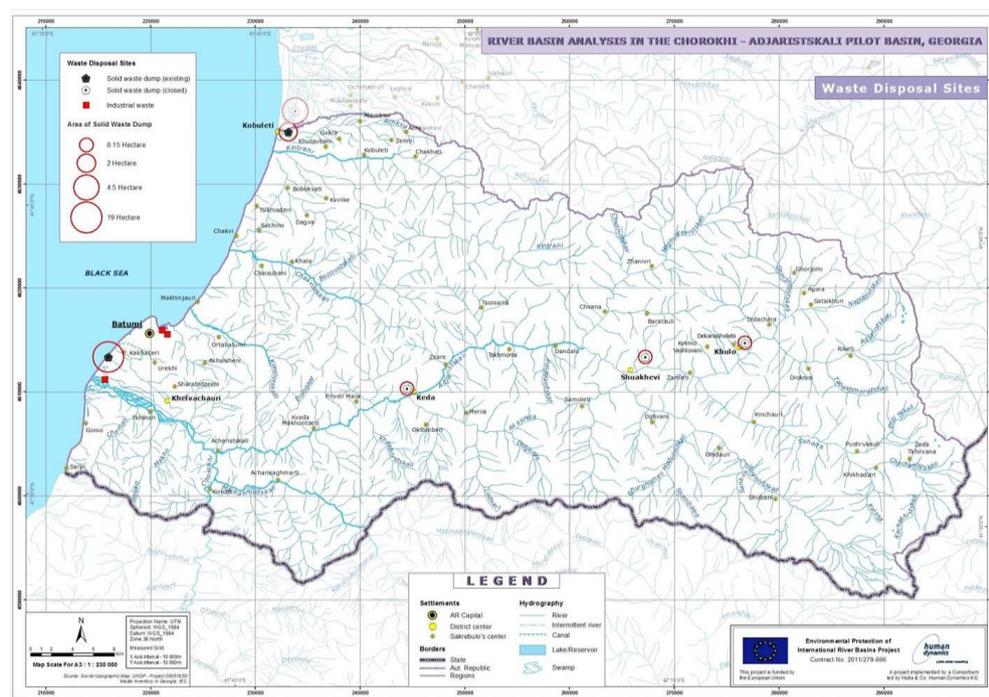
	Zugdidi	Khobi	Poti	Lanchkhuti	Ozurgeti	Kobuleti	Khelvachauri	Batumi
2019 Estimated quantities of plastic wastes, t/y								
Urban	2,285	163	2,315	276	1,149	2,185	0	15,271
Rural	2,317	524	0	544	1,543	1,263	1,136	0
Total	4,601	688	2,315	820	2,692	3,448	1,136	15,271
2025 projected quantities of plastic wastes under 0% WGI growth scenario								
Urban	2,142	138	2,308	268	1,120	2,174	0	16,400
Rural	2,214	486	0	516	1,440	1,211	1,134	0
Total	4,356	624	2,308	784	2,560	3,385	1,134	16,400
2025 projected quantities of plastic wastes under 1.6% urban WGI growth and 0.8% rural WGI growth scenario								
Urban	2,393	154	2,579	300	1,251	2,430	0	18,327
Rural	2,341	514	0	546	1,522	1,280	1,199	0
Total	4,734	668	2,579	846	2,773	3,710	1,199	18,327

Table 31. Total Quantities of Plastic Waste for Coastal Municipalities

	Zugdidi	Khobi	Poti	Lanchkhuti	Ozurgeti	Kobuleti	Khelvachaur i	Batumi
2019 estimated quantities of plastic waste, t/y								
Urban	2,285	163	2,315	276	1,149	2,185	0	15,271
Rural	2,317	524	0	544	1,543	1,263	1,136	0
Total	4,601	688	2,315	820	2,692	3,448	1,136	15,271
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Total	4,734	668	2,579	846	2,773	3,710	1,199	18,327

Multiple dumpsites of different size produce some of the most pollution in Georgia’s coastal area. The biggest three of such sites are in Batumi and Kobuleti Municipalities.

Figure 23. Location of 3 dumpsites within Chorokhi-Adjaristskali River Basin and along the shore of the Black Sea



(Source: EUWI+)

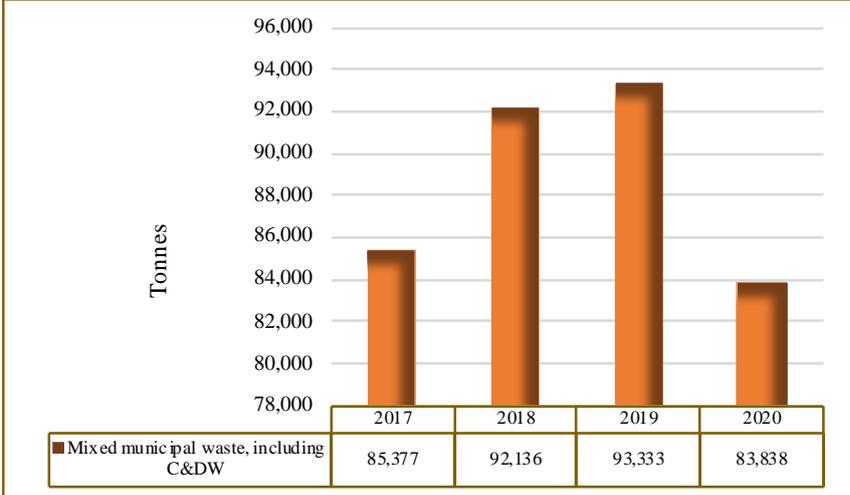
Batumi’s landfill/dumpsite is in a flood zone/delta, about 10 km south of the city centre, between the airport, the Chorokhi River, and the Black Sea shoreline. The site is an important bird area (IBA) and part of the Ramsar Site.

The site has been operational since 1965. Initially it occupied 19 ha (hectare) land area, but it expanded in 2016 to 30 ha. Currently, the site is operated by LLC Sever, which weighs waste at the gate and spreads/levels it by bulldozer, without soil covering. Mixed MSW, CDW, and other types of mostly commercial waste are disposed of in the landfill, which also has a section for dead/fallen animals. The landfill is full and approximately 12-15 m high. Disposal of waste occurs on the sea side, where inert materials were once extracted. The riverbank protection was inadequately designed and constructed,

which resulted in riverbank erosion and a significant part of the landfill washed away in the mid-2000s. The landfill is unlined and has no leachate collection and treatment facilities or gas collection system. Moreover, it is unfenced and offers easy access to stray/feral dogs and livestock. Unintentional burning is frequently reported there as well as intentional burning of tires. There are about 100 scavengers/diggers on-site daily, recovering metal, plastic, cardboard, and WEEE for supply to local recyclers, including Sever, Zugo, and others. The site lacks proper management and meaningful control over its landfill situation.

The landfill’s designed disposal capacity/acceptance rate is 250-300 t/d on average; its actual acceptance rate is approximately 240 t/d.

Figure 24. Approx. Quantity of Mixed MSW Disposed in Batumi Existing Landfill



Source: Inception Report. EBRD Batumi Solid Waste Management Project Due Diligence)

Since existing waste composition data for 2017-2020 shows that 16.7 percent of all Achara A.R. MSW is plastic, that means 13,414-14,933 t/y of plastic waste, including packaging, wound up in Batumi’s dumpsite.

Another large, abandoned dump is located on the Kobuleti State Nature Reserve and belongs to the Ramsar site. It covers four ha and is situated along the road from Kobuleti City to the former aerodrome. The disposal of waste commenced service in 1961 and operated for 46 years. The landfill area is peat with a shallow water table. The waste has gradually settled into the peat and today reaches only one to two m above the surrounding ground level. Previous drillings estimated the average thickness of the waste at eight meters, with a maximum of 12 meters. The waste is now covered by grass and bushes as no remediation measures were implemented after abandonment of the landfill. The site is no longer used due to the military airport in the neighborhood. It does not conform to geological and hydrogeological requirements for landfills. The permeability of the soil and conditions of the local water table do not provide the required protection of the groundwater. The area is unfenced and animals can be found grazing there, but there is no scavenging as the landfill has been closed and waste no longer arrives. One family lives there with a family member who has IDP status. Family members clean part of the onsite perimeter from time to time.

The third large dump is also located in Kobuleti and occupies four to eight ha. The depth/height of waste pile varies between two and five m. The site opened as a temporary landfill/controlled waste disposal site due to the high petrol expenses of transferring waste to Batumi after closure of a previous landfill. It is close to the Kintrishi River that flows directly into the Black Sea. The site is characterized by intensive washout that threatens the water biota. The area belongs to the Ispani wetlands designated as the Ramsar site. Therefore, leachates and surface runoff from these areas exert

pressures on wetlands ecosystems. In 2007 the site was closed. However, it still puts pressure on the environment, since it was not closed properly and remediated.

Along with waste dumping, a key source of plastic litter in marine water is the sewage collection and treatment (sanitation) sector. Both untreated and treated household wastewater may carry macro- and micro-plastics. According to available data, wastewater treatment can effectively remove more than 90 percent of microplastics from wastewater, when it uses tertiary treatment such as filtration. Conventional treatment, when optimized to produce treated water of low turbidity, can remove particles smaller than a micrometer through processes of coagulation, flocculation, sedimentation/flotation and filtration. Advanced treatment can remove smaller particles. For example, nano-filtration can remove particles $>0.001 \mu\text{m}$ while ultra-filtration can remove particles $>0.01 \mu\text{m}$.⁵¹

In Black Sea coastal communities, sewerage systems with operational wastewater treatment plants (WWTPs) serve Batumi and nearby small resorts as far away as the border with Turkey, including villages Sarpi, Kobuleti, and Chakvi. Recently, new plants in Anaklia, Ureki-Shekviteli and Poti were completed. Batumi's operational WWTP designed capacity is $5,832 \text{ m}^3/\text{hour}$ or $51,088,320 \text{ m}^3/\text{y}$. The treatment plant in Chakvi receives sewerage from 1,200 households, and the plant in Kobuleti services 22,000 people during low tourist season and 68,500 during high tourist season, discharging treated water into the Ochkhauri River, 150 m from its confluence with the Choloki River flowing into the Black Sea. (The designed capacity of the Kobuleti WWTP is $5,500 \text{ m}^3/\text{day}$ during the non-recreational season and $20,550 \text{ m}^3/\text{day}$ during the recreational season).⁵² The designed capacity of the newly built Ureki WWTP will be about 40,000 population equivalent (PE) by 2040. Its initial phase will have only 20,000 PE capacity. The treated wastewater will be discharged via a pressure line into the Sepa River, which feeds the Black Sea, 500 m distant.⁵³ The designed capacity of the Anaklia WWTP is PE 30,000, with its main collector in the southwestern outskirts of Anaklia, close to the Black Sea, that collects, delivers, and discharges the treated sewage at a predetermined discharge point in the Enguri River.⁵⁴ The Poti WWTP will treat 98,000 PE equivalent of sewage by 2040. Zugdidi City, which is very close to the Enguri delta and the river's confluence with the Black Sea, also has a new WWTP, expected to serve 81,000 by the 2040. Its capacity is $22,411 \text{ m}^3/\text{per day}$. It discharges treated water in the Chkhoushi

⁵¹ Source: Micro-plastics in Drinking Water. WHO (World Health Organization). 2019. <https://apps.who.int/iris/bitstream/handle/10665/326499/9789241516198-eng.pdf?ua=1>

⁵² Source: APPENDIX TO THE DRAFT RIVER BASIN MANAGEMENT PLAN OF THE CHOROKHI-AJARISTSKALI RIVER BASIN OF GEORGIA: COASTAL AND TRANSITIONAL WATERS, European Union Water Initiative Plus for Eastern Partnership Countries (EUWI+): Results 2 and 3, ENI/2016/372-403

⁵³ Source: Draft Initial Environmental Examination, October 2013, GEO: Urban Services Improvement Investment Program – Tranche 3 (Improvement of Ureki Wastewater System), Prepared by United Water Supply Company of Georgia LLC of the Ministry of Regional Development and Infrastructure for the Asian Development Bank. <https://www.adb.org/sites/default/files/project-document/78789/43405-025-geo-iee-03.pdf>

⁵⁴ Source: WATER TREATMENT PLANT, RESERVOIRS AND TRANSMISSION LINES FOR WATER SUPPLY (WTP) IN MESTIA (SECTION 1) AND WASTE WATER TREATMENT PLANT (WWTP) IN ANAKLIA (SECTION 2) Contract No: UWSCG/USIIP/ICB/CW/REG-02, Environmental management plan for works on design and construction of a new wastewater treatment plant for Anaklia town, February 23rd, 2015, United Water Supply Company of Georgia, JV "Ludwig Pfeiffer – Protecno"

River, a tributary of the Jumi River, that flows directly into the Enguri River.⁵⁵ By 2022 Makhinjauri, Mtsvane Kontskhi, Khelvachauri, Adlia, Kakhaberi, Airport Settlement, and Mejinistskali in Achara A.R. will get sewage systems and a modular, EU-compliant WWTP (in Makhinjauri) as well as upgrades to the existing WWTP in Adlia settlement that will add a new purification step in order to comply with the EU Directive on WWT. KfW will fund the project. According to MEPA's statistical yearbook, in 2019 a total of 24,265,977 m³ wastewater was discharged by households into the Black Sea, of which 22,998,000 m³ was discharged from the Adlia municipal treatment plant of Batumi.⁵⁶ The Kobuleti plant discharged 3,047,000 m³ of treated wastewater into the Ochkhamuri River. Some areas of Batumi—as well as other settlements lacking sewerage systems or having sewage systems unconnected to treatment plants—are illegally using nearby stormwater drains that allow polluted water to enter surface waters and end up in the sea or rivers draining into the sea. In addition to this, 2,259,20 m³ of domestic wastewater was discharged by various organizations directly into the Black Sea in Achara A.R.⁵⁷

Moreover, stormwater drainage systems with both open and closed channels direct a significant volume of untreated stormwater into rivers and the sea, carrying both macro- and micro-plastics.

Industries and large transportation systems in Batumi and Poti—including Batumi Oil Terminal, Black Sea (Kulevi) Oil Terminal, Batumi Petroleum, Georgian Railways, Batumi and Poti ports, Batumi International Airport, the Poti Free Industrial Zone, etc.—generate significant quantities of industrial wastewater, and stormwater coursing through industrial drainage/stormwater systems discharge treated or untreated wastewater directly into the sea or rivers flowing into the sea (e.g., through Bartkhsana, Korolistskali, Kubistskali, Khobistskali, etc.)

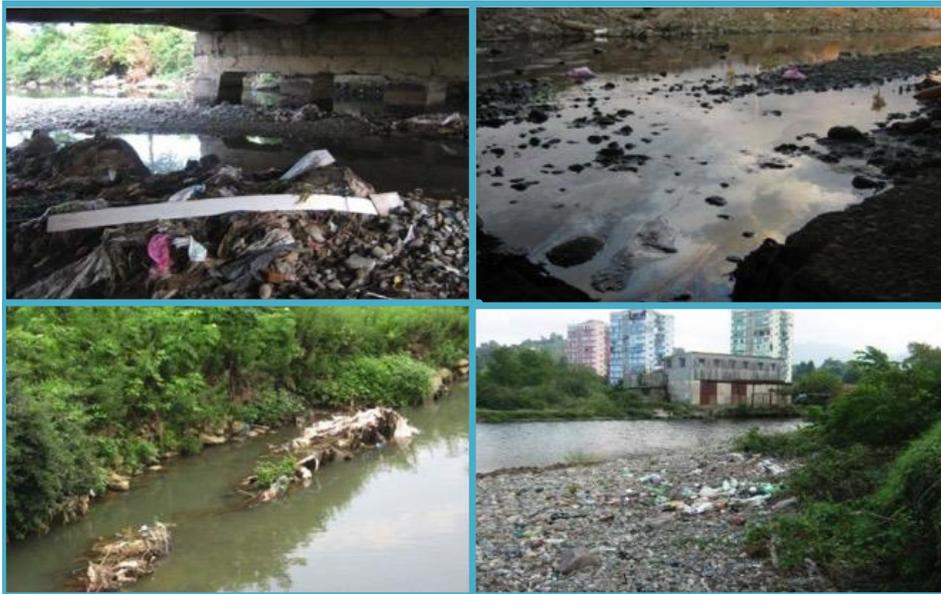
Riverine sources—such as the lower parts and deltas of the Chorokhi, Achkva, and Kinkisha Rivers, the lower part and estuaries of the Chaktistskali, Kintrishi, Kinkisha, Mejinistskali, and Bartskhana Rivers, the lower Korolostskali River, including its delta and estuary of Kubistskali, downstream of Khobistskali, all impose significant anthropogenic pressures.

⁵⁵ Source: SITE SPECIFIC ENVIRONMENTAL MANAGEMENT PLAN. Project Number: 43405-027. USIIP, Tranche 5, Construction of a New Waste Water Treatment Plant (WWTP) in Zugdidi. Contract Number: UWSCG-USIIP-ICB-REG-03a. Prepared by Contractor Company "JV Pfeiffer-Emit". March 2018 . Georgia

⁵⁶ Source: APPENDIX TO THE DRAFT RIVER BASIN MANAGEMENT PLAN OF THE CHOROKHIAJARISTSKALI RIVER BASIN OF GEORGIA: COASTAL AND TRANSITIONAL WATERS European Union Water Initiative Plus for Eastern Partnership Countries (EUWI+): Results 2 and 3 ENI/2016/pp. 372-403

⁵⁷ Ibid.

Figure 25. Photos of Bartskhana and Korolistskali River Banks



(Source: EUWI+)

According to the appendix of the Draft River Basin Management Plan of the Chorokhi-Adjaristskali River Basin of Georgia: Coastal and Transitional Waters, the transitional and coastal sea water bodies that suffer the most from point source pollution are:⁵⁸

- The section from Chorokhi estuary to Adlia—namely, Mejinistskali estuary—polluted by household discharges and surface discharges of pollutants from Batumi’s noncompliant operational landfill (dump) on Kakhaberi plain
- The Bartskhana-Korolistskali section polluted by the untreated sewage and stormwater that drain from historically polluted areas of the Batumi oil terminal
- The Makhinjauri-Tsikhisdziri area polluted by untreated household and stormwater
- The Tsikhisdziri Cape-Kobuleti area possibly at risk of pollution by untreated household wastewater from Bobokvati, Kobuleti, and the Kobuleti dump
-

Pollution of marine water with litter evidenced by empirical studies

There are a number of recent empirical studies on the marine littering of Georgia’s coastal areas. They were conducted in 2015-2017 and 2019 under local and international projects—in particular, the EC-UNDP-funded EMBLAS I, II, and EMBLAS+ projects.

EMBLAS I and II studied Ureki, Kobuleti-Shekviteli, and Sarpi beaches.⁵⁹ The assessment showed that Ureki Beach had more litter, with 1,497 items per 50 m of beach (94.45 percent). Kobuleti Beach’s distribution of different litter categories was similar to Ureki’s, with 851 plastic items in total (96.27 percent). Sarpi Beach was more polluted with rubber, textile-footwear, and metal items and the share of plastic waste in the litter was only 59.51 percent. Bottle caps made up 30 percent and more of the

⁵⁸ Ibid.

⁵⁹ Source: MONITORING OF BEACH, MARINE AND RIVERINE FLOATING LITTER WITHIN GEORGIAN BLACK SEA COASTAL AREA. N. MACHITADZE, N. GELASHVILI, V. GVAKHARIA ,K. BILASHVILI, V. TRAPAI DZE, N. GAPRINDASHVILI, A. MAGHLAKELIDZE. Journal of Environmental Protection and Ecology 19, No. 2, pp. 583–591 (2018). Marine ecology. January 2018.

plastic litter. Large volumes of plastic litter 2.5-50 cm in size were also found—almost 40 percent in Ureki and Kobuleti, and 17 percent in Sarpi. Plastic bottles made up seven to eight percent. A significant share (25 percent) in Sarpi was attributed to wrapper packaging, unlike Kobuleti and Ureki.

Litter floating on the Black Sea was counted during the Joint Open Sea Survey and National Pilot Monitoring Studies (JOSS/NPMS) within the framework of the EMBLAS II project, from aboard RV Mare Nigrum in May-June 2016. Observations were performed in Georgian territorial waters and open sea areas. The observed sea surface litter items were registered and categorized using the JRC (Joint Research Centre under the EU Marine Water Strategy) Tablet Computer Application “Floating Litter,” according to the JRC guidance. Onboard observations were carried out and the vessel speed and weather conditions were registered. The data obtained were sent automatically to RIMMEL (a JRC Exploratory Research Project database). Twenty monitoring transects were conducted while surveying Georgian territorial waters (28-31 May 2016), corresponding approximately to a combined 114 km for all transects, with an observation track width of 10 m, covering 1.14 km² of observed surface. In total, the following plastic items were counted: i) 120 items of cover/wrap plastic of different sizes, 76 plastic bags, 68 2.5-50 cm plastic pieces, 28 plastic bottles, 17 plastic containers, 14 synthetic ropes, five polystyrene items larger than 50 cm, two other plastic/polystyrene items, one polystyrene item 2.5-50 cm, one buoy, and one fish box. The vast majority of all items observed was made of plastic.

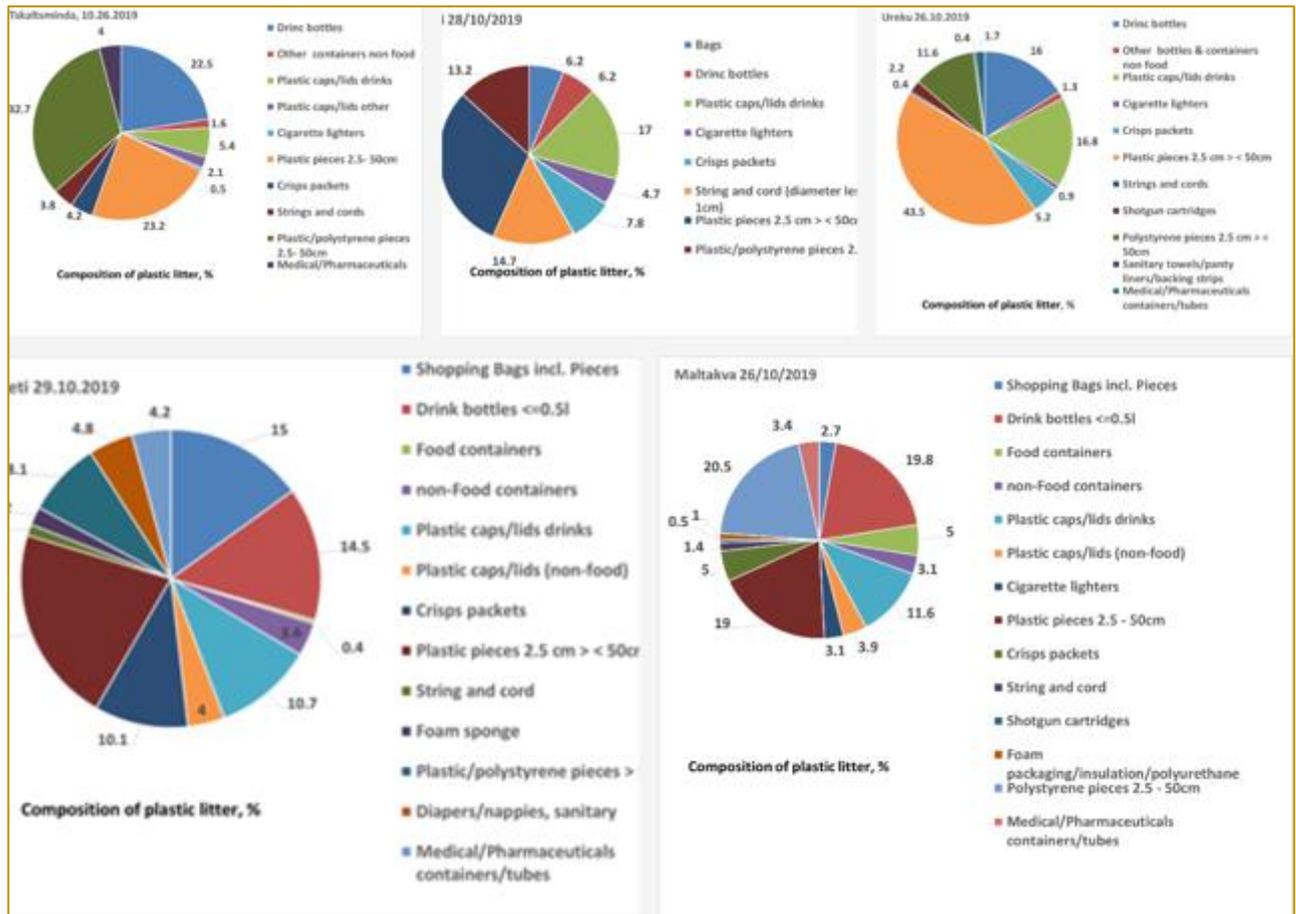
Floating macro litter (> 2.5 cm) was counted in rivers flowing into the sea. Observations were conducted from bridges at river/sea mouths. The registration and categorization of floating litter were carried out using the JRC Litter Monitoring Application, similar to the sea surface litter survey. The four surveys from 2016 to 2017 studied the Chorokhi, Supsa, Natanebi, and Rioni Rivers, which yielded the following plastic counts: 37 plastic bottles, 24 plastic bags, 24 litter patch items, 15 plastic containers, 14 polystyrene items 2.5-50 cm in size, two packaging covers, two synthetic ropes, two foam items, and one plastic piece larger than 50 cm. Plastic made up the absolute majority of all litter.

All the studies above indicate that the litter on the surveyed sections of beaches is generated by land-based sources. It does not contain elements that could originate at sea from ships, or could be related to fishing. Rivers transport solid waste, including wood, to the sea. Observations on marine floating litter revealed that litter consists mostly of plastic bags and packaging. Riverine monitoring data show the prevalence of plastic items, as well.

The most recent study of marine litter was conducted in September-October 2019 under the EMBLAS+ project. Similar to previous studies, beaches, rivers, and sea water were assessed. Monitoring locations included Tskaltsminda (Achara A.R.), Maltakhva (Poti, Samegrelo-Zemo Svaneti), and the northern parts of Kobuleti, Sarpi, and Ureki. The Marine LitterWatch mobile application was used to register and categorize beach litter. At all observed sites except Sarpi the plastic litter amounted to 95-98 percent and comprised plastic bottles, and various caps and lids. Sarpi beach, similar to previous surveys, was characterized by a relatively high concentration of metal items, and the lowest percentage of plastic. The main part of plastic litter comprised drinking bottles, caps/lids and different sized plastic pieces. The riverine litter observations were carried out on the Chorokhi, Natanebi, Rioni, and Supsa Rivers. The JRC Floating Litter Monitoring Application was used to register and categorize floating litter, which made it possible record coordinates and time in situ. In addition, the application allowed registration of “non-litter” floating items such as wood, leaves, feathers, etc. on the rivers’ surface, which compose an important part of material leached on the beaches from the sea. All protocols with data obtained during the session were sent to the RIMMEL database. Riverine litter monitoring over a given time period showed the decrease in the plastic litter transported by the four

rivers to 60 items per one hour. At same time, non-litter items reached 300, one-third of the total obtained during the September session.⁶⁰

Figure 26. 2019 Beach Litter Survey Results – Composition of Plastic Litter of Selected Georgian Beaches



Source: EMBLAS+, <http://emblasproject.org/archives/3615>

2.8.3 Gaps, Challenges, and Need for Plastic Marine Litter Management

Black Sea littering results from gaps and challenges at all system, institutional, and individual levels and from current plastics management practices and behavioral patterns in the country.

The system (legal-regulatory and policy) level has no/insufficient mechanisms to promote plastic litter prevention, reuse, and recycling. SUP and microplastics are unregulated, unlike in the EU. Circular economy principles have not been fully adopted at the national level. EPR for packaging has yet to be adopted, as discussed above. Furthermore, national water legislation and policy do not reflect new EU strategies related to plastics reduction and/or prevention in wastewater, including micro-plastics. Most importantly, marine littering is omitted from both waste and water policy documents.

At the institutional level, municipalities lack the capacities to design and implement separate collection and recycling measures/programs. Moreover, they have inadequate knowledge, information, and resources to identify major sources of plastic litter, track their pathways, plan, implement, and monitor

⁶⁰ Source: EMBLAS+, <http://emblasproject.org/archives/3615>)EMBLAS+, <http://emblasproject.org/archives/3615>

measures to reduce or prevent plastics from contaminating marine water, including those plastics related to dumpsite closures and remediation.

Mixed waste collection is a predominant MSW collection practice across the country, including in coastal communities. Source separation is implemented only rarely and at negligible levels. The MSW collection rate is pitifully low in rural areas, which leads to dumping and littering almost everywhere—including in rivers, on beaches, and in seawater. Enforcement of anti-littering regulations is virtually nil. Recycling capacities and infrastructure are practically absent. Many settlements—especially in rural areas—have no sanitation systems or WWTs to control wastewater, a key source of plastic flows into the sea. Even existing plants and greenfield projects lack tertiary treatment with nano- or micro-filtration to remove fine items.

Therefore, systems that address plastic waste littering of the marine environment must be mandated by national laws and strategies, including those for water and waste management. Moreover, it is necessary to design plastic prevention programs nationwide and within regions, and to implement them. SUP and microplastics regulations should be on the government agenda, at least as mid-term goals.

The capacities of municipalities should be strengthened and their related infrastructure improved in MSW collection, source separation, implementation of/support to plastic waste reuse initiatives, etc. Landfill operators' capacities to treat MSW—including by applying technologies such as MBT, with or without birdying—must be improved. Law enforcement should be strengthened, particularly with respect to marine littering.

Monitoring and field survey programmes should be designed and implemented on a regular basis for all strata—including beaches, coastal, transitional, and open waters and key rivers—and marine litter reduction measures such as beach clean-ups, containment of floating items, etc. should be based on the results of these studies.

3 ABP/Animal Waste

3.1 Laws and Regulations

3.1.1 EU Legislation

*Definition, quantities, sources of generation, categories, and measures applied.*⁶¹ In Europe, waste of animal origin (hereafter “animal waste”) is animal byproduct (ABP)—entire animal bodies or body parts, products of animal origin, or other products obtained from animals—not intended for human consumption (see the EU’s [Regulation \(EC\) 1069/2009](#).) In the EU, more than 20 million tons of ABP are generated annually by slaughterhouses, plants producing food for people, and dairies, and as fallen stock from farms.

ABPs are categorized according to their public and animal health risk, per basic principles in the above regulation. These categories are:

- Category 1 ABPs (highest risk)—carcasses and all body parts of domestic animals (stock and pets) suspected of being infected with TSE (transmissible spongiform encephalopathy); carcasses of wild animals suspected of being infected with a disease that humans or animals could contract; carcasses of animals used in experiments; international catering waste, and carcasses and body parts from zoo and circus animals or pets.
- Category 2 ABPs (high-risk)—animals rejected by abattoirs/slaughterhouses for having infectious diseases; carcasses containing residues from authorized treatments; unhatched poultry that have died in their shells; carcasses of animals killed for disease control purposes; carcasses of dead livestock; manure, and the contents of digestive tracts.
- Category 3 ABPs (medium to low risk)—carcasses or body parts passed as fit for humans to eat and slaughterhouse products or foods of animal origin originally meant for human consumption but withdrawn for commercial reasons; domestic catering waste; shells from shellfish with soft tissue; eggs, egg byproducts, hatchery byproducts and eggshells; aquatic animals (both invertebrate and vertebrate species), aquatic and terrestrial invertebrate hides; skins from slaughterhouses; animal hides, skins, hooves, feathers, wool, horns, and hair that had no signs of infectious disease at death; processed animal proteins (PAP)—proteins processed from any category 3 ABP except milk, colostrum or products derived from them; gelatin, collagen, hydrolyzed proteins, dicalcium phosphate, tricalcium phosphate of animal origin, and blood products.

Measures that apply to ABPs depend on the ABP category and type of handling. The latter includes: production, storage, collection, transport, pretreatment/pre-handling (e.g., temporary storage, sorting, cutting, chilling, freezing or salting, removal of hides and skins, removal of specified risk material, sampling and testing of dead animals, hygienization/pasteurization of ABPs destined for dispatch to a biogas or composting plant, and sieving), use, disposal and treatment (processing/treatment—alkaline hydrolysis method, high temperature, and high pressure hydrolysis, thermos-mechanical treatment, etc., incineration, recovery with co-incineration/combustion, or disposal by landfilling). EU national (competent) authorities control ABP imports from non-EU countries.

EU legislation. ABPs pose potential risks to human and animal health, as the improper use of such products may lead to outbreaks of foot-and-mouth disease, classical swine fever, avian flu, or the

⁶¹ Source: Animal Byproducts. European Commission. https://ec.europa.eu/food/safety/animal-by-products_en

spread of Bovine (transmittable) spongiform encephalopathy (BSE, which is the same as TSE), commonly known as mad cow disease.⁶² Bearing in mind the threat of spreading these contagious diseases, the EU began controlling these risks in the 1990s, adopting a number of legislative acts to regulate ABP handling (collection, storage, transport, treatment, use, and disposal) strictly. In 1990 it adopted stringent rules on food of animal origin and animal feed, followed by strict measures for disposal of ABPs, which until then were recycled as feed in the form of meat or bone meal. Regulation (EC) No. 1774/2002 of 3 October 2002 laid down health rules concerning ABPs not intended for human consumption and was named the “ABP Regulation.” Directive 97/78/EC regarding certain samples and items exempt from veterinary checks at the border has been in effect since 1997. On 21 October 2009, Regulation (EC) No. 1774/2002 was repealed and replaced by the Regulation (EC) No 1069/2009 which established health rules governing animal byproducts and derived products not intended for human consumption, followed by the enactment of Commission Regulation (EU) No 142/2011 of 25 February 2011, consolidating Directive 97/78/EC and Regulation (EC) No 1069/2009 into one legal act. The chronology of ABP regulations is:⁶³

- 1990—Adoption of strict measures for the processing and disposal of ABP (Directive 90/667/EEC)
- 1994—Prohibition of the use of mammalian meat-and-bone meal for animal feed (Directive 94/381/EC)
- 1997—Establishment of the heat treatment under pressure (133° C for 20 minutes under a pressure of three atm) (Decision 96/449/EC); adoption of a Directive 97/78/EC regarding certain samples and items exempt from veterinary checks at the border
- 1998—Establishment of measures for the epidemiological surveillance of BSE (Decision 98/272/EC)
- 2000—Abolition of specific risk material (SRM) from cattle and small ruminants (Decision 2000/418/EC)
- 2001—Prohibition of the use of fallen stock in feeding stuffs (Decision 2001/25/EC); Generalized ban on the use of meat-and-bone meal in feeding stuffs (Decision 2000/766/EC); Bovine animals over 30 months intended for human consumption (Regulation (EC) 1248/2001); Prohibition of the use of mechanically recovered meat from bovine, ovine, and caprine bones (Decision 2001/233/EC); Classification of the entire intestine and spinal cord of cattle as SRM (Decision 2001/2/EC)
- 2002—Creation of a single legislative framework for ABP (Regulation (EC) 1774/2002)
- 2009—Publication of a new Regulation on ABP (Regulation (EC) 1069/2009)
- 2011—Repeal of the Regulation 1774/2002; Implementation of basic Regulation 1069/2009, in force since December 2009 by publication of implementing Regulation 1069/2009 on ABPs (Regulation (EU) 142/2011)

Thus, the latest Commission Regulation (EU) No. 142/2011 of 25 February 2011 with its amendments sets animal and public health rules for ABPs and derived products, including:

- Clear requirements based on ABPs’ technical standards

⁶² Source: Animal Byproducts General Guidance. Department of Agriculture, Environment and Rural Affairs of Northern Ireland, UK. <https://www.daera-ni.gov.uk/articles/animal-products-general-guidance>

⁶³ Source: ABP Guidance Manual for Authorities and Operators. Technical assistance for the improvement of Waste management systems in Georgia (EuropeAid/138609/DH/SER/GE). 2019. Enviroplan S.A.

- Enforcement measures for the new risk-proportionate approach
- End point in the manufacturing chain for processed and packaged pet food, biodiesel, tanned hides and skins, and other products
- Reduction of red tape for producers of medicines and diagnostics from ABPs
- More flexible official controls by laboratories of processing and biogas plants handling ABPs
- Better traceability of food production
- Risk-proportionate solutions for transport, processing, use, and import

3.1.2 Georgian Legislation

Georgian legislation governing ABPM creates the following key definitions for ABPs and derived products:

- Animal Byproduct—the whole carcass or parts of the carcass, a product of animal origin or other animal products not intended for human consumption, including oocytes, embryos and semen;
- Derived Product—product obtained as a result of one or more processes, transformation (conversion), or treatment of ABP

In Georgia the management of ABPs and derived products, including animal waste, are regulated by the following:

- The EAC
- The WMC
- The Code on the safety of foodstuffs and animal feed, veterinary services, and plant protection
- Product safety and free movement code
- GoG Resolution No. 605 of 29 December 2017 on the Approval of the Technical Regulation on health rules for products and byproducts of animal origin, including animal waste, not intended for human consumption and rules for recognition (authorization) of business operators dealing with such activities

Apart from the laws and regulations governing ABPs, including animal waste, and derived products there are a number of animal food/feed safety and veterinary protection regulations in effect that protect the public from harmful ABPs or derived products—particularly high-risk ABPs—by establishing public, animal health, and hygienic requirements for living animals and for food/feed of animal origin. They stipulate the requirements of sanitary and phyto-sanitary (SPS) measures of the EU set out in Chapter 4 of the of the Deep and Comprehensive Trade Area (DCFTA), signed by the EU and Georgia as part of the EU-Georgia Association Agreement. The terms, conditions, and measures established in national SPS regulations ensure the safety of trade in animals and plants, and products of animal and plant origin. SPS measures reflect EU animal welfare standards and norms and advancements of the World Organization for Animal Health (OIE).

The Environmental Assessment Code

The EAC lists activities subject to environmental impact permitting (equivalent to the issuance of an environmental decision). It requires scoping and a consequent, full EIA for activities with significant, potential, negative environmental impacts, depending on the scoping results. Activities related to disposal of animal waste and its recovery—as well as pretreatment and temporary storage of more than 10 t animal waste that is considered hazardous due to its nature/characteristics, and is referred to in the WMC and the waste classification list—require scoping and an EIA, depending on the scoping results. According to the EAC, disposal, incineration, and/or chemical treatment of HW require a full EIA. Similar activities related to animal waste treated as hazardous (e.g., harmful and/or infectious animal waste, etc.) are subject to a full EIA and environmental impact permitting.

The Waste Management Code

The WMC defines animal waste as “waste related to animals (animal bodies, parts of animal bodies, manure, meat production waste, animal testing waste)” and authorizes the Ministry of Agriculture (currently the Ministry of Environmental Protection and Agriculture—MEPA) to regulate the management of animal waste. Furthermore, stipulating from EAC, the WMC requires EIA and environment permitting for certain waste-related activities listed in EAC, as well as registration of a number of waste-related activities not subject to EIA and environmental permitting, through the Business/Economic Activities Register established by the Law of Georgia on Entrepreneurs. The activities subject to registration are: collection and/or transportation of waste; construction and operation of facilities for the temporary storage of more than 50 t of nonhazardous waste; pre-treatment of nonhazardous waste; construction and operation of facilities for the temporary storage of not less than two tons and not more than 10 t of hazardous waste, and construction and operation of waste transfer stations. Waste-related activities subject to registration may include animal waste-related activities as well. Furthermore, the WMC sets administrative penalties for certain types of illegal activities, including the dumping of animal waste in the environment, and authorizes MEPA’s State Supervision Department, local authorities, and patrol police to enforce the law. The WMC lists the waste characteristics that classify it as hazardous, including such properties as “harmfulness” and “infectiousness” that may be attributable to high-risk category ABPs and derived products including animal waste and, therefore, the terms and conditions set out in the WMC for hazardous waste apply to this type of waste, too.

The Law of Georgia – Code on Safety of Foodstuff and Animal Feed, Veterinary Services, and Plant Protection of 08/05/2012

Apart from protecting human and animal health and welfare in relevant plants, this law,⁶⁴ lays down unified principles of state regulation and sets requirements for effective State control in the fields of food/feed safety and veterinary protection. The Code applies to the production, processing, and distribution of food/feed, animals, and products of animal origin which at any stage of the food chain become nonapplicable for human consumption by the choice of business operators. Together with the Tax Code of Georgia it also regulates the transboundary movement (import, export, re-export, and transit) of goods, including goods of animal origin, across the customs border. More specifically, the Code:

- Sets basic food/feed safety principles
- Sets key food/feed safety requirements for business operators at all stages of food/feed production, processing, and distribution including:
 - An obligation to set up a system for Hazard Analysis and Critical Control Points (HACCP), except for business operators carrying out primary production
 - An obligation for business operators, engaged in the production and/or processing of food products of animal origin to register their relevant activity in the registry of economic activities, except for those business operators engaged in household production, primary production, production and/or processing of food products of animal origin using traditional methods, production and/or processing of food products of animal origin in high mountain regions, primary product direct delivery to a final consumer—or to a retail outlet engaged in direct delivery to a final consumer and has the status of a small business in accordance with this Code, direct delivery of meat of the poultry and lagomorphs slaughtered at a farm, killed game, or game meat to a final consumer—or to a retail outlet engaged in direct delivery to a final consumer and has the status of a small business in

⁶⁴ Source: The Law of Georgia – Food/Feed Safety, Veterinary and Plant Protection Code. The Legislative Herald of Georgia. <https://matsne.gov.ge/en/document/view/1659434?publication=8>

accordance with this Code, storage of such food products of animal origin that do not require the temperature control determined by Georgian legislation, retail trade—except when food products of animal origin are retailed in order to deliver food products of animal origin to another business, or when activity implies only storage and/or transportation of food products of animal origin, or when food products of animal origin are delivered locally from one retail outlet to another retail outlet, or when the production and/or processing of feed is defined by an ordinance of GoG

- The requirement that business operators seek and receive “recognition”/approval based on the results of an inspection by the competent authority (National Food Agency [NFA] or “Agency” as defined by the Code); upon a business operator’s request, the Agency may “recognize” an activity that is not subject to mandatory recognition under the Code
- The requirement that products at all stages of production, processing, and distribution of food/feed, animals, and products of animal origin be traceable. To perform such traceability, business operators shall have appropriate information and shall maintain the relevant documents and records; to perform traceability, food/feed, animals, and products of animal origin shall be labelled as determined by GoG
- Ensuring that the movement and sale of products of animal origin are accompanied with the relevant veterinary documents.
- Sets rules and requirements for State control in the fields of food/feed safety and veterinary protection
- Lays down general requirements for the traceability of food/feed, animals, products of animal origin, and veterinary drugs, at the stages of production, processing, and distribution
- Defines the competencies of authorities in the areas of food/feed safety and veterinary protection
- Defines the obligations of business operators
- Sets operational rules and conditions for veterinary practices in Georgia
- Sets the requirements for the export and import of food/feed, animals, products of animal origin, and veterinary drugs
- Defines responsibility for violations of the requirements of this Code.

According to the Code, simplified requirements (excluding universal, hygienic requirements) are set for business operators engaged in processing and distributing food/feed, or in primary production; use traditional methods for the production, processing, and/or distribution of food/feed, and for primary production; operate in high mountain regions and in non-factory production, processing, and/or distribution of food/feed, and in primary production.

State control of food/feed as provided for by this Code is not applicable to the production of food/feed or to primary production by natural persons who are household producers (“a household producer”) according to this Code. Only veterinary controls under this Code related apply to such household producers.

The Law of Georgia – Product Safety and Free Movement Code of 08/05/2012

This Code⁶⁵ seeks to:

- Protect human life, health, property, and the environment;
- Place safe products in the market and provide for their free movement;
- Ensure competition and facilitate product movement and placement in the market;

⁶⁵ Source: The Law of Georgia – Product Safety and Free Movement Code Legislative Herald of Georgia <https://matsne.gov.ge/en/document/view/1659419>

- Ensure that facilities take required precautions when dealing with increased technical risks through state supervision and control;
- Introduce an inspection system based on risk analysis and assessment;
- Develop a technical inspection system for facilities with increased technical risks and create a legal basis for the activities of inspection bodies;
- Separate powers between the Legal Entity under Public Law (LEPL) - Technical and Construction Supervision Agency, and the inspection bodies in the area of operation and control of facilities with increased technical threat and
- Introduce best practices in the areas of standardization, metrology, accreditation, and conformity assessment, as well as harmonization with relevant EU legislation.

The Code regulates the safe movement of all products except those manufactured specifically for police and/or military purposes. It defines “product” as all movable items and related services, even if the item is a component of another movable or immovable item. For the purposes of this Code, “an item” does not include a primary food product or a product obtained as a result of hunting. “Product” also includes goods placed on the market, regardless of whether they are intended directly for final consumers, delivered, or otherwise made available for commercial or noncommercial purposes. The Code allows for unlimited access of the product to the market if: i) the product, regulated by the Code, is manufactured in a country with appropriate product safety standards and advanced quality infrastructure in compliance with domestic legislation (the list of such countries is defined by GoG by special regulation) and, ii) the specific safety requirements for any product to be placed on the market are not governed by the technical regulations and the requirements of this Code. If a regulated product has safety features which are materially changed, it shall be deemed a new product and it must comply with the requirements of the Technical Regulation under this Code when stated by the Technical Regulation.

Resolution No. 605 of 29 December 2017 on Health Rules for Animal Byproducts (including Waste of Animal Origin) and Derived Products, which are not Intended for Human Consumption, and Rules for the Recognition of Business Operators Working with the Same Activities

This Resolution is a key legal act in the area of ABPM that:⁶⁶

- Classifies ABPs into three categories—including animal waste and derived products not intended for human consumption—according to their public and animal health risks
- Lays down health rules intended to prevent or minimize animal and public health risks related to ABPs, animal waste, and derived products not intended for human consumption, particularly in relation to animal feed and the food chain
- Lays down rules for certification of business operators handling ABPs (production, processing, storage, collection, transportation, use, disposal, and placement on the market), including animal waste and derived products not intended for human consumption

Apart from ABPs and derived products of animal origin not intended for human consumption, the bylaw applies to products of animal origin initially intended for human consumption and raw materials used in the manufacture of animal products which by a business operator’s “own choice” were considered no longer appropriate for human consumption. This, however, does not apply to: i) entire bodies of wild animals of or parts thereof, other than those suspected of being infected with a human

⁶⁶ Source: Resolution No 605 of December 29, 2017 on of Georgian Government on Health Rules of Animal by-products (including Waste of Animal Origin) and Derived Products, which are not Intended for Human Consumption, and Rules for Recognition of Business Operators Working with the Same. Legislative Herald of Georgia. <https://www.matsne.gov.ge/ka/document/view/3977566>

or animal disease, other than aquatic animals dispatched on land for commercial purposes; ii) whole bodies or parts of hunted wild animals which are not collected after killing in accordance with good hunting practice and/or the requirements set by the Resolution of the Government of Georgia "On the Special Rule of Food Hygiene of Animal Origin" of March 7, 2012; iii) wild animals or their meat, if the hunted wild animal or its meat is supplied directly to the consumer or to a retailer directly supplying the consumer; iv) eggs, embryos, and sperm intended for breeding; v) raw milk, milk, and their byproducts received, stored, disposed of or used on a farm; vi) mollusk shells, from which soft tissue and meat are removed, and vii) public catering waste, unless it is:

- Generated during transportation operating internationally;
- Intended for animal feed;
- Designed for pressure sterilization or other processing (where time, pressure, temperature, and particle size are taken into account), or conversion or composting into biogas;
- Material produced aboard vessels, which conform to the "General Rules for Food/Animal Feed Hygiene" and the "Simplified Rule for Food/Animal Feed Hygiene" (GoG No. 173 of 25 June 2010) and the Special Rule on Animal Food Hygiene (No. 90 Resolutions of the GoG of 7 March 2012), except for material generated as a result of the removal of a specimen with signs of a communicable disease (including parasites) aboard the ship;
- A domestic animal or raw animal feed produced in a retail trade where cutting and storage is carried out only for onsite delivery to the consumer;
- Domestic raw food received from a slaughtered animal for personal use on a farm of origin;
- Excrement and urine, except for nectar and non-mineralized guano (dried bat or seabird score/excrement).

A product shall be exempted from veterinary control at the border inspection post if it:

- Has been sent and authorized by the NFA in advance as a trade sample or is intended for exhibition and on the condition that it will not be sold;
- Is intended for special research and analysis so the State can determine that the product is not for human consumption and when the exhibition, special study, or analysis is completed the product, other than the quantity used for analysis, is subject to destruction or return as determined by the NFA.

The regulation stipulates from two codes: i) on Foodstuff/Animal Feed Safety, Veterinary Services and Plant Protection and, ii) on Product Safety and Free Movement Codes and is almost entirely based on the Commission Regulation (EU) No. 142/2011 of 25 February 2011, consolidating implementing Directive 97/78/EC and Regulation (EC) No. 1069/2009 in one legal act.

ABPs and derived products are classified in three categories, based on public and animal health risk levels (details on Regulation No. 605, including the comprehensive list of the three ABP categories is given in Annex 4):

- Category 1 includes ABPs or derived products which are considered the highest-risk products, e.g.: entire animal carcasses or parts of carcasses, including skins and hides of animals with suspected or confirmed TSE cases—or killed as part of a TSE elimination campaign, pets, zoo or circus animals with suspected contagious/infectious diseases for humans and animals, high-risk materials, high-risk carcasses or parts of carcasses of dead/fallen animals during handling and disposal procedures, etc.
- Category 2, which are considered relatively high-risk products, e.g.: manure, non-mineralized guano (dried excrement of seabirds and bats) and inner parts of the digestive system (including intestines), ABPs, collected during the treatment/processing of wastewater in accordance with the requirements, established by this rule, from the Category 2 material processing establishments, plants or slaughterhouses, animal products, except for the Category 1 material, imported or brought from another country and not meeting Georgian legal

requirements, unless their importation is permitted by Georgian law under special restrictions or their return to another country is allowed, etc.

- Category 3, which are considered low-risk products, e.g.: carcasses of slaughtered animals and their parts, or in the case of a hunted animal, its dead body or parts thereof suitable for human consumption according to the law but not intended for human consumption for commercial reasons, carcasses and their parts obtained from animals slaughtered and deemed appropriate for slaughter by a human during pre-mortem inspections, ABPs obtained from the slaughter of poultry and lagomorphs with no signs of disease transmittable to humans or animals on a farm supplying fresh meat to the final consumer or a retail outlet supplying such meat directly to the consumer, the blood of animals which do not show signs of a blood-borne disease for humans and animals and which is obtained from animals (other than cattle) which must be tested for TSE and cattle which have been tested, catering waste, etc.

The Regulation sets general conditions for both initial and end points of the food chain, and for both the NFA (the “Agency”) and business (economic) operators, including:

- A requirement that business operators identify ABPs or derived products at the stage of their generation and manage them properly during the entire food chain
- A requirement for the Agency to monitor and verify that the relevant requirements established by this Rule are met by the business operator within the framework of the whole food chain of ABPs and derived products, including collection, identification and transportation without undue delay, processing, use, or disposal
- Permission to relieve certain ABPs or derived products specified by the Rule, from requirements laid down in the Rule beyond the end point of the food chain
- Exemptions to this Rule for ABPs and derived products—other than imported goods without restrictions and State control as defined by this Rule—include:
 - Biodiesel, which meets the requirements for the use and disposal specified in Article 99 (3) (b) of this Rule
 - Processed pet food for a domestic animal that meets the special requirements set forth in paragraph 14 of Article 162 of this Rule
 - Chew bones for dogs, which meet the special requirements set forth in paragraph 15 of Article 162 of this Rule
 - Hides and skins of ungulates, which meet the special requirements of the end point set forth in Article 165, paragraphs 4 and 6 of this Rule
 - wool and wool products, which meet the special requirements of the final stage set forth in paragraphs 5-7 of Article 167 of this Rule
 - Feathers and gills that meet the special requirements of the final stage set forth in Article 167, Paragraph 8 of this Rule
 - Fur that meets the special requirements of the final stage established by Article 168 of this Rule
 - Fish oil for the production of a medicinal product that meets the special requirements of the end point established by Article 173 of this Rule
 - Petrol and fuel, which meets the special requirements for products participating in the multistage, catalytic process for the production of a renewable fuel source specified in Article 99 (3) (c) of this Rule
 - Oleo-chemical product obtained from trans-fat and that meets the requirements set forth in Article 171 of this Rule
 - Renewable diesel, renewable jet fuel, renewable propane, and renewable gasoline, which meet the special requirements for products that have undergone multistage, catalytic hydro-processing for the production of renewable fuels specified in Article 99 (f) of this Regulation
- General restrictions and exemptions on animal health, including:

- Restrictions related to contagious diseases as defined by the World Organization for Animal Health (OIE), Terrestrial Animal Health Code (2010 Edition) 1.2.3. Article and, the Aquatic Animal Health Code (2010 edition)
- Bans on the dispatch (transportation) of ABPs and derived products generated from Artiodactyla (ruminant, non-ruminant, and even-toed ungulates) stalls, establishments, plants, and zones which are subject to the restrictions set out by Georgian legislation, in the presence of a significant communicable disease
- Exemptions from animal health rules of ABPs and derived products distributed in compliance with conditions which prevent the spread of communicable diseases to humans and animals

Specific conditions and rules are set for both business operators and authorizing/controlling agencies for the use, handling, disposal, storage, transportation, placement on the market, importation, transit, and export of ABPs or derived products. Critical conditions and rules include:

- Bans on the use of certain ABPs or derived products for feeding terrestrial and farm animals, including farm fish
- Bans on the importation and transit of certain ABPs or derived products, including untreated manure, untreated feathers and their parts, and bee's wax in the form of honeycomb
- Sets health and environmental conditions and rules for the handling/disposal of ABPs or derived products through their incineration, recovery via co-incineration, and their use as biofuel, compost/soil improvers, or for the production of biogas, stipulating their handling, disposal, or use as follows:
 - Category 1 ABPs or derived products may be incinerated with or without treatment, co-incinerated with or without treatment, recovered, or used as fuel or be buried in legal landfills
 - Category 2 ABPs or derived products may be incinerated with or without treatment, co-incinerated with or without treatment, recovered, disposed of in legal landfills, or used for the production of compost or biogas
 - Category 3 ABPs or derived products, may be incinerated with or without treatment, co-incinerated with or without treatment, recovered, used for the production of compost, biogas, petfood, or animal feed
- Requirements—pursuant to the EAC and the WMC—for business operators to conduct EIAs and obtain environmental decisions (environmental impact permits) from the MEPA for activities subject to environmental permitting
- Requirements for business operators to register their establishments or plants not subject to EIA and environmental permitting, through the business registry (same as the economic activities' registry)
- Requirements—pursuant to the Food/Animal Feed Safety, Veterinary, and Plant Protection as well as Products Safety and Free Movement Codes—for business operators to establish a HACCP system at all critical points in the production chain
- Conditions and rules for storage, collection, transportation, and placement of a product on the market, including requirements for product traceability (marking, labelling, filling out and carrying commercial documents during transportation, etc.)
- Conditions and rules for importation, transit, export, and re-export of ABPs or derived products, including requirements for submitting mandatory veterinary (health) certificates for ABPs or derived products listed in Annexes 7 through 39 of the regulation and in the formats set out in those annexes
- Conditions and procedures for the recognition of establishments or plants dealing with ABPs or derived products by the Agency, including requirements and procedures for temporary (conditional) recognition for up to one year

- State control and supervision requirements, procedures and mandates of the Agency, MEPA, and the Revenue Service

It is noteworthy that the GoG has chosen a step-wise approach to implementing Regulation No. 605 on ABPs, particularly regarding recognition/approval and State control of business operators. According to the latest amendments to the Regulation:

- Effective dates for provisions on State control and recognition of business operators producing processed petfood from Category 3 ABPs are postponed to 1 April 2023
- Effective dates for provisions on State control and recognition of fish flour producers are postponed to 1 April 2023
- Effective dates for provisions on State control and recognition of ABPs or derived products generated from the apiculture sector are postponed to 1 April 2023
- Effective dates for provisions on State control and recognition of raw unprocessed petfood, canned petfood, dog chews, wood, skins, and hides are postponed to 1 April 2023
- Effective dates for paragraph 2, article 65 of the Technical Regulation/rule requiring all precautionary measures to reduce public and animal risks related to destruction by combusting ABPs or derived products by existing business operators are set at 1 September 2026

3.2 National Policies

There is no single policy document in Georgia setting strategic directions and elaborating measures for ABPM, including management of animal waste. Moreover, the NWMS and associated NWMAPs, which lay down a strategy framework and implementation mechanisms in for SWM lack any specific objectives, indicators, measurable targets, and actions related solely to ABPs. However, to a lesser extent they do address animal waste and suggest implementation of following three measures:

- Establishment of special cells for nonhazardous animal waste in existing landfills
- Reduction of municipal biodegradable waste—inclusive of food waste—in MSW landfills
- Development of legislation regulating animal waste

In addition, the NWMS sets the following quantitative targets for collection of hazardous waste, including ABPs treated as hazardous by their characteristics (e.g., being infectious or otherwise harmful to the public or animal health), as per the WMC and the waste list classification:

- 50 percent collection rate by 2020
- 75 percent collection rate by 2025
- 100 percent collection rate by 2030

Among its key strategic goals, the new Rural and Agriculture Development Strategy for 2022-2027 seeks to establish an effective system of food/feed safety and veterinary and plant protection (Goal 3). It addresses animal food/feed safety and veterinary protection, which are closely related to the prevention of ABPs, in particular high-risk ABPs, and sets the following immediate objectives:

- Approximation of the sanitary and phytosanitary regulatory basis of Georgia to the EU SPS legislation
- Legislation (Objective 3.1)
- Ensuring that products supplied to the local and export markets comply with sanitary and phytosanitary standards (Objective 3.2)
- Development of laboratory capacities (Objective 3.3)
- Quality assurance of agricultural inputs (Objective 3.4)

Implementation mechanisms for the above strategic objectives are specified in the 2021-2023 action plan for the above strategy under the third strategic goal, and include:

- Adoption of some 23 regulations in line with EU sanitary and phytosanitary (SPS) rules, as prescribed by DCFTA
- Conducting laboratory analysis of food/feed safety and State control over same
- Prophylactic vaccination of living animals, to total 5,196,493 head
- New research methods, diagnostic research, and analysis approaches/parameters for food/feed products and living animals, with 15 new methods and 15 new parameters to be introduced and accredited
- Veterinary control and the monitoring of veterinary remedies/drugs through sampling and analysis of the content of banned drugs in more than 1,600 animals

3.3 Institutional Setting

Pursuant to Resolution No. 605 on ABP handling and the recognition/approval of business operators, the EAC, the WMC, the Foodstuff/Feed Safety, Veterinary Services, and Plant Protection Code, and the Product Safety and Free Movement Code as well as stipulations in the statutes of the relevant national authorities and their departments, MEPA—through its Agriculture, Food, and Rural Development and its Waste and Chemicals Management Departments—represents a key law and policy-making body for ABPM, including animal waste management. MEPA’s Environmental Assessment Department issues environmental decisions (permits) for ABP handling operations (incineration, co-incineration, combustion/recovery, processing, etc.), subject to EIA and environmental permitting, pursuant to the EAC and the WMC. Furthermore, through the Agency MEPA represents State control, supervision, and monitoring of ABPM. The MoF’s Revenue Service is a key agency for border control of importation, transit, export, and re-export of ABPs and derived products. Through permit terms and conditions, MEPA’s Environmental Supervision Department polices compliance of ABP handling by business operators/facilities holding environmental decisions.

MEPA’s Agriculture, Rural Development, and Food Safety Department and the NFA are responsible for setting food safety statutory requirements and policy frameworks, implementing measures, and appropriate actions to ensure the management of SPS-related crisis situations, State control and supervision over food/feed safety and veterinary protection, cooperating with international, educational, scientific organizations and organizations that protect the interests of consumers, and organizing risk analyses. The authorities and obligations of Georgia’s Ministry of Labor, Health, and Social Affairs in SPS is to determine food safety standards and parameters; monitor, study and control diseases caused by food and maintain a relevant database, prepare recommendations and develop procedures for the prevention, epidemic supervision and control of diseases; inform the NFA—as determined by Georgia’s legislation—when zoonotic diseases and food-caused diseases are detected; within its authority, participate in the management of crisis situations and ensure the exchange of information in accordance with the requirements of the International Health Regulations (IHR-2005). The MoF’s Revenue Service conducts border control for food/feed safety, veterinary border control, exchange of information with the NFA, including information about existing and potential risks associated with food/feed, animals, and about measures implemented or about to be implemented during the movement of goods across Georgia’s customs border or after they arrive in the territory of Georgia, ensuring mutual access to and availability of the relevant database maintained by them—necessary for the exercise of State control by the Agency and the Service—and timely exchange of information through a quick response system.

Laboratory testing of food/feed of animal origin and ABPs is carried out by the LEPL State Laboratory of Agriculture of the Ministry of Environmental Protection and Agriculture (SLA) which is responsible for: laboratory diagnosis of animal diseases (including poultry, fish, and bees); laboratory diagnosis of communicable animal pathogens; assessment of the risk of dangerous diseases for animals within the scope of competence; examination of food and raw materials of animal origin, animal feed, and raw materials, determination of quality and feed ability; participation in disease control and quarantine

measures within the scope of competence; facilitation of testing and introduction of new diagnostic methods, laboratory equipment and diagnostic tools. The central laboratory of the SLA together with its regional branches provides national accreditation within the following scope (Assessment standard: Assessment Standard: SST ISO/IEC 17025:2017/2018; Accreditation Certificate No: GAC-TL-0230, validity Date: 2021-May-05)⁶⁷:

- Central Laboratory in Tbilisi—testing of food products, including serological examination of thermally processed meat product; animal feed, veterinary samples, veterinary medicine—serological, bacteriological, parasitological, histological examination
- Akhaltsikhe Zonal Diagnostic Laboratory—food, animal feed, and veterinary samples
- Batumi Regional Laboratory—veterinary samples
- Laboratories of Marneuli, Ozurgeti, Ambrolauri, Gori, Dusheti, Gurjaani—diagnosis of animal diseases – veterinary

The State Lab holds a number of international certificates, including ISO 9001:2015 (Quality Management certificate).

LEPL Levan Samkharauli National Forensic Bureau is a government agency, a Legal Entity under the Public Law, providing services to the State and Budgetary agencies; to private, commercial, and noncommercial institutions, and to physical and legal entities/persons.⁶⁸ The Bureau's Department of Chemical-Narcological Expertise has a national accreditation with the following scope (Assessment Standard: SST ISO/IEC 17025:2017/2018; Accreditation Certificate No: GAC-TL-0166 Accreditation Certificate validity date: 2021-October-03:

- Various biological materials;
- Meat and meat products (beef, frozen beef, lamb, frozen lamb, pork, frozen pork, rabbit meat, packaged meat, frozen meat blocks, meat offal, mince);
- Chicken meat (frozen chicken, broiler chicken and chicken, chicken offal, minced chicken);
- Sausages, sardines, mincemeat, boiled sausage, semi-smoked sausage, boiled-stuffed sausage, raw smoked pork;
- Canned meat and meat offal, canned meat
- Semi-finished products made from meat, ready-made dishes containing meat;
- Fish (live, chilled, frozen, extracted, salted) cold smoked, hot smoked, squid, cuttle fish, shrimp) caviar; canned fish and tinned fish, canned fish and vegetables;
- Ready-made dishes containing fish;
- Milk and dairy products (cow's milk, pasteurized cow milk, raw milk, skim milk, cream);
- Canned milk (raw condensed milk with sugar, condensed milk, cocoa with condensed milk and sugar, coffee with condensed milk and sugar, cream with condensed milk);
- Dairy products;
- Cow milk butter, mixed butter (vegetable fat), cooking fats;
- Eggs, egg products, egg powder; products with added eggs, dishes with dairy products, milk porridge, porridge without milk;

⁶⁷ Source: LEPL State Laboratory of agriculture of Georgia, <https://sla.gov.ge/En/>; Georgian Accreditation Center – <https://gac.gov.ge/en/accredited-bodies/16>

⁶⁸ Source: LEPL Levan Samkharauli National Forensic Bureau <http://expertiza.gov.ge/page.html?page=biuro&item=3143>; Georgian Accreditation Center: <https://gac.gov.ge/en/accredited-bodies/16>

- Blood, urine, hair, vitreous body, internal organs, stains of biological origin, other excretory.

The Bureau is equipped with ultra-modern, international standard laboratories, is accredited in compliance with ISO 17025 standards, and operates in line with international forensic practice. It is a member of the European Network of Forensic Science Institutions (ENFSI), the leading international forensic organization.

Along with State testing and research laboratories, there are private laboratories officially accredited to test food/feed products, including ABPs. The accreditation to these companies is granted by the LEPL Unified National Accreditation Body—Accreditation Center (GAC), a national public authority operating under the Ministry of Economy and Sustainable Development of Georgia, which performs accreditation activities for Conformity Assessment Bodies (hereafter “CAB”). GAC grants accreditation to international standards to the following CABs: Testing and Calibration Laboratories; Inspection Bodies; Personnel Certification Bodies; Product, Processes, and Service Certification Bodies; Certification Bodies for Audit and Management Systems, etc. A detailed, online database is publicly available on GAC’s website. For the purpose of this study, the list of food/feed/ABP testing labs is given in Annex 7 of this Report.

3.4 Government and Donor Initiatives in ABP/Animal Waste and Derived Products Management

At present, there are no specific projects and/or programs in ABPM. In 2017-2019, EU supported a two-day training and a one-day onsite (slaughterhouse) and classroom consultation with relevant decision-makers on ABP and derived products for various key stakeholders (MEPA’s Waste and Chemicals Management and Agriculture and Food and Rural Development Departments, structural divisions, and territorial units of the NFA, MEPA, the SWMCG) under the project Technical Assistance for the Improvement of Waste Management Systems in Georgia. The trainings were conducted by the senior staff of the Greece Veterinary Service and were focused on the EU’s, Greece’s, and Georgia’s ABP legislation, existing practices, and recommendations for improvements in Georgia. Moreover, at the request of the Agriculture, Food, and Rural Development Department, the project has developed an ABP guideline for competent authorities and business operators in both English and Georgian.

There are a number of completed or ongoing initiatives that supported and continue support the transformation of Georgia’s agriculture sector to meet international standards, including those related to food/feed safety and veterinary protection.

During its implementation (2013-2018), USAID’s project: Restoring Efficiency to Agricultural Production (REAP) helped Georgian agribusinesses upgrade their food safety and quality management systems to adhere to internationally recognized standards and take advantage of trade opportunities, including HACCP, ISO, and Global GAP.⁶⁹

In 2012-2018 EU supported Georgia—and particularly the NFA—with capacity-building in SPS and establishing a EU-level food safety, animal health, and plant protection system in Georgia, through the Comprehensive Institution Building (CIB) Support Program. The CIB program rebuilt and equipped existing NFA premises—providing NFA staff with appropriate IT equipment and other tools necessary for food inspection and supporting veterinary and phytosanitary staff duties. Based on the needs of

⁶⁹ Source: USAID Caucasus. <https://partnerships.usaid.gov/partnership/technical-assistance-agribusinesses-international-food-standards>

the growing staff, the NFA's buildings in Tbilisi and Kutaisi were renovated. Under the program, the NFA built a number of buildings for its territorial units throughout Georgia, whose staff underwent intensive trainings provided by the program. CIB has supported other Georgian institutions aiding the NFA achieve its goals, such as the Laboratory of the Ministry of Agriculture. Beyond that, it has helped the GoG develop Georgia's Revenue Service Tax and Customs Administration—SPS Border Control Agency (Revenue Service)—to provide SPS Border Inspections sufficient to protect the Georgian SPS sector.⁷⁰

In the near future, EBRD will renew its support to the establishment of a HWM system in Georgia, through an approximately EUR 10 million loan project to construct, commission, and operate properly at least two HW treatment (incineration/disposal) facilities in Georgia. The project will also design and implement a proper institutional setting for the HWM and—together with various HW streams—may cover high-risk category ABPs, as well.

Under the government-funded “United Agro Project” considerable attention is paid to introducing and implementing international quality standards. All enterprises that benefit from the co-financing program for processing and storage facilities are obliged to implement the ISO 22000 or HACCP international standard.

The most active international partners in food/feed and ABP laboratory testing supporting the SLA are: U.S. Department of Defense, U.S. Defense Threat Reduction Agency, U.S. Centers for Disease Control and Prevention, the U.S. Department of Agriculture, FAO, the World Organization for Animal Health, the Animal Health and Veterinary Laboratories Agency, European and Mediterranean Plant Protection Organization, the European Food Safety Authority, Erasmus+, the ANSI-ASQ National Accreditation Board of the U.S., BIOR, the Latvian Institute of Food Safety, Animal Health, and Environment.

3.5 ABP Quantities

Under this study, the quantity of ABPs was estimated for following streams/types:

- Fallen animals/field losses of livestock farming (average loss of animals per each stream) – according to Regulation No. 605, Category 1 ABPs
- Byproducts from meat production – according to Regulation No. 605, Categories 1 or 2
- Animal feces (manure) – according to Regulation No. 605, Category 2

The domestic animal categories considered were: cattle, pig, sheep-goat, and poultry. Other categories/streams (e.g., aquaculture, rabbit farming, etc.) could not be assessed due to inadequate data which, in many cases, were entirely nonexistent. However, these sectors account for an exceedingly small share of the total animal husbandry sector and do not significantly affect the final results. Moreover, it was impossible to get data on food waste of animal origin or animal feed of animal origin, due to the absence of official statistics on such streams. Given the short time for the assignment, it was not feasible to collect data from individual business operators

Projections of animal byproducts have been made for 2025, 2030, 2035, and 2040.

Geographic scope of the study—due to the lack of statistical data, it was impossible to estimate the quantities of ABPs in the regional context (the National Statistical Office considers aggregated information for several regions so it is impossible to identify regional differences). Based on the above, waste quantity was estimated at the national level.

⁷⁰ Source: <https://www.euneighbours.eu/sites/default/files/Features/2017-02/Cow%20to%20the%20Consumer.pdf>

Estimating animal losses from livestock farming (average loss of animals per each animal category)—the following formula was used: Number of animals for the relevant year (quantity) x Average rate of animal losses (%) x Average weight of an animal (kg).

Based on this method/approach, the following parameters were identified for each stream of assessment (cattle, pig, sheep-goat, poultry):

- Average number of animals
- Average annual growth rate
- Average rate of losses
- Average weight of an animal

It was practically impossible to track the dynamics of growth in the animal husbandry sector (number of animals). According to the GEOSTAT data, the number of animals in each category varies randomly. An increase in one year is followed by a drastic decrease, then an increase, and so on. Consequently, it is impossible to identify clear trends. Accordingly, the present assessment considers two alternative growth scenarios: a zero percent growth scenario and an “optimistic” one percent growth scenario.

- Zero percent growth—according to this scenario, the average number of animals for the last five years is taken annually. Annual growth is not considered, although the last five years include years of growth and years of decline; accordingly, their average reflects both.
- One percent growth—envisages an annual one percent increase in the number of animals. This accords with the growth dynamics of the agricultural sector’s share of national GDP over the last four years.

Table 32. Key Parameters and Assumptions Made for Estimation of Quantities of ABPs by Domestic Animal Category

Domestic Animal Category	Number of Animals	Average Annual Growth Rate (%)	Average Rate of Losses	Average Animal Weight
Cattle	Data for 2016-2020 ⁷¹	0% and 1% growth rate scenarios	According to the National Statistics Office, the average cattle mortality rate has been ~5% over the past four years Consultations with relevant experts were carried out Finally, 5% was selected as an average loss rate in this stream	Based on data from various local studies, 300 kg was taken as the average weight of cattle ⁷²
Pig/Hog	Data for 2016-2020 ⁷³	0% and 1% growth rate scenarios	According to the National Statistics Office, the average rate of hog mortality is significant and varies 40-70% over the past four years (50-55% is an average for these years)	Based on data from various local studies, 50 kg was taken as the average weight of a hog ⁷⁴

⁷¹ Source: National Statistics Office of Georgia

⁷² 1)

<http://agrosc.ge/uploads/%E1%83%9B%E1%83%94%E1%83%AB%E1%83%A0%E1%83%9D%E1%83%AE%E1%83%94%E1%83%9D%E1%83%91%E1%83%98%E1%83%A1%20%E1%83%93%E1%83%90%E1%83%A0%E1%83%92%E1%83%98.pdf>; 2) http://livelihood.gov.ge/res/uploads/drc_gzamklevi/16102104143886e0.pdf; 3) http://www.rda.gov.ge/rules/mecxoveleoba/saqonlis_sheskidvis_cesi.pdf; 4) <http://enpard.ge/ge/wp-content/uploads/2015/05/Market-Assessment-Report-Beef-Geo.pdf>; 5) <https://agrokavkaz.ge/dargebi/mecxoveleoba/saqonlis-phermis-kriteriumebi-sheghavathiani-agroreskhisthvis.html>

⁷³ Source: National Statistics Office of Georgia

⁷⁴ 1) <https://agrokavkaz.ge/dargebi/megoreoba/zogadi-inphormatsia-maththvis-vints-ghorebis-moshenebas-gegnavs-html.html>; 2) <https://agrokavkaz.ge/dargebi/megoreoba/ghoris-kvebis-thaviseburebebi.html>; 3) http://srca.gov.ge/files/goris_mosheneba_20_gv.pdf; 4) <https://agronews.ge/meghoreoba-damtsqhebi-phermerebisathvis/>

			<p>Also, consultations with relevant experts were carried out</p> <p>50% was selected as an average loss rate in this stream</p>	
Sheep-goat	Data for 2016-2020 ⁷⁵	0% and 1% growth rate scenarios	<p>International examples were used to calculate the average loss in this stream⁷⁶</p> <p>According to these examples, the average loss in sheep breeding is about 5-7%</p> <p>Consultations with relevant experts were carried out</p> <p>7% was selected as an average loss rate in this stream (since good practice in sheep-goat farming is less common in the country</p> <p>Accordingly, the maximum value/rate was selected</p>	Based on data from various local studies, 20 kg was taken as the average weight of a sheep or goat ⁷⁷

⁷⁵ Source: National Statistics Office of Georgia

⁷⁶ <http://www.assurewel.org/sheep/mortality.html>;
<https://www.massey.ac.nz/massey/fms/Colleges/College%20of%20Sciences/Epicenter/docs/KamaliahGhazliMVS.pdf?0F604B246DB6A3B204BA7D811D47FB9D>

⁷⁷ https://sabuko.org/wp-content/uploads/2020/08/Sheep-Sector_GEO_1182020.pdf;
<http://business.org.ge/ckhvari-da-tkha-suladoba-khorci-rdze-da-matyli-2016-wels/>;
<https://catalog.elkana.org.ge/index.php?pageid=28&postid=1214>;
<https://catalog.elkana.org.ge/index.php?pageid=28&postid=1218>;
<https://agrokavkaz.ge/dargebi/mecxoveleoba/thushuri-tskhvari-qarthuli-tskhvriv-iishi.html>;
https://gtu.ge/Agro-Lib/paikidze_matylmcodneoba_da_cxvriv_matylisa_da_tyav0001.PDF

Poultry	Data for 2016-2020 ⁷⁸	0% and 1% growth rate scenarios	Data from one of the largest poultry factories ⁷⁹ in Georgia were used to calculate poultry losses, which averaged 5% Since the vast majority of poultry are concentrated in factories, the share among the population is relatively small and factory data is relevant	Based on data from various local studies, 1.4 kg was taken as the average weight of poultry ⁸⁰
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Note: In the process of calculating the average weight of the fallen cattle, the fact that the loss is usually associated either with adolescence or with a weak-sick animal was taken into account. The mass of this category is relatively less than the average mass of healthy animals. Accordingly, in consultation with a relevant expert from the NFA, the reduced average weights of the animals were taken for the purposes of this assessment.

Estimating the quantity of ABPs generated in the meat production sector—the following formula was used: Quantity of meat produced (tons) x Average carcass yield per animal/carcass category - quantity of meat produced (tons).

According to this method, for each stream/category of evaluation (cattle, pigs, sheep-goats, poultry) the following parameters were determined:

⁷⁸ Source: National Statistics Office of Georgia.

⁷⁹ Ltd. “Chirina” (Gardabani district, Sartichala village). The scoping report.

⁸⁰ 1) http://livelihood.gov.ge/res/uploads/drc_gzamkvlevi/161021041755bbe0.pdf; 2) Ltd. “Chirina” (Gardabani district, Sartichala village). The scoping report.

Table 33. Key Parameters and Assumptions Made for Estimation of Quantities of ABPs, Generated in Meat Production Sector by Domestic Animal Category

Animal Category	Volume of Produced Meat	Average Annual Growth Rate of Produced Meat ⁸¹	Average Carcass Yield per Stream
Cattle	Data from the National Statistics Office of Georgia	0% and 1% growth rate scenarios	45% was taken as the average carcass yield of cattle based on data from various local studies and consultation with experts ⁸²
Pig/Hog	Data from the National Statistics Office of Georgia	0% and 1% growth rate scenarios	70% was taken as the average carcass yield of pig/hog based on data from various local studies and consultation with experts ⁸³
Sheep-Goat	Data from the National Statistics Office of Georgia	0% and 1% growth rate scenarios	50% was taken as the average carcass yield of sheep-goats based on data from various local studies and consultation with experts ⁸⁴
Poultry	Data from the National Statistics Office of Georgia	0% and 1% growth rate scenarios	75% was taken as the average carcass yield of poultry based on data from

⁸¹ In this case, it was assumed that the volume of meat correlated with the number of animals and, respectively, identical zero percent and one percent scenarios were considered.

⁸² <http://jrc.ge/316/>; http://livelihood.gov.ge/res/uploads/drc_gzamkvlevi/16102104143886e0.pdf; <http://agriedu.ge/Uploads/images/1547311792-B%20%E1%83%9B%E1%83%94%E1%83%AA%E1%83%AE%E1%83%9D%E1%83%95%E1%83%94%E1%83%9A%E1%83%9D%E1%83%91%E1%83%90.pdf>

⁸³ https://agronews.ge/meghoreoba-_damtsqhebi-phermerebisathvis/; <https://agrokavkaz.ge/dargebi/megoreoba/zogadi-inphormatsia-maththvis-vints-ghorebis-moshenebas-gegnavs-html.html>; <https://agroface.ge/article/c3bd310c-afc7-4338-82a6-5fc60ae48973>; http://srca.gov.ge/files/goris_mosheneba_20_gv.pdf

⁸⁴ <http://agriedu.ge/Uploads/images/1547311792-B%20%E1%83%9B%E1%83%94%E1%83%AA%E1%83%AE%E1%83%9D%E1%83%95%E1%83%94%E1%83%9A%E1%83%9D%E1%83%91%E1%83%90.pdf>; https://sabuko.org/wp-content/uploads/2020/08/Sheep-Sector_GEO_1182020.pdf; [http://www.gaas.dsl.ge/pdf/recomendations_2016/%E1%83%92%E1%83%A3%E1%83%92%E1%83%A3%E1%83%A8%E1%83%95%E1%83%98%E1%83%9A%E1%83%98-%E1%83%9B%E1%83%94%E1%83%AA%E1%83%AE%E1%83%95%E1%83%90%E1%83%A0%E1%83%94%E1%83%9D%E1%83%91%E1%83%90%20\(%E1%83%A0%E1%83%94%E1%83%99%E1%83%9D%E1%83%9B%E1%83%94%E1%83%9C%E1%83%93%E1%83%90%E1%83%AA%E1%83%98%E1%83%94%E1%83%91%E1%83%98\).pdf](http://www.gaas.dsl.ge/pdf/recomendations_2016/%E1%83%92%E1%83%A3%E1%83%92%E1%83%A3%E1%83%A8%E1%83%95%E1%83%98%E1%83%9A%E1%83%98-%E1%83%9B%E1%83%94%E1%83%AA%E1%83%AE%E1%83%95%E1%83%90%E1%83%A0%E1%83%94%E1%83%9D%E1%83%91%E1%83%90%20(%E1%83%A0%E1%83%94%E1%83%99%E1%83%9D%E1%83%9B%E1%83%94%E1%83%9C%E1%83%93%E1%83%90%E1%83%AA%E1%83%98%E1%83%94%E1%83%91%E1%83%98).pdf)

			various local studies and consultation with experts ⁸⁵
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Estimating the quantity of manure generated from livestock farming—the following method/approach was used to calculate the amount of manure: Manure production = Number of Animals x Average Weight of Animal (kg) ÷ 1000 (animal unit) x Daily Manure Production.

In this case the number of animals for each year and the average mass of the animal were taken from the relevant calculations (see above).

The amount and consistency of manure varies with animal type, climate, feed ration, animal age and health, and other factors. To compare manure production between animal types or between animals of the same type, manure production is expressed in terms of 1,000-pound animal units. For reference, a dairy cow weighs about 1,400 pounds, or 1.4 animal units. A typical steer weighs about 1,000 pounds, or one animal unit, and most hogs weigh between 200 and 300 pounds, or 0.2-0.3 animal unit. A mature broiler, on the other hand, weighs between four and five pounds, so it takes as many as 250 birds to make up an animal unit.⁸⁶

Based on this approach, after calculating the relevant factors and converting them into metric units, the following was obtained:⁸⁷

- Cattle — 30 kg/day/animal unit
- Pig/hog — 28 kg/day/animal unit
- Sheep-goat — 18 kg/day/animal unit
- Poultry — 32 kg/day/animal unit

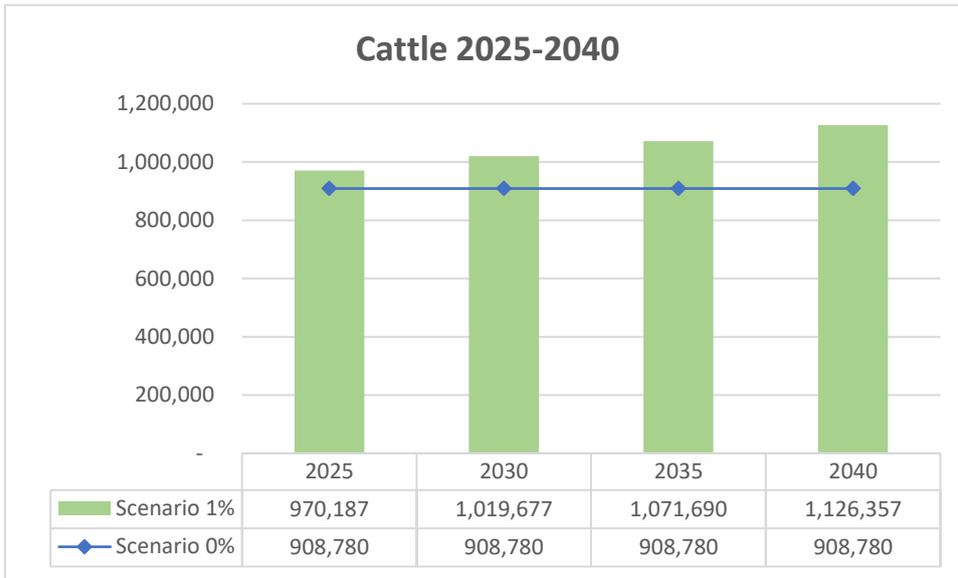
The following data were obtained as a result of counting animal byproducts using the described method/approach. Results of calculations of ABP quantities are as follows:

⁸⁵ <http://fof.ge/index.php?m=1330>; <http://agriedu.ge/Uploads/images/1547311792-B%20%E1%83%9B%E1%83%94%E1%83%AA%E1%83%AE%E1%83%9D%E1%83%95%E1%83%94%E1%83%9A%E1%83%94%E1%83%9D%E1%83%91%E1%83%90.pdf>; <http://enpard.ge/ge/wp-content/uploads/2015/05/Market-Assessment-Report-Poultry-Geo.pdf>; <https://bm.ge/ka/article/samsaxuri-swavla-da-saqme---27-wlis-fermeri-romelic-egzotikuri-frinvelebis-moshenebas-apirebs/4684>

⁸⁶ https://www.nrcs.usda.gov/wps/portal/nrcs/detail/null/?cid=nrcs143_014211#collected

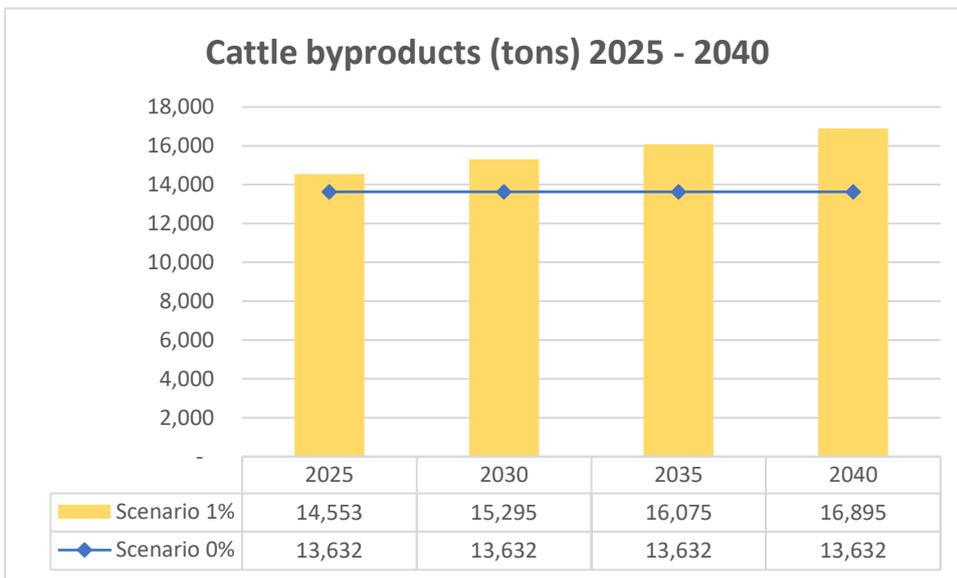
⁸⁷ <https://ag.umass.edu/crops-dairy-livestock-equine/fact-sheets/manure-inventory>; https://www.nrcs.usda.gov/wps/portal/nrcs/detail/null/?cid=nrcs143_014211#collected

Figure 27. Projected Number of Cattle Heads for 2025-2040



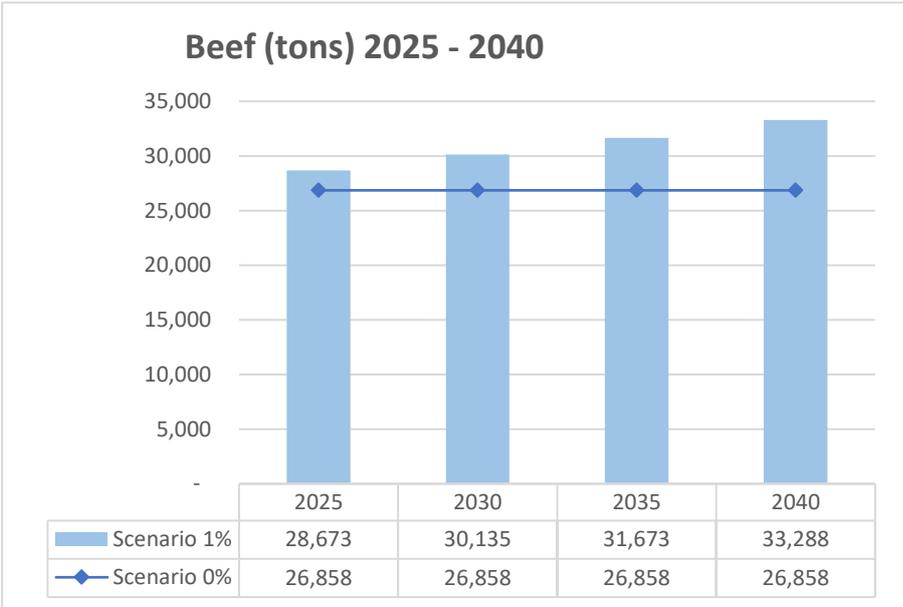
The estimated quantity of ABP generated as a result of cattle loss is shown in the diagram below:

Figure 28. Projections of Quantities of ABPs Generated as a Result of Cattle Loss, T/Y



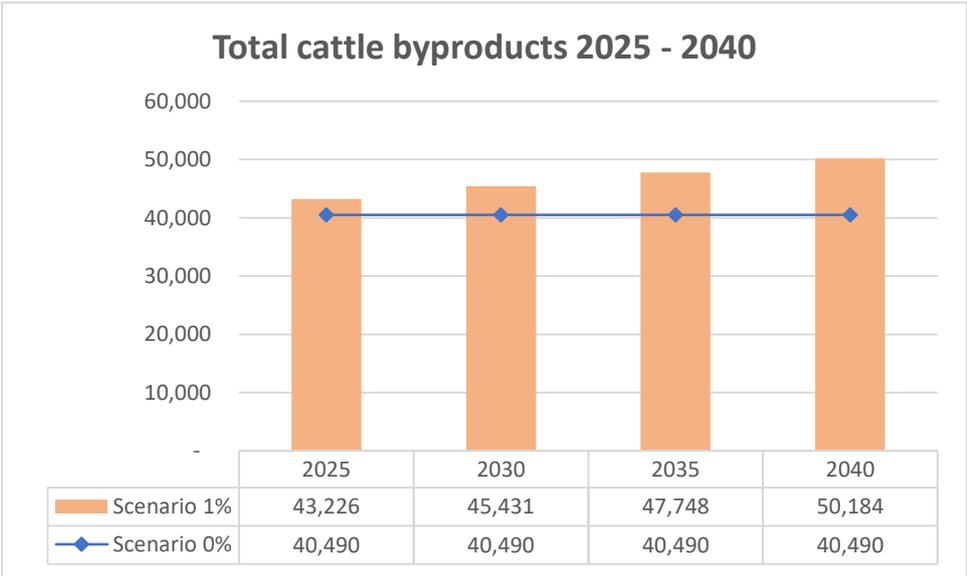
The forecast of animal byproducts generated by beef production in animal husbandry is presented in the diagram below.

Figure 29. Projection of Quantity of ABPs Generated as a Result of Beef Production in Animal Husbandry, T/Y



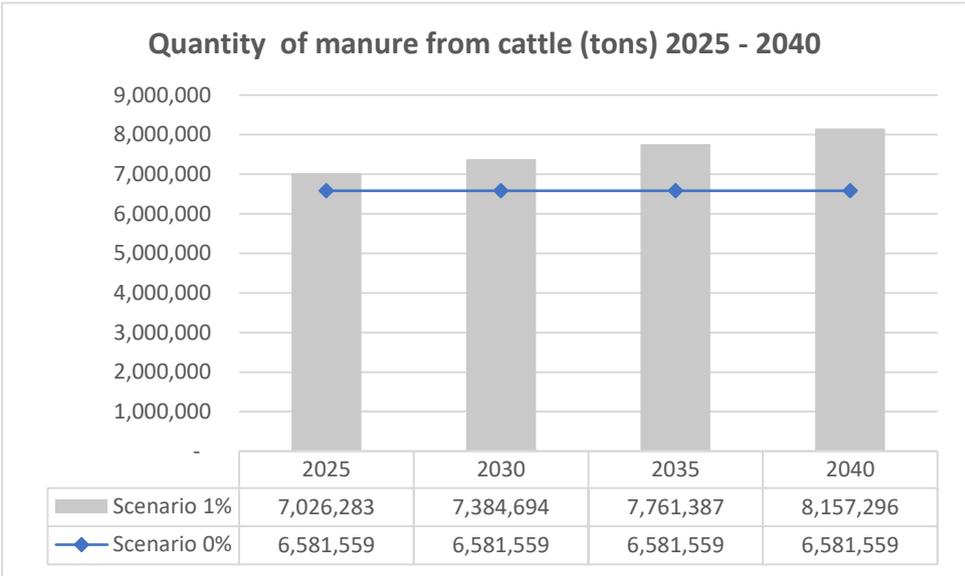
In total, the forecasted quantity of all types of the animal byproducts generated in the cattle breeding sector is given below

Figure 30. Projection of the Quantity of ABPs Generated from Cattle Breeding Sector



In addition, the amount of manure produced by the cattle sector was calculated during the evaluation process.

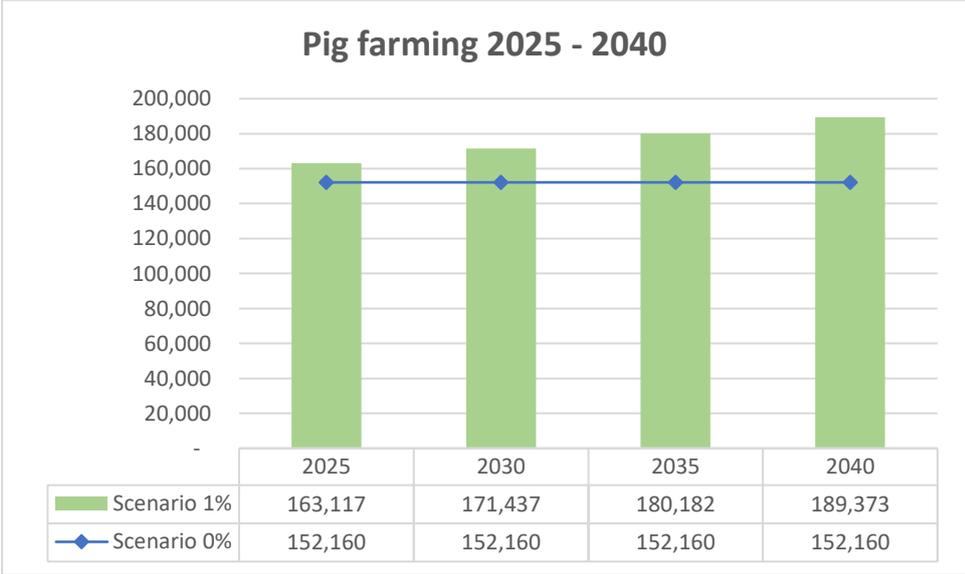
Figure 31. Projected Quantity of Manure Generated from Cattle Breeding Sector



Pig farming

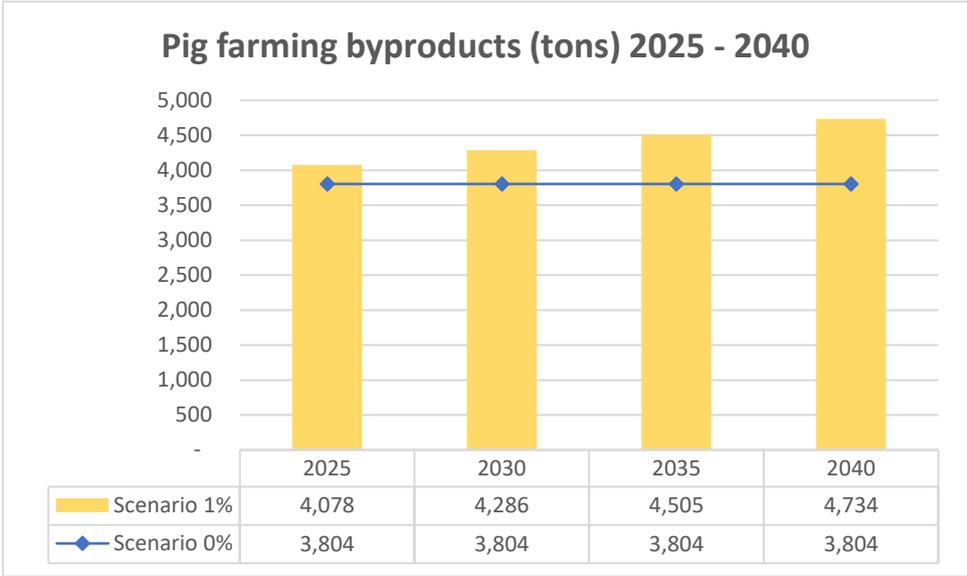
The forecast dynamics of the number of pig/hogs obtained as a result of the calculation is given in the diagram below:

Figure 32. Projected Number of Pigs/Hogs for 2025-2040



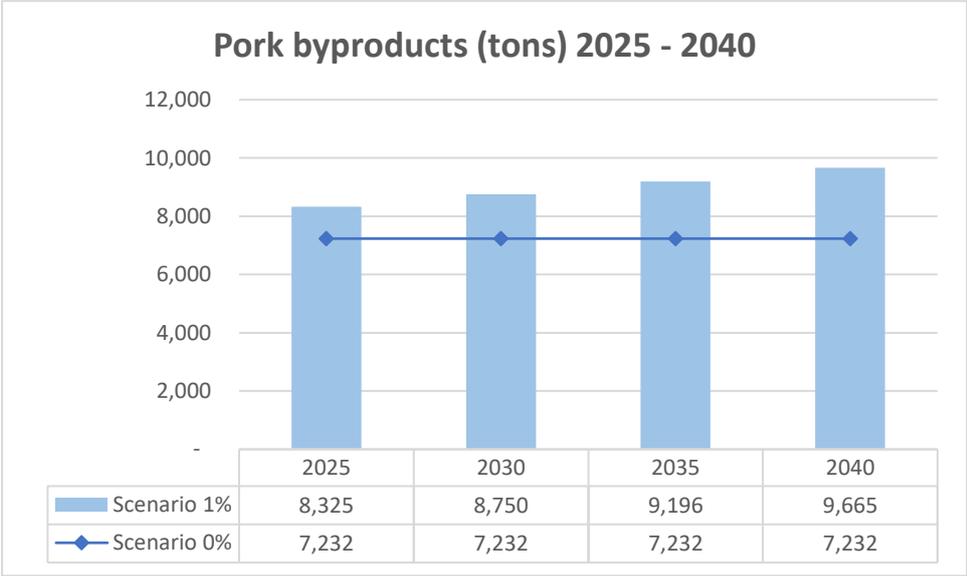
The estimated quantity of ABP generated as a result of pig/hog loss is shown in the diagram below:

Figure 33. Projected Quantity of ABPs Generated in Pig Farming Sector, T/Y



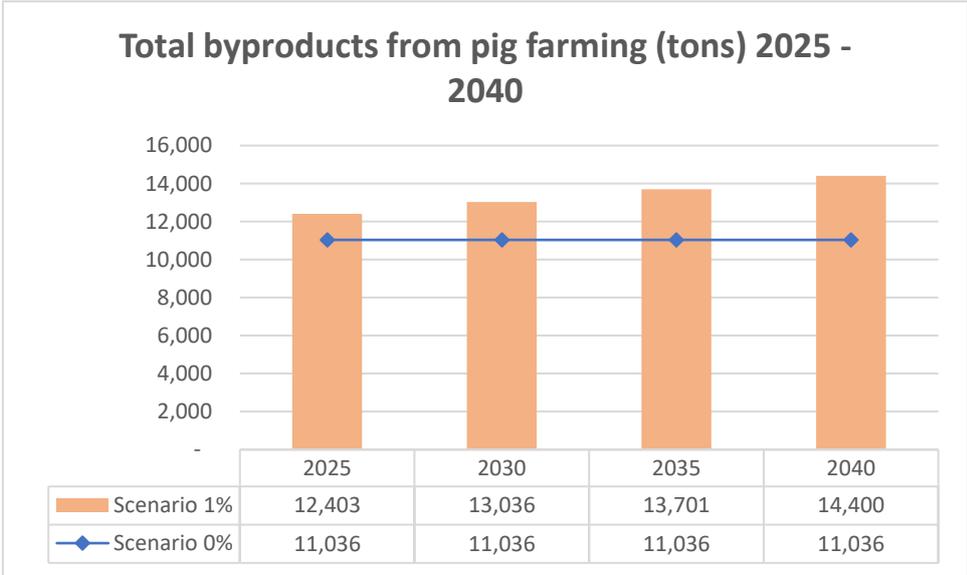
The forecast of animal byproducts generated by pork production in animal husbandry is presented in the diagram below

Figure 34. Projected Quantity of ABPs Generated as a Result of Pork Production, T/Y



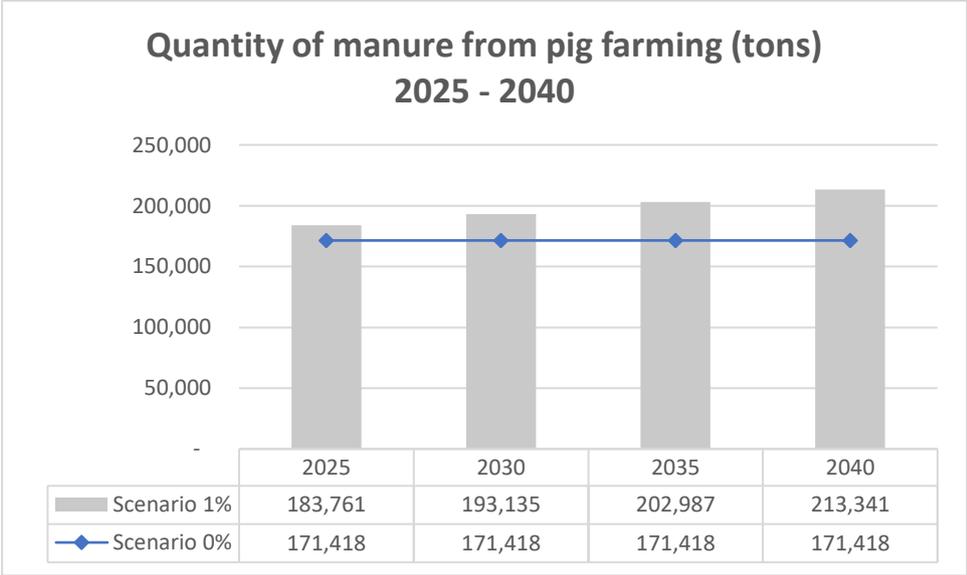
Total projected quantity of all types of the animal byproducts generated in the pig/hog farming sector is shown in figure below:

Figure 35. Total Projected Quantity of all types of the ABPs Generated in the Pig/Hog Farming Sector, T/Y



In addition, the amount of manure produced by the pig/hog farming sector was calculated, which is given below

Figure 36. Total Projected Quantity of Manure Produced in Pig/Hog Farming Sector, T/Y



Sheep & Goat

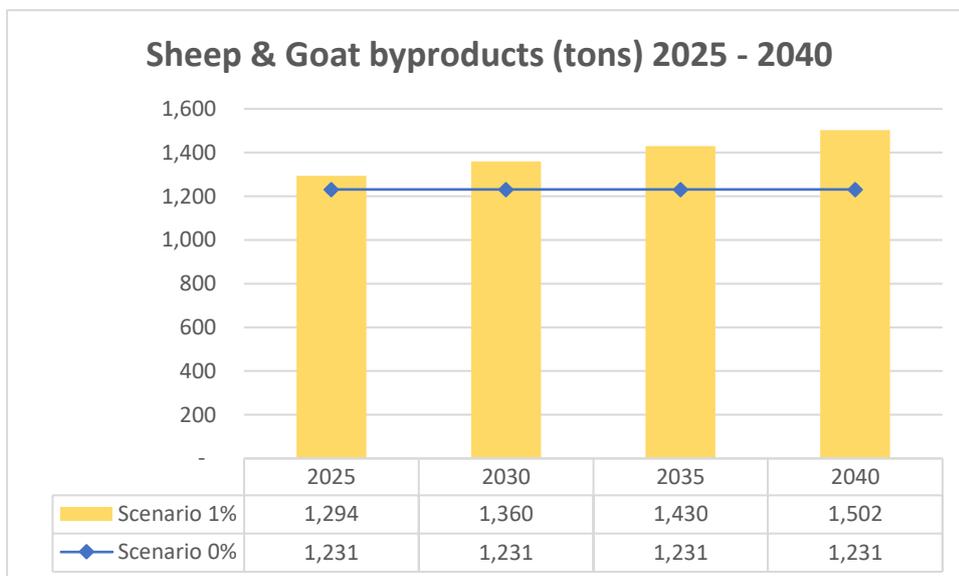
The forecast dynamics of the number of sheep & goat obtained as a result of the calculation is given in the diagram below:

Figure 37. Total Projected Quantity of Sheep and Goats



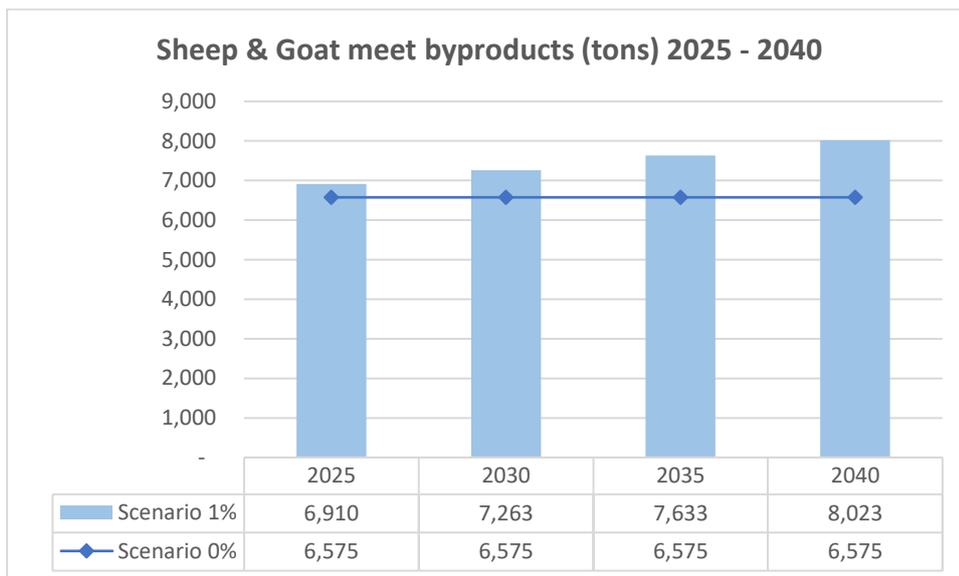
The estimated quantity of ABPs generated as a result of sheep/goat loss is shown in the diagram below:

Figure 38. Total Projected Quantity of ABPs Generated as a Result of Sheep/Goat Loss, T/Y



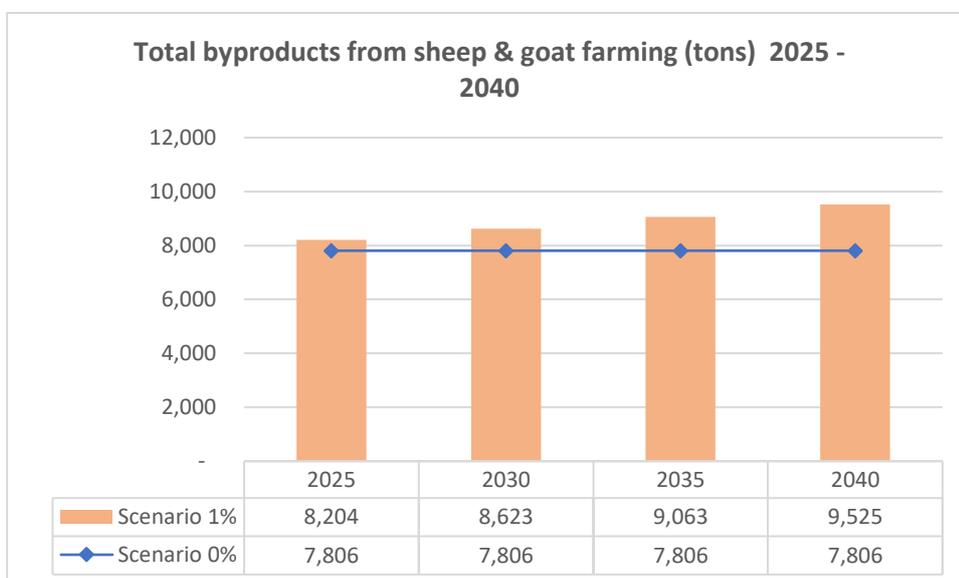
The forecast of animal byproducts generated by sheep/goat meat production in animal husbandry is presented in the diagram below:

Figure 39. Total Projected Quantity of ABPs Generated by Sheep/Goat Meat Production in Animal Husbandry, T/Y



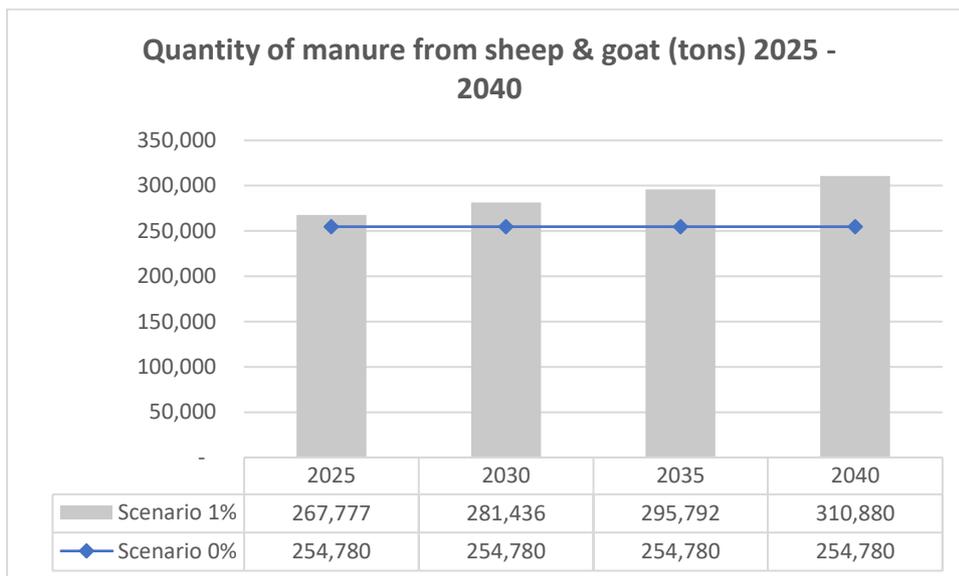
In total, the forecasted volume of all types of the animal byproducts generated in the sheep and goat farming sector is given in diagram below:

Figure 40. Total Projected Quantity of ABPs Generated in Sheep and Goat Farming Sector, T/Y



In addition, the amount of manure produced by the sheep & goat farming sector was calculated.

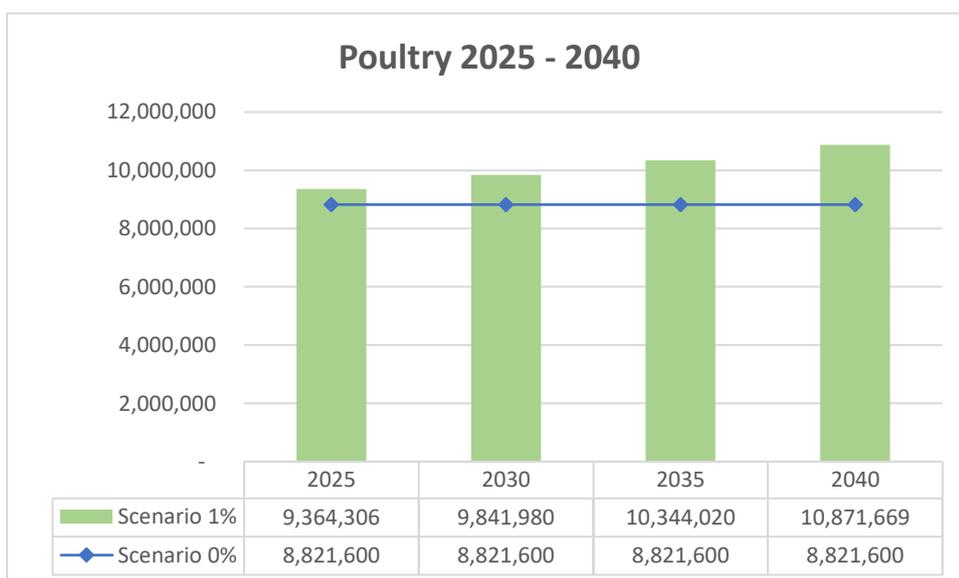
Figure 41. Total Projected Quantity of Manure Generated in Sheep and Goat Farming Sector, T/Y



Poultry

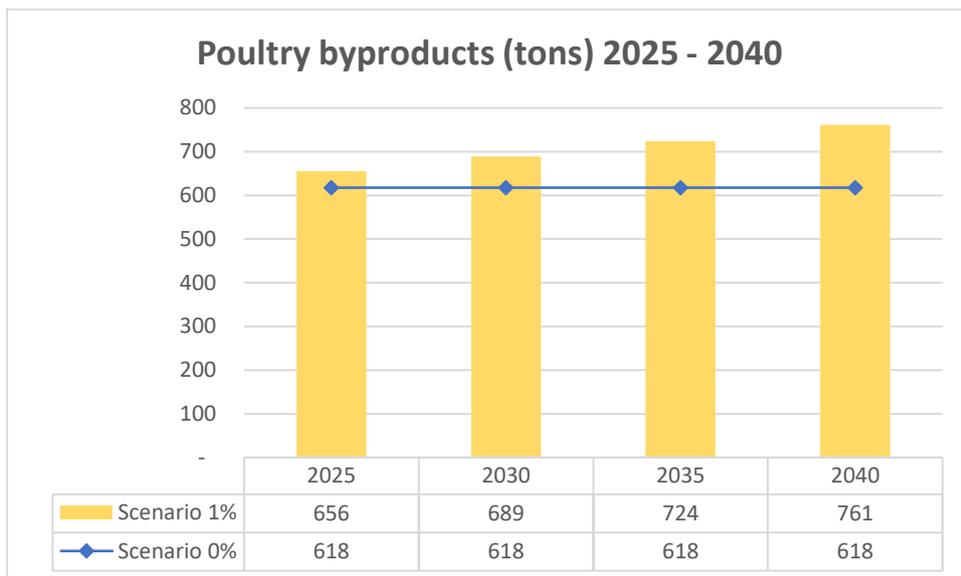
The forecast dynamics of the number of poultry obtained as a result of the calculation is given in the diagram below:

Figure 42. Total Projected Quantity of Poultry, T/Y



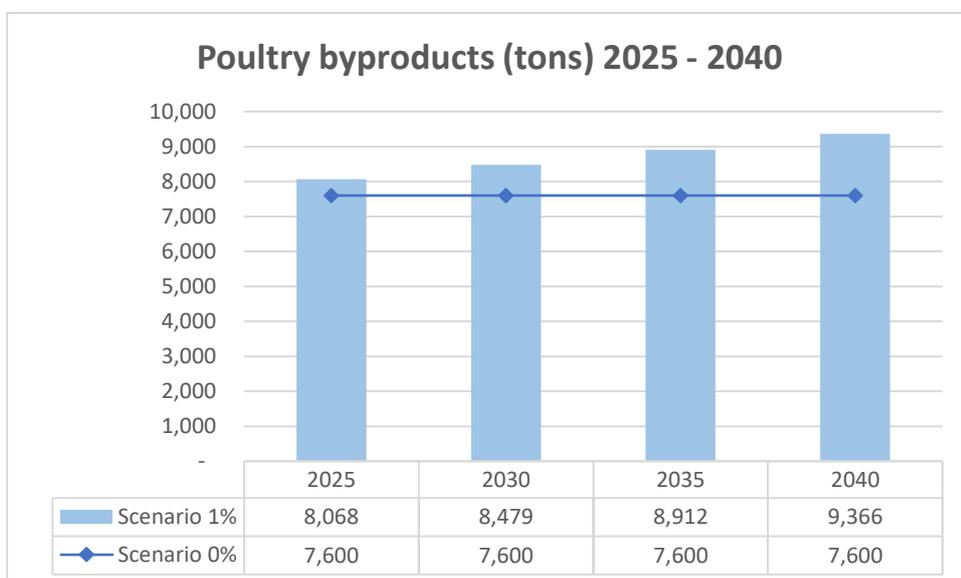
The estimated quantity of waste generated as a result of poultry loss is shown in the diagram below:

Figure 43. Total Projected Quantity of ABPs, generated from Poultry Loss, T/Y



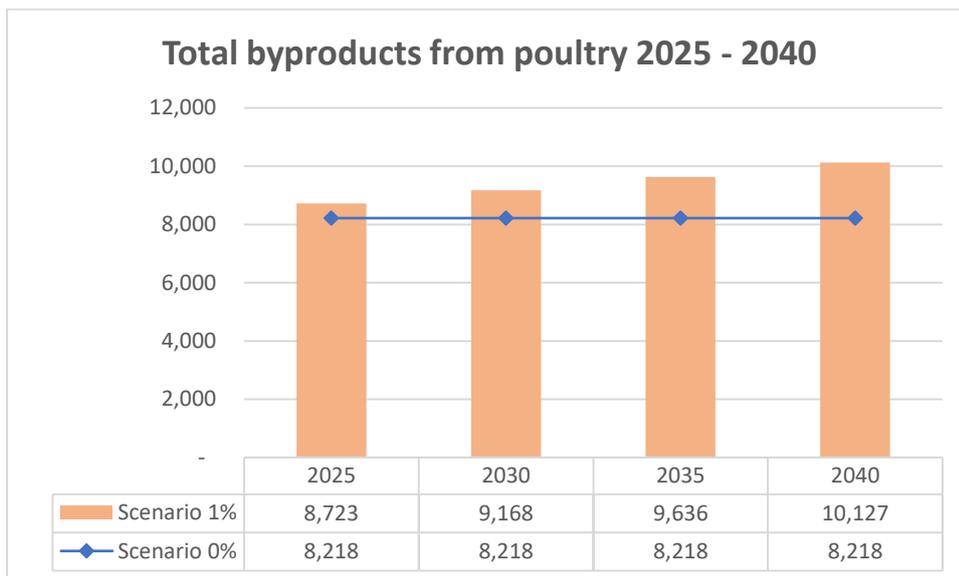
The forecast of animal byproducts generated by poultry meat production in animal husbandry is presented in the diagram below:

Figure 44. Total Projected Quantity of ABPs, generated from Poultry Meat Production, T/Y



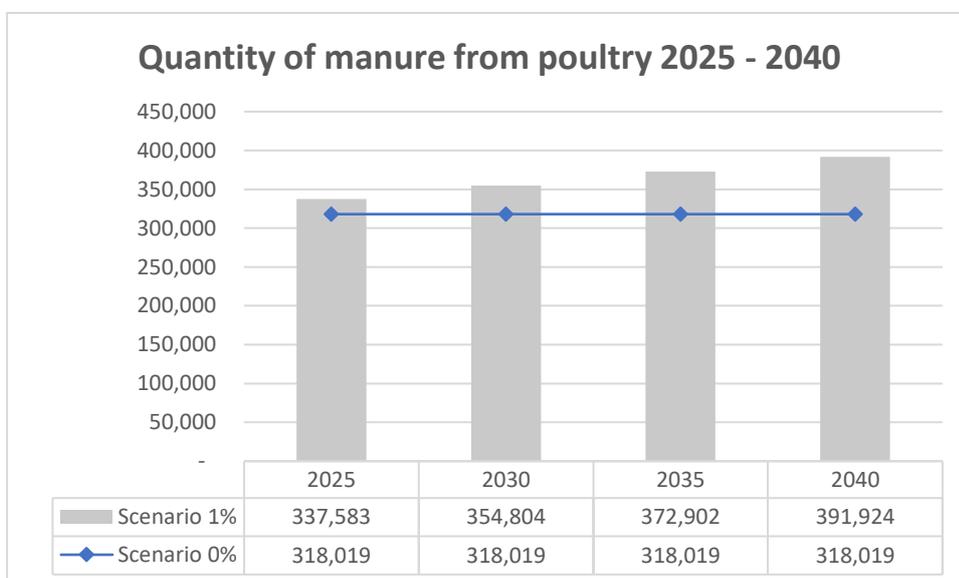
In total, the forecasted quantity of all types of the animal byproducts generated in the poultry sector is given below:

Figure 45. Total Projected Quantity of ABPs, generated from Poultry Sector, T/Y



In addition, the amount of manure produced by the poultry sector was calculated, which is given below:

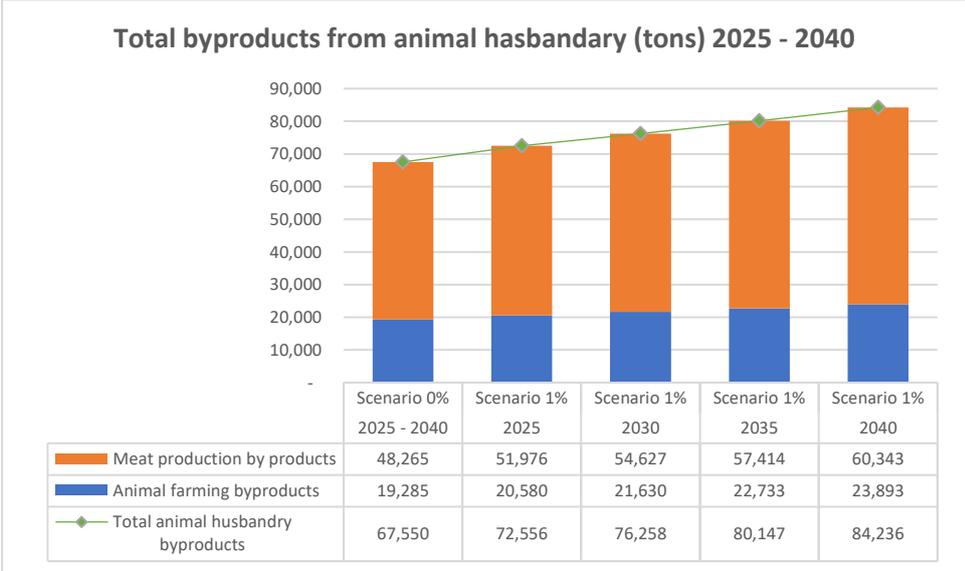
Figure 46. Total Projected Quantity of Manure, Generated in Poultry Sector, T/Y



Total ABPs from animal husbandry/livestock farming

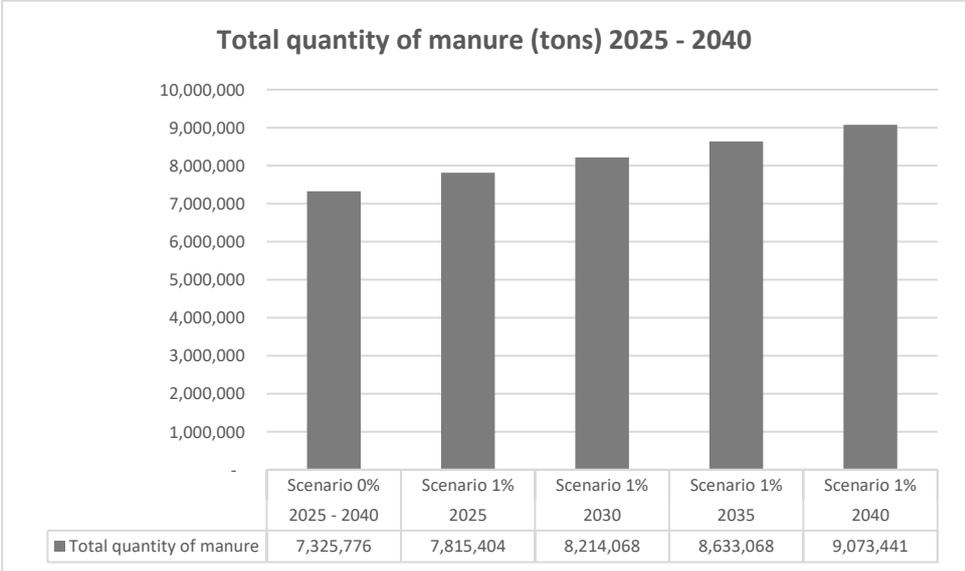
The total forecasted quantity of animal byproducts for 2025-2040 years, according to the mentioned categories - a) byproducts from farming (losses) and b) byproducts from meat production - is given in the diagram and table below:

Figure 47. Total Projected Quantity of ABPs, Generated in Animal Husbandry/Livestock Farming, T/Y



The total forecasted quantity of manure for the same 2025-2040 is given in the diagram below:

Figure 48. Total Projected Quantity of Manure, Generated in Animal Husbandry/Livestock Farming, T/Y



3.6 ABPM Practices

Existing ABP regulation imposes quite strict human and animal health (sanitary) requirements for business operators. However, most of the articles of the regulation related to business operators and their obligations in ABPM are not currently in force. Accordingly, at this stage there is practically no unified approach to ABP management in the country. In such a situation, established practice can change case by case, in the context of different municipalities/regions and/or different business operators, etc.

Three different streams of ABPs can be assessed to characterize existing practices:

- ABPs generated by business operators—slaughterhouses, meat producers, large farms (including poultry factories), etc.
- ABPs generated on small, household farms (slaughter of animals, animal losses).
- ABPs generated from the death of street animals.

The existing practice, according to each stream is follows:

ABPs Generated by Business Operators (Slaughterhouses, Meat Producers, Large Farms, Poultry Factories, etc.)

Prior to adoption of Regulation No. 605, producers typically disposed of animal waste in municipal landfills. As a rule, bilateral agreements were signed on ABP disposal between landfill operators (e.g., the SWMCG or the TSG) and companies. After entry into force of the ABP regulation, such practice has practically been abolished. Landfill operators are required to keep animal waste from getting into landfills. Therefore, the management of such waste is almost entirely the sole responsibility of business operators. Nevertheless, small quantities of expired/spoiled food products from large retailers or meat producers still get into landfills in Tbilisi, regions, and A.R.R. These data are available for Tbilisi and regions, but are unavaibale for the Batumi landfill.

Based on the interviews conducted with MEPA representatives, at present:

- Business operators lack incinerators (the only exceptions are the poultry company “Chirina” and the “Georgian Meat Company”), so waste incineration is practically nonexistent.
- Liquid waste (e.g., blood) is usually discharged in surface waterbodies. Only a small portion of companies treat liquid waste. However, it is well known that virtually no company performs complete cleaning (e.g., there is practically no microbiological cleaning).
- In the case of solid ABPs, at best companies dispose/bury waste on their own sites. In some instances uncontrolled dumping into the environment may occur (e.g., in forests, where this waste usually becomes food for feral/stray cats and dogs or wild animals).
- As a rule, companies do not categorize waste according to Regulation No. 605 definitions. In fact, at this stage categorization makes no sense because there is no capacity (technical, financial, human etc.) to treat/manage each category according to the requirements given in the Regulation.
- There are two incinerators, operated by the NFA/MEPA. These plants are idle most of time, since the input of ABPs is very low. Besides, operations of incinerators are very expensive, and the Agency cannot afford to pay for them.

ABPs Generated on Small Household Farms (Slaughter of Animals, Animal Losses)

- Animal waste (slaughter products) generated in the household is usually disposed in the environment indiscriminately.
- Only in very rare cases do farmers bury animal waste.
- An exception is when representatives of the regional laboratory are called, and the carcass of a fallen animal is examined for possible diseases.
- In this case, if a high-risk disease is detected, the carcass is eliminated (burned) on the spot, in a place selected in agreement with the local government. After the burning of the carcass, the place is treated in a special way. There is practically no practice of incinerating this type of waste in an incinerator.
- The State currently owns two mobile incinerators (running on diesel fuel) owned by the National Food Agency. However, these incinerators are practically nonfunctioning (due to the high cost of maintenance, technical complexity, etc.).

ABPs Generated from the Death of Street Animals.

- The issue of street animals is usually the responsibility of local governments. As a rule, municipalities sign contracts with specialized companies that sterilize and vaccinate street animals (usually only dogs). However, the disposal of dead animals is not their responsibility.
- The carcasses of dead animals are usually disposed of by the municipal services responsible for MSW collection and street cleaning, in a municipal landfill or in a so-called bekar (biothermal) pit, if such exists. Dead animals usually are not screened for disease.

- The exception is when suspicion of rabies arises. In such a case, the relevant material is sent to MEPA's Agricultural Laboratory, where the tested material is ultimately placed in a bekar (biothermal) pit.

Manure—is mostly used as organic fertilizer by farmers. There is practically no organized market for it and sanitary norms for its use are not strictly followed. Although dumping or disposal of manure in public containers is banned, law enforcement against such illicit actions is not performed. Biogas production is practically zero.

In general, the process of animal waste handling—including disposal—is currently chaotic and is not actively controlled/regulated by government agencies. In such a situation, more or less reliable statistical information (quantitative data) on ABPs does not exist.

3.6 Gaps in ABPM Management and Need for Closing the Gaps

Despite the fact that Regulation No. 605 on ABPs was adopted in 2017, setting the legal-regulatory framework for ABPM, recent amendments to the effective dates for many critical provisions related to recognition/approval and State control of business operators in a large portion of the business sector (including petfood, skin, hide producers, and all agriculture producers) were moved to 1 April 2023, while the effective dates for specific sanitary-hygienic requirements for existing ABP combustion plants/incinerators were moved to 2026. This means that Georgia will continue conducting existing, unsafe ABP-handling practices in many sectors—most importantly in the agriculture sector—until the entry into force of relevant ABPR articles. The grace period should be used to create the basis for setting and implementing a EU-compliant ABPM system in Georgia. Meanwhile, the country faces numerous challenges, including:

- Absence of systematic data collection, processing, analysis, and reporting and a unified, electronic database on all three categories of ABPs
- Absence of an ABPM strategy and action plan with priority measures, and a relevant investment plan
- Absence of administrative sanctions against violators of the ABP regulation
- Absence of conformity assessment/verification measurers for ABPs
- Absence of detailed procedures for approval and/or registration of ABP management activities
- Absence of a registry of approved establishments and/or plants
- Absence of an ABP veterinary experts network
- Absence of checklists for official control of each activity
- Inadequate ABPM knowledge and capacities of NFA staff, in particular, in its territorial branches, and of Customs Department staff
- Inadequate awareness by business operators of their duties and responsibilities laid down in the technical regulation on ABPs and about the best available ABP-handling techniques and technologies
- Lack of technical guidelines/circulars
- Weak laboratory capacities
- Absence of infrastructure in all critical points of the food/feed chain (e.g., EU-compliant processing, incineration, co-incineration, or use), and proper control

Hence, there is need for:

- Conducting detailed inventories of key sources and quantities of ABPs within each risk category

- Identifying input data needs, designing and setting data collection, processing, and analyzing, and a reporting system
- Identifying detailed legal-regulatory, policy, institutional, and operational needs, and drafting an ABPM strategy and action plan
- Defining and introducing adequate administrative sanctions
- Elaborating and introducing conformity measures
- Developing detailed procedures for approval and/or registration of ABPR activities and establishment of an electronic ABP registry
- Building of community of practice, including ABP veterinary and waste management experts' networks
- Developing official control checklist formats for each ABP-handling activity
- Further enhancing laboratory capacities through trainings, certification, improving the quality assurance/quality control (QA/QC) system, expanding the network of laboratories and improving their testing equipment, enhancing interlaboratory cooperation, including collaboration with well-established EU laboratories
- Enhancing the knowledge and capacities of the NFA, its territorial bodies, and the Customs Department in controlling ABP-handling and transboundary movement through trainings, field visits, and study tours
- Enhancing the ABP-handling knowledge and capacities of business operators
- Creating Circulars/ Guidelines
- Establishing a certified training system
- Creating a specific website with information about ABPM

As a medium- to longer-term measure, feasibility and investment studies should be carried out on establishing ABP-handling infrastructure, and investments should be mobilized to develop proper infrastructure. If the GoG decides to construct and operate two HW disposal/treatment facilities through a EBRD loan, the capacities of these facilities should reflect the quantities of ABPs generated and gate fees for business operators should be introduced and take into account actual disposal and/or treatment costs.

4 Management of Biowaste Generated by Non-Municipal Sectors

4.1 Laws and Regulations

In Georgia, major streams of biodegradable waste generated by non-municipal sectors are produced by agriculture and forestry activities. Agriculture biowaste consists of crop residues and ABPs, including fallen stock from livestock and poultry farms, manure, residues from slaughter- and poultry houses, etc. ABPs are regulated by Regulation No. 605 on ABPs, discussed above.

Crop residues are not regulated by the WMC, which considers these part of biomass. According to the WMC terminology, besides crop residues biomass covers fecal mass/manure, straw, and other non-hazardous materials of similar natural origin used in farming, forestry, or to obtain energy from it through processes and methods that pose no threat to the environment or human health.

Forest/wood waste management—particularly its disposal—is covered by the new Forestry Code, which defines this stream as “wood/forest waste, consisted of bark, oil, sawdust, firewood, roots left over from the implementation of forest care measures and timber production, which are no longer valued as wood due to the impact of natural or other factors.” Furthermore, the law requires laying down a specific resolution for the disposal of forest/wood waste. The draft GoG resolution on the Approval of Forest Use Rules has already been officially uploaded to the government circular and will be soon posted on Georgia’s Legislative Herald (www.matsne.ge). According to article 28 of this regulation, wood waste handling (mostly disposal) should be done by either i) depositing the waste on logging trails to protect them from soil erosion, ii) stacking branches unusable as firewood, no more than one metre in height, or iii) evenly distributing the waste over the waste generation areas. Burning waste is also allowed in order to prevent the spread of pesticides and phyto-diseases, provided that precautionary and safety measures against forest fires are taken. When selecting a waste disposal mode, the risk of acceleration of small fires should be a consideration. The disposal of the waste can be performed either inside or outside the felling area (logging site) at the instruction of the forestry authority (forest management body) and in a manner consistent with the timber harvesting, but not later than the completion of the timber harvesting. Disposal of wood waste should be carried out in case of incorrect allocation of logging site, as well as in case the terms of validity of special license for timber production and/or for specific logging site is expired. Disposal of wood waste should not interfere with the process of that harvesting. In such a case, the deadline for disposal of the waste may not exceed the deadline for the closure or cancellation of the timber harvesting, or the deadline established by the relevant license.

The forestry authority, which according to the Forestry Code may be either the National Forest Agency, the Achara Forest Agency in Achara A.A.R., or another competent authority (e.g., municipality, church, NGO, private business, etc.) is authorized to distribute the wood waste free of charge to the population for personal needs. The transfer of rights to use wood waste from the Forestry Authority to third parties is also possible through State auction. The wood waste is used without formal designation of the logging site. The amount of waste wood to be disposed of is determined in advance, and the quantity of waste actually used is calculated according to the approved methodology annexed to the rule. Prior to transportation, the recipient of the waste is entitled to shred it on the spot using appropriate technology or to dispose of the waste in uncut form. The forestry authority may on its own ensure removal and transportation of wood waste—shredded or uncut—and its disposal and storage in a place designated for further auction.

According to the Forest Code and the pursuant Forest Use Rule, fallen timber and secondary wood material can be used for common/general (personal) and special (commercial) purposes. The latter needs a special license for the production of secondary wood materials—roots, bark, phloem, woody

forage, stump, brushwood, seed, and branches. When the fallen timber is within a protected forest harboring habitats of endangered species or habitats protected by the European Convention for the Protection of Wildlife and Natural Habitats, or when the wood waste has high conservation value, its removal from the site is prohibited.

A new law on “Promoting the Generation and Consumption of Energy from Renewable Sources⁸⁸” was adopted [??? when ???] by Georgia’s Parliament to promote renewable energies, including biomass energy, pursuant to EU Energy Community requirements as laid down for Georgia in the 2019 EU-Georgia Association Agreement. The new law was designed to:

- Create legal grounds for the encouragement, promotion, and consumption of energy received from renewable sources, and
- Set mandatory, national targets for the energy received from all renewable sources as part of total energy consumed and energy consumed by transport. [???]

The law establishes norms related to support schemes, certificates of origin, administrative procedures, information support and training, and the accessibility of renewable energy and biogas to the electric power grid and the natural gas network. It also establishes sustainability criteria for biofuel and bioliquids.

The statute introduces key terms for renewable energy, biomass, and products derived from biomass:

- Renewable Energy: energy received from renewable sources—particularly wind, sun, and ocean energy, aerothermal energy, geothermal energy, hydrothermal energy, hydropower, biomass, gas generated from decomposing organic matter at landfills, gas generated in a wastewater treatment facility, and biogas
- Biomass: biodegradable elements in agricultural products and waste of biological origin (including plant and animal substances), wood waste and forestry residue, agriculture-based industrial waste, including waste from fish farming and fish processing enterprises, aquaculture waste, and biodegradable elements in industrial and municipal waste
- Bioliquid: liquid fuel generated from biomass used for energy purposes, except transport, that include electric power, heating, and cooling
- Biofuel: liquid or gaseous fuel produced from biomass and used for vehicles

The law mandates that at least 35 percent of all energy consumed by 2030 come from renewable sources, and that at least 10 percent of all energy used by all types of transport come from renewable sources by 2030. Furthermore, it requires an energy producer to generate from renewable sources a given proportion of its total energy production, or requires that an energy supplier include in its supply a given proportion of energy received from renewable sources, or requires that an energy consumer include in its consumption a given proportion of energy received from renewable sources. As part of support schemes, it introduces the following mechanisms:

- Green Certificate: a marketable document which certifies that a given share or quantity of energy is generated from renewable sources and which may be traded without restrictions by a renewable energy producer; the value of a green certificate may be set by the producer at a minimum guaranteed price
- Premium Tariff: an instrument of tariff policy whereby the electric power produced by a renewable energy producer may include a fixed premium payment which is added to the wholesale price;

⁸⁸ Source: Law of Georgia on Promoting the Generation and Consumption of Energy from Renewable Sources. Legislative Herald of Georgia. <https://matsne.gov.ge/en/document/view/4737753?publication=1>

- Special Green Tariff: an instrument of tariff policy whereby the electric power produced by a renewable energy producer may be traded by a fixed payment, with the wholesale price excluded.

According to the law, the GoG shall ensure the implementation of measures which, in the case of biomass, promote a production process having at least 85 percent efficiency when used for household or commercial purposes, and at least 70 percent efficiency when used for industrial purposes. The GoG should develop a National RE Action Plan (NREAP) to implement step-by-step achievement of national RE targets.

The statute requires the issuance of certificates of origin for electric power received from renewable sources, to confirm the percentage of renewable energy in the mix of energy supplied to an end-user. A transmission system operator in Georgia shall issue such a certificate of origin upon request by a producer of renewable electric power. The MoESD shall be authorized to organize the issuance of certificates of origin for heating and cooling produced from renewable sources upon request by producers of such heating and cooling. For electric power generated from renewable sources, a certificate of origin shall be standard and shall be issued for the generation of one megawatt per hour. Only one certificate of origin shall be issued for each unit of generated electric power.

4.2 Policies

The National Agriculture and Rural Development Strategy of Georgia for 2021-2027⁸⁹ considers food/feed safety, environmental protection, and sustainable utilization of natural resources in rural areas as key strategic areas for intervention (goals 2 and 3). The sustainable use of forest resources and support to the implementation of energy-efficient and renewable energy technologies and practices are among the strategy's key, immediate environmental objectives. In the forestry sector, measures are directed towards increasing access by the rural population to firewood, and forest restoration measures. The previous action plan seemed to imply that biomass will be within the scope of planned measures.

The National Forest Concept of Georgia,⁹⁰ adopted in 2013 by GoG, considers the use of forests by the local population for firewood to be an unsustainable pressure on timber resources. Objective 8 describes a wide array of awareness, capacity-building, and education measures to reduce the practice. The piloting of using alternatives to timber for firewood is considered a key step in this direction. A Low Emission Development Strategy (LEDS)⁹¹ outlines a number of activities to reduce net greenhouse gas emissions, including efficient biomass heaters and solar hot water heaters.

NREAP, adopted and published in 2019, proposed a number of policies and investments to meet a 2020 target of having 30 percent of energy consumed come from renewable sources, and to implement the Renewable Energy Directive—including the likely costs of their implementation.

⁸⁹ Source: Agriculture and Rural Development Strategy of Georgia 2021-2027. <http://enpard.ge/en/wp-content/uploads/2015/05/ARDSG-FINAL-version-ENG.pdf>

⁹⁰ Source: National Forest Concept of Georgia. CENN. <http://environment.cenn.org/sustainable-forestry/policy-institutions/national-forest-concept-georgia/>

⁹¹ Source: Georgia's Low Emission Development Strategy (leds), draft; Enhancing Capacity for Low Emission Development Strategies (ec-leds); Clean Energy Program - Cooperative Agreement no. 114-a-13-00008, Winrock International, http://www.decisionwaregroup.com/assets/wi-172_2017-09-14-georgia-s-low-emission-develdevelopment-strategy_eng.pdf

Regarding biomass—including agricultural and forest residues, biofuels, and bioliquids derived from biomass—NREAP suggests measures to integrate biogas-generated heat energy into the national gas supply, ways to improve management of solid biomass resources by developing better forestry practices, potentially support for the use of biomass residues for heating, hybrid electricity production, etc., efforts to develop feasibility studies and potentially invest in renewable energy-based district heating and cooling—currently underway in Borjomi/Akhaltsikhe, the capacity-building of technical experts, and continued communication with the general public about renewable energy.

The draft State Strategy for the Development of Solid Biofuels in Georgia has been elaborated and is subject to Government approval and adoption in the near future. The Strategy's major goal is to facilitate the use of solid biomass residues in Georgia by encouraging the production and acceptance of modern solid biofuels. The main directions of the strategy include:

- Sustainable management and supply of solid biomass residues from forest, agriculture, industry, and other sources
- Adoption of new technologies and processes for the production of solid biofuels
- Encouragement of sustainable production and demand for energy from biomass residues

4.3 Institutional Setting

LEPL National Forestry Agency—with local branches under MEPA—is a central organ responsible for forests—including their protection, tending operations⁹², and wood waste management on State Forest land. In the Achara region, a similar Forestry Agency has similar duties and responsibilities within the administrative borders of Achara A.R. municipalities, where churches and non-public entities, including conservation NGOs, etc., may become owners of forests under the present Forest Code. LEPL Agency for Protected Areas under MEPA is responsible for maintaining and safeguarding protected forests, including the handling of wood waste generated within protected areas.

The MoESD is in charge of setting legal requirements and policies for the use of renewable energy and for determining the scope of the work of the Georgian National Energy and Water Supply Regulatory Commission.

A number of Georgian NGOs are cooperating with local communities and/or nationwide on forestry and biomass energy issues. The Energy Efficiency Centre and World Experience Georgia (WEG) are thinktanks for developing national energy policies, including RE and EE policies, in line with EU Energy Community Requirements. CENN promotes forestry reform and on-the-ground rural initiatives to engage local communities. REC supports sustainable land management policy, techniques, and practices, including afforestation-reforestation and land reclamation measures. ELKANA—a biopharmers association—works on biopharming and sustainable agriculture, including agroforestry and rural development issues.

The Georgian Farmers' Association (GFA), founded in 2012, unites about 4,000 farmers across the country. The Association acts as an intermediary between the Government and farmers. GFA works effectively with GoG agencies, helped prepare the Agricultural Development Strategy, and participates in policymaking. It sits on various Governmental and non-governmental boards, such as the Georgian Chamber of Commerce and Industry (GCCCI) and the Georgian Alliance for Agriculture and Rural Development (GAARD). In 2013, the GFA became a partner of COPA-COGECA, an agricultural union of

⁹² For establishment of the regeneration and subsequent development of the forest crop up to harvesting, tending operations are carried out. These operations are carried out in the forest crop at different stages of growth in order to provide a healthy environment for their development.

European farmers and cooperatives. The GFA's main pursuits include advocacy, capacity-building, and networking in order to:

- Identify problems and address relevant bodies
- Make recommendations and boost communication
- Protect farmers' interests
- Support farmers' certification
- Encourage vocational education
- Offer consultations
- Strengthen farmers by involving them in various activities
- Host work meetings and training
- Perform research

The GFA, with the support from the USAID's Zrda, has developed a local, standard GeoGAP for primary agricultural products (focusing initially on fruits and vegetables). Through GeoGAP, which is tailored to local conditions, the GFA will help local farmers adopt sustainable agricultural practices in accordance with food safety requirements, thereby moving them closer to European standards. This will simultaneously improve food safety in local markets and promote exports of high-quality products. GLOBAL G.A.P. is an internationally recognized set of farming standards based on Good Agricultural Practices (GAP). The scheme's principal objective is to ensure the safety and quality of agricultural products and sustainable practices among farmers, retailers, and consumers. There is a strong and growing demand from Georgia's consumers, retailers, suppliers, and producers for food safety standards.⁹³

On 6 April 2017 the Biomass Association was established in Georgia with the participation of various business companies and non-profits. The founder and chair of the Association is New Technology Center (NTC). Representatives of the Caucasus Environmental NGO Network (CENN), the Greens Movement, the Energy Efficiency Center (EEC), WEG, Nisoni Ltd, and Innovative Technologies and Services (ITS) are members of its board. The Association's mission is to stimulate multi-stakeholder cooperation, and information and knowledge exchange on biomass issues in Georgia to generate opportunities to influence public policy on biomass deployment, ensure the most favorable business environment, and accelerate development of the biomass market.

Business operators engaged in using agricultural and forest residues for biomass energy—including biofuel—have supported a number of small-scale, private initiatives in Tbilisi and Akhmeta to produce briquettes and pallets, and in a number of small cities to promote the use of crop residues (e.g., hazelnut shells, wine production residues, etc.) to heat kindergartens. The largest biomass utilization plant so far is Biodiesel Georgia founded by the Frego company in 2018. The plant's designed capacity is nine t/d. So far, used vegetable oils (rapeseed, soy, peanuts, corn, sunflower, olives) and public cooking oils (from restaurants, canteens, fast food outlets, and cafes, and packaged roasted products) are processed into biodiesel (B10). In the future, the company plans to use second generation biofuels obtained from sawdust, straw, and crop residues. The product now is sold to Frego gas stations in Tbilisi and a few other regions nationwide who are the first in the country to retail B10. The company collects used kitchen/cooking oils from some 200 restaurants, hotels, and other food establishments but primarily from McDonald's. Beyond retail sales, Biodiesel Georgia is looking to help public transportation companies transition to B10, reduce fossil fuel demand, and improve the environmental

⁹³ Source: Georgian Farmers Association (GFA). <https://gfa.org.ge/en/#>

footprint of urban areas. The company produced around 190 t of biofuel in 2019, which increased to 300 tons in 2020. Total investment in the facility was GEL one million.⁹⁴

4.4 Government and Donor Initiatives

Until recently, there was no Government support for using biowaste generated from the agriculture and forestry sectors. The adoption of the new Forest Code and pursuant rule on forest use will gradually address forest waste management. However, the entry into force of requirements for ABPs generated in the agriculture sector will create market demand for agricultural biowaste of animal origin. Most importantly, the adoption of a renewable energy law and action plan will foster achievement of Georgia's RE target for energy and biofuel consumption, with statutory biofuel sustainability criteria to ensure the proper quality of fuel. In the recent past, donor and private sector support for biomass use was quite limited.

The largest assistance—USD 1.3 million—was provided in 2012-2017 under the GEF project: Promotion of Biomass Production and Utilization in Georgia. That project supported three SMEs (Small to Medium-size Enterprises) in Tbilisi and regions to produce 500 t of briquettes, which was only 50 percent of designed output. In addition, high-efficient stoves were purchased on a cost-sharing basis for a number of municipal facilities. In 2013-2017 a Bioenergy Association was established, an inventory of biomass potential took place, and a draft bioenergy/biomass strategy was developed.

The second small-scale initiative was implemented by a partnership of the Marneuli composting plant—a limited liability company owned by Marneuli Municipality—and an EU technical assistance project to improve waste management systems in Georgia. The project helped the company improve biowaste collection from various sectors, including agro markets. In 2019 the company was able to put about 16,000 t of various products, including compost, on the market.

The latest private initiative is biodiesel fuel production from used kitchen oils by LLC Biodiesel Georgia, discussed above.

4.5 Quantities Generated and Existing Practices

Biowaste assessment under this SWSA is mainly based on the analysis of secondary sources:

- The International Energy Agency—Sustainable Bioenergy for Georgia: A Roadmap, Country Report, September 2020⁹⁵
- World Experience for Georgia (WEG)—Assessment of Wood and Agricultural Residue Biomass Energy Potential in Georgia, prepared for UNDP under the Micro-Capital Grant Agreement for Non-Credit Related Activities of 26.06.14. 2014
- Biomass Energy—Country Profile of Georgia, GEF/UNDP/MoENR

⁹⁴ Source: <https://bpi.ge/biodiesel-georgia-%E1%83%9B-1-%E1%83%AC%E1%83%94%E1%83%9A%E1%83%A8%E1%83%98-190-000-%E1%83%9A-%E1%83%91%E1%83%98%E1%83%9D%E1%83%A1%E1%83%90%E1%83%AC%E1%83%95%E1%83%90%E1%83%95%E1%83%98-%E1%83%90/>; https://business-partner.ge/biznesi/biodiesel-georgia-m-05-mln-litramde-biosatsvavi-atsarmoa?fbclid=IwAR2kyQM4cu-bvF-PJgYTD1_ZKQ7B9rbsMqHx72nL6NbMoF_1a1F53TIN8CO; Non-technical summary, Biodisel Production, Biodisel Georgia, <https://mepa.gov.ge/Ge/Files/Download/8677>

⁹⁵ Source: <https://www.iea.org/reports/sustainable-bioenergy-for-georgia-a-roadmap>

- The UNEP Food Waste Index Report 2021

Information on food waste was also used (from the SWMCG and the Tbilservice Group).

N.B., the quantitative data of this type of waste are mainly evaluative. There is practically no accurate statistical accounting in this sector, which results in the absence of precise statistical data.

Biowaste was assessed according to the following main categories/streams:

- Forest Residues
- Agricultural Residues
- Food Waste

Below are brief assessments of each category/stream.

Forest residues

Wood waste biomass produced by forestry is mainly of two origins:

- a. The biomass derived from timber harvesting and logging—treetops, branches and foliage, stumps (excluding roots), and sawdust, and
- b. The biomass resulting from primary timber processing at sawmills—slabs, edgings and off-cuts, sawdust and fines, bark, and various production losses.

It is noteworthy that, as existing reports and interviews conducted for this evaluation show, in the process of extracting timber and firewood, 38 percent of wood waste biomass (e.g., treetop, branches and foliage, stumps, and sawdust) remains in the forest every year after harvesting. Annually this figure is approximately 280,000 m³ (WEG, 2014).

Sawmill management of waste products is a serious problem. About 34 percent of wood waste (slabs, edgings and off-cuts, sawdust and fines, bark, and various losses) accumulates in sawmills. According to the survey results, the sawmills currently take different approaches—burning nearby [???], disposal nearby for further decomposition, transfer to the local population (free of charge), sale to the local population, disposal off site, use by the sawmill for heating and the drying of their wood products, and further processing to produce briquettes (WEG, 2014).

Table 34. Total Estimated Quantity of Wood Residues (biomass) Distributed by Sources of Origin

Source of origin	Annual potential, m ³
Timber harvesting (License holders, Local Population, Illegal cut)	2,886,000
Primary wood processing (Sawmills, Early & Mid-term Tending and Thinning, Measures to support natural regeneration)	1,161,000
Total	4,047,000

UNDP estimates the amount of the same type of biowaste differently. According to the “Biomass Energy Country Profile,” more than one million m³ of forest residues are produced every year through Georgia,

Agricultural residues

Important source of biomass is agricultural residue from annual and perennial crops.

Perennial crops

Main source of biowaste in terms of perennial crops are following -

- *Vine and orchard pruning residues* – Vineyards have the highest share of residue in perennial crops. Generally, 3.2-3.5 tons of vine pruning residue is available from 1 ha. 90% is being burned soon after cutting in early springs. Also, wastes from vineries which means - pomace

biomass generated after pressing the grapes. Big wineries have annual accumulation of pressed pomace of several hundred tons and have difficulty of its disposal. As of fruit orchards, 3.5 tons of pruning residues are left from 1 ha.

- Hazelnut – there is some practice of using hazelnut shells as an alternative heating source in cities and suburban areas of some regions of Georgia (e.g. Samegrelo and Guria).
- Bay-leaf – an important source of biowaste, e.g. 25-30 kg batches leave 5-6 kg of bay leaf and about 10-12 kg of residual fine branches after drying and separation. Bay is mainly spread in western part of country (mostly Samegrelo region).

Annual crops

Main source of biowaste in terms of annual crops are following -

- Corn straw – approximately 2.6 tons of corn stover is accumulated from 1 ha. Totally 1,313 tons of residue is available annually from corn (WEG, 2014). According to the established practice, virtually all quantities of this type of waste are used as animal feed.
- Of the annual crops, in terms of biomass generation are also noteworthy - wheat, barley, sunflower. It should be noted that in the case of annual crop residues, the practice of burning this waste is widespread.

The total amount of bio-waste generated from the agricultural sector is estimated by WEG as 304,000 tons (WEG, 2014). The results of the UNDP estimate are much higher. Specifically, according to the UNDP, the amount of bio-waste generated annually in the agricultural sector exceeds 1.5 million tons.

According to the UNDP estimation, 78% of the bio-waste generated nationwide is generated in the agricultural sector and 22% in the forestry sector.

Food waste

The main source of food waste assessment was UNEP Food Waste Index Report⁹⁶ (2021) and also, the information received from the "Solid Waste Management Company" and the "Tbilservice Group".

The UNEP study assesses food waste generation by three different sectors:

- Household sector
- Food Service sector
- Retail sector

The results of the evaluation for Georgia are given in the table below:

Table 35. Total Estimated Quantity of Food Waste in Georgia

Source	kg/capita/year	tons/year
Household estimate	101	403,573
Food Service Estimates	28	110,504
Retail Estimates	16	62,511
Total		576,588

According to the SWMCG and TSG data, some part of the food waste generated by food industries and/or retailers is disposed of in existing landfills. According to this data, in 2019 - 4,095.54 t of such

⁹⁶ United Nations Environment Programme (2021). Food Waste Index Report 2021. Nairobi.

waste was disposed of in landfills. In 2020 - 2,651.03 t (no data was received from Achara within this assessment framework).

Food waste generated in the household sector is completely disposed of in landfills. As for foodservice and retail, they have contracts with the waste management company, and usually, their waste is disposed of under that contract - which means that the food waste from these sources should be calculated.

According to a UNEP study, it can be estimated that 173,015 tons of food waste are generated in the non-household (or in other words - the business) sector (table above – Foodservice estimations + Retail estimations). Accordingly, based on data from the waste management company, it can be concluded that only a small amount (1.5-2.5%) of food waste generated in the business sector is dumped legally in landfills. Based on the above, it is likely that most of the food waste interferes with household waste and then disposed of in landfills.

Animal byproducts

According to the information received from Tbilsservice Group, this type of waste is not disposed of in their landfills. According to the information received from the Solid Waste Management Company, although similar waste is not disposed of in accordance with the company policy, in some cases, they still have to dispose of animal wastes. According to the company, in 2019, 1,771 tons of such waste were disposed of in their landfills. In 2020, 865 tons. This amount is about 1.5-2.5% of this type of waste generated nationwide (see ABP chapter).

4.6 Gaps in Managing Biowaste Generated from Non-Municipal Sectors and Need for Closing the Gaps

At present, major gaps in the management of biowaste generated by non-municipal sectors are the absence of a detailed inventory of all sources and major streams by source category, and a reliable database. Although there is also no biowaste strategy or action plan, this is currently being addressed under EU4Environment project.

Stemming from the examples above, in the short run the first item should be creation of a detailed inventory of biowaste sources, quantities per source category, and mapping of all important actors, particularly business operators. Once biowaste KPIs and targets are adopted, there will be a need to quantify targets and assess technical options and costs for reaching these targets. Third, relevant authorities (e.g., National Forestry Agency) and business operators need more knowledge and better capacities in biowaste treatment (reuse, recycling, and waste-to-energy recovery), approaches, and available technologies. This will require trainings, awareness campaigns, developing knowledge products, and pilot projects. In the medium-term, pre-investment studies should be carried out for the development of biomass utilization infrastructure and to attract investments.

5 Conclusions

5.1 MSWM

5.1.1 Conclusions

This Solid Waste Sector Study has revealed a number of significant achievements, gaps, and challenges in the area of MSWM. On the positive side, the adoption of the WMC has provided great impetus for noteworthy legal-regulatory, policy, and institutional changes in the field during the last five and six years, including:

- Adoption of the NWMS and associated NWMAP;
- Enactment of WMC implementing regulations related to landfill construction, operations and closure, waste accounting, registration and reporting, MSWM planning, etc.;
- Enactment of bylaws promoting circular economy, including EPR regulations for four specific waste streams (batteries and accumulators, WEEE, used oils, and ELTs);
- Upgrading of the legal status of MEPA's Waste Management Service to the department level, with extended responsibilities and staff, and rebranding;
- Establishment of the SWMCG—to manage landfills in regions, and A.A.R Solid Waste Management Company—to manage a new sanitary landfill in Achara.

Currently, with assistance of its international partners, the GoG implements a number of initiatives at the national level which will significantly help address some key, MSWM sector-specific gaps. These partnerships are:

- EU/RECC assistance in reviewing and updating NWMS and NWMAP under EU4Environment project;
- Government of Norway/CENN assistance in assessing plastic waste in Georgia and preparing the national plastic waste program;
- Orchis assistance in assessing the circularity of Georgia's economy under the Sida's Keep Georgia Tidy projet.

At the local level, all municipalities have adopted 2018-2022 MWMPs and have recently started preparing for a new planning cycle. With EBRD financial assistance, Tbilisi Municipality and the Achara government are working on waste prevention and recycling strategies. Tbilisi is in a more advanced stage of strategic planning, with a final draft strategy prepared and submitted to TCH for endorsement.

In terms of MSWM infrastructure and practices, the country has made significant investments to improve MSW collection and transportation infrastructure in all municipalities, leading to increased MSW collection/service coverage rates, and reaching almost 100 percent in urban areas and roughly 64 percent in rural areas. Some municipalities have launched pilot source separation measures, too. Many small dumpsites have been cleaned up across the country. A number of operational landfills that posed high public health and environmental risks have been closed and remediated, while those having lesser impacts have been rehabilitated and their closure and remediation schedules have already been set. Significant investments have been mobilized for the design, construction, and commissioning of new, EU-compliant, regional sanitary landfills and the setting up of relevant transportation systems, including transfer stations. These projects are ongoing and are either in their feasibility or design phases. These regional landfill projects also envisage support to the sorting of dry recyclables. Furthermore, a new, EU-compliant, sanitary landfill has been built in A.R.R., which will be commissioned during the third/fourth quarter of 2021. Waste treatment facilities are planned. In Tbilisi, EBRD is supporting ongoing measures to improve landfill leachate collection and treatment, and

to upgrade existing transportation equipment and facilities, including the Beliashvili st. transfer station.

In information management, a state registry for CIIs and public entities subject to waste registration and reporting has been established and commissioned within MEPA, which is currently actively used by waste generators; MEPA recently launched (for beta testing) a new registry for producers of specific waste streams subject to EPR. Furthermore, an electronic database on regional landfills has been created within the SWMCG and the Tbilservice Group. Currently, under TA components of ongoing regional landfill projects, IMSs are being created to link target municipalities and the SWMCG. In parallel, UNDP supports the establishment of a MSWM and street cleaning PMS and analytical tool for all 39 municipalities of six regions—Kvemo Kartli, Mtskheta-Mtianeti, Imereti, Racha-Lechkhumi and Kvemo Svaneti, Guria, and Samegrelo-Zemo Svaneti.

As for awareness, participation, and learning management, a new course for CII environmental managers has been introduced within EIEC/MEPA and is currently in active use. Ten MSWM training modules and video lessons, together with a MSWM planning template, a data collection template, and a planning support tool (an automated, Microsoft Excel-based calculator) have been developed and all municipalities of four regions (Kvemo Kartli, Mtskheta-Mtianeti, Samtskhe-Javakheti, and Samegrelo-Zemo Svaneti) have used these training materials to improve their MSWM planning and implementation. For public participation at the national level, LEPL EIEC/MEPA has established an e-platform for citizen's notifications, where anyone can report alleged violations/illicit actions. At the local level, some municipalities, including Tbilisi, Zugdidi, Mtskheta, etc., have established citizens' reports, handling/grievance redress mechanisms, and/or hotlines.

5.1.2 Challenges

Notwithstanding many positive changes that the sector saw in the past decade, Georgia still faces some major challenges to:

- Reduce the quantity of MSW at landfills;
- Treat disposed waste to render it minimally harmful to public health and the environment;
- Eliminate/prevent illegal dumping and littering;
- Manage MSW in the most cost-effective and efficient ways and achieve self-sufficiency of the system through cost-recovery, and
- Transition gradually to circular economy in order to turn waste into resources/products, maximize the value and the lifespan of the materials that circulate within the economy, and minimize material consumption.

A number of systemic, operational, and capacity gaps make it difficult to overcome the stated challenges that have been identified through the given sector assessment and can be broken down into the four categories, as presented below. These issues require attention at various levels to address them in short-, medium- and long-term:

1. Legislation and policy gaps
 - Weak integration of circular economy principles into the existing laws and regulations:
 - Absent or substandard waste prevention regulations, policies, and programs—including quality criteria for material/product reuse, recycling, and/or recovery, as well as financial incentives to promote prevention (e.g., differentiated gate fees for various recyclable streams, VAT and profit tax deductions/exemptions for food donations, etc.), particularly for such streams as food, plastic (including micro-plastics and SUPs), paper, WEEE, bulk, and C&DW waste (this gap is being partially addressed by ongoing EU/RECC, Government of Norway/CENN and Sida technical assistance efforts mentioned above);
 - Lack of readiness by major actors (e.g. producers, retailers and municipalities, etc.) to set up effective EPR systems, as a result of which the enactment date for the packaging

regulation and two provisions of already adopted four regulations on placing on the market products outside EPR schemes and registering producers through EPR register have been postponed to 2022, with EPR targets for all specific streams to come into force in 2023; absent technical regulations on calculating quantitative EPR targets and EPR costs to be adopted before implementing EPR schemes; difficulties in establishing EPR schemes and institutional frameworks for specific streams, for which EPR regulations have already been enacted due to producers having low/no knowledge and skills in circular economy in general and EPR in particular;

- Absent guiding documents/methodology on defining recycling targets, their quantification (including localization), and the ways to achieve them; unrealistically high recycling targets; major streams recycling targets are also missing, other than dry recyclables with high potential for prevention, reuse, and recycling (e.g., C&DW);
- Shortage of regional visions regarding MSW separate collection and treatment (recycling, recovery, etc.) as well as relevant legal-regulatory mechanisms in support of developing and implementing regional waste recycling strategies. While this is not a required practice by the Georgian legislation, planning at the regional level is a good international practice and should be adopted and followed in Georgia as well, starting with a pilot region(s). Moreover, in the light of implementing a regional approach regarding MSW transportation and disposal (regional transfer stations and sanitary landfills), it is advisable to integrate separate collection and in particular, waste treatment aspects into ongoing regional solid waste management activities;
- Absent quality criteria for MWMPs and regulations on PMSs with well-defined KPIs and quantitative targets, and monitoring and reporting frameworks; absent law enforcement regulations within municipal authorities.

2. Institutional, including knowledge and capacity gaps:

- Weak interagency coordination and integration of waste management considerations into decision-making by line ministries in the area of circular economy, including waste prevention. Under the Sida's Keep Georgia Tidy Project an inter-agency coordination mechanism has recently been established, which coordinates assessment of circularity of Georgia's economy and development of circular economy strategy. This coordination mechanism shall be further strengthened to ensure efficient strategy implementation;
- Weak cooperation between central bodies and municipalities in all aspects of MWM—particularly in translating national policy requirements into the local context (e.g., recycling targets, municipalities' role in EPR, etc.);
- Weak cooperation between the Government and producers (including importers) of specific products subject to EPR, and other business operators active at any stage of product lifecycle regarding circular economy, including waste prevention, reuse, end-of-waste criteria, product quality, mandatory or voluntary certifications, tax incentives, etc.
- Weak or absent intermunicipal cooperation in the areas of separate collection, waste treatment schemes, and reaching national recycling targets;
- Lack of coordination within the donor community often resulting in overlapping activities;
- Inadequate knowledge and skills of sectoral ministries, municipalities, and business operators regarding circular economy and new EU measures in waste prevention and reuse, product quality, end-of-waste criteria, intermediary product quality, EPR, etc.; absent proper governance structure for EPR within MEPA, municipalities, and the private sector;
- Inadequate knowledge, skills, and resources—including simple, decision-making support tools—in all municipalities for developing quality MWMPs in line with the NWMS and NWMAP, precisely estimating their infrastructure needs, designing and implementing

effective and efficient schemes for waste collection and street cleaning (including source separation and waste treatment), and waste data collection/accounting and reporting;

- Limited NGO capacities to apply more sustainable and longer-term approaches in their programs;
- Thin market of local consulting firm to promote MSWM planning, policy, financial analysis and, in particular, engineering design of MSW collection and transportation schemes, waste disposal, and treatment facilities.

3. Financial gaps:

- Improper tax/fee-level setting and weak cost recovery (billing and tax/fee collection) practices resulting in inadequate financing schemes;
 - High level of dependency by MSW collection service providers in the field of MSWM;
 - Inadequate capacities of staff/workers at planning and operational levels (capacity-building required);
 - Weak implementation of the “polluter pays principle” as required by the WMC, especially important given the current low fee level and collection coverage due to poor enforcement of payments and high level of subsidies;
 - Lack of reliable information for efficiency monitoring and planning due to the weak accounting and cost allocation system in the municipalities, and the lack of data on waste generation by households and commercial sector;
 - Poor operational efficiency deriving from the landfill regionalization policy affecting collection and transport costs, composition of the truck collection fleet, and the need for transfer stations.

4. Operational/practice gaps:

- Weak MSWM planning, monitoring, and reporting performance—absent/poor waste accounting and information and performance management (including monitoring and reporting), absent knowledge, skills, and decision-making support tools for setting quantifiable targets in line with the NWMS, defining exact needs for the period of the planning cycle, designing viable measures and estimating the costs of these measures (common with institutional/capacity gaps); absent annual operational plans and weak linkage of planned measures with municipal budgets;
- Poor MSW collection/service coverage, especially in rural areas due to: i) inefficient utilization of equipment and infrastructure with containers and RCVs using less than 80 percent of their capacity; ii) inadequate numbers of containers and RCVs to collect MSW from remote villages;
- Prevailing practice of mixed waste collection through common containers; absent separate collection for households and CIIs; negligible levels of separate collection of dry recyclables and waste pretreatment/treatment—attributed to the lack of resources, knowledge, and skills within municipal services, including:
 - Absent or inadequate knowledge and capacities within municipalities to design source separation and treatment measures for dry recyclables (especially the knowledge and decision-making support tools to calculate total quantities of dry recyclables generated within municipal streams and to make waste generation projections, localize and quantify national separate collection/recycling targets, assess different container system options and select the most feasible ones, calculate the number and volume of containers and vehicles needed together with associated costs);
 - Lack of financial resources to implement source separation and waste treatment/pretreatment measures;
 - Negligible material recovery capacities;
 - Absent incentives to reduce the quantity of waste to be landfilled (e.g., gate fees);

- Thin market for dry recyclables due to the low absorption capacities of local business operators/recyclers, decreasing export prices, and still nonexistent statutory requirement for waste treatment before disposal in the existing landfills;
- Low public awareness and no incentives for households and CIs to start separate collection of MSW;
- Hesitance in the public and decision-makers to switch from traditional mixed waste collection to source separation;
- Technical/operational difficulties introducing multi-container collection systems for the population and municipalities, due to limited kitchen space in single apartment housing blocks and on streets of densely populated and built-up areas, especially on Tbilisi's many intensively developed, narrow streets;
- Absent/negligible level of biowaste reuse and/or treatment/recycling due to nonexistent separate collection, reuse and recycling (e.g., green garden waste, manure, etc.) at household, community, and municipal levels, absent biological treatment facilities, underdeveloped market for compost and its products; poor knowledge, skills, and finances within municipalities and/or landfill operators to divert biowaste from landfills;
- Poor street cleaning practices, especially in small towns and rural settlements; poor coverage in the majority of cities; widespread application of labor intensive, outdated dry cleaning methods (broom sweeping); limited use of vacuum and/or wet cleaning due to inadequate finances and resources;
- Lack of resources and knowledge on the part of the vast majority of municipalities to conduct comprehensive inventories of dumpsites and develop and implement closure and remediation measures; absent guidelines on dumpsite closure and remediation; poor support from the central government to close and rectify large dumpsites;
- Poor/absent law enforcement of dumping and littering due to low/absent enforcement capacities within municipalities;
- Lack of resources and capacities for proper landfill management—noncompliance with EU requirements related to landfill design, O/M, equipment, and infrastructure, particularly leachate and landfill gas collection and treatment (the latter is missing from most regional landfills); absent regulatory requirement for waste treatment before disposal in existing landfills (this is being addressed under ongoing landfill projects); weak capacities for the closure and remediation of existing landfills; poor accounting with most existing landfills lacking scales;
- Very limited/nonexistent waste prevention measures:
 - Food waste—no incentives (e.g., VAT and profit tax deductions/exemptions) for charity work and, in particular, for food donations by commercial institutions; strong SPS requirements on food/animal feed and low awareness and capacities of business operators to meet such requirements and to establish and operate HACCP systems; low interest of GoG, donors, CSOs, and the private sector in food recovery and redistribution; weak cross-sector cooperation; inadequate knowledge, skills, resources, and experience of CSOs/NGOs and charities in logistics and food safety (SPS/HACCP), including food collection, safe storage and preparation, refrigeration and reheating facilities; inadequate knowledge and skills of commercial institutions dealing with food products in proper planning, self-monitoring, and reporting on food losses;
 - Paper waste—a weak paper-recycling market, low awareness and consciousness of the general public, government institutions, and businesses about paper conservation and reuse, low capacities of various stakeholders for separate collection and recycling, and underdeveloped e-governance infrastructure;
 - Plastic including packaging waste—absent packaging EPR/DRS regulation and strong implementation mechanisms, absent regulation/policy on SUP and a plastic waste

- prevention program, underdeveloped local plastic recyclables markets, low public awareness;
- C&DW—underdeveloped market and relevant quality criteria for C&SW recyclables, inadequate knowledge and capacities of developers and construction companies for C&DW prevention through proper design, application of easily dismantled materials, as well as for reuse and recycling potential and technologies, absent fees that would promote C&DW reuse, recovery, and recycling, absent nationwide recycling targets for C&DW, and weak enforcement to combat dumping of C&DW waste;
- Other miscellaneous streams—low public awareness; absent infrastructure for separate collection and/or reuse and recycling, including creation of Bring Centers/Green Points/Recycling Yards to collect items for reuse, treatment/recovery of waste (including WEEE, tires, batteries, clothes, CDs, furniture, books, rubber items, etc.); absent donations of used and/or repaired items to socially vulnerable people, and absent promotion and advocacy for reuse and recycling.
- Insufficient enforcement of the WMC and related regulations due to the weak/absent general knowledge, skills, and resources within enforcement authorities; for enforcement of single-use plastic bags regulation, weak/absent knowledge, skills, and infrastructure for detecting violations as well as for assessing/verifying plastic bag biodegradability;
- Widespread use of intermittent or one-time awareness raising measures at national and local levels; absent PR and communications units within cleaning/amenity services and no annual budget lines earmarked for awareness; weak/absent public participation during preparation of MWMPs and absent mechanisms for citizen reporting or the handling of complaints/grievance redress in the vast majority of municipalities;
- Absent nationwide, unified MSWM IMS and database, with specific meta-databases linked to a central depository and with analytical and reporting/data presentation modules, allowing for geographic aggregation/disaggregation and presentation of critical data (e.g., KPI values) online and available to the public; absent electronic waste accounting and information management systems on MSW collection and street cleaning within municipalities; absent critical information and data on many key elements of MSWM, including data on WGIs, waste composition, waste generation, and generation projections by total quantities and by streams, quantities of waste collected from urban and rural areas and household and commercial sectors, quantities of household hazardous waste and C&DW and dumpsites, etc.; poor quality of existing data;
- No well-developed, nationwide or municipal websites on MWS; absent annual performance reports on MSWM at national and local levels, and
- Unsustainability of local capacities created by frequent staff changes in the cleaning/amenity services; absent continuous CD programs and/or certification courses for municipalities in MSWM.

5.1.3 Recommendations

To address key challenges, identified under this study, a package of legal-institutional and policy changes should be implemented in Georgia, leading to elimination of existing unsustainable waste management practices should be modified. In addition, global good practices from other countries shall be adopted.

Some of the key gaps and needs are being currently addressed by ongoing investments and technical assistance projects, including the review and revision of NWMS&AP to include biowaste and other targets, the study of Georgia’s economic circularity and development of a circular economy strategy, preparation of a plastic waste program, development of waste prevention and recycling strategies for a number of cities and development of regional solid waste management infrastructure, including sanitary landfills and transfer stations. In addition to the ongoing efforts, the EU is preparing to launch

a three-year TA to support the Government in priority national issues. This may include, among other things, EPR system development, DB management and information systems, and capacity development of municipalities in MWM planning and implementation.

In the short-run, covering 2021-2025, the World Bank is recommending to implement high priority measures, focusing on building the knowledge and capacities of municipalities in MSWM planning and implementation, especially improving MSWM planning, monitoring, and reporting, waste metrics/accounting (waste quantities, composition, projections, etc.) and financial accounting, waste collection and transportation effectiveness and efficiency, tariff setting, billing, revenue collection, and law enforcement; strengthening intermunicipal and MEPA-municipal cooperation in support of MSWMP planning and implementation; preparing national guidance documents for municipalities to clarify municipal responsibilities regarding targets and suggest methods for the localization and quantification of these targets, and supporting piloting source separation from selected sectors and/or settlements. During this five-year period, an assessment should be carried out to explore opportunities for making local cleaning services less dependent on the central government in terms of financial and assets management.

At the system level, the ongoing circular economy and EPR reform should be further supported in establishing a proper regulatory framework—e.g., packaging regulation, technical regulations on calculating EPR targets and costs, etc., governance structures, and knowledge- and capacity-building of all stakeholders in EPR implementation. It is crucial to support the Government in designing and establishing a unified SWM information management system, including MSWM, and integrating all relevant databases in it.

Preparatory steps for building regional landfills and improving waste collection and transportation systems—which are currently ongoing with EBRD and KFW financial support—should continue and additional finances should be mobilized for waste treatment, including MBT pre-feasibility/feasibility studies, including pre-investment.

Starting from 2025, efforts should concentrate on improving the efficiency and self-sufficiency (cost-recovery) of municipal solid waste management organizations and law enforcement. There should be further support at the system and institutional levels for circular economy policies and actions, including waste prevention, reuse, and recycling on other streams such as C&DW, textiles and leather, etc. NWMS should undergo review and update and an associated action plan should be developed for 2025-2030. Feasibility, investment, and design works should be carried out, regional waste disposal and transportation infrastructure built, and existing landfills should be properly closed and remediated.

5.2 ABPs

As this SWSA has shown, Georgia has no ABP management system in place. Many key provisions of ABPR have yet to be enforced—their effectiveness dates are set for 2026. At the same time, there is no reliable baseline data on ABP quantities per source category. Therefore, during 2021-2025 preparatory works should be undertaken to introduce an ABPM system, including creating a comprehensive inventory of ABP quantities per stream and/or source category, identifying system, institutional, operational, and investment needs, and drafting an ABPM strategy and action plan. Awareness of key stakeholders in ABP management should be built. 2025 should see commencement of support for implementing strategy, to include conducting investment studies and attracting investments for building ABP handling (processing, including rendering).

5.3 Biodegradable Waste

Similar to the status quo for ABPM, Georgia has neither an organized system nor any governance structure for collecting and handling biodegradable waste generated in non-municipal sectors. There is no baseline data on all source categories or waste per category. There is no biowaste strategy or action plan (although the EU4Environment project is currently addressing this issue).

Therefore, the first priority in the short run is to create a detailed inventory of biowaste sources, including quantities per source category and mapping of all important actors—particularly business operators. Second, after biowaste KPIs and targets are adopted, there will be need to quantify targets and assess technical options and costs for reaching these targets. Third, the relevant authorities (e.g., National Forestry Agency, etc.) and business operators will have to learn more and grow their capacities in biowaste treatment (reuse, recycling, and waste-to-energy recovery) approaches and available technologies by means of trainings, awareness campaigns, knowledge products, and pilot projects. In the medium- to longer-term, pre-investment studies for developing biomass utilization infrastructure and attracting investments will be needed.

5.4 Recommended priority investment projects for all target streams

Based on the given analysis, priority investments which are not covered by ongoing or upcoming investment projects are as follow:

- 1. MSW - Setting of source separation and recycling system in regions:** preparation of a regional waste prevention and recycling strategy for a pilot region(s) as a global good practice and as a more integrated solid waste management approach. This should be coupled with option analysis for both separate collection and waste treatment (for both dry recyclables and biodegradable waste) and investment plans leading to the preparation of detailed feasibility studies, design and implementation works;
- 2. Landfill management** – setting of landfill gas collection and treatment system in Tbilisi Lilo landfill. The draft project proposal is developed and an investment is needed for implementation of the project;
- 3. Dumpsite closure and remediation** - detailed inventory and mapping of all dumpsites, preparation of a master plan and an investment program for dumpsite closure and remediation across the country. For example, Tbilisi's landfill in Gldani that is non-operational since 2007 need to be closed as soon as possible.
- 3. C&DW** – detailed inventory/assessment of C&DW generation and its sources, gap analysis, development of a master plan supported with an investment plan for organised system development, including those for regional landfilling and recycling and followed by feasibility studies, desing works and setting relevant infrastructure. A similar approach shall be adopted for hazardous waste fractions, including asbestos utilization.
- 4. ABPs/animal wastes and derived products** – Setting of organized collection, transportation and handling (processing and/or disposal system): needs detailed inventory of all streams by sources, gap analysis, development of a master plan including investment plan and implementation support, including support to implementation of CB program for GoG and business operators and, public awareness raising campaign as well as support development of modern compliance monitoring and control (e.g. laboratory network) and waste handling (e.g. icineration, storage, processing (rendering)

biogas production, compost production, derived products production, fertilizer production, etc.) infrastructure.

5. Biowastes generated by non-municipal sectors – Setting of organized collection, transportation and handling (processing and/or disposal system): needs detailed inventory of all streams by sources, gap analysis, development of a master plan including investment plan and implementation support.

5.5 Climate Change and Related Considerations

Emissions from target sectors

The sectors discussed in this report are sources of GHG emissions. Emissions from the waste management sector, for the purposes of this report include Solid Waste Disposal on Land. Emissions from the agricultural sector, for the purposes of this report include Manure Management and Field Burning of Agricultural Residues.

In terms of quantity, according to the Fourth National Communication of Georgia to the UN Framework Convention on Climate Change, the following data on emissions from these sectors for 2017 are noteworthy:

Table 36. Emissions from the selected sectors in 2017

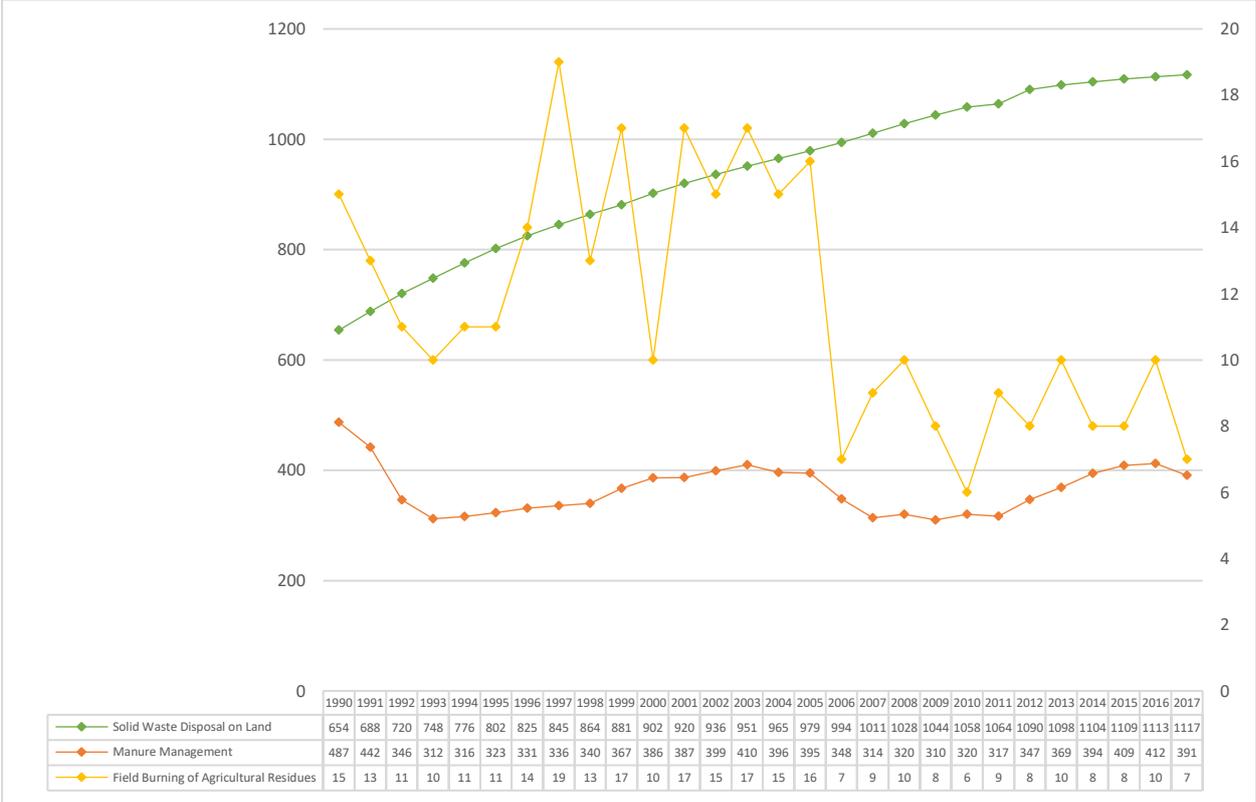
Source	GHG	Gg CO ₂ -eq.
Solid Waste Disposal on Land	CH ₄	1,117.0
Manure Management	CH ₄	51.0
	N ₂ O	340.0
Field Burning of Agricultural Residues	CH ₄	5.0
	N ₂ O	2.0

With regard to waste management, it should be noted that these calculations are made for waste disposed of at landfills. At the same time, as shown in this report, the country's coverage of waste management services is 64%. Accordingly, emissions from the waste management sector are likely to be relatively higher than shown in these calculations.

The diagram below shows the greenhouse gas emissions from these sectors in 1990-2017⁹⁷

⁹⁷ Source: Fourth National Communication of Georgia to the UN Framework Convention on Climate Change

Figure 49. Emissions from the Agriculture and Waste Sectors in 1990-2017 (Gg CO₂eq)



The measures presented in the report will have a significant impact on both climate change mitigation and adaptation. The nature of these impacts is described below.

Mitigation

Closing and remediation of dumpsites will significantly reduce greenhouse gas emissions from the waste sector since emissions from dumpsites account for the bulk of emissions from the sector. Environmentally-sound disposal of waste, especially of the organics stream which mainly releases methane while degrading, will also significantly affect the reduction of emissions.

Enhancing municipal cleaning services' planning and implementation capacity will lead to optimizing waste transportation routes. This means that the lengths of the routes will be reduced, they will also be optimized, and the period of standing in traffic jams will probably be reduced. Ultimately, this leads to a reduction in GHG emissions from waste transportation.

In addition, the improvement of agricultural biodegradable waste management practices, which will inevitably be related to the elimination of field burning practices of agricultural residues, will have a double effect – On the one hand, greenhouse gas emissions will be reduced (mitigating effect). On the other hand, avoiding burning will help preserve the quality of the soil (which is significantly damaging by burning), and therefore this measure will also have an adaptive effect.

Adaptation

It is known that the process of climate change will have a significant impact on the nature and scale of disasters caused by natural hazards. One of the most important risks in Georgia is the threat of mudflows, including the country's relatively small ravines. At the same time, local communities often use such ravines for burying waste (especially construction waste). This waste closes ravines and, in conditions of abundant rainfall, cannot carry the incoming water, which accumulates. Eventually, after accumulating large water masses, strong mudflows are generated, which are often destructive (including human casualties). Due to climate change, which is mainly manifested in the change of the

precipitation regime (the amount of extreme precipitation will increase), these processes can appear as even more powerful disasters. Consequently, the C&D waste management improvement measures and remediations and closure of dumpsites, proposed under the report, will significantly reduce these risks and facilitate adaptation to climate change.

The measures presented for identification of plastic waste leakages and management are also important to prevent clogging of drain or canals which could result in flooding.

6 Operational Road Map and Investment Plan

- The EU Association Agreement initiates many standalone actions by many donors/IFI's with limited coordination.
- Activities focus mainly on Municipal Solid Waste Management in selected cities, landfills, and development of national legislation.
- Efficient and effective waste management development should consider five elements—i.e. legislation/policy, institutional, financing, communications/public participation, and operations—including infrastructure. These five elements are always interconnected.
- **This requires an integrated and holistic approach whereby municipalities are the key to successful MSWM and implementing the NWMS.**

The following road map of system (legal/regulatory and policy), institutional, financial, and operational measures/package of measures—with associated approximate costs/cost ranges—are suggested to meet existing needs and overcome key challenges in the management of MSW, ABPs, and biodegradable waste generated by non-municipal sectors. The measures are divided into short-term interventions covering 2021-2025 and medium- to longer-term interventions covering 2026-2030 and beyond. Government and/or ongoing/upcoming donor initiatives that will partially or fully cover the needs, are indicated in the comment column of the matrix.

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
Package of short-term measures (2021-2025)								
	Substandard performance by local municipalities due to inadequate planning, weak implementation capacities, or insufficient resources: Poor MSW collection and street cleaning coverage, especially in rural areas; absent or limited separation; waste dumping with	Improvement of municipality cleaning services by enhancing planning and implementation capacities, including capacities for financial management Measure: Implementation of a capacity-building program for municipalities in MSWM planning and implementation through	Institutional	Capacity-building: local municipalities Pilot project: selected region	Regional WM Plan with: Investments for short-term improvements Long-term investments including collection equipment,	Capacity-building: 500,000 Pilot project: 375,000	Responsible: MEPA/EIEC Cooperating parties: municipalities, TA international consultants, NGOs	MSWM planning capacity development may be covered under the upcoming 3-year EU TA project, or other donor funded activity. Waste prevention and recycling strategies are being developed

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
	health and environmental risks due to poor law enforcement and insufficient coverage; lack of financing due to weak fee imposition or collection; depreciated equipment; weak planning or implementation capacities; poor waste accounting and lack of critical data; poor knowledge and capacities of MSW cleaning services and LSGs in MSWM planning, monitoring, reporting, PR and communications; weak accounting	<p>trainings (including the online certification course already developed) and experience-sharing events (study visits, intermunicipal forums, etc.)</p> <p>Indicators: CB program developed (yes/no); Number of municipalities trained; Number of trainings delivered</p> <p>Measure: Implementation of at least one pilot project on: i) efficiency assessment and improvement for municipalities of a selected region(s) ii) development of a regional separate collection and recycling strategy for selected region(s)</p> <p>Indicators: Number of pilot projects related to efficiency implemented; Number of recycling strategies piloted.</p>			<p>regional landfill, transfer stations, sorting lines, dump closure, capacity-building</p> <p>The regional plan can be used for other regions</p>			<p>for Achara and Tbilisi with EBRD financial support.</p> <p>Preparatory works for the improvement of MSW transportation and disposal infrastructure (by building regional sanitary landfills and transfer stations) are ongoing under the EBRD and KfW financed regional solid waste management projects. Measures accompanying these projects include— among other things, capacity-building of local municipalities. For Tbilisi EBRD has allocated additional credit lines for improving collection and transportation</p>

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
								infrastructure, and recycling strategies for Achara and Tbilisi will also inform the EBRD's financial decision on waste collection, transportation, and treatment improvement.
	Absent comprehensive dumpsite inventory or closure and remediation plans for the majority of municipalities; poor or absent law enforcement to combat dumping and littering	<p>Creation of a detailed database and plans for dumpsite closure and remediation</p> <p>Measure: Comprehensive inventory of all municipality dumpsites and creation of GIS-compatible databases</p> <p>Indicator: Detailed inventory and GIS database developed and adopted (yes/no)</p> <p>Measure: Dumpsite closure and remediation plans for selected municipalities/regions</p>	Research, institutional	<ul style="list-style-type: none"> • Inventory: municipalities • Dumpsite management plans: selected municipalities/Regions • CB of law enforcement units (structural departments) of local municipalities. 	Basis for closure and remediation of dumpsites created	500,000	<p>Responsible:</p> <p>For inventories: municipalities</p> <p>For dumpsite closure and remediation plans for selected municipalities/regions: selected municipalities</p> <p>For Capacity-building of municipality enforcement units – MEPA/Environmental Supervision Department</p>	Development of dumpsite closure and remediation plans for Batumi and Kobuleti is covered by the EBRD Achara Solid Waste Management Due Diligence Project

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
		<p>Indicator: Number of dumpsite closed and remediation plans developed</p> <p>Measure: Capacity-building of municipality enforcement units to combat waste dumping and littering</p> <p>Indicators: Number of capacity building activities delivered; Number of municipalities covered by CB events; Number of municipal staff trained; Number of municipalities carrying out law enforcement of dumping</p>					<p>Cooperating parties: international TA consultants, NGOs, IFIs</p>	
	Absent technical regulations/methodology on closing and remediation of dumpsites	<p>Introduction of an international standard-based methodology for dumpsite closure and remediation</p> <p>Measure: Preparation and adoption of a methodology on dumpsite closure and remediation and training of municipalities in its application</p>	Legal/regulatory	National	Adopted methodology for dumpsite management	<20,000	<p>Responsible: MEPA</p> <p>Cooperating parties: MRDI, municipalities, donor projects</p>	

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
		Indicators: Methodology adopted (yes/no); Number of municipalities trained in the application of the approved methodology; Number of municipalities with dumpsite closure methodology applied.						
	Weak financial position of local municipalities; State dependency reduces initiatives.	Greater municipality autonomy in financing MSWM activities Measure: A legal/institutional study to assess the impacts Indicator: A legal/institutional study to assess the impacts prepared (yes/no)	Legislative; institutional	National	Financial autonomy, Commercialized activities	185,000	Responsible: MEPA Cooperating parties: MRDI, municipalities, donor projects	
	Existing landfills not meeting EU sanitary landfill requirements	Construction of EU compliant sanitary landfills and proper closure of the existing ones starting from 2024 Measure: Carrying out preparatory works for construction of new regional sanitary landfills Indicator: Feasibility studies, conceptual and	Policy/planning, investments	Regional	Basis for proper closure and remediation of existing non-compliant landfills and construction of new	> 8,000,000	Responsible: SWMCG; Achara Solid Waste Management Company, TSG Cooperating parties: MRDI, MEPA, International and local consultancy firms; EBRD and	Preparatory works for construction and commissioning of new EU-compliant sanitary landfills are currently ongoing with EBRD and KfW support.

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
		<p>detailed designs for regional landfills adopted (yes/no)</p> <p>Measure: Preparation and impelmentation of closure and remediation plans for existing landfills (e.g. Batumi, Samtredia)</p> <p>Indicator: Number of plans for closure of the existing landfills prepared; Number of existing landfills closed and remediated.</p>			sanitary landfills		KfW regional solid waste projects, other IFIs.	
	Lack of proper regulations for EPR (e.g., on packaging, calculation of EPR targets, costs, etc.); inadequate or absent governance structure for EPR (no EPR unit within the MEPA, no PROs, etc.); little or no knowledge or capacities of GoG and businesses in the EPR concept, organizational structure, implementation mechanisms—including	<p>Setting of proper legal-regulatory, institutional and operational mechanisms for EPR implementation, knowledge-building, and operational capacity-building of government institutions and businesses at the central and local levels</p> <p>Measure: Adoption of a packaging regulation; adoption of technical guidance documents on</p>	Legal/regulatory, policy, institutional	National, regional	Effective implementation of EPR and reduction of quantities of EPR streams at landfills	300,000	<p>Responsible: MEPA</p> <p>Cooperating parties: EU technical cooperation, NGOs, producers and distributors, general public and media</p>	<p>Some aspects of EPR (e.g., capacity-building, etc.) will be covered under the upcoming EU technical assistance program.</p> <p>Overall, CB programs shall result in improved business planning processes, monitoring and evaluation systems,</p>

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
	monitoring, reporting, law enforcement, negotiations, and contract management, etc.	<p>EPR target calculation, cost assessment, etc.</p> <p>Indicators: Packaging regulation adopted (yes/no); Technical documentation on EPR target calculations, cost assessment adopted (yes/no)</p> <p>Measure: Development and implementation of an EPR institutional-strengthening program for the government. For example, designing and establishing a separate EPR unit at MEPA and building its capacity as well as the capacity of the Environmental Supervision Department; building the knowledge and capacities of municipalities in EPR concepts, existing EPR legislation, and municipalities' role in it.</p> <p>Indicators: EPR unit at MEPA established and operational (yes/no); Number of trainings delivered to the MEPA</p>						calculation of national targets and how to meet them, law enforcement practices and enhanced public awareness.

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
		<p>staff; Number of trainings delivered for the municipalities; Number of municipal staff trained.</p> <p>Measure: Preparation and implementation of EPR capacity-building programs for businesses together with awareness raising campaign for public and media;</p> <p>Indicators: Capacity building program for businesses developed and implemented (yes/no); Number of businesses representatives trained; Number of EPR topics covered by the trainings; Number of PROs established/authorized and operational; Number of media coverages/outreach products developed and delivered to public.</p>						
	No quality assurance and control (QA/QC) mechanisms for MSWM	Establishing proper regulatory and institutional mechanisms for the QA/QC of MSWM	Legal/ regulatory and institutional	National	Improved quality of MSWMPs, improved	100,000	<p>Responsible: MEPA</p> <p>Cooperating parties: MRDI,</p>	UNDP/PMCG PMS project is working on introducing the PMS system in 39

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
	planning and implementation	<p>planning, performance monitoring, and reporting processes</p> <p>Measure: Revision of the MWMP approval procedure to enable MEPA to formally endorse mandatory municipal plans as a precondition for formal approval of such plans by the local councils (Sakrebulos)</p> <p>Indicator: Revision of the MWMP approval procedure enhanced allowing MEPA to endorse mandatory mandatory municipal plans before their adoption by the local councils (yes/no)</p> <p>Measure: Establishment of MWMP quality assessment criteria</p> <p>Indicator(s): MWMP quality assessment criteria adopted (yes/no)</p> <p>Measure: Development and adoption of technical regulations on PMS for MSW collection and street</p>			performance, monitoring and reporting		municipalities, UNDP/PMCG project, NGOs, other IFIs.	municipalities. Further interventions are needed for replication and upscaling, as well as making results sustainable

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
		<p>cleaning—with KPIs, targets, monitoring and reporting procedures, and a methodology for calculating baseline values; KPIs and targets should be linked with a national strategy and action plan as well as with MWMPs</p> <p>Indicator: Technical regulations on PMS for MSW collection and street cleaning adopted (yes/no)</p>						
	Coordination between stakeholders; consultation between regulator and implementer	<p>Creation of an Association of Municipalities</p> <p>Measure: An inventory of main municipalities—including organizational structure, tasks description, costs, and financing.</p> <p>Indicator: Inventory of municipalities with recommendations on creating inter-municipal cooperation mechanisms developed (yes/no)</p>	Institutional	National Regional	Discussion partner for MEPA, practical impact assessment of any new legislation	100,000	<p>Responsible: MEPA</p> <p>Cooperating parties: MRDI, municipalities, NGOs, IFIs</p>	

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
	Reliable information needed for decision-making; no database management or information analysis	<p>Establishing integrated IMS and DB with relevant meta-databases within MEPA/EIEC and building operational capacities of all stakeholders</p> <p>Measure: Preparation of detailed needs assessment study; design of an IMS/DB architecture for its implementation</p> <p>Indicator: Unified solid waste IMS/DB with metadatabases prepared (yes/no)</p>	Institutional	National	Improved database management leading to informed decision-making	1,000,000	<p>Responsible: MEPA/EIEC</p> <p>Cooperating parties: local municipalities, SWMCG, Achara Solid Waste Management Company, NGOs, IFIs</p>	This topic will be partially addressed by the upcoming 3-year EU technical assistance project
	Weak integration of circular economy principles into existing laws and policies; weak capacities of stakeholders—including GoG and businesses—in understanding and application of circular economy principles	<p>Establishing a circular economy policy framework</p> <p>Measure: Assessment of the circularity of Georgia’s economy, development of a circular economy strategy, and support in its implementation through awareness raising and training of key stakeholders, and by implementing pilot projects.</p>	Legal/regulatory, policy	National	Better integration of circular economy considerations into existing laws and policies and improved implementation capacities	150,000	<p>Responsible: inter-agency coordination body and MEPA</p> <p>Cooperating agencies: Line ministries, businesses, NGOs, IFIs (Sida Keep Georgia Tidy)</p>	<p>Circular economy strategy development is supported by Sida’s “Keep Georgia Tidy” project. There will be a need to support its implementation</p> <p>NWMS is under the review and revision under the</p>

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
		<p>Indicators: Circular economy strategy adopted (yes/no); Number of stakeholders trained in circular economy topics; Number of awareness raising campaigns; Number of circular economy projects piloted.</p> <p>Measure: Revision and update of NWMS & NWMAP to include realistic waste prevention, reuse and recycling targets for key MSW streams— including dry recyclables and biowaste</p> <p>Indicator: Realistic waste prevention, reuse and recycling targets for key MSW streams — including dry recyclables and biowaste adopted (yes/no)</p>						EU4 Environment project
	River and marine pollution by plastic waste; absent database and upstream policy	Identification of the main pollution sites along the major rivers and establishment of an upstream policy framework	Research, Policy, institutional, Equipment	Research: site-specific Policy: national	Reduction of river and marine pollution	1,000,000	<p>Responsible:</p> <p>For the development of drone surveys; site visits to pollution centers to assess their</p>	Development of a national plastic waste prevention program is ongoing under the Government of Norway/CENN

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
		<p>Measure: Development of drone surveys; site visits to pollution centers to assess their shortcomings</p> <p>Indicators: Number and geographic scale of (drone) surveys; Number of field assessments; Current data on marine pollution with plastic available (yes/no)</p> <p>Measure: Preparation of a national program/action plan to combat plastic pollution—including an investment plan for tackling plastic pollution</p> <p>Indicator: National program and action plan to combat plastic pollution—including an investment plan for tackling plastic pollution adopted (yes/no)</p> <p>Measure: Capacity-building of enforcement agencies and national laboratories in compliance assurance monitoring and control of single-use</p>					<p>shortcomings: MEPA/National Environmental Agency; research and academic institutions; NGOs (e.g. Black Sea Ecoacademy);</p> <p>For the development of a national program/action plan to combat plastic pollution—including an investment plan for tackling plastic pollution: MEPA</p> <p>For capacity-building of enforcement agencies and national laboratories in compliance assurance monitoring and control of single-use plastic bag restrictions: IFIs</p>	initiative in cooperation with MEPA

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
		<p>plastic bag restrictions, coupled with improvements of laboratory infrastructure</p> <p>Indicators: Number of CB events delivered, Number of beneficiaries of CB activities, Number of administrative proceedings resulting in the prevention of single use plastic bags; Number of laboratories upgraded.</p>					<p>Cooperating parties: MRDI/SWMCG, municipalities, laboratories, Customs Department, NGOs, IFIs</p>	
C&D waste	No accounting or missing data; absent C&D landfills; no regulated collection; no dedicated disposal; poor or absent law enforcement	<p>Establishment of an effective and efficient C&D management system</p> <p>Measure: Preparation of gap analysis and an investment plan, market research, and a feasibility study for municipal cleaning services/waste collecting companies and other private entities providing C&DW collection and disposal services to construction/development companies and residential customers. Preparation of pre-/feasibility studies for</p>	Policy, institutional	National	Commercialized municipal services generating additional income	150,000	<p>Responsible: MEPA in cooperation with donors/ project(s)</p> <p>Cooperating parties: municipalities, MRDI/SWMCG, NGOs, research institutions, international TA consultants</p>	

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
		<p>establishing regional landfills and/or recycling facilities to be co-managed by intermunicipal alliances/associations and/or by SWMCG.</p> <p>Indicators: Gap analysis and investment plan, based on the market research and including a feasibility study for municipal cleaning services/waste collecting companies or other private entities providing C&DW collection and disposal services to construction/development companies and households (yes/no); Pre-/feasibility studies for establishing regional landfills and/or recycling facilities to be co-managed by intermunicipal alliances/associations and/or SWMCG prepared (yes/no)</p>						

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
HMW	No separate collection; no database; no national policy	National inventory of HMS generation, collection, and disposal; an inventory of treatment facilities Measure: Preparation of a National Master Plan on waste types, quantities, collection, and processing—including required legal and institutional aspects and cost assessment. Indicator: National Master Plan on waste types, quantities, collection, and processing—including required legal and institutional aspects and cost assessment prepared (yes/no)	Policy, institutional	National	A national system with a potential for the private sector involvement	500,000	Responsible: MEPA Cooperating parties: MRDI, municipalities, donors/donor projects, NGOs, research institutions	EBRD will support EUR 10 M investment project for establishing a HWM system in Georgia, which will support establishment of an organized collection, transportation, and treatment/disposal (incineration/land filling) system for HWs
ABPs and derived products	No regulated collection and handling; no database; no national policy; absent or weak capacities of relevant authorities and business operators	National inventory to set the baseline for waste generation, current disposal and processing practices, gap analysis, policy framework. Strengthening of implementation capacities and the provision of	Policy, institutional, Equipment	National	Basis for a national system with the potential for the involvement of the private sector	1,000,000	Responsible: MEPA/National Food Agency Cooperating parties: laboratories, Customs Department of Revenue Service	EBRD will support EUR 10 M investment project for establishing a HWM system in Georgia, which will support setting of an organized

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
		<p>laboraty equipment for improved laboratory analysis and inspection.</p> <p>Measure: A comprehensive inventory of all ABPs by type and source, and establishment of a national ABP DB</p> <p>Indicator: Detailed ABP inventory and DB completed (yes/no)</p> <p>Measure: A National Master Plan with market assessment, required legislation, institutional arrangements—especially the involvement of the private sector, collection system, processing technologies, costs, and financing</p> <p>Indicator: A National Master Plan with market assessment, required legislation, institutional arrangements available (yes/no)</p> <p>Measure: Capacity-building in laboratory analysis of enforcement</p>					of Ministry of Finance; businesses, media, donors/donor projects	collection, transportation and treatment/disposal system for HWs. Management of Category 1 and 2 ABPs may also be integrated into this system

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
		<p>agencies and business operators in ABPR, and an upgrade of laboratory infrastructure</p> <p>Indicators: Number of CB activities completed; Number of CB beneficiaries; Number of laboratories upgraded.</p>						
Biodegradable wastes generated by non-municipal sectors (forestry, agriculture)	No regulated collection and treatment; no database; no national policy	<p>A national inventory of waste generators, current disposal and processing, gap analysis; policy framework, and improvement of implementation capacities</p> <p>Measure: A comprehensive inventory of all biowaste and establishment of a relevant DB</p> <p>Indicator: Comprehensive inventory and DB on biowastes available (yes/no)</p> <p>Measure: A National Master Plan including a market assessment, required legislation,</p>	Policy, institutional	National	Basis for a national system for biodegradable waste management	500,000	<p>Responsible: MEPA, including National Forest Agency</p> <p>Cooperating parties: municipalities, farmers, IFIs (e.g. FAO, EU ENPARD), NGOs</p>	<p>Biowaste objectives, targets, and relevant actions are currently being integrated in the National Waste Strategy and Action Plan under the EU4 Environment project</p> <p>Subsector assessments for agriculture biowaste will be conducted under the ongoing EU4 Environment project</p>

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
		<p>institutional arrangements—especially the involvement of the private sector, a collection system, processing technologies, costs, and financing</p> <p>Indicator: Master Plan, with associated investment program prepared (yes/no)</p> <p>Measure: Capacity-building of relevant authorities and business operators in the collection and treatment (recycling, energy recovery, etc.) of biodegradable waste</p> <p>Indicators: Number of CB activities for authorities and business operators; Number of beneficiaries of CB activities.</p>						
Package of medium to longer-term measures (2026-2030 and beyond)								
MSW	Poor integration of circular economy principles into Georgia's	Measure: Implementation support for a circular economy strategy	Policy, institutional	National	Circular economy principles are well	>1,000,000	Responsible: MEPA and interagency coordination body	

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
	laws, policies, and practices	Indicator: Number of circular economy promotion initiatives completed, including waste prevention initiatives.			integrated into Georgia's economy		Cooperating parties: line ministries, business, municipalities, businesses, NGOs, media, IFIs	
	No EPR system	Measure: Implementation support to EPR—including market support Indicators: Number of effective separate collection and recycling schemes of specific waste streams subject to EPR prepared; EPR targets achieved (percentage).	Policy, institutional, financial	National	Quantities of specific waste streams subject to EPR are reduced, national EPR targets are met	>500,000	Responsible: MEPA in cooperation with municipalities Cooperating parties: producers and distributors NGOs, donors/donor projects, media	New EU TA will assist GoG in implementing EPR regulations in Georgia
	Present multiple dumpsites	Measure: Implementation of dumpsite closure and remediation plans Indicator: Number of dumpsites cleaned up and remediate	Structural	Municipalities	Reduced waste in the environment, reduced riverine and/or marine water pollution, enhanced environmental status and aesthetic	>5,000,000	Responsible: local municipalities Cooperating parties: MEPA, MRDI, IFIs	EBRD will provide loan financing for dumpsite closure and remediation for Batumi and Kobuleti municipalities

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
					value of landscapes			
	Disintegrated, ineffective, and inefficient MSWM system	<p>Support to the development and implementation of an integrated solid waste management system, by:</p> <p>Measure: Improving MSW collection, transportation, and disposal infrastructure and facilities</p> <p>Indicators: MSW collection rate and disposal rate; Number of newly built and effectively operated transfer stations and EU compliant sanitary landfills; Number of MRFs and MBTs; Quantities (t/y) of wastes, including biodegradable wastes diverted from landfills.</p> <p>Measure: Developing waste prevention and recycling strategies and investment plans—including those for separate collection and treatment—and</p>	Policy, institutional, structural	Regions	Reduced waste at landfills, decreased environmental impacts, increased revenues	>100,000,000 (including biological waste treatment)	<p>Responsible: municipalities</p> <p>Cooperating parties: MRDI, MEPA, donors, donor projects, private sector/PROs</p>	Investments for Tbilisi, Achara, and other regional waste disposal and transportation infrastructure (transfer stations) have already been mobilized from EBRD and KfW

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
		<p>mobilizing investments for their implementation</p> <p>Indicators: Number of regions having waste recycling strategies; Number of regions implementing waste recycling strategies.</p>						
	Poor intermunicipal co-operation	<p>Measure: Support the establishment and capacity-building of intermunicipal associations</p> <p>Indicators: Number of regions having inter-municipal alliances; Number of inter-municipal alliances co-managing separate collection and recycling schemes</p>	Institutional	Regional	Suitable institutional mechanism for MSWM	100,000	<p>Responsible: For establishment of associations – municipalities</p> <p>For capacity building – MEPA</p> <p>Cooperating parties: MRDI, donors/donor projects</p>	
	Low financial autonomy	<p>Measure: Support for decentralization and increased efficiency of municipal services through capacity building, revising fee collection schemes to enable municipalities to retain revenues for adequate spending</p>	Legal-regulator, Institutional	Municipalities	Increased autonomy of municipalities	300,000	<p>Responsible: For legal and institutional changes – MRDI, Ministry of Finance, Parliament of Georgia</p>	

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
		<p>Indicators: Legal-regulatory, policy and institutional reforms promoting improved cost-recovery practices completed (yes/no)</p>					<p>For capacity building – MEPA in cooperation with donors/donor projects</p> <p>For implementation – municipalities</p> <p>Cooperating parties: IFIs, NGOs, general public, media</p>	
	River and marine water littering with plastic waste	<p>Measure: Support for the implementation of a plastic waste prevention program and an action plan to reduce marine littering</p> <p>Indicators: Number of implemented measures/initiatives in support of preventing/curbing of marine littering; Number of administrative proceedings against plastic dumping and littering.</p>	Legal/policy, institutional, structural	Coastal Municipalities	Reduced marine littering	>1,000,000	<p>Responsible: MEPA, municipalities, SWMCG/MRDI</p> <p>Cooperating parties: NGOs, academia, consultancies, media</p>	

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
HMW	Absent organized management system for hazardous waste, including HMW	<p>Measure: Establish a HWM system covering waste collection, transportation, and disposal/treatment infrastructure</p> <p>Indicators: Number of municipalities/regions with HWM separate collection, storage, transportation, disposal/treatment facilities (yes/no); HWM collection coverage rate; NWM treatment rate.</p>	Structural	National, regions	Present organized HMWM system, reduced quantities of HMWs in landfills and/or the environment; improved health and environment quality	10,000,000	<p>Responsible: SWMCG and municipalities</p> <p>Cooperating parties: MEPA, MRDI, The Ministry of Internally Displaced Persons from the Occupied Territories, Health, Labour and Social Affairs of Georgia; business operators; IFIs, NGOs.</p>	EBRD is planning to make EUR 10 M investment to establish a HWM system in Georgia
ABPs	Absent organized management system for ABPs; absent ABP registry.	<p>Measure: Implementation support to establish ABPM system, covering regular inventory of waste, and registration system, laboratory analysis and inspection system and waste collection, transportation and handling infrastructure</p> <p>Indicator: Detailed ABP inventory, registry and DB</p>	Structural; institutional.	National, regional	Present organized ABPM system; reduced quantities of ABPs in landfills and/or environment; improved health and	> 10,000,000	<p>Responsible: SWMCG and municipalities</p> <p>Cooperating parties: MEPA, MRDI, Ministry of Health, business operators</p>	EBRD is planning to make EUR 10 M investment to establish a HWM system in Georgia. Among various HW streams, first and second category of ABPs may be covered by the intervention

Stream	Main shortcomings	Measures and Indicators	Type of Intervention	Impact Scale	Intended Result	Estimated costs (USD)	Responsible	Comment
		available (yes/no); International-standard based laboratory network available (yes/no); Number of municipalities/regions with ABP collection, storage and handling infrastructure; Quantities of ABPs collected and properly handled.			environment quality			
Biowaste (non-municipal)	No organized management system for biowaste; no registry	<p>Measure: Support for the establishment of a biowaste system— including collection, transportation and handling infrastructure, and a registry.</p> <p>Indicators: Detailed biowaste inventory and DB available (yes/no); Number of municipalities/regions with biowaste collection and treatment infrastructure; Quantities of non-municipal collected and treated</p>	Policy, institutional, structural	National, regions	Present organized biowaste management system, reduced quantities of biowaste in landfills and/or the environment, improved health and environmental quality	5,000,000	<p>Responsible: SWMCG and municipalities</p> <p>Cooperating parties: MEPA, MRDI, Ministry of Health,</p>	

ANNEX 1: Estimate cost/ton

Municipality	Population			Waste Collected 2019 (tons)			Type ¹	Cost (GEL)	Cost/ton
	Total	Urban	Rural	Total	Urban	Rural			
Rustavi	128,299	128,299	n/a	31,213.90	31,213.90	n/a	urban	2,614,921.00	83.77
Marneuli	106,800	22,700	84,100	14,915.50	7,394.90	7,520.60	mix	1,264,347.00	84.77
Bolnisi	55,400	14,300	41,100	6,621.30	4,371.10	2,250.20	urban	1,283,869.00	193.90
Dmanisi	20,400	2,800	17,600	2,556.10	757.30	1,798.70	rural	210,639.00	82.41
Tetritskaro	22,000	5,300	16,700	4,017.90	1,547.60	2,470.30	rural	635,221.00	158.10
Gardabani	80,788	11,324	69,464	10,483.90	4,876.90	5,607.10	mix	934,722.00	89.16
Tsalka	19,400	3,700	15,700	2,082.10	936.00	1,146.10	mix	322,239.00	154.77
Mtskheta	53,592	7,595	45,997	14,110.70	2,802.40	11,308.30	rural	842,911.00	59.74
Tianeti	10,087	3,234	6,853	1,846.10	913.60	932.50	mix	192,912.00	104.50
Dusheti	26,151	6,681	19,470	5,932.20	1,975.20	3,956.90	rural	705,091.00	118.86
Kazbegi	3,806	1,412	2,394	2,827.70	2,355.80	471.90	urban	644,886.00	228.06
Akhalgori	no data	no data	no data	no data	no data	no data			
Kutaisi	138,200	138,002	n/a	46,993.60	46,993.60	n/a	urban	8,173,008.00	173.92
Tskaltubo	49,000	9,700	40,000	6,840.20	2,602.30	4,237.90	rural	871,890.00	127.47
Vani	22,300	3,600	18,700	2,847.90	1,005.00	1,842.90	rural		
Samtredia	45,015	25,110	19,905	13,165.50	10,127.50	3,038.00	urban	500,970.00	38.05
Zestaphoni	56,031	22,244	33,787	15,105.30	10,480.70	4,624.60	urban	547,760.00	36.26
Terjola	32,600	4,800	27,800	6,944.50	1,717.00	5,227.50	rural	2,294,136.00	330.35
Bagdati	19,300	3,300	16,000	3,573.80	944.30	2,629.50	rural	407,699.00	114.08
Tkibuli	18,800	9,200	9,600	3,387.90	2,652.10	735.80	urban	201,558.00	59.49
Sachkhere	35,825	5,853	29,972	8,712.40	1,922.70	6,789.70	rural	467,600.00	53.67
Chiatura	38,957	12,620	26,337	3,885.30	2,948.00	937.30	urban	758,245.00	195.16
Khoni	21,800	8,500	13,300	3,057.60	1,828.90	1,228.70	mix	467,585.00	152.93
Kharagauli	18,900	1,900	17,000	1,885.60	459.80	1,425.80	rural		
Poti	41,600	41,600	n/a	16,059.60	16,059.60	n/a	urban	914,956.00	56.97
Zugdidi	101,815	41,961	59,854	28,482.00	17,995.60	10,486.40	urban	4,443,700.00	156.02
Martvili	32,184	4,242	27,942	3,129.70	111.8	2,014.90	rural	326,764.00	104.41
Senaki	36,040	19,315	16,725	6,065.70	4,665.90	1,399.80	urban	375,430.00	61.89
Khobi	28,733	3,747	24,986	2,740.30	984.70	1,755.60	rural	276,720.00	100.98
Chkhorotsku	21,710	2,875	18,835	2,008.50	755.60	1,252.90	rural	344,200.00	171.37
Tsalenjikha	24,269	4,699	19,570	2,759.30	1,457.90	1,301.50	mix	602,340.00	218.29
Mestia	9,479	7,501	1,978	4,396.90	4,343.30	53.70	urban	773,910.00	176.01
Abasha	20,341	4,657	15,684	3,075.20	1,821.50	1,253.70	mix	295,120.00	95.97
Ambrolauri	10,643	2,017	8,626	1,942.10	678.40	1,263.70	rural	336,124.00	173.07
Oni	5,778	2,600	3,178	1,733.70	887.10	846.50	mix	288,775.00	166.57
Tsageri	9,105	1,197	7,908	1,271.40	357.00	914.40	rural	328,700.00	258.53
Lentekhi	4,175	1,011	3,164	357.20	232.50	124.70	urban	206,996.00	579.50
Ozurgeti	60,632	23,417	37,215	12,606.40	6,923.20	5,683.10	urban	533,224.00	42.30
Lanchkhuti	30,501	6,330	24,171	3,577.80	1,755.90	1,821.80	mix	611,641.00	170.95
Chokhatauri	18,263	1,679	16,584	3,167.60	441.20	2,726.30	rural	292,130.00	92.22
Total	1,437,519	615,522	822,499	301,646.90				35,292,939.00	117.00

¹ Type based on dominant waste collection activity (quantities collected)

ANNEX 3: Collection Cost Breakdown

2019 Municipality	Population	Tons/Year	Wages		Fuel		Tyres		M&R		Insurance		Other		Overhead ¹		total
			GEL	%	GEL	%	GEL	%	GEL	%	GEL	%	GEL	%	GEL		
Rustavi	128,299	31,213.90	1,145,094.00	80.62	145,300.00	10.23			37,200.00	2.62					92,728.20	6.53	1,420,322.20
Marneuli	106,800	14,915.50	382,000.00	48.91	129,500.00	16.58			93,950.00	12.03			64,900.00	8.31	110,698.20	14.17	781,048.20
Bolnisi	55,400	6,621.30	351,880.00	53.29	137,950.00	20.89			74,690.00	11.31					95,760.00	14.50	660,280.00
Dmanisi	20,400	2,556.10	34,056.00	33.87	32,527.00	32.35			14,239.00	14.16					19,732.80	19.62	100,554.80
Tetritskaro	22,000	4,017.90	152,850.00	34.38	153,972.00	34.63			20,099.00	4.52					117,660.00	26.47	444,581.00
Tsalka	19,400	2,082.10	43,650.00	38.43	41,700.00	36.72			4,240.00	3.73					23,981.40	21.12	113,571.40
Mtskheta	53,592	14,110.70	225,000.00	32.90	309,841.00	45.31			96,670.00	14.14					52,320.00	7.65	683,831.00
Tianeti	10,087	1,846.10	43,550.00	46.17	30,102.00	31.91			4,990.00	5.29					15,678.00	16.62	94,320.00
Dusheti	26,151	5,932.20	155,768.00	32.81	169,085.00	35.62			63,800.00	13.44			21,059.00	4.44	65,017.80	13.70	474,729.80
Kazbegi	3,806	2,827.70	230,836.00	48.94	78,971.00	16.74			11,168.00	2.37			46,453.00	9.85	104,283.00	22.11	471,711.00
Kutaisi	138,200	46,993.60	2,324,280.00	73.37	613,485.00	19.37			60,080.00	1.90					169,920.00	5.36	3,167,765.00
Samtredia	45,015	13,165.50	144,060.00	42.34	130,000.00	38.21			30,000.00	8.82			5,800.00	1.70	30,372.00	8.93	340,232.00
Terjola	32,600	6,944.50	230,625.00	18.32	104,185.00	8.28			35,720.00	2.84					888,000.00	70.56	1,258,530.00
Sachkhere	35,825	8,712.40	90,500.00	30.79	103,373.00	35.17			14,376.00	4.89			10,500.00	3.57	75,210.60	25.59	293,959.60
Chiatura	38,957	3,885.30	163,850.00	38.83	100,130.00	23.73			29,300.00	6.94			10,500.00	2.49	118,200.00	28.01	421,980.00
Senaki	36,040	6,065.70	72,000.00	33.31	104,200.00	48.21			15,220.00	7.04					24,726.00	11.44	216,146.00
Khobi	28,733	2,740.30	35,367.00	30.65	18,806.00	16.30									61,230.00	53.06	115,403.00
Chkhorotsku	21,710	2,008.50	34,800.00	34.00	15,000.00	14.65			19,500.00	19.05					33,060.00	32.30	102,360.00
Tsalenjikha	24,269	2,759.30	76,200.00	23.17	73,000.00	22.19			53,600.00	16.29			4,500.00	1.37	121,644.00	36.98	328,944.00
Mestia	9,479	4,396.90	114,000.00	37.89	95,351.00	31.69			28,201.00	9.37					63,288.00	21.04	300,840.00
Abasha	20,341	3,075.20	58,920.00	29.52	65,300.00	32.71			13,000.00	6.51			29,160.00	14.61	33,240.00	16.65	199,620.00
Ambrolauri	10,643	1,942.10	75,300.00	36.61	48,024.00	23.35			8,250.00	4.01					74,130.00	36.04	205,704.00
Oni	5,778	1,733.70	37,440.00	28.30	29,880.00	22.59			3,600.00	2.72			30,835.00	23.31	34,140.00	25.81	132,295.00
Tsageri	9,105	1,271.40	71,840.00	47.83	41,000.00	27.30									37,356.00	24.87	150,196.00
Lentekhi	4,175	357.20	29,280.00	27.07	11,260.00	10.41			1,666.00	1.54			8,428.00	7.79	57,517.20	53.18	108,151.20
Ozurgeti	60,632	12,606.40	128,215.00	29.26	187,258.00	42.73			87,800.00	20.04					34,930.20	7.97	438,203.20
Lanchkhuti	30,501	3,577.80	77,000.00	18.14	161,200.00	37.97			37,377.00	8.80					148,970.40	35.09	424,547.40
Chokhatauri	18,263	3,167.60	75,220.00	30.16	110,490.00	44.31			32,800.00	13.15					30,852.00	12.37	249,362.00
Total	1,016,201	211,526.90	6,603,581.00	48.20	3,240,890.00	23.66			891,536.00	6.51			232,135.00	1.69	2,734,645.80	19.96	13,699,187.80
Cost/ton																	64.76

¹ 60% of total overhead costs

Note: The cost /ton (GEL 64,76) is some lower than the cost/ton (GEL 67,54) in Annex 6.2.

This might be due to inconsistencies between information in the annexes and the main report.

ANNEX 4: Estimate Collection and transport costs

	10km		30km	
	Municipal collection			
Distance to landfill				
Collection system				
Container system	1100.00		1100.00	
inhabitants	40000.00		40000.00	
Generation (kg/cap/day)	0.78		0.78	
waste quantity (tons/year)	11388.00		11388.00	
	urban	rural	urban	rural
Tons/year	7000.00	4350.00	7000.00	4350.00
Collection truck-airvolume m ³	15.00	15.00	15.00	15.00
compaction	3.00	3.00	3.00	3.00
volume/truckx90%(m ³)	40.50	40.50	40.50	40.50
load/truck(500kg/m ³)	6.75	6.75	6.75	6.75
Price truck (GEL)	480000.00	480000.00	480000.00	480000.00
Price container -1100 litre(BGN)	1200.00	1200.00	1200.00	1200.00
Working days/year	260.00	260.00	260.00	260.00
Waste density (kg/m ³)	185.00	185.00	185.00	185.00
weight/container (kg)	162.80	162.80	162.80	162.80
Collection time(minutes)				
Time/shift (minutes)	480.00	480.00	480.00	480.00
Fuelling,etc.	20.00	20.00	20.00	20.00
Garage to collection area	20.00	20.00	20.00	20.00
Lunch break	30.00	30.00	30.00	30.00
Landfill to garage				
Available for collection and transport	410.00	410.00	410.00	410.00
Cycle time truck				
Collection/container(minutes)	5.00	8.00	5.00	8.00
containers/truck	41.46	41.46	41.46	41.46
collection time(minutes)	207.31	331.70	207.31	331.70
transport to landfill (Minutes)	15.00	15.00	45.00	45.00
Unloading at landfill	15.00	15.00	15.00	15.00
transport to collection area	15.00	15.00	45.00	45.00
total(minutes)	252.31	376.70	312.31	436.70
trips/day/truck	1.62	1.09	1.31	0.94
Daily weight/truck (tons)	10.97	7.35	8.86	6.34
Capacity/year/truck	2851.85	1910.16	2303.96	1647.72
Number/trucks	2.45	2.28	3.04	2.64
truck availability	0.80	0.80	0.80	0.80
actual truck number	3.07	2.85	3.80	3.30
containers/day	165.38	102.77	165.38	102.77
filling degree 80%	206.72	128.46	206.72	128.46
Investments (KM)				
Collection trucks	1472726.35	1366374.56	1822945.24	1584010.58
Containers	248062.75	154153.28	248062.75	154153.28

Operational costs

Wages				
1 Driver+2 loadersx1,2=3.6/truck	8.84	8.20	10.94	9.50
wages cost/year/truck	5200.00	5200.00	5200.00	5200.00
drivers/loaders/year(GEL)	45949.06	42630.89	56875.89	49421.13
Total incl.supervisors, etc (20%)	55138.87	51157.06	68251.07	59305.36
Fuel				
km/cycle				

Breakdown MSWM costs Tskaltubo			
Collection	GEL	%	cost/ton
Wages incl.clothing	156250.08	26.90	
Fuel/lubricants	140264	24.15	
M&R	184156	31.71	
Overhead incl office	100122.6	17.24	
sub total	580792.68		84.91
streetcleaning			
wages and clothing	216913.92	67.99	
Fuel and lubricants	35066	10.99	
M&R			
Overhead incl office	67075.40	21.02	
sub total	319055.32		46.65
Total	899848		131.56

Breakdown MSWM costs Tbilisi (GEL)						
2019	Admin	Collection	Cleaning	Landfill	total	
Wages	3562014	11512376	21243973	863522	32756349	
Fuel/lubricants	1818818	7071116		909072	7980188	
M&R		4136573			231368	4367941
Overhead		3750365.43	3520751.22	382690.35	7653807	
Other	2272975	963674	3854889	49257	4867820	
sub total	7653807	27434104.43	28619613.22	2435909.35	58489627	
depreciation		2691076		570844	3261920	
total		30125180.43		3006753.35	61751547	
cost/ton (411,370 t/y)	OPEX	66.69	69.57	5.92	142.18	
cost/inhabitant			24.44			

Comparison collection costs (OPEX)

garage to collection area	10.00	10.00	10.00	10.00
collection route	34.55	55.28	34.55	55.28
To landfill	10.00	10.00	30.00	30.00
to collection area	10.00	10.00	30.00	30.00
Total km/day	242.13	209.37	407.51	312.14
Total km/year	62953.84	54436.38	105952.94	81157.25
Litre (0,4 litre/km)	25181.54	21774.55	42381.17	32462.90
costs/year(GEL 2,5/litre)	62953.84	54436.38	105952.94	81157.25
lubricants (1.5ltr/100km)	5665.85	4899.27	9535.76	7304.15
Tyres				
4/truck;30,000km	8.39	7.26	14.13	16.23
cost(1200 GEL/tyre)	10072.61	8709.82	16952.47	19477.74
M&R				
truck(5%)	73636.32	68318.73	91147.26	79200.53
containers(2%)	4961.25	3083.07	4961.25	3083.07
Total	78597.57	71401.79	96108.52	82283.59
Insurance				
Trucks(0,50%)	7363.63	6831.87	9114.73	7920.05
Sub-total OPEX	210602.57	188910.03	294540.31	247563.92
Miscellaneous(10%)	21060.26	18891.00	29454.03	24756.39
Communications	20000.00	20000.00	20000.00	20000.00
Overhead (15%)	37749.42	34170.15	51599.15	43848.05
Total OPEX	289412.25	261971.19	395593.49	336168.36
Cost/ton (GEL)	41.34	60.22	56.51	77.28
Total OPEX (GEL/ton)	48.58		64.47	
Amortization				
Trucks(8 years,3%)	209716.23	194571.74	259587.40	225563.11
Containers(5 years,3%)	54152.10	33651.66	54152.10	33651.66
Total AMEX	263868.33	228223.40	313739.50	259214.77
Cost/ton (GEL)	37.70	52.47	44.82	59.59
Total AMEX (GEL/ton)	43.36		50.48	
Grand total	553280.58	490194.59	709332.99	595383.12
Cost/ton(GEL)	79.04	112.69	101.33	136.87
Average (GEL/ton) Excl.VAT	91.94		114.95	

OPEX= operational expenses

AMEX= amortization (depreciation and financing costs)

	10km LF	%	Tbilisi	%	Tskaltubo	%	UNDP	%
wages	88579.95	17.82	11512376.00	41.96	156250	26.90	6603581	48.19
Fuel	127955.34	25.74	7071116.00	25.77	140264	24.15	3240890	23.65
M&R	168781.80	33.95	4136573.00	15.08	184156	31.71	891536	6.51
Overhead	71919.58	14.47	3750365.43	13.67	100123	17.24	2734646	19.96
Others	39951.26	8.04	963674.00	3.51			232135	1.69
total OPEX	497187.93		27434104.43		580793		13702788	
Comm	40000.00							
Insurance	14195.50							
	551383.43							
cost/ton	48.58		66.69		84.91		64.78	

Notes:

1. UNDP information is given in Annex 6.3
2. Tskaltubo information is based on KFW Financial Report May 2020
3. Estimates are based on an average municipality in Georgia (40,000 inhabitants and an average waste generation of 0,78kg/cap/day.)

ANNEX 5: Revenues

2019 municipality	population	tons/year	Fees collected		state	municipal
			population	CII	payments	costs (GEL)
Rustavi	128,299	31,213.90	129,362	693,797	2,614,921.00	2,614,921.00
Marneuli	106,800	14,915.50	-		1,264,347.00	1,264,347.00
Bolnisi	55,400	6,621.30	-		1,283,869.00	1,283,869.00
Dmanisi	20,400	2,556.10	-	11,945	211,239.00	210,639.00
Tetritskaro	22,000	4,017.90	-	15,240	635,221.00	635,221.00
Gardabani	80,788	10,483.90	-	44,587	934,722.00	934,722.00
Tsalka	19,400	2,082.10	-		322,239.00	322,239.00
Mtskheta	53,592	14,110.70	9,526	566,390	842,911.00	842,911.00
Tianeti	10,087	1,846.10	-	17,700	192,912.00	192,912.00
Dusheti	26,151	5,932.20	31,624	98,080	705,091.00	705,091.00
Kazbegi	3,806	2,827.70	-	57,000	644,886.00	644,886.00
Akhalgori	no data	no data				
Kutaisi	138,200	46,993.60	393,000	1,674,501	8,173,008.00	8,173,008.00
Tskaltubo	49,000	6,840.20	-		893,814.00	871,890.00
Samtredia	45,015	13,165.50	-	130,700	500,970.00	500,970.00
Zestaphoni	56,031	15,105.30	20,669	69,288	547,760.00	547,760.00
Terjola	32,600	6,944.50	-	77,416	2,294,136.00	2,294,136.00
Bagdati	19,300	3,573.80	21,979	83,431	407,699.00	407,699.00
Tkibuli	18,800	3,387.90	-	21,000	201,558.00	201,558.00
Sachkhere	35,825	8,712.40	15,000	39,000	467,600.00	467,600.00
Chiatura	38,957	3,885.30	-	10,448	758,245.00	758,245.00
Khoni	21,800	3,057.60	-	33,418	723,645.00	467,585.00
Kharagauli	18,900	1,885.60	-			
Poti	41,600	16,059.60	59,417	500,442	914,956.00	914,956.00
Zugdidi	101,815	28,482.00	100,000	460,000	4,443,700.00	4,443,700.00
Martvili	32,184	3,129.70	-	19,390	326,764.00	326,764.00
Senaki	36,040	6,065.70	-	41,000	375,430.00	375,430.00
Khobi	28,733	2,740.30	3,900	23,850	276,720.00	276,720.00
Chkhorotsku	21,710	2,008.50	-	21,400	344,200.00	344,200.00
Tsalenjikha	24,269	2,759.30	-	40,000	602,340.00	602,340.00
Abasha	20,341	3,075.20	2,795	26,198	295,120.00	295,120.00
Ambrolauri	10,643	1,942.10	6,810	26,953	336,124.00	336,124.00
Oni	5,778	1,733.70	4,726	3,700	288,775.00	288,775.00
Tsageri	9,105	1,271.40	1,810	8,199	328,700.00	328,700.00
Lentekhi	4,175	357.20	-	5,700	206,996.00	206,996.00
Ozurgeti	60,632	12,606.40	-	175,285	533,224.00	533,224.00
Lanchkhuti	30,501	3,577.80	9,000	17,000	611,641.00	611,641.00

Chokhatauri	18,263	3,167.60	-	11,000	292,130.00	292,130.00
Total	1,446,940	299,135.60	809,618	5,024,058	34,797,613.00	34,519,029.00
Analysis						
CII		66,697.73		5,024,058		
rev/ton total				75.33	or 15/m³	
households	705914	138393	809618			
rev/pp/yr to be billed			1.15		0.10 per person/month	
receivedhh %			4235484			
			19.12			
costs MoF	34,797,613-(809,618+502,4058)=			28,963,937		
Subsidy MoF %				83.24		

ANNEX 6: Regional Landfill cost estimate (greenfield construction)

Assumptions						
start quantity (tons/year)				57,500		
lifetime 20 years divided into 4 cells of 5 years each						
annual increase: 1,5%						
1st cell				57,500		
				58,363		
				59,238		
				60,127		
				61,028		
Total tons				296,255		
volume (m ³)				423,222		
total storage volume incl covering (m ³)				486,705		
footprint cell 160X300 m				48,000		
Storage density (t/m ³)						0.7
Storage height (m)						20
lifetime first storage cell (years)						5
leachate generation: 45m ³ /day						
service area 160 x50m ²				8,000		
roads,ditches m ²				9,600		
Total land area m ²				65,600		
Civil works						
Description			unit	total units	cost/unit	total(GEL)
clearing and grubing				65,600	10.00	656,000.00
service area			m ²	8,000	200.00	1,600,000.00
access road			m	150	800.00	120,000.00
garage/repairshop incl tools			m ²	250	1,500.00	375,000.00
gas flare,pipes,extraction wells						1,200,000.00
electricity network						300,000.00
water supply system						200,000.00
fence			m	1,000	200.00	200,000.00
gatehouse area			m ²	250	500.00	125,000.00
offices			m ²	200	2,000.00	400,000.00
surface water ditch			m	1,000	400.00	400,000.00
leachate system (SBR),piping ¹			l.s.	1	6,000,000.00	6,000,000.00
monitoring wells (groundwater)				2	30,000.00	60,000.00
sub total civil works(20 years depr)						11,636,000.00
storage cell (5 years depr)			m ²	48,000	275.00	13,200,000.00
grand total civil works						24,836,000.00
Equipment						
Compactor/bulldozer			l.s.	1	1,750,000.00	1,750,000.00
Excavator			l.s.	1	650,000.00	650,000.00
weighbridge			l.s.	2	200,000.00	400,000.00
tractor trailer			l.s.	1	40,000.00	40,000.00

dumptruck				2	240,000.00	480,000.00
leachate pumping station				1		35,000.00
wheels washing				1	100,000.00	100,000.00
Various tools, office, lab				1	40,000.00	300,000.00
Total equipment						3,755,000.00
Total CAPEX						28,591,000.00
Design, engineering,supervision (10%)						2,859,100.00
AMEX/year						
<i>civil works</i>						
Cell (5 years,3%)					2,881,560.00	
Remaining works (20 years,3%)					781,939.20	
<i>Equipment (7 years,3%)</i>					602,677.50	
<i>design, engineering,supervision (10%)</i>					192,131.52	
Total amortization					4,458,308.22	
OPEX/year						
<i>Wages</i>					month	
Landfill manager				1	800.00	9,600.00
Assistant manager				1	700.00	8,400.00
Gatehouse weighbridge operator				2	600.00	14,400.00
Site controller				2	500.00	12,000.00
Drivers				5	500.00	30,000.00
Guard				3	375.00	13,500.00
technician workshop				2	600.00	14,400.00
engineers				2	500.00	12,000.00
administrator				4	550.00	26,400.00
secretary				1	400.00	4,800.00
Sub-total						145,500.00
Surcharge (social charges, clothing,working time)						189,150.00
Overhead head office						37,830.00
<i>Energy</i>						
Bulldozer/Compactor(6hrsx312daysx360kW)				1 ltr=10.6kwh	539,136.00	127,154.72
excavator(6 hours x 312 days x300kw)					449,280.00	105,962.26
site:150kWx10hrsx365days					438,000.00	103,301.89
leachate system (8hrsx15Kwx2=240kwh/day)					87,600.00	20,660.38
Sub-Total						336,418.87
<i>M&R</i>						
Civil works (0,5%)						58,180.00
Equipment(5%)						187,750.00
Sub Total M+R						245,930.00
<i>leachte treatment</i>						574,875.00
<i>Waste covering</i>						
15% of tonnagexGEL30/ton						266,629.81
<i>Insurance equipment</i>						18,775.00
<i>Environmental monitoring</i>						10,000.00
<i>Office</i>	consumeables					25,000.00

	phone, utilities					5,000.00
	Audit					5,000.00
<i>total</i>						35,000.00
<i>taxes</i>						60,000.00
<i>Administration</i>						160,000.00
Total OPEX						1,774,608.68
OPEX cost/ton						29.95
closure cell after 5 years				48,000	70.00	3,360,000.00
Closure cost/ton						11.34
Total AMEX						4,458,308.22
AMEX cost/ton						75.24
Grand total						6,904,916.90
Cost/ton(excl.VAT)						116.54

Note:

CAPEX: capital investment

OPEX: operational expenditure

AMEX: amortization expenditure

¹ Leachate treatment costs is depending on the effluent requirements.

Cost distribution-OPEX	GEL/year	%
Wages	226,980.00	12.79
Fuel	336,418.87	18.96
M&R	245,930.00	13.86
Leachate treatment	574,875.00	32.39
Waste covering	266,629.81	15.02
Insurance	18,775.00	1.06
Monitoring	10,000.00	0.56
Office	35,000.00	1.97
Tax	60,000.00	3.38
Total	1,774,608.68	100.00

ANNEX 7: Estimate Separate Collection and transport costs

Assumption

Total waste generation: 11,388 tons with 7,000 tons urban and 4,350 rural

dry recyclables percentage: 31.5% (co-mingled collection)

separation at source: 50% of dry recyclables resulting in 1,785 tons

	30km		30km	
	mixed waste		dry recyclables	
Distance to landfill				
Collection system				
Container system				
inhabitants		1,100.00		1,100.00
Generation (tons/year)		40,000.00		40,000.00
waste quantity (tons/year)				11,388.00
		9,600.00		1,785.00
	urban	rural	urban	rural
Tons/year	5,935.00	3,665.00	1,100.00	685.00
Collection truck-airvolume m ³	15.00	15.00	15.00	15.00
compaction	3.00	3.00	1.50	1.50
volume/truckx90%(m ³)	40.50	40.50	20.25	20.25
load/truck(500kg/m ³)	6.75	6.75	4.73	4.73
Price truck (GEL)	480,000.00	480,000.00	480,000.00	480,000.00
Price container -1100 litre(GEL)	1,200.00	1,200.00	1,200.00	1,200.00
Working days/year	260.00	260.00	260.00	260.00
Waste density (kg/m ³)	185.00	185.00	85.00	85.00
weight/container (kg)	162.80	162.80	74.80	74.80
<i>Collection time(minutes)</i>				
Time/shift (minutes)	480.00	480.00	480.00	480.00
Fuelling,etc.	20.00	20.00	20.00	20.00
Garage to collection area	20.00	20.00	20.00	20.00
Lunch break	30.00	30.00	30.00	30.00
Landfill to garage				
Available for collection and transport	410.00	410.00	410.00	410.00
<i>Cycle time truck</i>				
Collection/container(minutes)	5.00	8.00	5.00	8.00
containers/truck	41.46	41.46	63.17	63.17
collection time(minutes)	207.31	331.70	315.84	505.35
transport to landfill (Minutes)	45.00	45.00	45.00	45.00
Unloading at landfill	15.00	15.00	15.00	15.00
transport to collection area	45.00	45.00	45.00	45.00
total(minutes)	312.31	436.70	420.84	610.35
trips/day/truck	1.31	0.94	0.97	0.67
Daily weight/truck (tons)	8.86	6.34	4.60	3.17
Capacity/year/truck	2,303.96	1,647.72	1,196.85	825.24
Number/trucks	2.58	2.22	0.92	0.83
truck availability	0.80	0.80	0.80	0.80
actual truck number	3.22	2.78	1.15	1.04
containers/day	140.21	86.59	56.56	35.22

spare (20%)	168.26	103.90	67.87	42.27
Investments (GEL)				
Collection trucks	1,545,597.14	1,334,574.43	551,447.60	498,035.20
Containers	201,908.90	124,683.42	81,447.96	50,719.87
Operational costs				
<i>Wages</i>				
1 Driver+2 loadersx1,2=3.6/truck	9.27	8.01	3.31	2.99
wages cost/year/truck	5,200.00	5,200.00	5,200.00	5,200.00
Costs/year(GEL)	48,222.63	41,638.72	17,205.16	15,538.70
<i>Fuel</i>				
km/cycle				
garage to collection area	10.00	10.00	10.00	10.00
collection route	34.55	55.28	52.64	84.22
To landfill	30.00	30.00	30.00	30.00
to collection area	30.00	30.00	30.00	30.00
Total km/day	345.51	262.99	110.05	88.72
Total km/year	89,832.95	68,377.31	28,612.76	23,066.90
Litre (0,35 litre/km)	31,441.53	23,932.06	10,014.47	8,073.42
costs/year(GEL 2,5/litre)	78,603.84	59,830.15	25,036.17	20,183.54
lubricants (1.5ltr/100km)	6,737.47	5,128.30	2,145.96	1,730.02
<i>Tyres</i>				
4/truck;30,000km	11.98	9.12	3.82	4.61
cost(1200 GEL/tyre)	14,373.27	10,940.37	4,578.04	5,536.06
<i>M&R</i>				
truck(5%)	77,279.86	66,728.72	27,572.38	24,901.76
containers(2%)	4,038.18	2,493.67	1,628.96	1,014.40
Total	81,318.04	69,222.39	29,201.34	25,916.16
<i>Insurance</i>				
Trucks(0,50%)	7,727.99	6,672.87	2,757.24	2,490.18
Sub-total OPEX	236,983.23	193,432.80	80,923.91	71,394.65
Miscellaneous(10%)	23,698.32	19,343.28	8,092.39	7,139.46
Communications	10,000.00	10,000.00	10,000.00	10,000.00
Overhead (15%)	40,602.23	33,416.41	14,852.44	13,280.12
Total OPEX	311,283.79	256,192.50	113,868.74	101,814.23
Cost/ton (GEL)	52.45	69.90	103.52	148.63
Cost/ton mixed/separated		59.11		120.83
Total OPEX (GEL/ton)				68.77
<i>Amortization</i>				
Trucks(8 years,3%)	220,093.03	190,043.40	78,526.14	70,920.21
Containers(5 years,3%)	44,076.71	27,218.39	17,780.09	11,072.15
Total AMEX	264,169.75	217,261.79	96,306.23	81,992.36
Cost/ton (GEL)	44.51	59.28	87.55	119.70
Cost/ton mixed/separated		50.15		99.89
Total AMEX (GEL/ton)				57.93
Grand total	575,453.53	473,454.29	210,174.97	183,806.59

Cost/ton(GEL)	96.96	129.18	191.07	268.33
Average (GEL/ton) Excl.VAT		109.26		220.72
Grand total (GEL/ton)				126.70

OPEX= operational expenses

AMEX= amortization (depreciation and financing costs)

ANNEX 8: Sorting line cost estimate

				Separation at source 50%		25%		50%			
Quantities (2025)											
waste/year(tons)				57500				57500			
Recyclables	total (%)	31.5	18112.50					31.5	18112.50		
separation at source		50%	9056.25			25%	4528.13	50%	9056.25		
Composition											
Paper/Cardboard(%)		11	3162.50				1581.25	11	3162.50		
Plastics(%)		14.5	4168.75				2084.38	14.5	4168.75		
Glass (%)		4	1150.00				575.00	4	1150.00		
Cans (%)		2	575.00				287.50	2	575.00		
co-mingled quantity (tons)				9056.25				9056.25			
Sorting lines (5tph installed capacity)											
Annual capacity(tons)											
Input (tpy)				9056.25				9056.25			
Rejects (impurities in pre sorted materials)				4528.125	50% landfill		2264.06	25% landfill	2264.0625		
Output of saleble materials(tons/year)				4528.13				6792.19			
Cost calculation											
Investments											
Item	costs (KM)		total								
M/E works	3,500,000										
civil works	2,000,000										
total	5,500,000										
Costs/year											
<i>Amortization</i>			544600				544600		544600		
M/E works (10 years/3%)	410,200										
Civil works (20 years,3%)	134,400										
AMEX cost/ton			60.14				120.27		60.14		
<i>Operational costs</i>											
<i>Transport landfill rejects</i>		15	67921.875				33960.94		33960.94		
<i>M+R</i>			215000				161250		215000		
M/E (%)	5	175,000									
civil (%)	2	40,000									
<i>Labour (one shift)</i>			143220.00				107415.00		143220.00		
manager	1	650	7800								
engineer	1	550	7260								
baler	1	450	5940								
drivers	2	500	13200								
sorters	6	375	29700								
guards	2	800	19200								
administr	2	550	13200								
secretary	1	500	6000								
			102300								
working time 85%				120352.94							
overhead (19%)				143220.00							
<i>Energy</i>			47998.125				23999.0625		47998.125		
20kWh/ton	0.106	181,125	47998.125								
<i>Office</i>			5000				5000		5000		

sub total			479140.00			331625.00	
Miscellaneous (10%)			47914.00			33162.5	
OPEX total			527054.00			364787.50	527054.00
OPEX cost/ton			58.20			80.56	58.20
Total OPEX+AMEX/ton			118.33			200.83	118.33
Total expenditures			1071654.00			909387.50	1071654.00
Revenues							
Savings on landfill				466396.88		233198.4375	699595.31
Quantity (tons)	4,528				2264.06		6792.19
Disposal:GEL/ton(excl VAT)	103						103
Sales ex sorting line				986125.00		493062.50	
Paper/cardboard	110	1581.25	173937.50		86968.75		2371.88 260906.25
Plastics	300	2084.38	625312.50		312656.25		3126.56 937968.75
Glass	50	575.00	28750.00		14375.00		862.50 43125
Cans	550	287.50	158125.00		79062.50		431.25 237187.5
total (tons)		4528.13	986125.00		493062.50		6792.19 1479187.5
Total income				1452521.88		726260.94	2178782.81
revenu/ton			160.39			160.39	240.58
Nett Income			380867.88			-183126.56	1107128.81
net result (GEL/ton)			42.06			-40.44	122.25

ANNEX 9: Municipal Budgets and WM Costs

Source of information on budget expenditures: matsne.gov.ge

#	Municipality	Total municipal budget expenditures	Budget allocations for WMC	Data from UNDP report	% of WMC according matsne.gov.ge data	% of WMC according UNDP report data
1	Rustavi	36,490,500.00	3,445,500.00	2,614,921.00	9.44%	7.17%
2	Marneuli	20,111,000.00	2,146,800.00	1,264,347.00	10.67%	6.29%
3	Bolnisi	24,698,600.00	1,528,600.00	1,283,869.00	6.19%	5.20%
4	Dmanisi	5,565,500.00	376,400.00	211,239.00	6.76%	3.80%
5	Tetritskaro	8,943,300.00	847,500.00	635,221.00	9.48%	7.10%
6	Gardabani	20,925,900.00	1,251,100.00	934,722.00	5.98%	4.47%
7	Tsalka	4,640,000.00	270,200.00	322,238.63	5.82%	6.94%
	<i>Kvemo Kartli</i>	<i>121,374,800.00</i>	<i>9,866,100.00</i>	<i>7,266,557.63</i>		
8	Mtskheta	17,014,000.00	1,733,000.00	842,911.00	10.19%	4.95%
9	Tianeti	5,314,500.00	386,800.00	192,912.00	7.28%	3.63%
10	Dusheti	8,221,600.00		705,091.00	0.00%	8.58%
11	Kazbegi	7,076,500.00	1,184,100.00	644,886.20	16.73%	9.11%
12	Akhalgori		-			
	<i>Shida Kartli</i>	<i>37,626,600.00</i>	<i>3,303,900.00</i>	<i>2,385,800.20</i>		
13	Kutaisi	51,998,600.00	4,765,500.00	8,173,007.73	9.16%	15.72%
14	Tskaltubo	11,344,700.00	1,050,900.00	893,814.00	9.26%	7.88%
15	Vani	7,491,400.00	454,700.00		6.07%	0.00%
16	Samtredia	11,923,100.00	937,600.00	500,970.00	7.86%	4.20%
17	Zestaphoni	12,339,300.00	1,819,300.00	547,760.00	14.74%	4.44%
18	Terjola	10,478,000.00	1,487,300.00	2,294,136.00	14.19%	21.89%
19	Bagdadi	6,603,200.00	944,700.00	407,699.00	14.31%	6.17%
20	Tkibuli	8,280,100.00	279,500.00	201,558.00	3.38%	2.43%
21	Sachkheri	9,549,400.00	778,200.00	467,600.00	8.15%	4.90%
22	Chiatura	16,038,058.00	1,647,919.00	758,245.00	10.28%	4.73%
23	Khoni	7,037,100.00	659,300.00	723,645.00	9.37%	10.28%
24	Kharagauli	8,315,800.00	1,095,300.00		13.17%	0.00%
	<i>Imereti</i>	<i>161,398,758.00</i>	<i>15,920,219.00</i>	<i>14,968,434.73</i>		
25	Poti	17,696,100.00		914,956.00	0.00%	5.17%
26	Zugdidi	35,808,800.00	4,720,000.00	4,443,700.00	13.18%	12.41%
27	Martvili	7,290,500.00		326,764.00	0.00%	4.48%

28	Senaki	8,821,400.00		375,430.00	0.00%	4.26%
29	Khobi	8,607,800.00	481,800.00	276,720.00	5.60%	3.21%
30	Chkhorotsku	6,971,400.00	323,100.00	344,200.00	4.63%	4.94%
31	Tsalenjikha	9,626,300.00	1,155,000.00	602,340.00	12.00%	6.26%
32	Mestia	8,857,900.00	787,100.00	773,910.00	8.89%	8.74%
33	Abasha	7,460,800.00	265,600.00	295,120.00	3.56%	3.96%
	Samegrelo-Zemo Svaneti	111,141,000.00	7,732,600.00	8,353,140.00		
34	Ambrolauri	8,348,800.00	694,000.00	336,124.00	8.31%	4.03%
35	Oni	3,488,300.00	306,000.00	288,775.00	8.77%	8.28%
36	Tsageri	6,786,200.00		328,700.00	0.00%	4.84%
37	Lentekhi	3,410,800.00	200,700.00	206,996.00	5.88%	6.07%
	Racha-Lechkhumi Kvemo Svaneti	22,034,100.00	1,200,700.00	1,160,595.00		
38	Ozurgeti	20,764,900.00	2,646,200.00	533,224.00	12.74%	2.57%
39	Lanchkhuti	10,498,700.00	891,900.00	611,641.00	8.50%	5.83%
40	Chokhatauri	9,047,700.00	674,900.00	292,130.00	7.46%	3.23%
	Guria	40,311,300.00	4,213,000.00	1,436,995.00		
41	Tbilisi	710,069,200.00	53,200,000.00	61,751,548.00	7.49%	8.70%
	Total average (excluding Tbilisi)	493,886,558.00	42,236,519.00	35,571,522.56	8.55	7.20

* WMC - Waste Management Cost

ANNEX 10: EPR Packaging impact assessment for Georgia

Take back obligation of packaging put on the market for the first time

Quantity assessment

Tons/Year	Georgia		Regions		
	2025	take back	2025	take back	
Population (Total)	3,761,232.00				
Tbilisi	1,259,120.00				
Regions	2,502,112.00		2,502,112.00		
Waste generated (tons)	1,252,855.00				
Tbilisi (tons)	499,859.00				
Regions (tons)	752,996.00		752,996.00		
Recyclables (tons)	406,233.00		246,642.00		
Packaging	278,087.00		143,766.00		
Less direct sellings 10%	250,278.30		129,389.40		
Paper %	12.40	95,667.41	47,833.71	50,790.00	25,395.00
Plastics	14.91	115,032.35	57,516.18	66,549.39	33,274.70
metals/cans	1.62	12,498.48	9,998.79	8,121.13	6,496.91
glass	3.51	27,080.05	13,540.03	18,305.47	9,152.74
Total		128,888.70		74,319.34	

Cost/ton	mixed waste+recyclables			only recyclables		
Annex 6.7	OPEX	AMEX	total	OPEX	AMEX	total
collection	69	58	127	121	100	221
sorting	58-81	60-120	118-201	58-81	60-120	118-201
landfilling	41	75	116	41	75	116

costs/revenues for PRO's

collection,sorting and landfilling Georgia				Regions		
GEL	OPEX	AMEX	Total	OPEX	AMEX	Total
2025	24392185.61	23038854.31	47431039.92	14064935.07	13284582	27349517.06
communication			7522464	5004224		5004224
Overhead (20%)						
2025	9486207.984		9486207.984	5469903.413		5469903.413
Total costs						
2025			64439711.9			37823644.48
cost/ton			499.96			508.93
revenues	unit rate	2025 ¹			2025	
paper	120	4305033.64			2285550.165	
plastics	300	12941139.44			7486806.504	
metals/cans	550	4124499.975			2679973.832	
glass	70	710851.3214			480518.6496	
total		22081524.38			12932849.15	
Revenues/ton			171.32			174.02
PRO net costs/ton			328.64			334.92

¹ Based on 25% rejects at sortingline

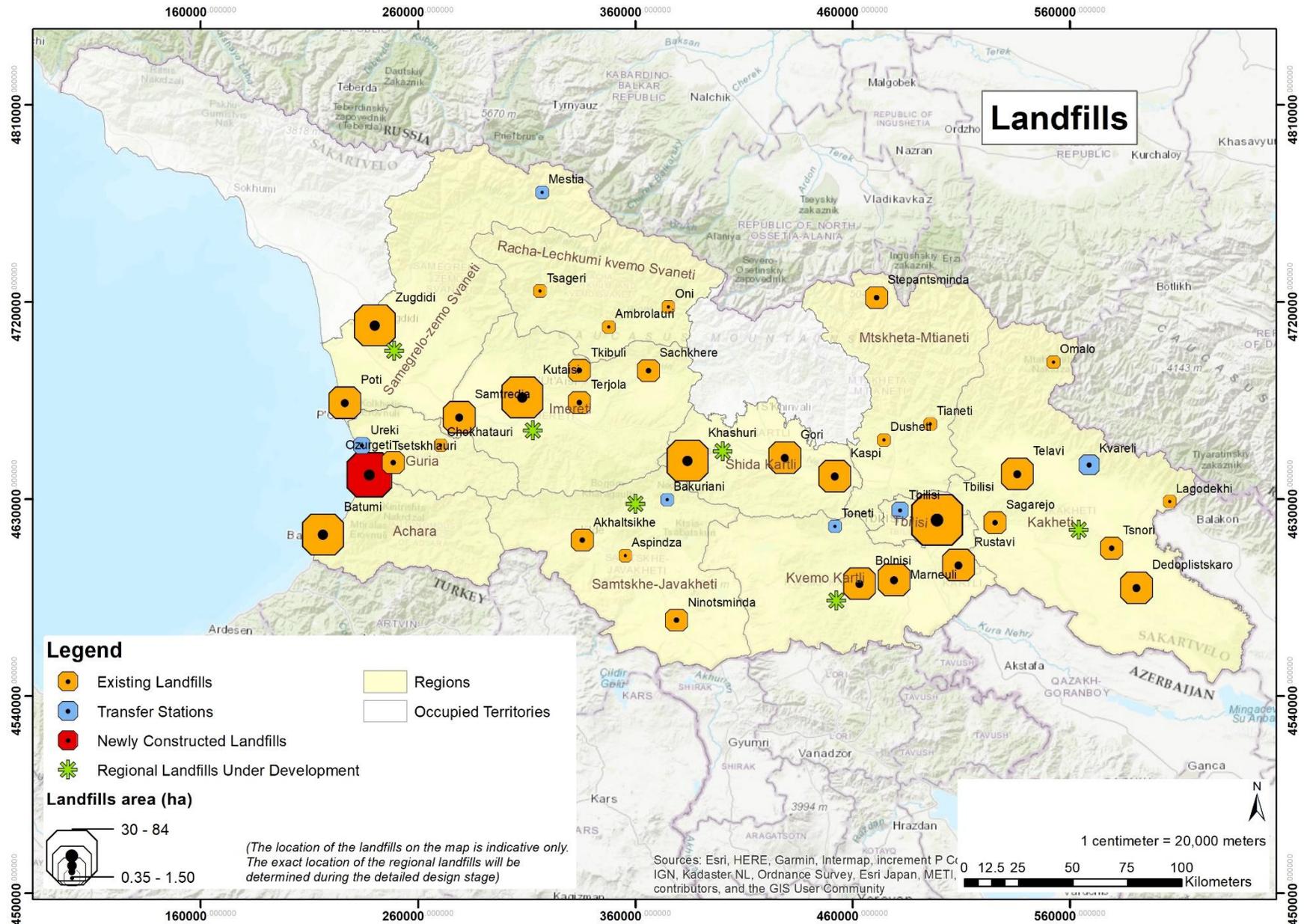
MSWM Costs (excl. street cleaning and EPR payments)

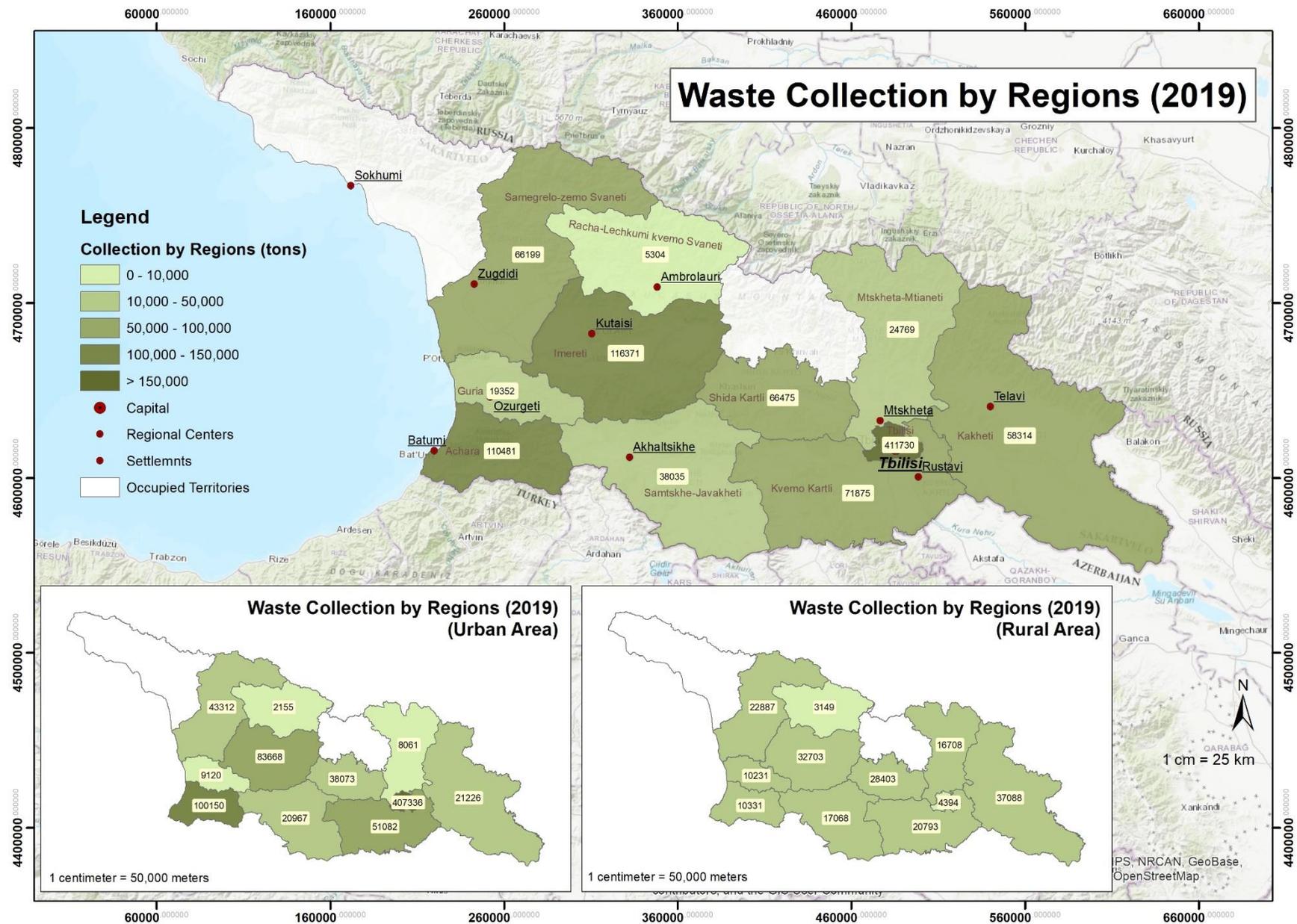
		Georgia		Regions	
Municipal costs		2025	OPEX	2025	OPEX
collected tons ¹		1252855.00	1252855.00	752996.00	752996.00
collection	127	159112585	86446995	95630492.00	51956724.00
sorting ²	118	23979143.56	11786358.7	14549765.21	7151579.51
landfill	116	127651642	45118252.76	76620166.74	27081265.83
total costs		310743370.5	143351606.5	186800423.95	86189569.34
EPR payment		47431039.92	47431039.92	27349517.06	27349517.06
%		15.26	33.09	14.64	31.73

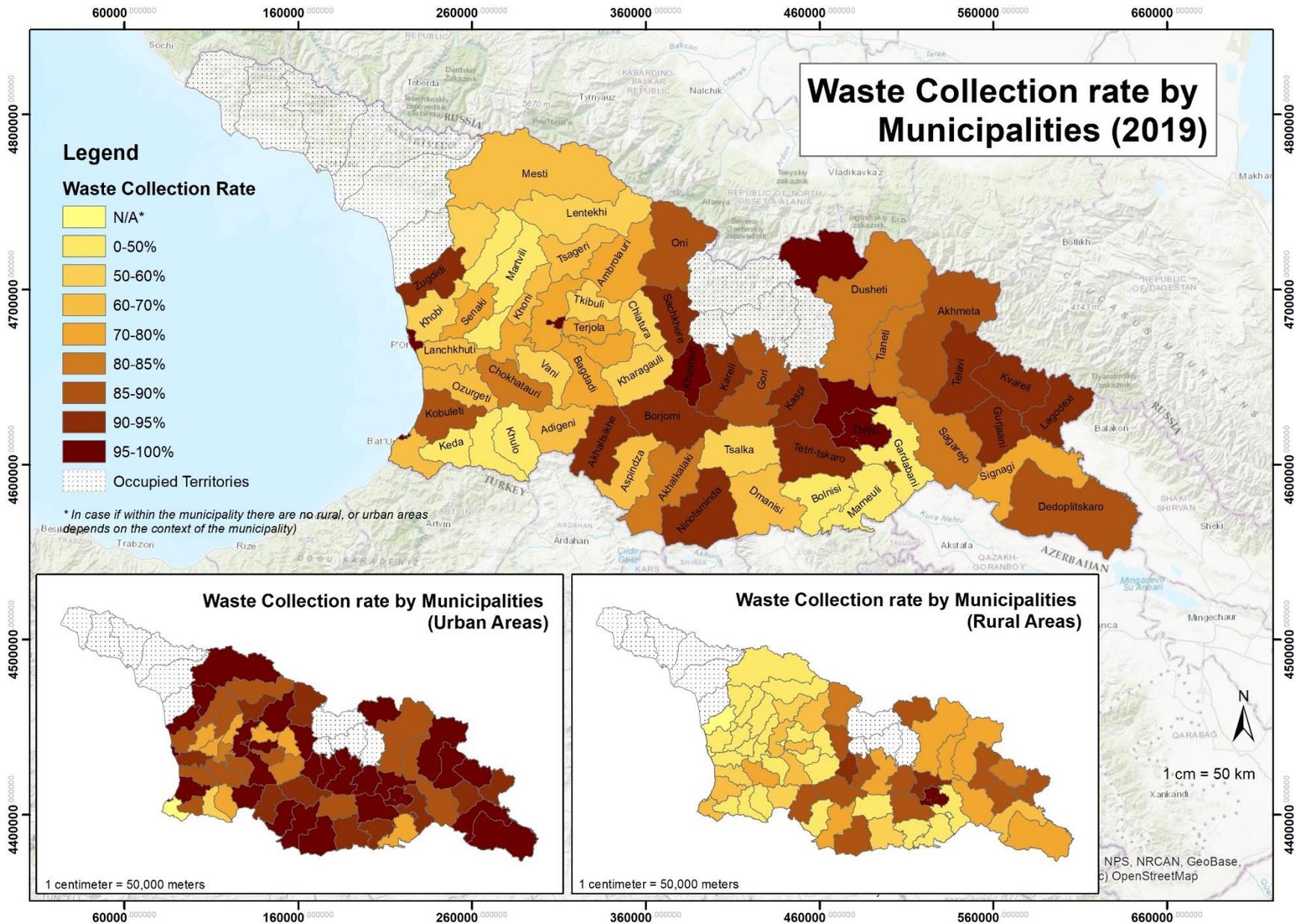
¹Generated waste x collection coverage (100% in 2025)

²Based on 50% separation at source of dry recyclables and 25% rejects at sorting line

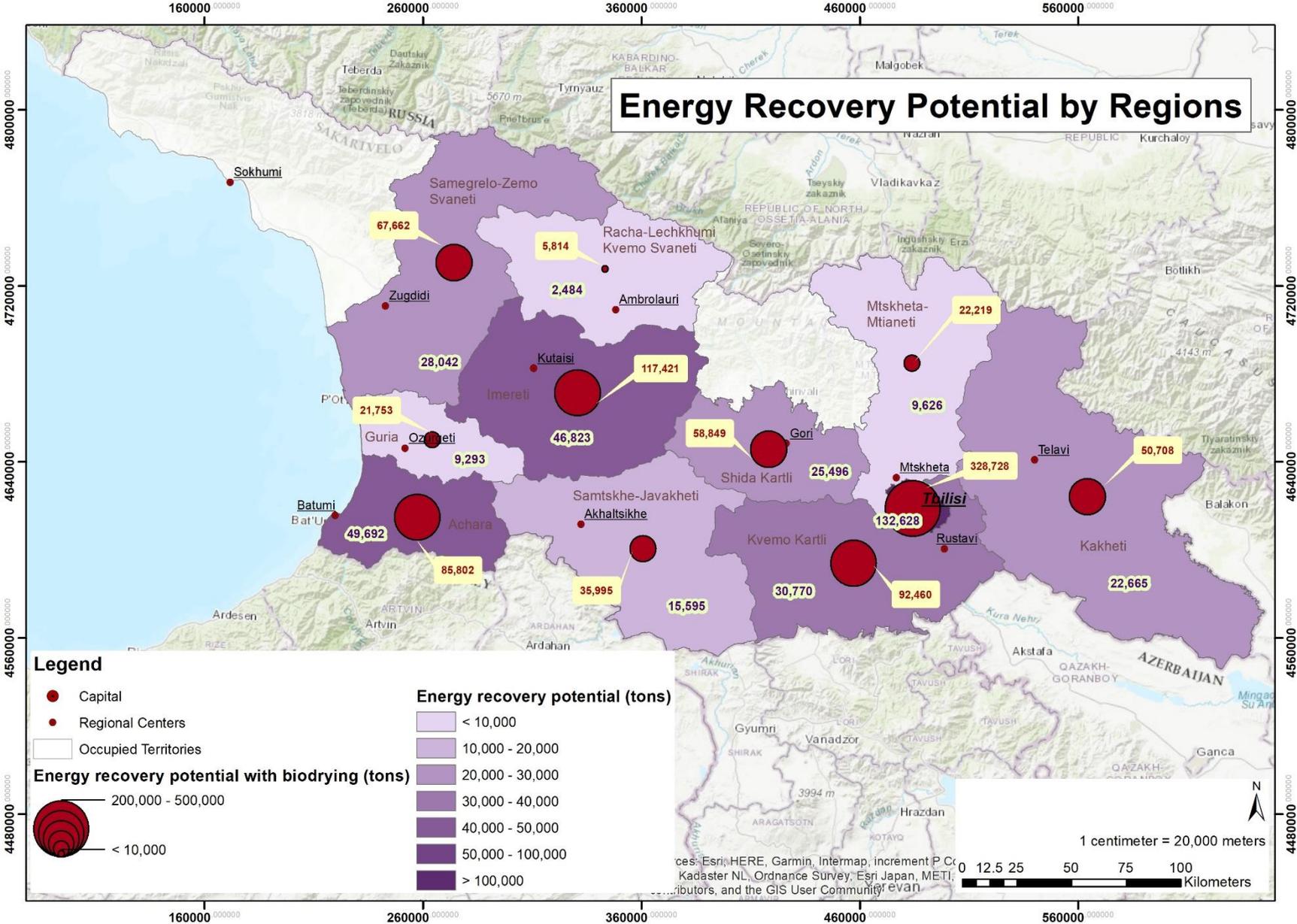
Annex 11 - Maps







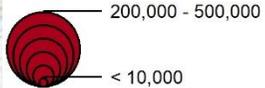
Energy Recovery Potential by Regions



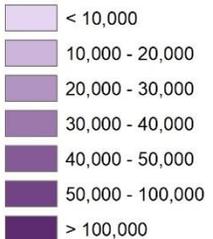
Legend

- Capital
- Regional Centers
- Occupied Territories

Energy recovery potential with biodrying (tons)



Energy recovery potential (tons)

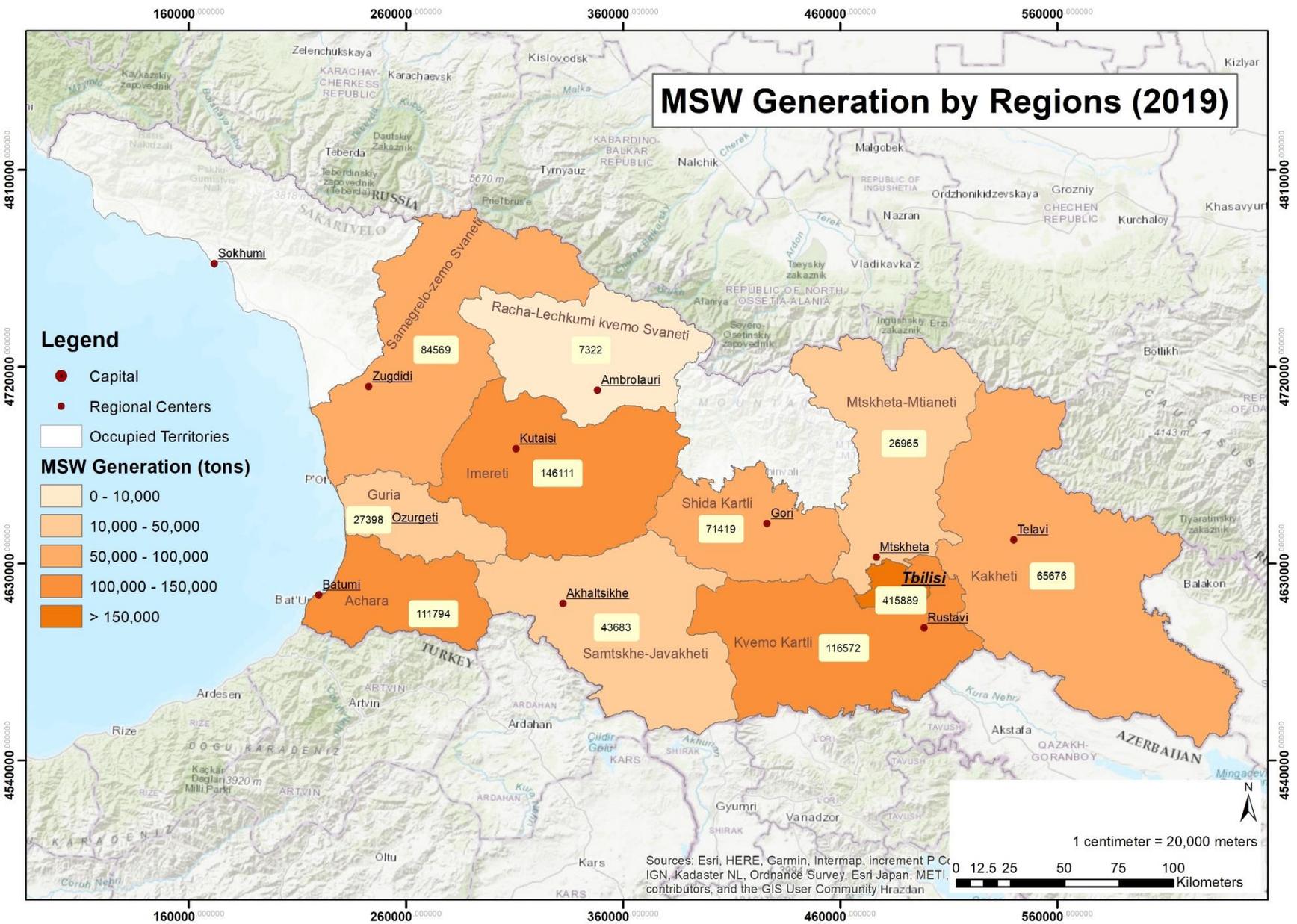


1 centimeter = 20,000 meters

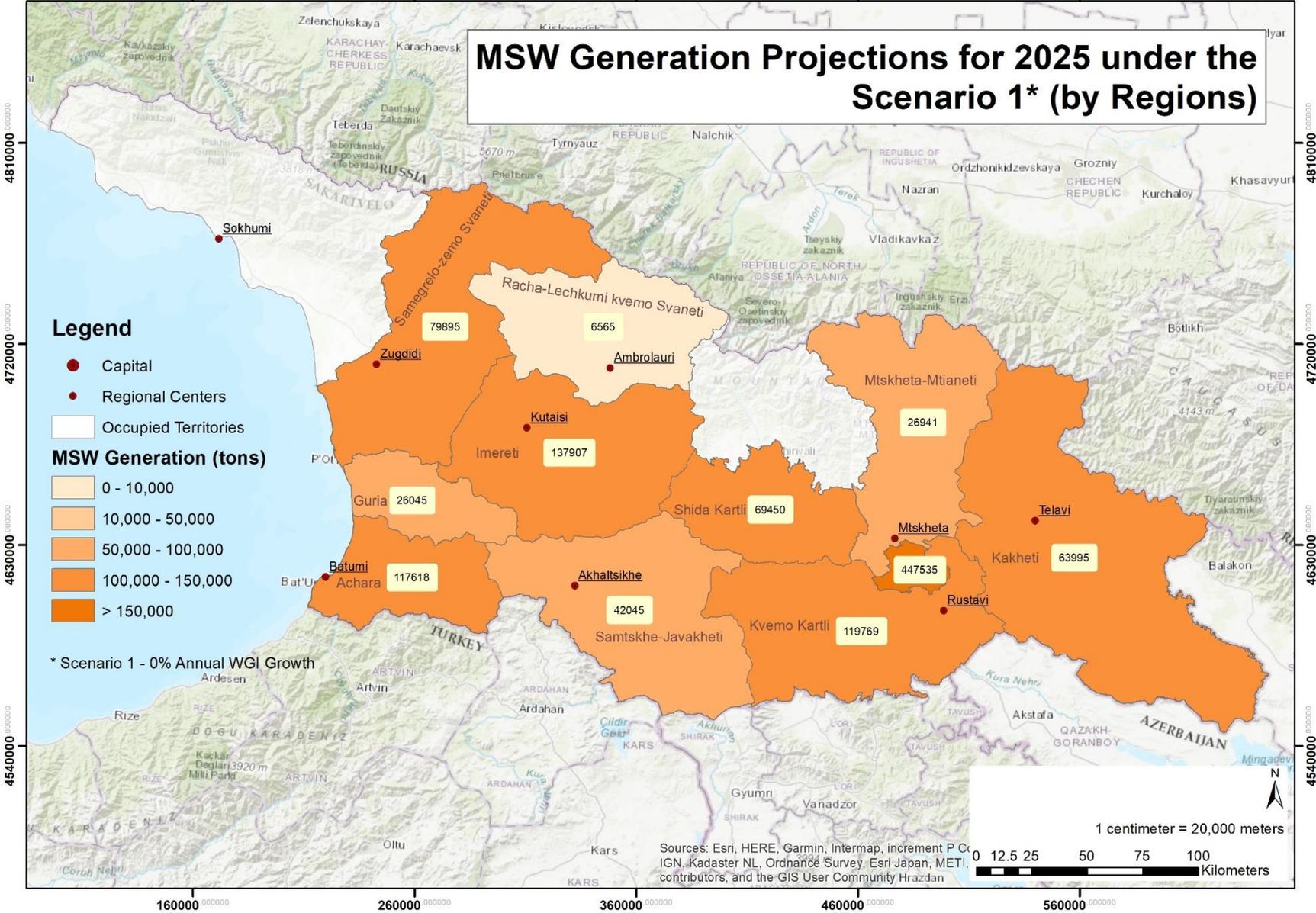
0 12.5 25 50 75 100 Kilometers

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., Kadaster NL, Ordnance Survey, Esri Japan, METI, Swisstopo, and the GIS User Community

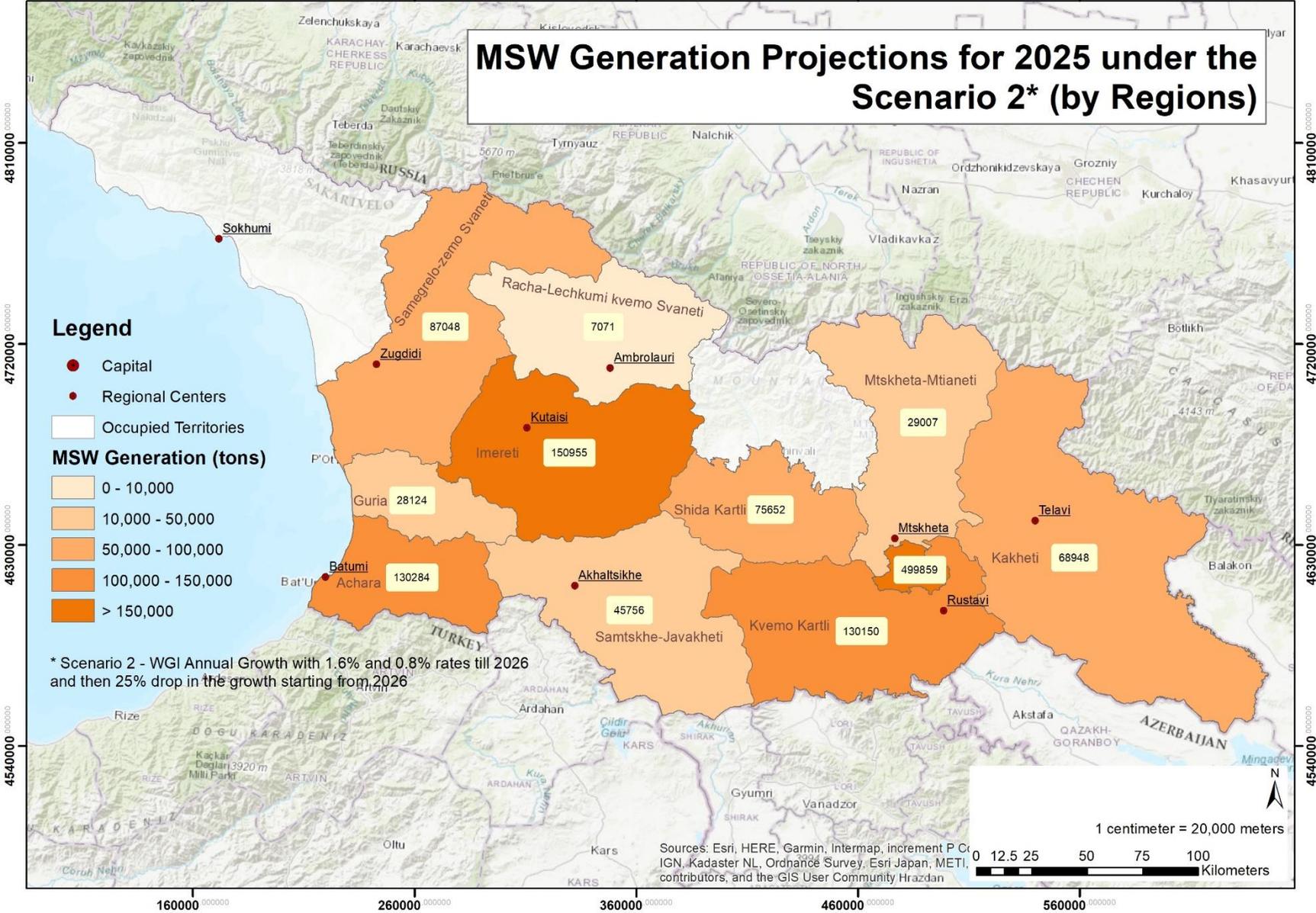
MSW Generation by Regions (2019)



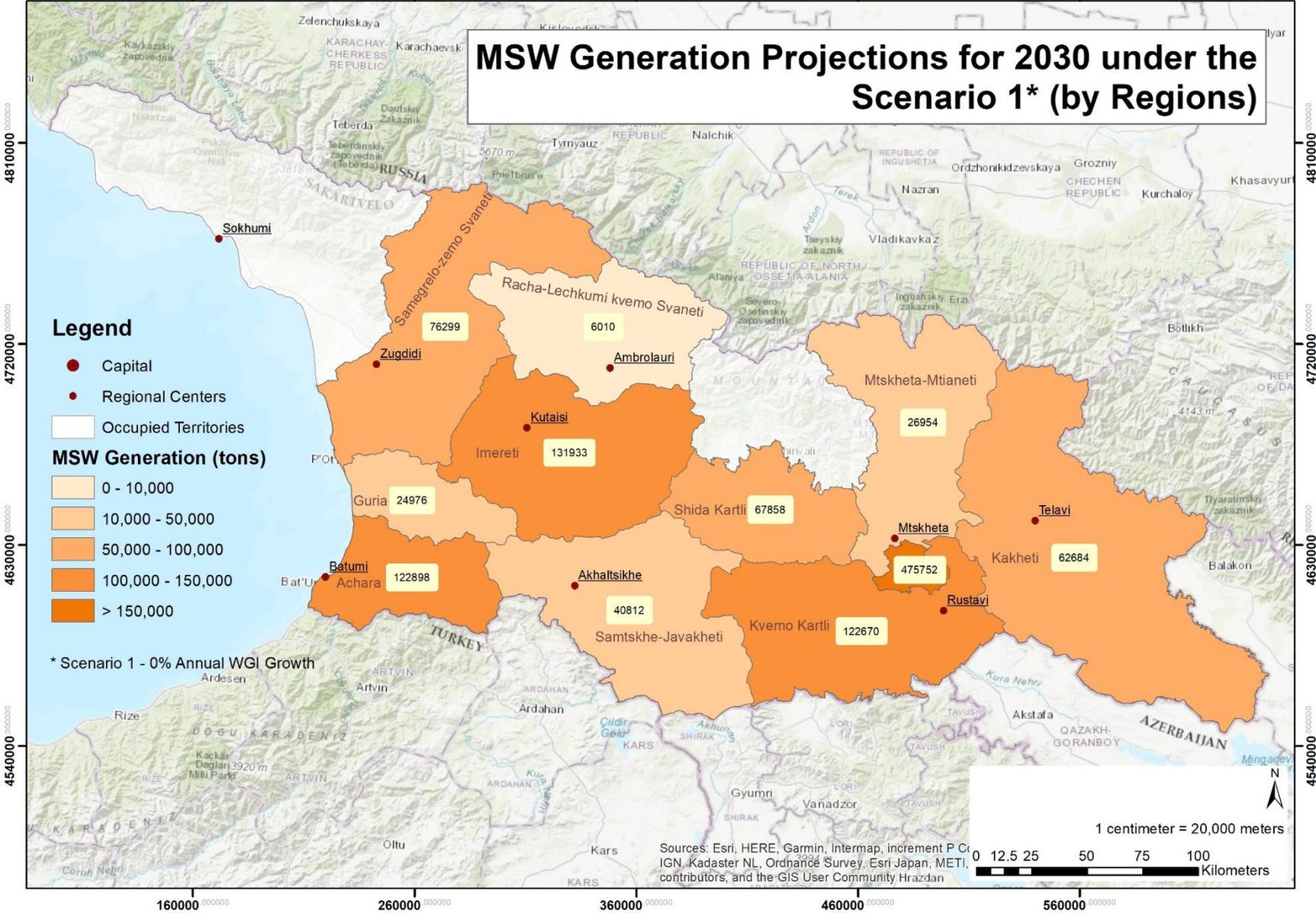
MSW Generation Projections for 2025 under the Scenario 1* (by Regions)



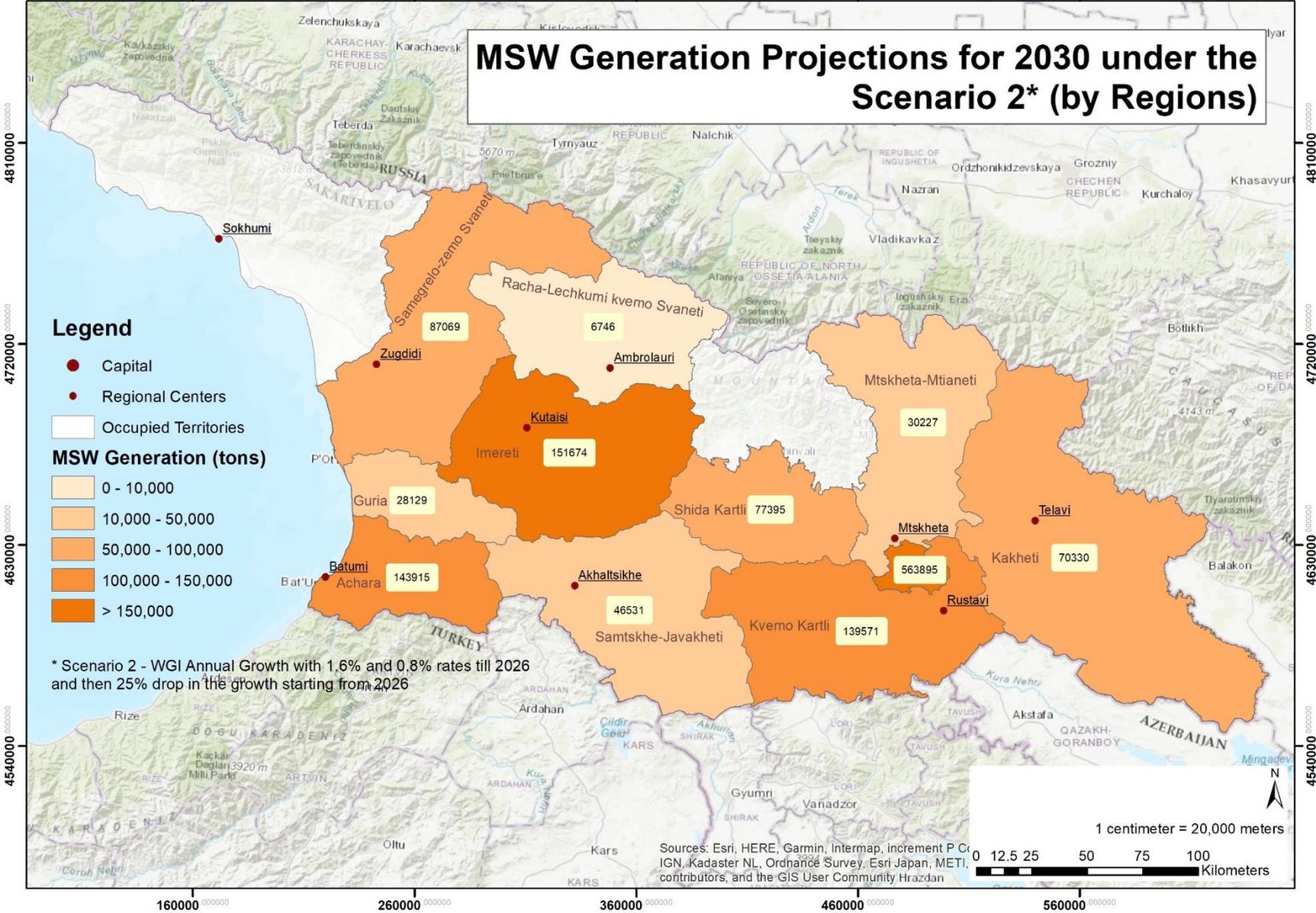
MSW Generation Projections for 2025 under the Scenario 2* (by Regions)



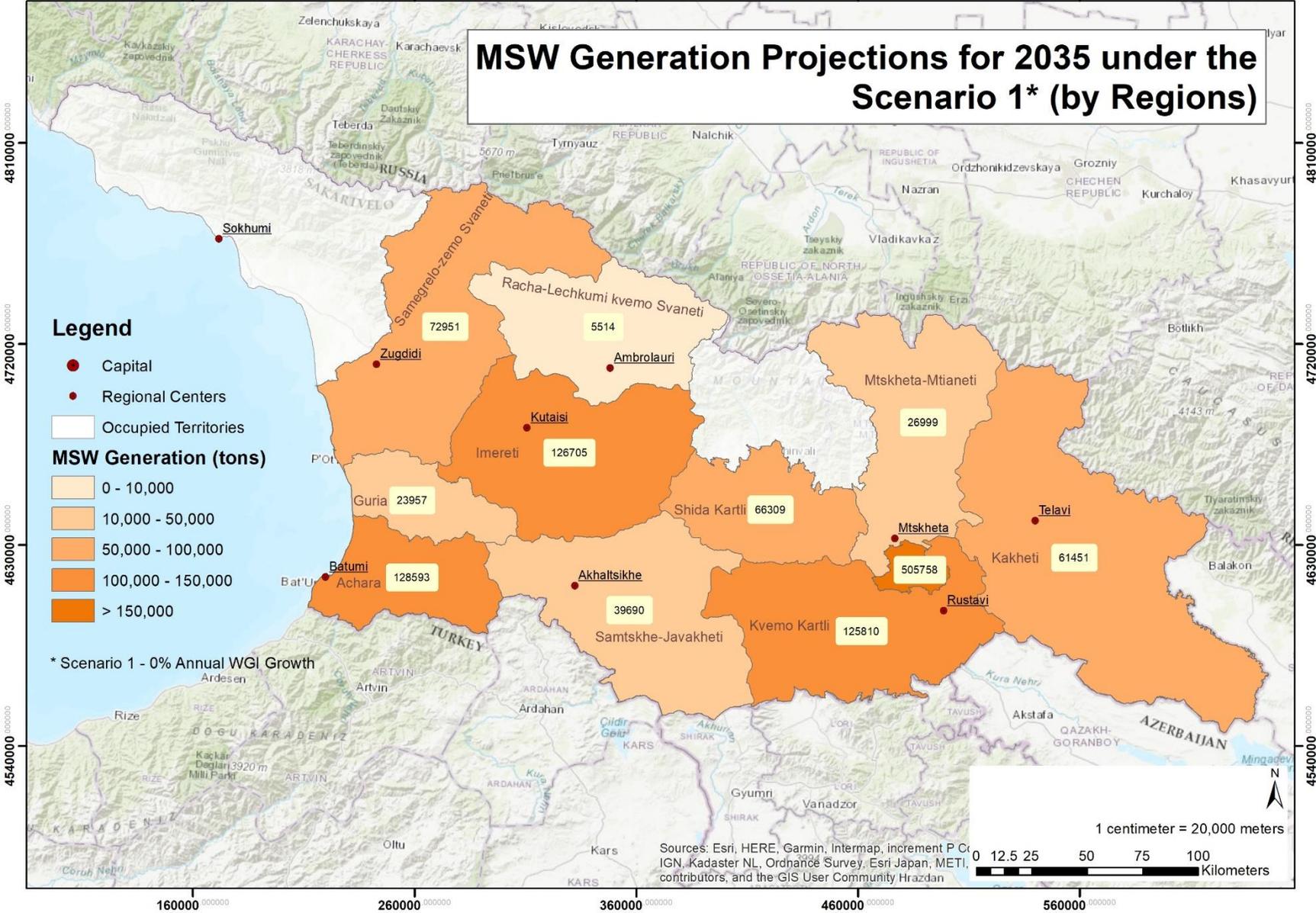
MSW Generation Projections for 2030 under the Scenario 1* (by Regions)



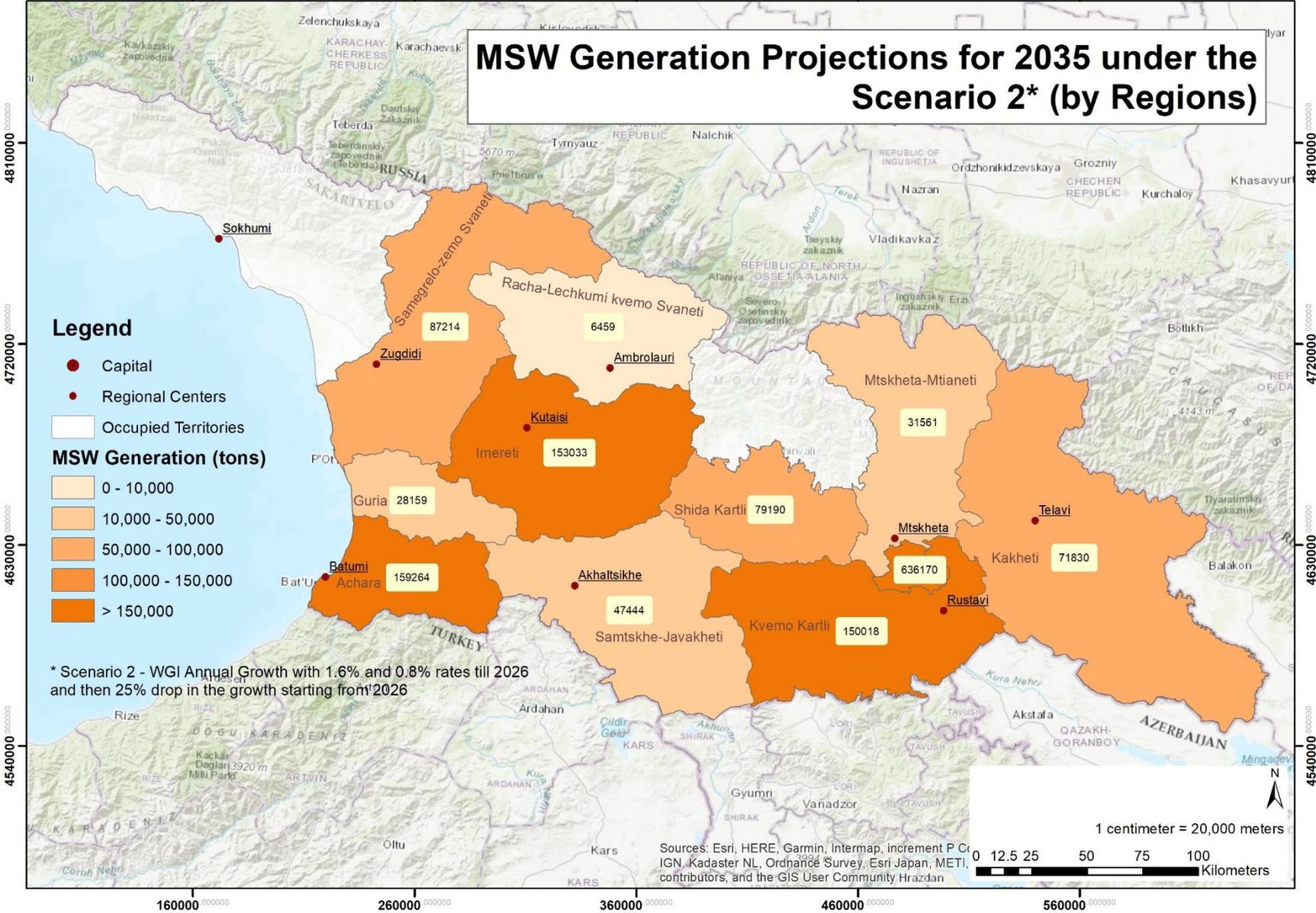
MSW Generation Projections for 2030 under the Scenario 2* (by Regions)



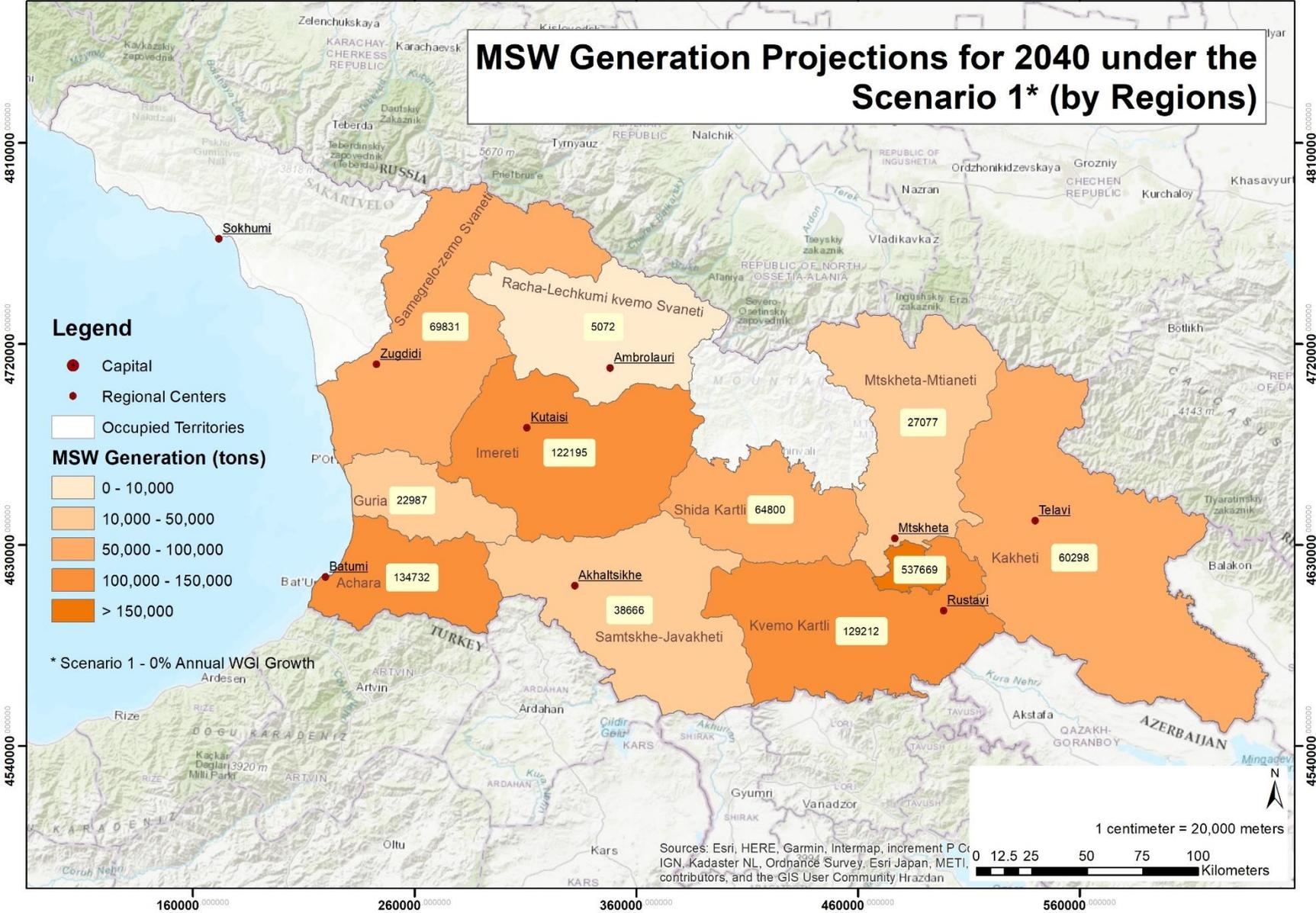
MSW Generation Projections for 2035 under the Scenario 1* (by Regions)



MSW Generation Projections for 2035 under the Scenario 2* (by Regions)



MSW Generation Projections for 2040 under the Scenario 1* (by Regions)



MSW Generation Projections for 2040 under the Scenario 2* (by Regions)

