USAID FROM THE AMERICAN PEOPLE

CityLinks

ICMA Leaders at the Core of Better Communities

CENN Caucasus Environmental NGO Network

WASTE MANAGEMENT TECHNOLOGIES IN REGIONS, GEORGIA

Quarterly Report
PERIOD: October 1, 2016 – December 31, 2016

31 January 2017

This publication was produced for review by the
United States Agency for International Development

Waste Management Technologies in Regions, Georgia

USAID Cooperative Agreement AID-114-LA-14-00001

Prepared for:
Mission Environmental Officer
Economic Growth Office
USAID | Caucasus

Prepared by:
International City/County Management Association
777 North Capitol Street NE, Suite 500
Washington, DC 20002-4201

CONTENTS

ABBREVIATIONS

ADC	Austrian Development Cooperation
AOR	Agreement Officer`s Representative
APA	Agency of Protected Areas
CENN	Caucasus Environmental NGO Network
EHS	environmental health and safety
EPR	Extended Producers Responsibility
EIA	Environmental impact assessment
EIEC	Environmental Information and Education Centre
EU	European Union
FB	Facebook
GHG	Greenhouse gas
GoG	Government of Georgia
ICMA	International City/County Management Association
ISWM	integrated solid waste management
LFG	landfill gas
MOENRP	Ministry of Environment and Natural Resources Protection
NWMCG	National Waste Management Code of Georgia
NGO	non-governmental organization
PEST	political, economic, social and technological
PSA	public service announcement
PMP	performance monitoring plan
4Rs	reduce, reuse, recover, recycle
SCG	Stakeholder Consultative Group
SFG	Sustainable Forest Governance in Georgia program
SW	Solid Waste
ISWM	Integrated Solid Waste Management
SWM	Solid Waste Management
SWMCG	Solid Waste Management Company of Georgia
USAID	United States Agency for International Development
WMTR	Waste Management Technologies in Regions

Program Background

USAID awarded the Waste Management Technologies in Regions Program (WMTR) to the International City/County Management Association (ICMA) on March 18, 2014, under Cooperative Agreement AID 114-LA-14-00001. ICMA is implementing WMTR in partnership with a local sub-recipient, the Caucasus Environmental NGO Network (CENN). WMTR contributes to the following USAID monitoring and evaluation framework objectives and results:

- Strategy Development Objective 2: Inclusive and sustainable growth.
- Intermediate Result 2.3 More responsible management and development of Georgia's natural endowments.
- Intermediate Result 2.3.3 Waste management improved.

The goal of WMTR is to provide professional waste management technical assistance to support waste management system development and recycling in two regions of Georgia — Kakheti and the Autonomous Republic of Adjara. Project activities promote greenhouse gas (GHG) mitigation and sequestration by developing the waste management sector, including waste collection, recycling, and public awareness. Specifically, this project enables GHG mitigation and sequestration within the waste sector by enabling the recycling business environment in targeted regions and municipalities to:

- Improve waste collection systems
- Minimize pollution of natural resources from landfills by closing down old, illegal landfills and dumpsites
- Enhance public awareness of waste management issues and promote public participation in the decision-making and design processes of new waste management systems.

ICMA works closely with its local partner, CENN, to build the capacity of its staff with the ultimate goal of WMTR handover in 2017.

WMTR activities combine various components into a comprehensive structure that focuses on technical assistance and capacity/institution building of integrated waste management systems and recycling/composting in two regions of Georgia — Kakheti and Adjara AR. WMTR has four main components:

- Component 1: Waste Collection and Recycling Systems
- Component 2: Private Sector-Led Recycling
- Component 3: Waste Management Strategy and Tariff Policy
- Component 4: Communication and Outreach

WMTR also implements crosscutting activities that support the four components above and promote local governance. The crosscutting activities include, among others, empowerment of youth and women, ethnic minorities and people with disabilities, and gender mainstreaming.

This Quarterly Report covers the period from October 1, 2016 until December 31, 2016, within the USAID Fiscal Year 2017.

Assumptions, Problems and Barriers

WMTR contended with the following assumptions, problems, and barriers during the reporting period:

1. Lack of coordination among donor agencies working in the waste management sector;
2. Lack of communication among state institutions responsible for waste management in Georgia;
3. Lack of capacity at the municipal level for addressing waste management issues;
4. Lack of financial resources allocated in municipal budgets for waste management;
5. Municipalities' lack of technique and equipment (trucks, bins, etc.) required for waste collection and recycling;
6. Lack of local expertise in waste management;
7. Weak recycling sector – limited number of recycling companies with limited capacity, resources, and a problem with obtaining raw materials
8. The context of the broader socio-economic situation in the country;
9. The public's lack of awareness when it comes to integrated waste management issues like waste separation, recycling, tariff issues, etc.

To address and mitigate the effects these problems and barriers have on the program, WMTR works closely with all tiers of government and stakeholders on capacity building and has been using an intensive communication, outreach and awareness campaign to promote best practices in waste management and recycling systems. In Particular:

- (1&2) Twice a year the WMTR team organizes stakeholder consultation meetings with the involvement of donor organizations, governmental structures, and other stakeholders. Such meetings present a good opportunity for all parties involved in the waste management sector to coordinate their work and improve communication with one another.

  The WMTR team hosted the fourth Stakeholder Consultative Group Meeting in December 2016 and has scheduled the next for March 2017.

  WMTR meets regularly with different waste management projects' teams in order to coordinate and supplement activities while avoiding duplication.

- (3) The WMTR team supported municipalities in project target regions to develop municipal waste management plans, which will help them to improve their waste management systems and comply with the requirements of national legislation. In addition, the WMTR team conducted a series of trainings and meetings with local governments to raise their awareness and knowledge on the development of these plans.

- (4, 5) The WMTR team cooperated with the *Integrated Solid Waste Management Kutaisi* project, implemented by the by PEM Consult together with INTECUS (Germany) and Gamma (Georgia) and funded by the KfW. Within the framework of this cooperation, the WMTR team provided the Integrated Solid Waste Management Kutaisi project with the guideline on Developing Municipal Waste Management Plans, which was developed by the WMTR project, and shared experience and lessons learned on the plans development process. Based on this guideline, the *Integrated Solid Waste Management Kutaisi* project is assisting 16 municipalities in Imereti, Racha-Lechkhumi and Kvemo Svaneti regions in developing their municipal waste management plans. KfW has allocated EUR 124,500 to implement this assistance.

The WMTR team provided 36 waste bins for separated waste collection to the self-governing city of Telavi. A donated modern 2010 Kenworth Rear Loader trash truck, with an estimated market value of USD 90,000 arrived to Telavi in January.

- (6) The WMTR team is using international expertise to conduct analyses, develop documents, and solve different waste management issues that Georgia faces, while at the same time building local capacity.
- (7) The WMTR team is supporting waste collection and recycling companies to increase their capacity and gain access to raw materials. To do this, WMTR started developing an extended producers responsibility (EPR) scheme for beverage producers, creating a mechanism to provide recyclable materials to recycling companies and create a demand for the sector.
- (9) The WMTR team has conducted a very intensive awareness raising campaign through competitions, roundtable meetings, TV programs, Facebook campaigns, etc. to increase the public's awareness of integrated waste management issues.

Significant Events and Achievements during the Reporting Period

- ***Development of Municipal Waste Management Plans for Municipalities in Kakheti Region and the Autonomous Republic of Adjara***

  The WMTR team, in cooperation with local governments, developed final versions of the municipal waste management plans for seven municipalities and self-governing cities and draft plans for eight municipalities. Local governments will communicate these plans to the MoENRP for their concurrence. The development of such plans is required by the Georgian legislation i.e. the Waste Management Code.

- ***Closure of illegal dumpsite in Beshumi, Khulo municipality***

  The WMTR team, in cooperation with the local government, closed the Beshumi illegal dumpsite in Adjara AR. The dumpsite covered around 780 m^2, was not fenced off and was surrounded by a unique forest. The cleaned area no longer represents a threat to public health or the environment.

- ***Developing Waste Management Strategy for the Adjara AR***

  The WMTR team developed the Waste Management Strategy for Adjara AR in accordance with the requirements of the national waste management strategy and action plan. The strategy covers the period of 2017–2023 and intends to harmonize the waste management process in Adjara AR with the requirements introduced at the national level.

- ***Cleaning and repurposing illegal dumpsites in Kakheti region***

  The WMTR team, in cooperation with the local governments, cleared illegal dumpsites and repurposed cleaned areas by planting trees. The local population actively participated in the process. Around 200 trees were planted at cleaned areas to avoid further littering of these places.

- ***Developing recycling market research of plastic, glass, paper, and aluminium***

  The WMTR team assessed the market for plastic, glass, paper, and aluminum waste in the country and developed a relevant report. The document will help the government of Georgia to make informed decisions and attract investors and businesses to introduce waste separation schemes in the country for further recycling.

- ***Waste tariff calculation for municipalities and self-governing cities in Kakheti region and Adjara AR***

  The WMTR team has supported 15 municipalities and self-governing cities in Kakheti region and Adjara AR to calculate waste tariffs in accordance with the modern methodology for establishing waste management tariffs and a cost recovery system developed by WMTR.

Status of Activities by Components

Component 1: Waste Collection and Recycling Systems

Facilitate the Stakeholder Consultative Group (SCG) advisory role

Fifth stakeholder consultation meeting

On December 15, 2016, the WMTR team held the fifth stakeholder consultation meeting. All institutions involved in the waste management sector in the country participated, including central and regional governments, NGOs, and international organizations. The meeting aimed to inform participants about WMTR`s work over the last six months, to facilitate future coordination and avoid duplication.

During the meeting, the WMTR team presented project activities and results, including the development of Municipal Waste Management Plans for seven local governments, a waste tariff methodology, and calculated fees for target municipalities. The team also presented the 2017-2023 Adjara A.R. waste management strategy, which was submitted to the government of Adjara AR for revision and market research of the waste management sector. The objective is to inform decision makers and businesses about the recycling potential of glass, plastic, aluminium, and paper waste in the country. The WMTR team also introduced the applications developed by the program to raise public awareness of waste management — the Green Watch app, an e-game, and an environmental portal.

The meeting was very interactive; stakeholders asked questions and gave their opinions regarding the documents developed by the WMTR team. The Ministry of Environment and Natural Resources Protection of Georgia once again stressed their fruitful cooperation with the project and the support that WMTR is providing to the government in terms of developing legal documents, guidelines, municipal waste management plans, an EPR system, and strengthening the recycling sector in general. The MoENRP mentioned that they would need further support in developing municipal waste management plans in other regions. The market analysis report developed by WMTR has also raised the interest of stakeholders, as it provides important information on how to potentially attract investors in the recycling sector.

In general, all stakeholders provided positive feedback to the work conducted by the WMTR team over the last six months and expressed their willingness to cooperate further.

Design region-specific ISWM strategies and action plans and Provide tailored assistance and trainings to municipalities and SW companies

Development of Municipal Waste Management Plans for Municipalities in Kakheti Region and the Autonomous Republic of Adjara

The WMTR team is supporting municipalities and self-governing cities in the project target regions to develop Municipal Waste Management Plans. The development of such plans is required by article 13 (1) of the Waste Management Code.[1] According to the law, all municipalities in Georgia should have these plans by December 31 2017.

So far, WMTR has helped seven municipalities and self-governing cities – Telavi and Batumi cities, and Telavi, Lagodekhi, Akhmeta, Khulo and Khelvachauri municipalities – to develop their municipal waste management plans. These plans intend to help the municipalities define how they will fulfill their waste management responsibilities.

With the support of the WMTR team, all seven municipalities elaborated their plans in accordance with the requirements of the Municipal Waste Management Plan Development Guideline, created by the program. The municipalities appointed relevant personnel responsible for the development of the plans. The WMTR team coordinated the process of collecting required information and developing relevant chapters of the plans.

On December 13–14, 2016, the WMTR team held a working group meeting with representatives of these municipalities and self-governing cities to discuss draft municipal waste management plans, make relevant corrections, clarify issues, as well as develop the budget for an action plan.

In October 2016, the WMTR team started working with the remaining eight municipalities in the program target regions — Lagodekhi, Sagarejo, Gurjaani, Dedoplistskaro, Keda, Kobuleti, and Shuakhevi — to support them in developing municipal waste management plans. The team followed the process used while assisting the first seven local governments: contact people have been appointed at the request of the program, background information collected, relevant chapters have been elaborated and draft reports have been developed.

On December 22, 2016, the WMTR team held working group meeting with these eight municipalities to discuss the drafts plans. Representatives of the municipalities provided their comments and

[1] Enacted on January 15 2015.

specified certain information. Based on these comments, the WMTR team and the contact people appointed by the municipalities finalized the plans in January 2017.

As a next step, the municipalities and self-governance cities will arrange public hearings to introduce these plans to the public and get their feedback. After completion of this process, local governments will submit plans to the Ministry of Environment and Natural Resources Protection of Georgia for its concurrence.

Cooperation with the Government of Adjara AR

Development of Waste Management Road Map for the Adjara AR

At the request of the Adjara government, the WMTR team supported Adjara AR in developing a regional waste management strategy in accordance with the requirements of the national waste management strategy and action plan.

The strategy for Adjara AR covers the period of 2017–2023 and intends to harmonize waste management processes in Adjara AR with the requirements introduced at the national level. The strategy includes a vision and objectives for the waste management process in Adjara AR, as well as a list of concrete activities, responsible institutions and a budget for the implementation of these activities.

The document has been provided to all stakeholders for their feedback, relevant comments have been incorporated and it is currently under revision by the regional government of Adjara AR. Once the regional government approves the document, they will submit it to the National Government for its concurrence.

Please see annex 1. Waste Management Road Map for the Adjara AR.

Cooperation with the Ministry of Environment and Natural Resources Protection of Georgia

Development of a Technical Regulation on the Design, Construction and Operation of Incinerators

In November 2017, the WMTR team, at the request of the Deputy Minister of Environment and Natural Resources Protection of Georgia, started working on the development of a Technical Regulation on the Design, Construction and Operation of Incinerators. Elaboration of such a regulation is a requirement of the National Waste Management Code of Georgia (NWMCG). According to article 49 of the NWMCG, the Government of Georgia shall adopt this technical regulation no later than February 1, 2017.

The purpose of the technical regulation is to prevent or minimize the negative environmental impact of waste combustion by incinerators and co-incinerators. This includes incineration's impact on atmospheric air pollution and on human health, which will be mitigated by establishing strict technical and operating requirements, measures, and procedures for the combustion of waste materials through incineration and co-incineration facilities and systems.

Furthermore, the technical regulation will establish technical criteria and requirements for incinerator and co-incinerator construction, design and operation. In addition, it will introduce special requirements for existing incinerators that have not been permitted in accordance with the law of Georgia on Environmental Impact Permits with the intent of bringing these existing incinerators into compliance with the requirements specified in this technical regulation.

The WMTR team has developed a draft of the technical regulation, which has already been communicated with the MoENRP. After finalizing the technical regulation, the MoENRP will submit it to the government for approval.

Implement pilots via partial grant to assist recycling companies and target municipalities

Introduction of Waste Separation Scheme in the Self-Governing City of Telavi

The WMTR team is cooperating with the local government of Telavi self-governing city to introduce a plastic and paper waste separation scheme in the city. The scheme will be piloted on Telavi's Alazani Avenue, where about 25% of city's residents (approximately 154,100 people) live. In December 2016, the WMTR team provided the local government with 36 waste separation bins (18 for paper and 18 for plastic) produced by a local entrepreneur in Akhmeta Municipality.

The waste bins, with appropriate branding, will be installed at the beginning of 2017, now that the waste truck donated by Republic Services and Catawba County, NC to the Telavi self-governing city has arrived in Georgia. This truck will make it possible for the local government to allocate a separate truck currently used for regular waste collection to serve the bins for separated waste collection. The local government has already allocated space to store all separated waste before removal by the recycling company.

In addition to the installation of bins, the WMTR team together with the local government will conduct an intensive awareness raising campaign among the residents of the city, encouraging them to separately collect plastic and paper for further recycling.

In-Kind Activity Agreement on Optimization of Waste Management System in Telavi City

As explained above, Catawba County in North Carolina, USA, and the company responsible for waste collection and disposal in the county – Republic Services - have donated a 2010 Kenworth Rear Loader trash truck to the Telavi self-governing city. Catawba County also helped Telavi Municipality develop a waste collection route optimization plan incorporating into the system the donated truck. The truck, with an estimated market value of 90,000 USD, will allow the city to implement its optimized waste management system and improve waste management services provided to the city's residents.

The truck arrived in Georgia on January 15, 2017. In February 2017, the relevant staff of Catawba County will come to Georgia to train staff in Telavi on the maintenance and operation of the donated truck and finalize the Waste Optimization Plan.

Develop landfill remediation/closure plans

Closure of an illegal dumpsite in Beshumi, Khulo Municipality

On October 23, 2016, the WMTR team closed an illegal dumpsite located in Beshumi, Khulo Municipality in close cooperation with the regional and local governments, as well as with the Sustainable Forest Governance in Georgia (SFG) program funded by Austrian Development Cooperation (ADC) and implemented by CENN. The illegal dumpsite that has been in operation since 2002 was covering an area of 780 m^2, was not fenced off and was located in the forest. The dumpsite presented a threat to public health and the environment and an immediate closure was required.

To meet international standards, the WMTR team developed a closure plan for Besumi dumpsite. This plan served as the basis for the closure works.

Before closure **After closure**

During the closure work, more than 400 tonnes of waste was removed from the site and transported to an official landfill located in the town of Akhaltsikhe, which is located 67 km from Beshumi. Per agreement between Khulo Municipality and the Solid Waste Management Company, the latter has not charged the landfill gate fee for the disposal of the waste.

Because of WMTR's efforts, the dumpsite no longer presents a threat to public health and the environment. In addition, the WMTR team developed an information banner with photos of the dumpsite before and after closure. Due to weather conditions, the local government will place this banner at the site in spring.

To prevent future littering at the site and make the process sustainable, the SFG program elaborated a recreational forest development plan for this site. This SFG team provided the plan to the Government of Adjara AR for revision and further implementation.

Cooperation with the National Solid Waste Management Company of Georgia

Development of Telavi Compliance, Closure and After-care Plan

According to the Waste Management Code of Georgia, only landfills with an Environmental Impact Permit can operate in the country. If an existing landfill does not have such a permit, the operator of the landfill should address the Ministry of Environment and Natural Resources Protection of Georgia with a conditioning plan for the landfill that brings it into compliance with the requirements of a relevant sub-law.[2] This allows continued operation of the landfill until a new regional landfill is built. The law also requires closure of all landfills that do not have a relevant permit by no later than 2023.

Therefore, the Solid Waste Management Company of Georgia, which operates all landfills in Kakheti Region, requested WMTR program support in developing the Telavi landfill compliance, closure and after-care plan. This landfill does not have an Environmental Impact Permit, it covers approximately 5.6 ha and it is situated near the City of Telavi, in the vicinity of Gulgula village, which is part of Telavi

[2] The sub-law on Construction, Operation, Closure and Aftercare of Landfills was developed by the WMTR team. The By-Law was approved by the prime minister of Georgia on August 11, 2015 with Government of Georgia Resolution № 421.

Municipality. Closure of Telavi landfill requires several activities aimed at minimizing potential adverse impacts on the environment and human health that could be associated with the waste presently disposed at the landfill.

Waste Delivered to Site

Compaction and Cover Application

The WMTR team developed a draft Telavi Compliance, Closure, and After-care Plan. The intent of this plan is to present the design basis for the eventual closure of the site and recommendations ensuring the compliance of the landfill with Georgian legislation requirements. In addition, the plan specifies how to minimize the Telavi site's environmental and other impacts during ongoing operations until the new regional landfill is developed. After the landfill closure, a transfer station will be located in the landfill yard where waste generated in Telavi Municipality will be temporarily stored and transferred to the new regional landfill.

WMTR has already developed the environmental scoping statement in compliance with the requirements of Cooperative Agreement No. 114-LA-14-00001 and provided it to the Bureau Environmental Officer (BEO) for approval. After receiving BEO`s approval, the WMTR team will prepare the Environmental Impact Assessment document for the closure of the landfill. At this stage WMTR will finalize the Telavi Compliance, Closure and After-care Plan and will provide it to the Solid Waste Management Company of Georgia for further concurrence with the Ministry of Environment and Natural Resources Protection.

Clean-up and afforestation of the illegal dumpsites in Kakheti Region

The WMTR team in cooperation with the local government and the Sustainable Forest Governance in Georgia project funded by the Austrian Development Cooperation (ADC) and implemented by CENN cleaned and repurposed illegal dumpsites in the Villages of Karajala and Artana in Telavi Municipality.

In October 2016, an area of 0.7 ha of the illegal dumpsite located near the river basin in the village of Artana was cleaned-up and 130 trees were planted, namely: pomegranate, linden, ash, Georgian oak, walnut and maple trees. With this activity, the area of a former dumpsite was repurposed to avoid further littering.

In November 2016, a similar activity was implemented in the village of Karajala in Telavi Municipality. The WMTR team together with the local government and the Sustainable Forest Governance in Georgia project afforested approximately a half hectare of land with 90 tress, namely: Ligustrum, linden, Georgian oak, ash and Thuja trees. The area currently has a well-structured fence and the trees were planted along it.

In both cases, a team of school students from the villages of Artana and Karajala actively participated in the tree planting.




The WMTR team signed a memorandum of understanding with Telavi Municipality where the local government took an obligation to maintain the cleared areas and avoid further littering.

Presentation of the WMTR team at the Intergovernmental council meeting

On December 6 2016, the WMTR team made a presentation at the first meeting of the Intergovernmental council on effective implementation of the “National Waste Management Strategy" and "National waste management action plan". The council was formed by the Minister of Environment and Natural Resources Protection and unites different governmental institutions involved in the waste management sector in the country.

The aim of the council is to support the effective implementation of the Strategy and Action Plan and ensure coordination between parties working on waste management issues. The MoENRP leads

council meetings, which will be organized every six months to discuss progress and issues. International organizations, including USAID, the EU delegation to Georgia, CIDA, EBRD, the Czech Embassy, etc. attended the first meeting.

The Minister of Environment and Natural Resources Protection opened the meeting, which was facilitated by the Deputy Minister. The WMTR team presented the main achievements of the program in terms of the national waste management strategy, action plan implementation, and future steps. The support the program provided to different governmental institutions in implementing requirements of the strategy and action plan includes development of a number of by-laws, elaboration of guidelines and methodologies, implementation of pilot projects on waste separation and further recycling, etc.

After the presentation, MoENRP praised WMTR for providing valuable support to the country with implementing the requirements of the EU-Georgia Association Agreement and National Waste Management Strategy and Action Plan.

Replication of WMTR activities – Cooperation with other programs

The WMTR program cooperates with other projects implemented in the country. One successful example of such cooperation is the *Integrated Solid Waste Management Kutaisi* project, implemented by the by PEM Consult together with INTECUS (Germany) and Gamma (Georgia) and funded by *KfW*.

Within the framework of this collaboration, WMTR provided the Integrated Solid Waste Management Kutaisi project with the guidelines on Developing Municipal Waste Management Plans, which were developed by the WMTR project in cooperation with the Ministry of Environment and Natural Resources Protection of Georgia.

Based on this guideline, the *Integrated Solid Waste Management Kutaisi* project is assisting 16 municipalities in Imereti, Racha-Lechkhumi and Kvemo Svaneti regions in developing their municipal waste management plans.

On November 17, 2016, the WMTR team introduced the guideline to representatives of the municipalities from these regions and shared experiences and lessons learned during the process of developing municipal waste management plans in Kakheti region and Adjara AR. The WMTR team also disseminated hard copies of the guideline to the municipalities.

Component 2: Private Sector-led Recycling

Recycling market research of plastic, glass, paper and aluminum

Introducing a waste separation system in the country is a requirement of the Waste Managemnt Code, and the National Waste Mangemnet Strategy and Action Plan. However, the waste recycling market in Georgia is at an early stage of its development, and there is no information regarding the amount of waste available for recycling in the country. Obtaining this information is necessary for the government to make informed decisions and attract investors or businesses to introduce waste separation schemes for further recycling.

Considering the importance of this issue, the WMTR team assessed the market for plastic, glass, paper, and aluminum waste in the country and developed a report. Recycling market research showed that there is considerable potential in the country for the development of a waste recycling industry that would bring economic and environmental benefits. Most of the waste currently goes to landfills. The report found that there would be significant benefits in channeling reusable material through recycling.

The table below provides information about the volume and potential of the waste market in Georgia

Waste type	Import 2015 (million USD)	Local production 2015 (million USD)	Market potential 2011-2015 (million USD)	Annual waste potential (thousand tons)*[3]
Plastic	189.3	100.9	150-300	26-33
Paper	53.5	28.4	65-81	45-50
Glass	20.2	28.1	45-55	90-100
Aluminum	-	45.3	45-60	-[4]

*data from 2015

The table shows the availability of large amounts of plastic, glass, and paper waste in the country. The report also analyzed the opportunities and challenges of introducing a waste separation and recycling system in Georgia. This report serves as an informative document for decision makers and businesses.

Annex 2. Recycling market research of plastic, glass, paper and aluminum.

Developing the EPR system for beverage producers

At the request of the Deputy Minister of Environment and Natural Resources Protection, the WMTR team began work on a development of an extended producer's responsibility (EPR) scheme in the country.

[3] assessment based on the analysis of imports and local production
[4] cannot be assessed

Development of such a scheme is a requirement of the National Waste Management code, the National Waste Management Strategy and Action Plan. In particular, article 9 of the code requires that the manufacturer of a product, which after its use becomes specific waste, and who places this product on the market, should design the product in a way that ensures:

- reduction of their negative environmental impacts and the generation of waste during manufacturing and subsequent use of products;
- recovery and disposal of the waste from these products.

The National Waste Management Strategy requires development and implementation of such a scheme no later than 2019.

The WMTR team in consultation with the MoENRP has decided to focus its efforts initially only on beverage producers, as they produce a large amount of packaging waste and relatively accurate data exits in this sector. The program has already mobilized an international expert, developed a scope of work, and identified relevant stakeholders who will be involved in the process of developing the EPR scheme. The team has collected background information on the import and export of beverages and the current market share of plastic bottles versus glass bottles and aluminum cans.

By the end of February 2017, the WMTR team will develop an EPR scheme for beverage producers.

Piloting separated collection of paper waste in Batumi self-governing city - Green Office Campaign

The WMTR team initiated the *Green Office Campaign* in Batumi self-governing city. The campaign aims to collect separated paper waste from different institutions located in Batumi. The WMTR team officially communicated with several institutions and received confirmation from them that they would be involved in the campaign. These included the Ministry of Finance and Economy; Ministry of Education, Culture, and Sport; Ministry of Agriculture; Ministry of Health and Social Affairs; and the University of Batumi. All expressed their willingness and readiness to begin separated paper collection and support paper recycling in Adjara AR.

WMTR has structured the campaign as a Public Private Partnership, Tissue Paper Ltd, a paper recycling company, will collect separated paper. Moreover, the company expressed a readiness to provide waste bins to these institutions. The WMTR team has identified the number and exact location of waste bins for separated paper collection in the above-mentioned institutions and communicated this information with Tissue Paper Ltd.

In January 2017, the WMTR team together with Tissue Paper Ltd placed waste bins for separated paper collection in target institutions that agreed to be involved in the process.

Supporting waste collection and processing companies

The WMTR team has supported two waste collection and processing companies (Legi Ltd. and Sanitari Ltd.) with evaluations of their operations and has provided recommendations on how to extend these operations and increase income.

Legi Ltd. collects paper waste and produces ridged cardboard. The company expressed willingness to increase the efficiency of its operation and its amount of collected paper waste for further recycling.

The WMTR team assessed the company's current operation and provided concrete recommendations on the equipment that should be upgraded/purchased to make the process more efficient. In addition, WMTR made a financial assessment of the company and made a projection of its financial sustainability and profitability after purchasing upgraded and/or new equipment.

Similar work was conducted for Sanitari Ltd, a waste processing company that is planning to start producing recycled wooden plastic composite (WPC) — a hybrid material incorporating the best properties of wood and plastic polymers.

The companies can apply to donor agencies and other financial institutions for funds.

With these activities, the WMTR team is supporting the strengthening and development of recycling businesses in the country and helping to meet the requirements of national legislation and international agreements.

Component 3: Waste Management Strategy and Tariff Policy

WMTR supported 15 municipalities and self-governing cities in Kakheti region and Adjara AR to calculate waste tariff

The WMTR team has supported 15 municipalities and self-governing cities in Kakheti region and Adjara AR to calculate a waste tariff in accordance with the modern methodology for establishing waste management tariffs and cost recovery system developed by WMTR.

At the request of the WMTR team, all municipalities and self-governing cities in the project target regions appointed relevant contact people to work together with the program and calculate a waste tariff for their municipalities. At the first stage, the WMTR team guided the local governments on the background information that had to be collected to make a calculation. The municipalities and self-governing cities were provided with a questionnaire and requested to deliver the following information: personnel in charge of waste management, vehicles and equipment, consumables, office rent, contractual services, depreciation, miscellaneous etc. Afterwards, the collected information was entered into the waste calculation tool, which is an integral part of the methodology developed by the WMTR team. Once the initial drafts were prepared, the WMTR team arranged working group meetings with the representatives of municipalities and self-governing cities.

On October 26–27, 2016, the program organized a working meeting with the following seven municipalities and self-governing cities — Telavi and Batumi cities, and Telavi, Lagodekhi, Akhmeta, Khulo and Khelvachauri municipalities. The aim of the meeting was to discuss their calculated waste tariffs, clarify certain issues and make appropriate corrections. After the meeting, the WMTR team made relevant corrections and provided final documents to the municipalities and self-governing cities.

On December 21, 2016, a similar meeting was organized with representatives of the remaining eight municipalities: Shuakhevi, Keda, Kobuleti, Gurjaani, Dedoplistkaro, Kvareli, Sagarejo and Sighnaghi municipalities.

All municipalities and self-governing cities in Kakheti region and Adjara AR currently have final versions of their waste tariff calculation in accordance with the methodology developed by the WMTR team that they can apply in practice.

In addition, all municipalities and self-governing cities have been trained to use the tool and make calculations and adjustments on their own.

Component 4: Communication and Outreach

Education Festival in Telavi and Akhmeta

On October 3–4, the WMTR team participated in the Education Festival in Telavi and Akhmeta, organized by the US Embassy.

Within the festival, the team set up the program's corner in Telavi University and Akhmeta Public School #2. The WMTR team introduced to curious teenagers and university students to modern approaches to waste management, program goals, and planned activities. Festival participants took photos at the WMTR Program's "waste-to-craft" photo stand, participated in a waste separation and a trivia games.

The trivia game consisted of questions regarding waste. Prior to the trivia game, participants had a chance to look through a waste subject information booklet and thus prepare for the game. About 100 teenagers and students who provided correct answers to the questions received a notebook, a T-shirt and a mug.

Training for Gori school students

The WMTR team strives to replicate activities and introduce modern approaches to waste management beyond the project target regions. Successful example of this is our cooperation with the youth organization Droa in Shida Kartli region.

On October 1, 2016, the WMTR team in cooperation with Droa, gave a 1-day training of trainers on integrated waste management topics to school students in the city of Gori.

Trained school students gained knowledge on international waste management practices used worldwide, as well as national legislation and requirements. These students can now train peers at their schools to raise awareness among young people and introduce behavioral changes in regards to the 4R principles.

Goodwill recycling corner campaign continues

The WMTR team continues promoting the waste separation system introduced in Goodwill Hypermarket in Didi Digomi. In order to attract more customers to separated waste collection, the program developed a number of promotional materials.

Posters

One of them is a poster indicating the directions to the Goodwill recycling corner, placed near the second entrance of Goodwill Hypermarket. The banner is placed near the carts so that customers can easily spot it and know that the recycling corner is there.

The WMTR team also developed a poster to raise awareness in schools about the Goodwill recycling corner:

The WMTR team will distribute the poster in all international schools and schools located close to Goodwill Hypermarket.

Documentary Video

The WMTR team developed a video that describes the waste separation system in Goodwill Hypermarket. The video tells a story about where the waste separated in Goodwill Hypermarket is taken, how it is recycled and why this is important. The WMTR team distributed the video through social media, receiving 3,217 views. Please follow the link to watch the video: link.

WMTR Program cooperation with Peace Corps

The WMTR team considers cooperation with other projects and institutions working on waste management very important, to share experience, success stories and lessons learned. On November 5, 2016, the program participated in the Peace Corps organized Eco-Camp Alumni Conference. The WMTR team participated in the 2016 summer camp as well, and delivered a presentation.

At the conference, the WMTR team presented the program's work and delivered important messages on composting and recycling. The conference took place in Tskneti, where around 40 school students from the entire country and alumni of the G.R.E.E.N Camp 2016 participated in the conference and presented activities that they have implemented in their hometowns.

Green Tech and Innovations Day at Techno Park

On November 29, 2016, the WMTR team together with other CENN projects organized the *Green Tech and Innovations Day at Tech Park*. The aim was to officially launch green technologies developed by the program: the GreenWatch application, the Caucasus Environmental Portal, and the Sort & Recycle E-Game. The Deputy Minister of Environment and Natural Resources Protection of Georgia and the Mayor of Tbilisi attended the event and made introductory remarks.

Presentation of Jokolo village school teachers and students

Award of Kvemo Khodasheni public school

In addition to the demonstration of green technologies, the WMTR team arranged a presentation of Jokolo village school teachers and students from Pankisi Valley and symbolically awarded Kvemo Khodasheni public school with a green certificate for winning the Green School Competition.

Green Your University Campaign

In December 2016, The WMTR team concluded the first phase of the Green Your University Campaign and selected six groups of students – three from Batumi State University and three from Telavi State University to participate in the Idea Generator. The aim is to gather student groups to brainstorm and develop innovative ideas that help to green their universities.

In January 2017, the WMTR team organized the Idea Generator — Green Your University — which took place in Tbilisi and lasted two days. The event was a great opportunity for students to generate ideas, which will help their Universities to improve waste management and introduce modern approaches. The WMTR will help winning groups to implement their ideas.

The WMTR team will provide more details about the Green Your University Campaign in the next report.

Eco Playground for Green School competition winner

In December 2016, the WMTR team selected the winning organization to develop the Eco Playground in the Kvemo Khodasheni school, Kakheti Region.

In the summer of 2016, Kvemo Khodasheni school won the green school competition announced by the WMTR team in the schools of five villages of the Telavi pilot project. They collected the most plastic

and paper separately and stored it in a specially designated storage area. Therefore, the school was awarded with the prize of an Eco Playground.

Construction of the playground started in December and has six objects, a climbing wall, swings, table and chairs and other decorative but useful objects, made from household waste.

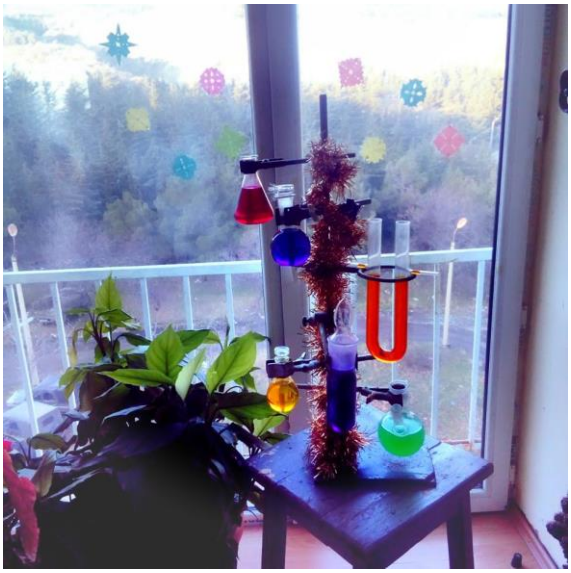
In February 2017, after completion of construction works, the WMTR team will organize the opening ceremony.

Creative Christmas Tree competition

In December 2016, the WMTR team launched the Creative Christmas Tree photo competition on the WMTR Facebook page.

The winners of the competition will be awarded with a Green Present. Participants of the competitions have been posting photos of their Creative Christmas Trees on WMTR's Facebook page.

Some photos of the Creative Christmas Trees competition are presented below:









In January 2017, the WMTR team announced the winner of the competition based of the number of likes. More details will be provided in the next report.

WMTR and M-TAG Programs Joint Training Course for Journalists from the region of Georgia on Waste Management Issues

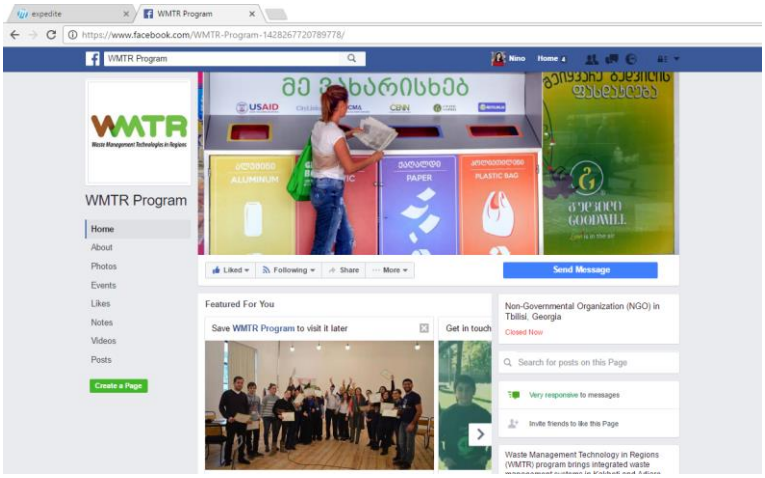
On December 10–13, 2016, the WMTR team and USAID M-TAG program conducted a second round of training courses for journalists in *Integrated Waste Management Practice, Challenges and Development Perspectives*. The programs trained journalists from different regions of Georgia. The duration of the training course was 24 academic hours. A total of 17 journalists attended the training and were provided with comprehensive information related to waste management issues in the country. The WMTR team introduced journalists to the requirements of national legislation and international standards, informed them of institutional arrangements (responsible structures, competencies, overlaps), existing management system and challenges. In cooperation with the Solid Waste Management Company, the WMTR team organized field trips to Rustavi and British Petroleum owned landfills to show them their operations.

At the end of the training course, WMTR and M-Tag awarded journalists with certificates.

Produce Booklets, Media Materials, Posters, Trainings and Other Activities to Introduce the Concept and Benefits of Recycling and Encourage People to Recycle

Maintaining the eco-camp alumni Facebook page

WMTR continues to update its Facebook page. Through this page, the public, including school students from the project target regions, receives updates on the implementation of the program — competitions, trainings, workshops, grant announcements, information about ongoing activities, and news on modern practices in waste management.



By December 31, 2106, the Facebook Page had 4,100 followers.

Newspaper Articles

The WMTR team continued cooperating with various online Georgian news outlets to ensure the outreach of WMTR program activities and make them available to a broader audience. In the period of October 1 – December 31, 2016, the following articles were printed:

Georgia Today	CENN Introduces Innovation and Green Technologies
Georgia Today	Illegal Dumpsites in Kakheti Region Repurposed with Help of School Pupils
Georgia Today	Recreational Forest Replaces Dumpsite
Georgia Today	Gurjaani Landfill Closes
Georgia Today	Biomass Briquettes: the Budget & Environmentally Friendly Alternative to Firewood

Table 1. Number of People Reached through Outreach Campaign

Channel of Communications	Type of Information	Size of Audience
Georgiatoday.ge, December 13,2016. Link	Article on Biomass Briquettes	6,409 Likes on Facebook Page 3,000 Print Subscribers
Georgiatoday.ge, October 06,2016. Link	Article on Gurjaani Landfill Closure	6,409 Likes on Facebook Page 3,000 Print Subscribers'
Georgiatoday.ge, November 03,2016. Link	Article on Recreational Forest Replaces Dumpsite	6,409 Likes on Facebook Page 3,000 Print Subscribers
Georgiatoday.ge, November 21,2016. Link	Article on cleaning and repurposing illegal dumpsites of Kakheti Region	6,409 Likes on Facebook Page 3,000 Print Subscribers
Georgiatoday.ge, November 21,2016. Link	Article on Innovation and Green Technologies	6,409 Likes on Facebook Page 3,000 Print Subscribers
Social media, USAID/Georgia Facebook Page, December 19, 2016 Link	Information on Green Watch App	**13 Likes, 5 Shares on post.** 18,464 Likes on Facebook Page
Social media, USAID/Georgia Facebook Page, December 16, 2016 Link	Information on E-game	**28 Likes, 19 shares on post** 18,464 Likes on Facebook Page
Social media, USAID/Georgia Facebook Page, December 15, 2016 Link	Information on Recycling Corner in Goodwill	**23 Likes on post** 18,464 Likes on Facebook Page
Social media, USAID/Georgia Facebook Page, October 31, 2016 Link	Information on building the composting box	**21 Likes, 2 shares on post** 18,464 Likes on Facebook Page
Social media, USAID/Georgia Facebook Page, October 11, 2016 Link	Information on Pilot Project of Telavi Municipality	**35 Likes, 1 shares on post** 18,464 Likes on Facebook Page
Business Contact, Maestro TV November 27, 2016 Link	The topic of the TV show was the Waste Management Code and its implementation	**37,016 subscribers** 66,506 Likes on Facebook page
Social Media, Ministry of Environment Protection Facebook Page, November 29, 2016. Link	Information on Innovation and Green Technologies Event	**123 Likes, 13 Shares on post** 93,565 Likes on Facebook page
Social Media, Ministry of Environment Protection Facebook Page, November 29, 2016. Link	TV reportage of Innovation and Green Technologies Event	**37 Likes, 4 Shares on the post** 1,949 Likes on Facebook page
Social Media, College Aisi, Facebook Page, February 10, 2016 Link	Information on meeting about starting separation and composting at the college	**29 Likes on the post** 93,565 Likes on Facebook page
WMTR Facebook page Link		**1,150 new likes** Total 4,100 Likes
7 E-Digests from WMTR disseminated via CENN's online network	WMTR activities and integrated waste management-related issues	24,000 subscribers
Summary	7 E-Digests on WMTR program were developed and disseminated via CENN E-Network - **24,000 subscribers** Maestro Television – **37,016 subscribers**	

Channel of Communications	Type of Information	Size of Audience
	USAID/Georgia Facebook Page - **18,464 subscribers** Georgia Today – **3,000 Readers** Number of people reached through various posts in social media is **350** (Views/Shares/Likes) Average number of people reached through WMTR Facebook page posts **3,489** Total number of people reached through outreach campaign – **86,319.**	

Major Activities Planned for Next Quarter

- Continue supporting the Ministry of Environment and Natural Resources Protection of Georgia in developing policy and legal documents in accordance with the requirements of the Waste Management Code, The National Waste Management Strategy and Action plan
- Finalize municipal waste management plans for eight local self-government bodies in Kakheti Region and Adjara AR
- Implement City-to-City partnership activities — support the city of Telavi to implement a waste management system optimization program
- Introduce a waste separation scheme (paper and plastic) in the City of Telavi in close cooperation with the local government
- Introduce a waste separation scheme (paper) in the governmental institutions of City of Batumi
- Clean and repurpose small illegal dumpsites in the project target regions
- Continue support and monitoring of separated waste collection systems in Goodwill hypermarket and Tbilisi Marriot hotel and replicate the systems in other institutions
- Finalize a scoping statement for Telavi landfill and conduct an environmental assessment
- Develop an Extended Producers Responsibility (EPR) scheme for beverage producers
- Support *Tissue Paper Ltd* to introduce a quality control system
- Continue lobbying the implementation of the *General Methodology for Tariff Calculation and a Cost Recovery Scheme* at the governmental level
- Work on public education and outreach in the areas of enhancing cost recovery
- Implement a public awareness campaign in Kakheti Region and Adjara AR;
- Implement wide-scale public education and outreach campaigns to promote the 4Rs and ISWM in Kakheti Region and Adjara AR
- Organize competitions for school students in Kakheti Region and Adjara AR and a national student summit
- Organize roundtables and trainings in Kakheti Region and Adjara AR to promote the 4Rs and ISWM
- Develop and disseminate project promo materials

Waste Management Technologies in Regions (WMTR) Program

Waste Management Sector

Plastic, glass, paper and aluminum market research

Georgia, 2016

This document was produced for review by the United States Agency for International Development.

Prepared for:

Environmental Office of the Mission

Economic Development Office
USAID | Caucasus

Prepared by:

International City/County Management Association
777 North Capitol Street NE, Suite 500
Washington, DC 20002-4201

The Caucasus Environmental NGO Network (CENN)
27 Bethlemi str., 0105, Tbilisi, Georgia

Content

1. Summary

Georgia's solid wate recycling industry has a great potential for the development which is not utilized. This sector covers a number of industries, including plastic, paper, glass and aluminum production. These industries vary in terms of the level of development. In many cases large portions of their production go to landfills while these wastes offer business opportunities that can facilitate the economic development of the country, contribute to the replacement of imported items with locally produced goods, save primary natural resources and reduce other negative environmental effects.

Georgia consumes large quantities of plastic goods, including different types and household containers and construction materials. For the objectives of waste recycling, the well-developed beverage industry – one of the largest consumers of plastic packaging should be noted. The mentioned industry ensures long-term generation of large quantities of plastic waste. In 2015, around 18 thousand tons of plastic containers and PET bottles have been manufactured in Georgia creating a strong potential for the development of recycling industry.

Since 2011, a system of collection of waste paper and cardboard for the purpose of their recycling has been improved to some extent. It shall be also noted that in 2015 the import of waste paper and cardboard considerably increased and reached 4 thousand tons in terms of quantity. Notwithstanding of the relative developed collection system, there is still an untouched potential of waste paper the annual volumes of which varies within 68-75 tons.

In Georgia, only one enterprise with the annual output of around 70 thousand tons manufactures glass containers. Used glass items go mainly to landfills, since the company recycles only faulty products. In addition, different types of glass items and containers are being imported to Georgia, implying generation of 100 thousand tons of waste glass. Glass recycling provides opportunities for small and medium size entrepreneurs which are interested in manufacturing glass goods.

The present document also describes the potential of aluminum recycling in Georgia. In 2011-2012 the collection and export of aluminum waste declined significantly due to the reduction of amounts of metal scrap in the country. The amount of aluminum waste can be hardly determined due to a large number of unrecorded amount of this type of waste (scrap metal). In this regard we could only judge about the market development trend which is expressed by the aluminum scrap export and locally recycled aluminum scrap. The annual production of aluminum slag by two local enterprises in Georgia exceeds 4,800 tons.

It shall be noted that there are several factors that can facilitate the development of recycling industry in Georgia, specifically, low energy cost, low labor cost, simplified tax and environmental regulatory system and framework. Therefore, in Georgia wastes can be recycled at lower cost compared to Eastern European and other South Caucasus countries. The volume and potential of waste market and waste in Georgia is summarized in the table below.

Table 1. Volume and potential of waste market and waste in Georgia

Waste type	Import 2015 (million USD)	Local production 2015 (million USD)	Market potential 2011-2015 (million USD)	Annual waste potential (thousand tons)***[1]
Plastic	189.3	100.9	150-300	26-33
Paper	53.5	28.4	65-81	45-50
Glass	20.2	28.1	45-55	90-100
Aluminum	-	45.3	45-60	-**[2]

*data of 2015

The present research is based on several important assumptions:

1. Market volume in each sector is estimated as a sum of local production and import.
2. Only short-term use products made of plastic, paper and glass such as tare, packaging materials, etc. are used for the measurement of the amount of waste. Therefore, the actual potential of the amount of waste exceeds the amount estimated by us.
3. Due to lack of sufficient statistical data on aluminum production, the amount of waste could not be estimated. In case of aluminum waste, scrap metal export dynamics was shown, which forms a basis for making an assumption on the change in market size in recent years.

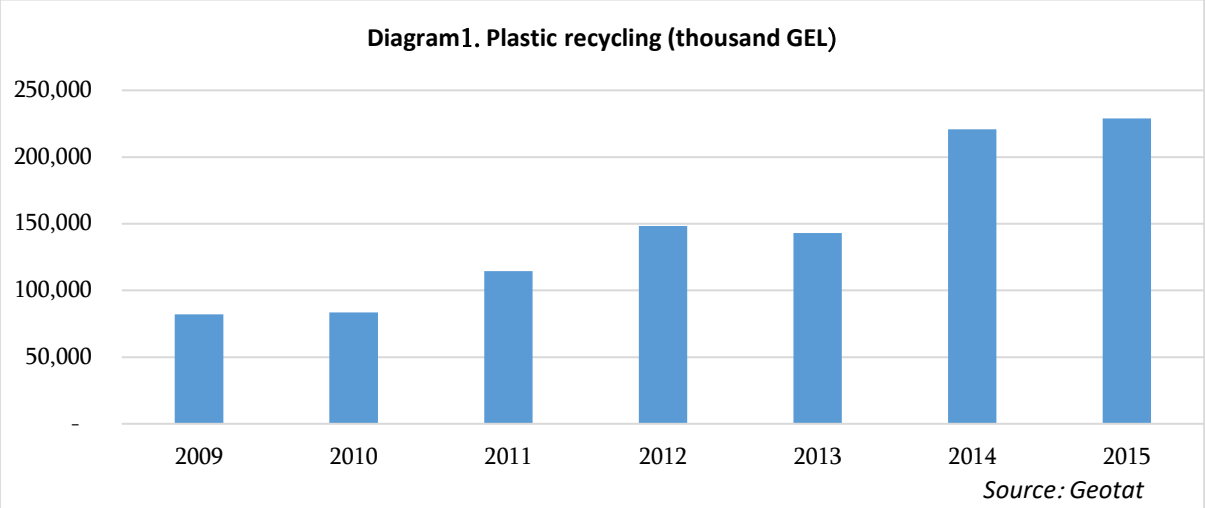
2. Plastic market

Plastic wastes make about 20% of solid municipal waste produced in Georgia. This is determined by the use of different plastic items in the majority of goods and the high demand on household plastic products among the population of Georgia as a developing country. Plastic waste needs long time to decompose and thus creates environmental problems. At the same time, plastic due to its characteristics can be easily recycled. Therefore, plastic recycling can help the enterprise in saving funds and resources and at the same time contribute to reduction of environmental pollution and landfilling areas.

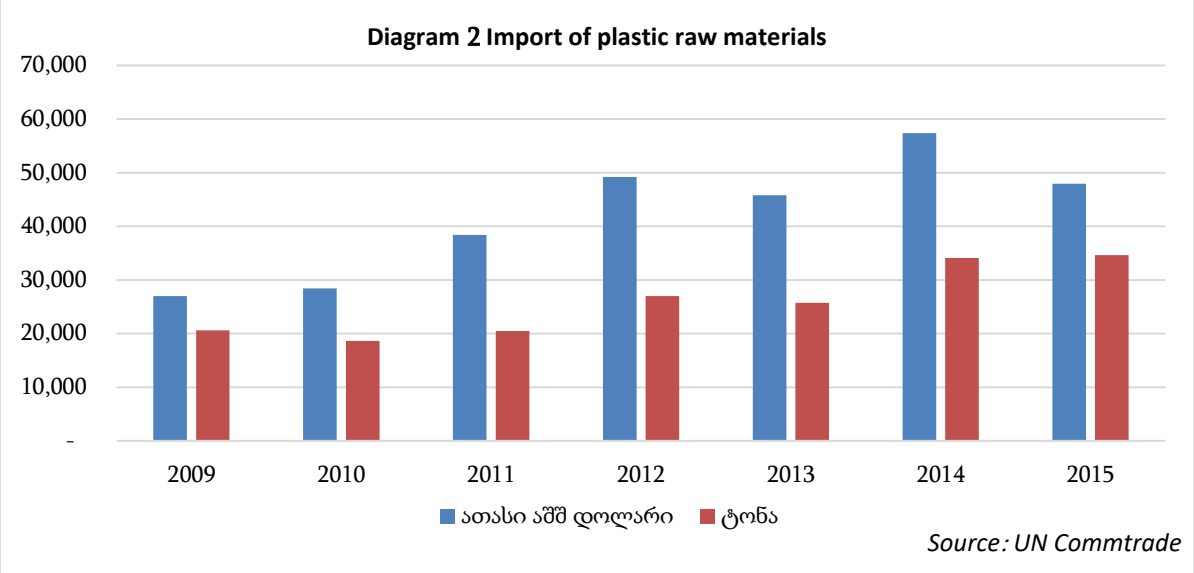
Manufacturing of plastic goods, including manufacturing of different plastic packaging, plastic bags, tapes, PET bottle capsules, plastic household items, plastic slabs, sheets, pipes and profiles, is a growing industry. In 2015, the mentioned industry produced 229,024 thousand GEL (100,920 thousand USD) worth goods and increased by 4% compared to the previous years. In 2009-2015, the average annual growth rate of plastic industry (using primary and waste plastic) was 17%, maintaining the steady growth (Diagram 1).

[1] assessment based on the analysis of imports and local production

[2] cannot be assessed

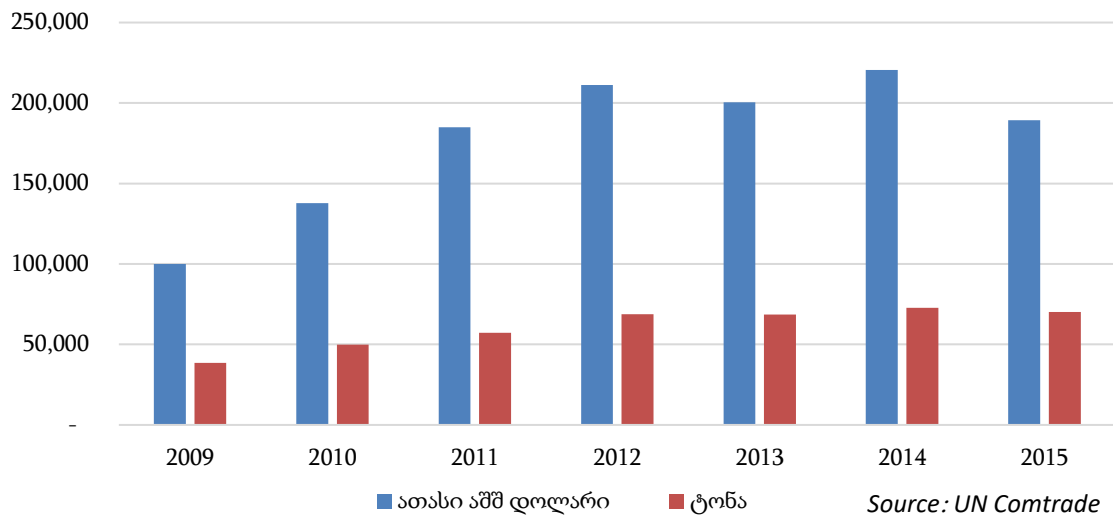


Plastic items in Georgia are produced from imported raw materials. Raw materials are imported from different countries, including Turkey, China, Russian federation, Azerbaijan and the EU countries. In 2015, the volume of import of primary raw materials reached 47,946 thousand USD (108,806 thousand GEL) worth 34,630 tons of plastic. It shall be noted that in 2015 the export of plastic raw materials in terms of monetary value declined by 16%, but increased in terms of quantity by 2% compared to 2014 due to the depreciation of the currency of Georgia and importer countries against USD.



Along with raw plastic materials, Georgia also imports different plastic goods, such as plastic pipes, floor mats, films, tapes, slabs, different types of plastic packaging and household items. The import of plastic goods is up to two times higher than the local production. In 2015 it reached 189,275 thousand USD (429,531 thousand GEL, Diagram 3), meaning 14% decline compared to the previous year. In 2015 the import of plastic amounted to 70,102 tons, thus the import was reduced by 4% compared to 2014. This difference was caused by the depreciation of the currency of Georgia and importer countries against USD. Based on a small growth of local production, it can be assumed that some portion of imported goods were replaced by locally manufactured items, nevertheless the plastic market has been slightly declined compared to the previous year.

Diagram 3. Import of plastic goods



Based on the analysis of imported plastic goods and local production, in **2009-2015 the Georgian plastic market varied within 150-300 million USD**. This is a range within which companies active in plastic market can operate. During this period the rate of annual growth of the market was 13% in average.

The major portion of plastic goods, including plastic pipes, slabs and facing materials have a long life span due to their characteristics. Therefore they will be discarded and become waste after a long period of time. On the other hand, the lifespan of different plastic packaging and PET bottles is short and they become wastes when they can no longer be used. Recycling of this type of waste offer significant economic benefits for enterprises, since the import price for 1 kg plastic in 2009-2015 varied within **1.3-1.87 USD**, while the export price for 1 kg of plastic during the same period was within **0.24-0.54 USD**[3]. The difference between the prices of imported primary raw materials and local prices offers opportunities for the development of a cost-efficient waste recycling industry. As mentioned above, plastic wastes make around 20% of total solid municipal wastes generated in Georgia[4]. Along with important economic benefit, plastic recycling brings additional positive environmental effects through reduction of amounts of landfilled wastes.

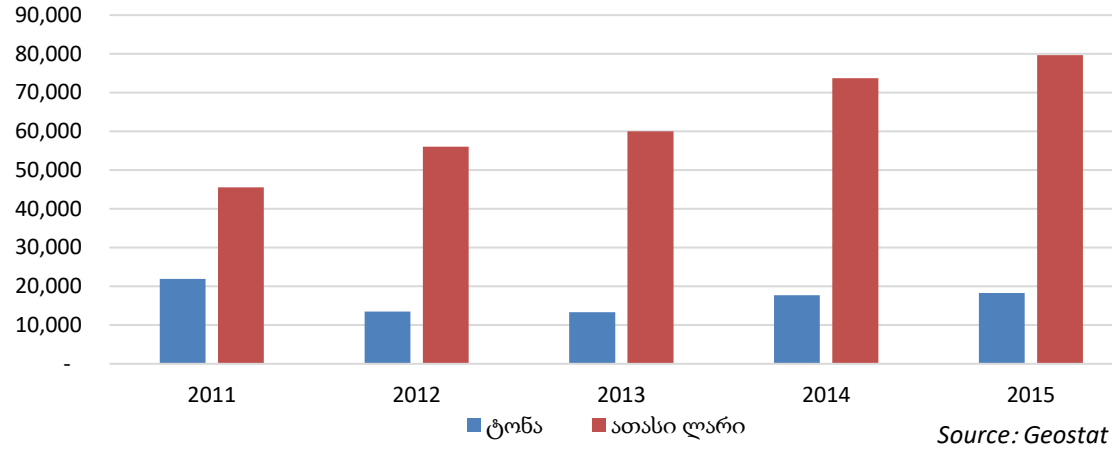
Due to the absence of a comprehensive data on amounts of wastes, plastic wastes can be assessed in an indirect manner based on certain assumptions. For the purpose of the present research, the total amount of plastic containers are assumed to be the total amount of plastic wastes generated in the country per year.

Plastic container manufacting, including production of both PET bottles and different packaging is quite well developed in Georgia. This is determined by the well-developed beverage industry that produces alcoholic and non-alcoholic beverages, sparkling soft drinks, mineral and fresh water. In 2015, 40,562 thousand GEL (17,874 thousand USD[5]) worth plastic containers[6] weighting 8,432 tons were produced in Georgia. In the same year, 39,102 thousand GEL (17,230 thousand USD) worth 353,040 thousand

[3] Source: UN Comtrade FOB prices for PET raw materials and waste.
[4] UNDP (2007). Report of Waste Inventory on the Territory of Georgia.
[5] Average annual exchange rate in 2015: 2,2693
[6] Under plastic container production the production of PET bottles, as well as different packaging and containers is meant

PET capsules (9,885 tons[7]) were produced from primary raw materials. In 2012-2015 the average annual growth rate of production of plastic containers and PET bottles in Georgia was 12%, so amounts of plastic waste would have been increased too. The dynamics of the both sectors are summarized in Diagram 4 below:

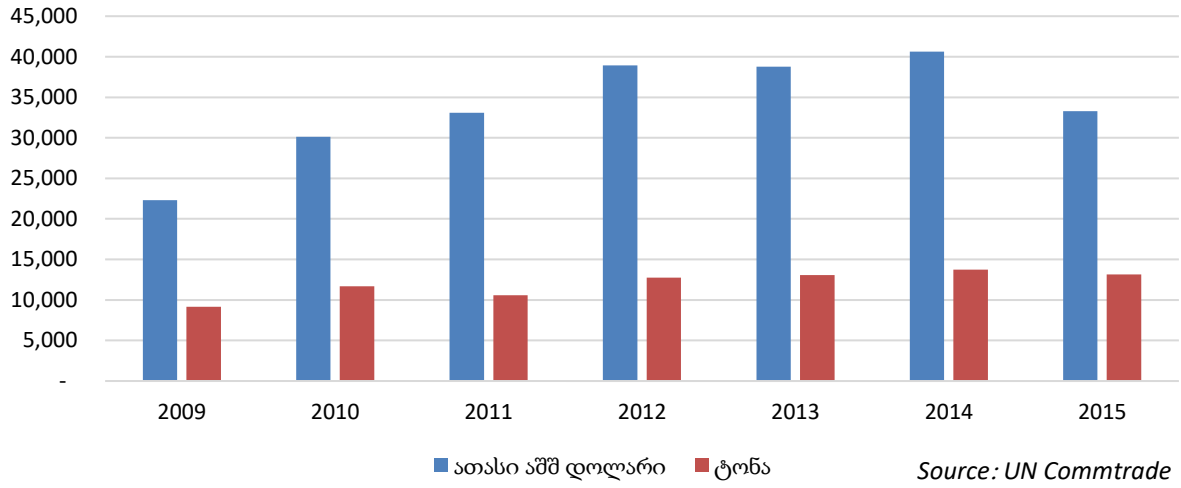
Diagram 4. Plastic container (including PET bottle) production



Source: Geostat

In 2015, around 13,146 tons of differet types of plastic containers at a cost of 33,281 thousand USD were imported to Georgia[8]. As compared to 2014, in 2015 the imports declined by 18%, however in terms of quantity the imports of plastic containers declined by only 4% due to the fluctuations in currency exchange rates. 3% growth in local production of plastic containers and PET bottles in 2015 indicates, that local products have substituted imported goods while consumption remained at the same level as in 2014. In 2012-2015 the average annual growth rate of imports of plastic containers and PET bottles in terms of monetary value was around 1%, while the average annual growth rate of imports in terms of quantity was 6%. Diagram 5 below illustrates the dynamic of imports of plastic containers:

Diagram 5 Import of plastic containers



Source: UN Commtrade

[7] Assuming that the weight of one PET bottle capsule is 28 grams

[8] The available data does not allow to separately assess the imports of capsules for plastic containers and PET bottles

Based on the above data, in 2011-2015 the Georgian market of plastic containers and PET bottles varied within **53-73 million USD**. In quantitative terms, the amount of consumed plastic container and PET bottles in Georgia in 2011-2015 amounted **26-33 tons which assumed to be a potential amount of plastic waste for the purpose of the present research**. It shall be also noted, that small amounts of plastic waste are exported from Georgia. The exports reached their peak - 721 tons in 2013[9]. Currently, some companies are engaged in recycling of different types of secondary polymers. They are mixing recycled plastic with primary raw materials to produce primary plastic goods. However, it can be still assumed that the available potential is not fully utilized.

Different types of plastic items, including plastic bags, PET bottle capsules, plastic construction and household goods (such as plastic pipes, window frames, etc.) are produced currently in Georgia. The companies engaged in manufacturing of plastic goods recycle secondary raw materials to produce plastic bags (e.g., Zugo Ltd.) or different construction and household goods (e.g., IGA Georgia Ltd.).

2.1 Opportunities and challenges

The amounts of waste available in the country create a number of opportunities for recycling of this type of wastes, however there are also **challenges**, namely:

- All types of plastic can be recycled, however for manufacturing particular plastic products specific type of waste polymers are needed. Therefore, specific waste sectors have to be studied for each final product to be manufactured;
- The absence of separated waste collection system makes the process of plastic waste collection complicated and costly. It increases the volumes of wastes that are polluted with different type of animal grease and require preliminary treatment prior to recycling;
- The market is saturated with imported goods, which make about 65% of the market. Therefore, local producers will have to compete with more experienced importer companies both in terms of quality and price.

At the same time, there are a number of **opportunities** for the development of a competitive and cost-efficient recycling industry, specifically:

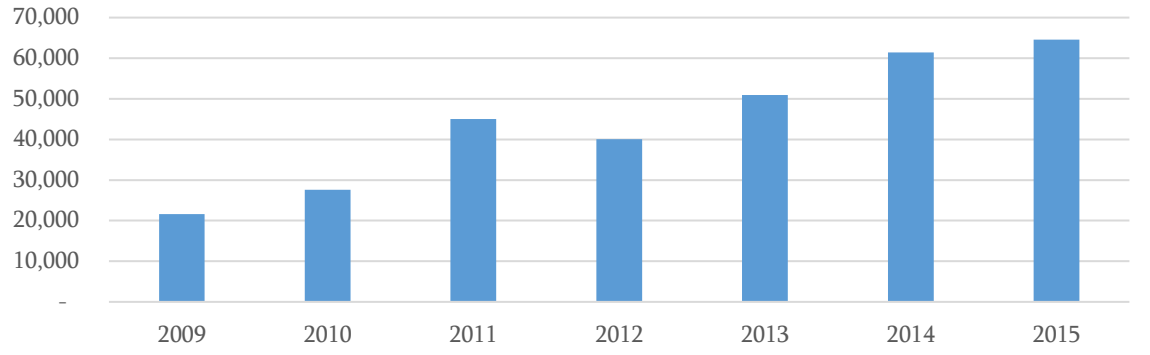
- Availability of large amounts (roughly 26-33 thousand tons) of unused secondary raw materials in the form of wastes;
- A wide range of recycled products gives the opportunities for diversification of manufactured goods in the recycling sector;
- The analysis of import prices of primary raw materials and export prices of plastic waste shows that the prices of secondary raw materials make 25% of the prices of primary raw materials. Therefore, recycling offers economic benefits to potential entrepreneurs;
- The new Code on Wastes considers extended producer responsibility which will enable to create a more effective system of collection of (plastic) waste within plastic producer and consumer industries and/or waste collection points.

[9] Source: UN Comtrade

3. Paper and cardboard market

Manufacturing of different types of paper and curdboard is quite well-developed in Georgia. There are some companies engaged in production of tissue paper and cardboard shipping containers[10]. Corrugated and plain packaging materials are also being produced. Local enterprises use mainly imported raw materials to manufacture paper goods. In 2015, 64,548 thousand GEL (28,435 thousand USD[11]) worth paper, cardboard and paper and cardboard items were manufactured. The cost of paper and cardboard items makes 97% of this amount. Production of paper, cardboard and paper and cardboard items is a steadily growing industry (Diagram 6). Its annual growth rate varies within 5-37%. Production of cardboard shipping containers makes 17% of the total output of this sector. In 2015, 11,037 thousand GEL (4,870 thousand USD) worth 8,258 m^2 cardboard shipping containers were manufactured. Peak cardboard shipping container production - 13,231 m^2 was reached in 2012.

Diagram 6. Production of paper pulp, paper, cardboard and paper and cardboard items (thousand GEL)



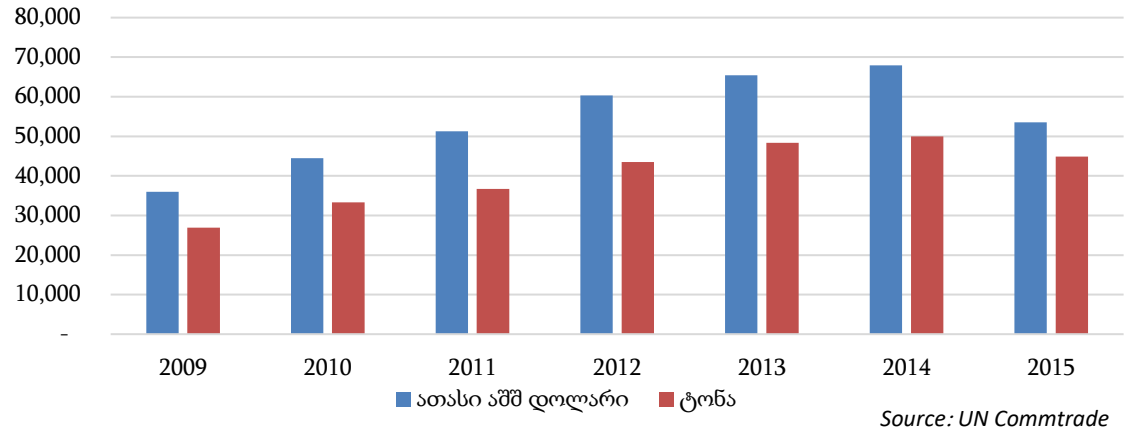
Source: Geostat

In terms of international trade, the paper and cardboard market is quite diverse. All types of paper, including tissue paper and paper and cardboard goods and containers are being imported. Imports are more than twice as large as local production. In 2015 imports reached 53,505 thousand USD (121,456 thousand GEL). Turkey is the largest importer – around 75%, followed by Germany and the Russian Federation (8-8%). There has been an increase in imports until 2014, however in 2015 imports declined by 21% compared to 2014 (Diagram 6). In quantitative terms, 44,861 tons of mentioned goods were imported to Georgia in 2015, which shows 10% decline of imports compared to the previous year (Diagram 7). This decline in imports is caused by reduced import prices on the one hand, and increased local production on another

[10] Cardboard boxes of different types

[11] Average annual exchange rate in 2015: 2.27 GEL / USD

Diagram 7. Imports of paper and cardboard goods



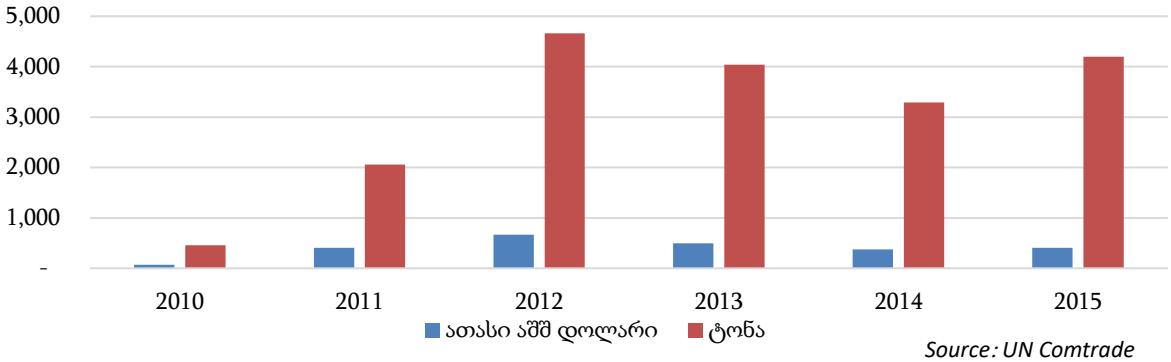
Source: UN Commtrade

The above data shows, that the paper and cardboard market is quite large considering the scales of the Georgian economy. Specifically, in 2015, the paper and cardboard market was as large as **81 million USD**[12]**. Around 65% of the market is occupied by imported goods and 35% - by local products.** Compared to 2014, in 2015 market declined by 20% (102.6 million USD). This was caused mainly by the depreciation of the currency of Georgia and importer countries (including Turkish Lira) against USD.

Paper pulp – the primary raw material is not produced in Georgia, therefore local paper industry uses mainly imported paper pulp or recycled waste paper. For the purpose of the present research, potential waste paper streams, as well as annual amounts of collected waste paper shall be analyzed. Unfortunately, there is no available statistical data on total amount (weight) of locally produced paper and cardboard. Therefore, the potential amount of waste paper generated per year in Georgia can be determined by dividing the cost of local production by import prices of paper and cardboard[13]. By adding the amounts of imported paper, it can be assumed that around **68-75 thousand tons of waste paper and cardboard** would be generated per year in Georgia. The above calculation is based on the assumption that both locally produced and imported paper/cardboard items become waste in the same year.

Georgia also exports waste paper. In 2015, Georgia exported 407 thousand USD worth 4,201 tons of waste paper. The scales of waste paper export are limited. This is an underdeveloped market characterized by fluctuating supplies (Diagram 8) that relies on a few providers of paper waste.

Diagram 8. Export of waste paper



Source: UN Comtrade

[12] Source: Geostat, UN Comtrade

Nevertheless, the system of paper and cardboard waste collection system is more developed compared to the practice of collection of other household wastes. In Georgia waste paper are collected by several large collecting companies, such as the member companies of Palitra Holding: Green Cycle, Makuliteratura and Legi Group. These companies collect waste paper for export in 5 cities. 4 largest paper manufacturing companies: Georgian Paper Production Ltd., Tissue Paper Ltd., Neoprint Ltd., and Kagaldi + Ltd. also collect waste paper. Recycled paper is used by the companies producing tissue paper, as well as book, newspaper and magazine manufacturing companies. The available statistical data does not allow to determine the amounts of collected and recycled waste paper, however WMTR partner companies recycle **9,430 tons of waste paper** a year.

3.1 Opportunities and challenges

The results of the research of the paper and cardboard market show that there exists a rather large potential to increase local production and replace imported paper with locally recycled materials. Collection and recycling of waste paper face a number of **challenges**:

- Recyclable waste paper should be clean and not polluted with organic greese;
- Waste separation does not occur in Georgia, therefore waste paper streams from the household sector is hard to receive. Major portion of recyclable waste paper is being collected by different organizations and motivated individuals;
- The absence of a unified system of waste paper collection makes the collection process costly and inefficient;
- For certain types of recycling the Georgian market of paper and cardboard may not be sufficient to ensure efficient operation of recycling enterprises;
- The Georgian market of paper and cardboard goods is saturated with imported items (around 2/3 of the market), especially in the case of tissue paper. Therefore new local companies will have to compete with more cost-efficient and experienced companies. It shall be also noted, that imported goods have been on the market for a long period of time and therefore are highly visible. Thus, mew companies will have to invest considerable resources and efforts in marketing.

At the same time, there are a number of **opportunities** for the development of waste paper recycling business:

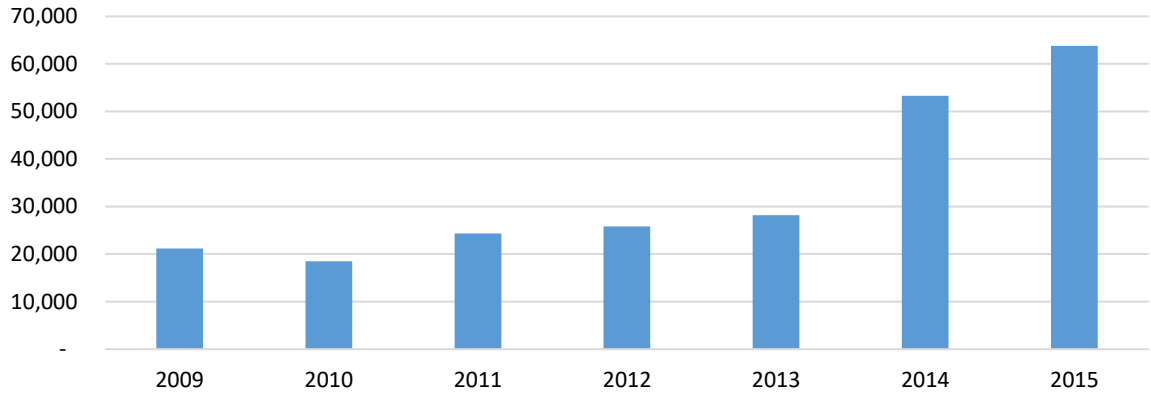
- Potential large amounts **(around 68-75 tons)** of waste paper that are available at a significantly lower cost than primary raw materials;
- Tax rates in Georgia are lower compared to competitor countries[14];
- Import of fixed assets is not subject to VAT. This is especially important for start-up companies which are going to purchase operating equipment;
- In conditions of separated waste collection an organized waste paper market can be created to facilitate the access to raw materials;
- Recycled waste paper and cardboard can be used for manufacturing of different items, therefore the companies will be able to diversify their production if needed.

[14] World Bank Doing Business 2017

4. Glass market

Glass is an important component of waste streams which makes about 5-6% of wastes generated in Georgia[15]. Glass creates serious environmental problems due to the long period of time required for its decomposition and therefore occupies larger areas on landfills. On the other hand, glass is infinitely recyclable and glass recycling uses less energy than manufacturing glass from primary raw materials. During Soviet times, glass had been produced at a number of enterprises, including Avchala, Ksani and Kutaisi glass factories. Currently, only one factory located in the village of Ksani of Mtskheta municipality is fully operational. Glass manufacturing from primary raw materials in Georgia has been increasing during the last years. In 2015, 63,830 thousand GEL (28,127 thousand USD[16]) worth glass and glass items were manufactured in Georgia. Since, there is only one factory engaged in glass manufacturing in the country, the information on its outputs is not public. However, based on the information provided by the company, the average output of the factory is 200 tons per hour, meaning that the factory manufactures 73,000 tons of glass from primary raw materials. The Ksani factory does not collect and recycle waste glass, however it recycles faulty products. Local glass production is growing. In 2014, the volumes of produced glass and glass items increased by 89% which was determined by the launch of the second glass melting furnace at the Ksani factory. 20% increase in glass industry was recorded in 2015.

Diagram 9 Production of glass and glass items (thousand GEL)



Source: Geostat

It shall be emphasized that the major portion of locally produced glass items are used within the country, however considerable increase in exports of these products has been observed during recent years. Increased capacities of the Ksani glass factory greatly determined the replacement of imported products with locally produced ones. In 2015, 20,249 thousand USD (45,953 thousand GEL) worth 38,833 tons of glass containers were imported to Georgia (Diagram 9), meaning that imports have declined by 50% due to increased local production capacities.

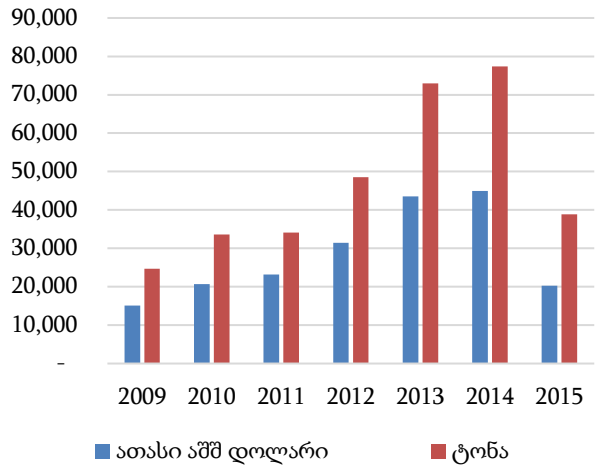
Exports of glass goods have been also increased during recent years and reached 5,791 thousand USD worth 14,250 tons in 2015 (Diagram 10-11).

[15] UNDP (2007). Report of Waste Inventory on the Territory of Georgia.

[16] average annual exchange rate in 2015 USD/GEL - 2.269

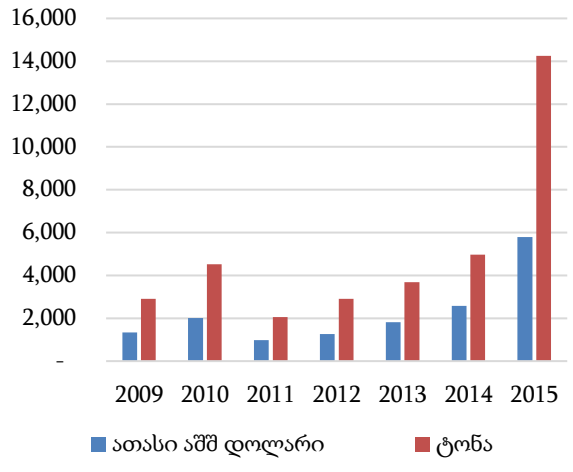
Based on the above information, the Georgian glass market varies within **40-55 million USD** and after leveraging additional local capacities uses about **100,000 tons** of glass containers. Since the above statistical data relates to only glass containers, it can be assumed that **potential amount of glass containers means 100,000 tons of glass waste**. It shall be also noted that often glass containers are reused for different households purposes, therefore only certain portion of potential amount of waste glass becomes municipal waste. To determine the amounts of discarded waste glass containers, a comprehensive study of waste composition is needed.

Diagram 10 Import of glass containers



Source: UN Comtrade

Diagram 11 Export of glass containers



Source: UN Comtrade

To make waste glass collection profitable, collected waste glass should be exported or locally recycled which is also an energy efficient option. Currently Georgia exports small amounts of glass waste. Exports of glass waste are characterized by fluctuating supplies. In 2010 export of glass waste from Georgia reached its peak – 673 tons. The use of recycled glass instead of raw materials offer a number of important benefits to local glass manufacturers:

- goods manufactured from recycled glass are the same quality as those made from primary raw materials;
- recycling waste glass requires less energy than manufacturing glass from primary raw materials. Glass manufacturing is an energy intensive industry, therefore in conditions of relatively low energy costs and/or energy saving, potential entrepreneurs can gain an advantage over competitor countries;
- the possibility of mixing primary and secondary raw materials that offers energy saving opportunity. An average energy saving of 2.8% is achieved for every 10% of recycled glass substituted for raw materials[17];
- environmental benefit through the reduction of greenhouse gas emissions;
- glass can be recycled at facilities with different production capacity. This makes possible to establish small and medium sized recycling companies and develop handmade glass industry.

[17] Glass Recycling - A Life Cycle Analysis Report, Prepared for British Glass by Enviros Consulting Ltd, November 2003

4.1 Opportunities and challenges

Glass recycling sector faces significant challenges, however there are a number of opportunities which might offer considerable benefits if provided they are used adequately. The **challenges** include:

- higher energy, specifically natural gas costs compared to competitor neighboring countries – Russian Federation, Azerbaijan and Armenia;
- the absence of a glass waste collection system. Additional substantial resources will be required for establishing a collection system;
- low market price of glass waste (according to the experts' estimate, 86 GEL for 1 ton of waste), which is not sufficient for adequate remuneration of collectors' work.

The glass market also offers a number of important **opportunities**:

- Although energy (natural gas) costs in Georgia are higher than in competitor countries, energy savings can be achieved through mixing primary and secondary raw materilas which in case of large scale production can lead to considerable economic effects;
- If extended producer responsibility is introduced, a cooperation between glass manufacturers and beverage and food producers can be established to make a collection system more effective. Within the framework of this cooperation waste glass collection and sale points can be established. Such system will ensure efficient waste collection and increase in exports of waste glass, which will be beneficial both for the large companies, like Ksani glass factory, and small and medium sized enterprises;
- small and medium sized enterprises manufacturing handmade glass articles will especially benefit from waste glass collection and recycling, since their development greatly depends on the availability of low-cost secondary raw materials.

5. Aluminum market

Aliminium recycling is one of the most profitable businesses in waste management sector, since the quality of recycled aluminum does not differ from aluminum manufactured from primary raw materials and recycling scrap aluminum requires only 5% of the energy used to make new aluminum. Recycled aluminum is used in a number of industries: construction, energy, automotive industry, production of packaging for beverages and food products, etc. Waste aluminum recycling involved the following steps:

1. Collecting scrap aluminum;
2. Crushing and cleaning from paints and other substances;
3. Melting and preparing for other uses.

Aluminum recycling process recovers 70-95% of the material[18], however the EU aluminum recycling industry is characterized by 98% recovery rate[19]. Although aluminum and zinc industries could be developed in Georgia due to the low cost of electricity generated by hydropower[20], 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

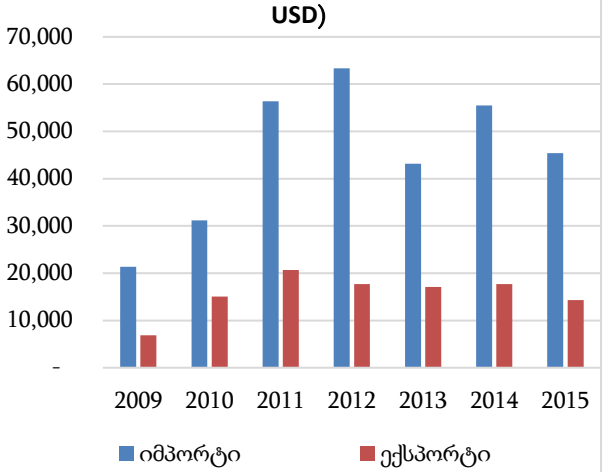
[18] Aluminum Recycling in Europe – The Road to High Quality Products, European Aluminum Association and Association of European Aluminum Refiners and Remelters, 2006

[19] Melting Standardized Aluminium Scrap: A Mass Balance Model for Europe. JOM 57(8), pp 26-33, Bain U.M.J. and Bertram M., 2005.

[20] Energy-intensive production: Potential in Georgia, German Economic team, 2015

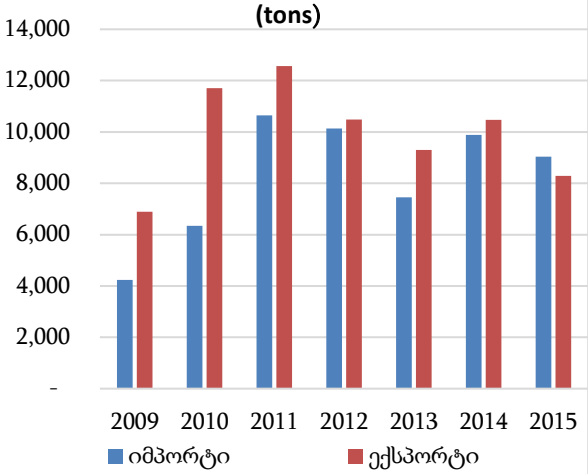
tons. Imports and exports (mainly re-export) of different aluminum goods also occurs in Georgia. In 2015, imports of aluminum items amounted to 45,399 thousand USD (103,025 thousand GEL[21]) and exports - 14,331 thousand USD (32,522 thousand GEL). In quantitative terms, the volume of imports in 2015 made 9,040 tons, and the volume of export - 8,291 tons. It shall be noted that Georgia exports mainly untreated and scrap aluminum. Exports of aluminum from Georgia are characterized by fluctuations. In 2015, in quantitative terms imports declined by 9% and exports – by 21%, while in 2014, these indices were characterized by 33% and 13% growth (accordingly). Dynamics in aluminum trading is illustrated in the Diagrams 12-13 below:

Diagram12 Aluminium trading (thousand USD)



Source: UN Comtrade

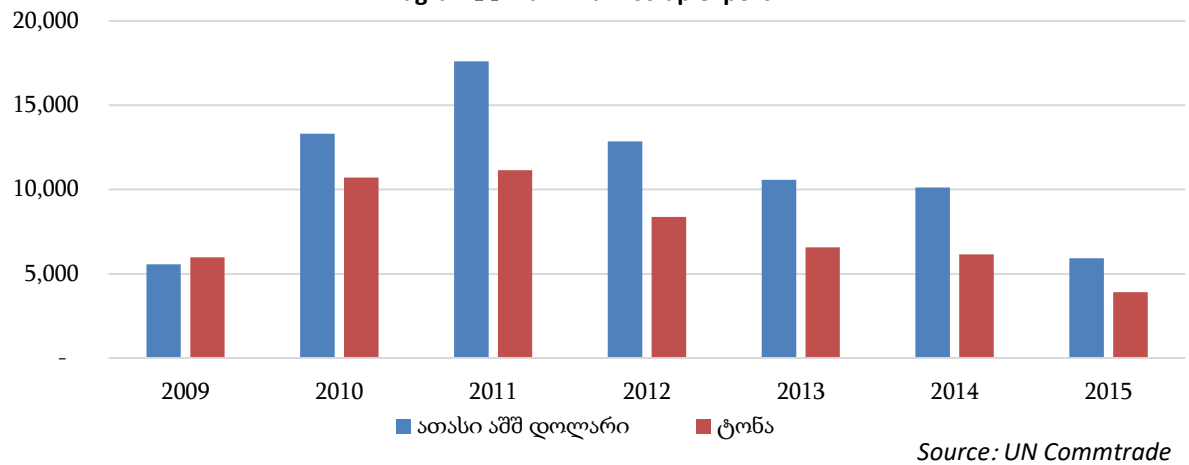
Diagram13 Aluminium trading (tons)



Source: UN Comtrade

Aluminum manufacturing does not occur in Georgia, however export of crap aluminum collected from outdated equipment and machinery of former factories has been taking place since the collapse of the Soviet Union. Metal scrap has been the main component of exports during the years. In recent years, export of aluminum scrap from Georgia declined considerably. Specifically, in 2015 exports amounted to 5,921 thousand USD (13,436 thousand GEL) meaning that exports have declined by 42% compared to the previous year. In quantitative terms, in 2015 exports amounted 3,906 tons showing 36% decline compared to 2014. Dynamics of aluminum scrap exports during recent years is shown in Diagram 14 below:

Diagram14 Aluminium scrap export



Source: UN Commtrade

[21] 2015 average annual exchange rate - 2.269

5.1 Opportunities and challenges

Total amounts of aluminum scrap can be hardly determined of the basis of analysis of the above data does. On one hand, aluminum items can be used for a long period of time and on another, there are still considerable amounts of aluminum scrap is Georgia, which have not been yet assessed. There are a number of important challenges and opportunities for aluminum recycling in Georgia. Main **challenges** faced by this sector include:

- The use of aluminum in Georgia is limited. Import data show that the aluminum market varies within 45-65 million USD. The scales of the market are not sufficient for an aluminum recycling company. Therefore, an aluminum factory producing aluminum from primary raw materials should be export oriented. However, aluminum recycling is a relatively simple process. Moreover, low electricity cost and relatively low electricity consumption needed for aluminum recycling create favorable conditions for the development of small and medium sized aluminum recycling enterprises;
- Classification of aluminum scrap according to EN 13920[22] standard does not occur preventing exports of metal scrap to European markets;
- Inadequate pre-treatment of aluminum scrap implying removal of other types of solid wastes from aluminum wastes reduces the price of exported scrap.

There are also important **opportunities** for the development for aluminum recycling industry available on the local market:

- Low electricity prices – the main component of costs associated with aluminum recycling;
- The system of aluminum scrap collection is more developed compared to the practice of collection of other household wastes. The existing experience can help to meet relevant standards established for scrap collection;
- Deep and Comprehensive Free Trade Agreement (DCFTA) signed between the EU and Georgia enables exports of local products to the European market;
- Aluminum recycling is a relatively simple process compared to manufacturing from raw materials. Therefore, aluminum can be recycled by companies having lower industrial capacities;
- Beverage industry - a major consumer of aluminum cans is well developed in Georgia. Both small (500 ml) as well as large aluminum cans (designed for transportation) can be produced to supply local beverage industry.

6. Comparative advantage for waste recycling in Georgia

There are several factors that can facilitate the development of local waste recycling business and make it more competitive against imports. These factors include:

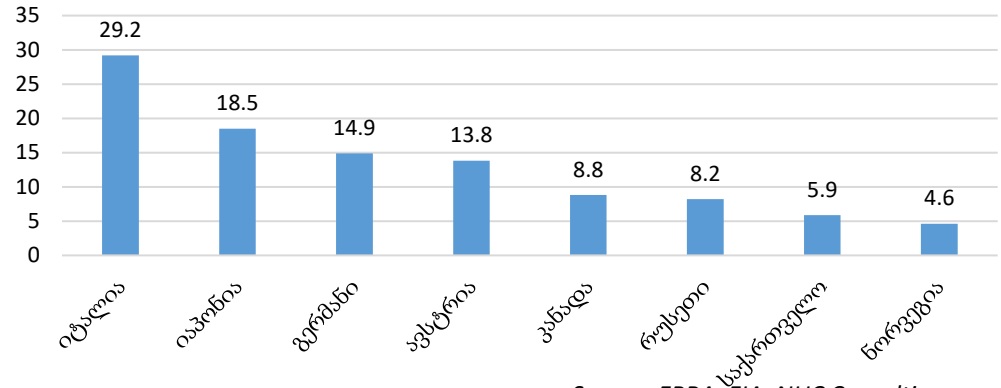
- **Energy costs[23]**: The majority of recycling processes use electricity the cost of which is the main component of recycling costs. Electricity prices in Georgia are lower than in the EU and competitor countries of the region. In this regard the difference between electricity prices in Georgia and the EU countries, such as Italy, Germany and Austria which are actively engaged in recycling if different waste types shall be noted. Therefore, electricity prices which in

[22] Aluminum Recycling in Europe – The Road to High Quality Products, European Aluminum Association and Association of European Aluminum Refiners and Remelters, 2006

[23] Energy-intensive production: Potential in Georgia, German Economic Team, Tbilisi 2015

Georgia are lower than in the EU and other countries of the region is a comparative advantage for waste recycling in Georgia;

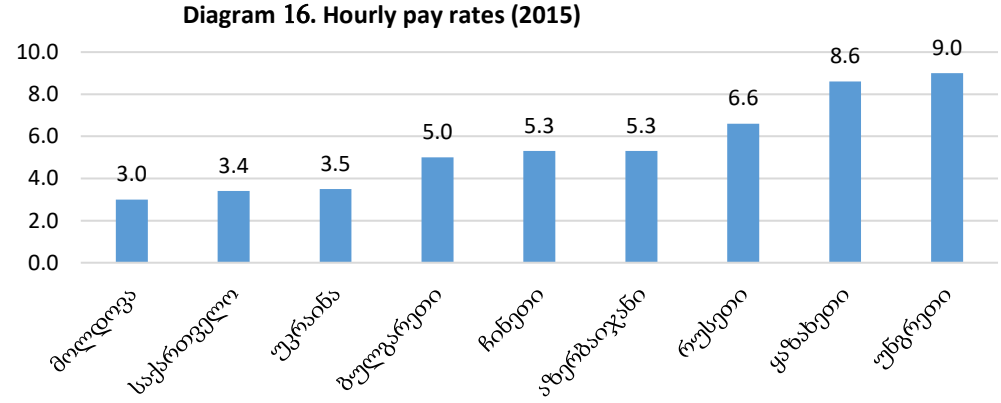
Diagram15 Electricity prices USD/kWh (2015)



Source: ERRA, EIA, NUC Consulting

- **Heap labor force[24]:** Wage level in the Georgian industrial sector is low compared to wage levels in competitor countries. Wages is a substantial component of costs associated with recycling and therefore lower wage level is a comparative advantage for potential recyclers;

Diagram 16. Hourly pay rates (2015)



Source: National Statistics Office

- **Great potential of unused waste:** Only few companies are engaged in waste recycling in the country, therefore there are still large amounts of unused recyclable wastes. The present research shows that recycling of plastic and paper offer greater opportunities;
- **Liberal tax system and low taxes:** With profit tax at the rate of 16.4%, Georgia is among 15 countries with the lowest tax rates in the world. Therefore, a simple tax system, with only 5 taxes and fixed tax rates create comparative advantages for potential investors in the recycling sector;
- **Simple regulatory framework:** Waste management in Georgia is regulated only by environmental legislation, which considers one-time permitting for environmental impacts. Permits are issued on the basis of the EIA report. Costs associated with the process of obtaining of an environmental impact permit varies within 8-12 thousand USD.

[24] Engineering goods: Potential in Georgia, German Economic Team, Tbilisi 2015

7. Conclusions

Waste recycling market in Georgia is at an early development stage. The market research shows that there exists a considerable potential for the development of waste recycling industry and associated economic and environmental benefits. First of all the availability of large amounts of plastic, glass and paper wastes shall be noted. The major portion of wastes which can be recycled and bring various benefits goes to landfills. Below the opportunities for the development of the recycling sector in the country are summarized:

- Paper, plastic, glass and aluminum goods are in demand in the country, however large amounts of discarded paper, plastic, glass and aluminum items go to landfills without being recycled;
- The abundance of raw materials on local markets on one hand ensures medium-term (3-5 years) sustainability of production, and determines the low cost of primary materials on another;
- Due to the availability of relatively cheap labor force, a low-cost waste collection system can be established in the country;
- A simple and low-cost regulatory framework (both tax and environmental) active in the country creates favorable conditions for operators;
- Eextended producer responsibility which will be introduced by the legislation have a potential to form partnerships between industries for establishing an effective waste collection system;
- The possibility of using the potential of export of available wastes.

The following improvements are needed to ensure successful operation of the recycling sector in the country:

- Separated waste collection system shall be established to minimize collection costs and ensure that the type and quality of collected wastes are adequate for recycling. Creation of an organized waste market at the level of waste collection points or material recovery facilities is important;
- Eextended producer responsibility shall be stablished in a manner to ensure cooperation among producers, collectors and recyclers;
- Financial and other incentive mechanisms have to be introduced for recycling companies based on the best international practice and experience;
- Modern recycling technologies have to be introduced and representatives of recycling industry have to be trained to improve the operational efficiency of the sector and the quality of its production.