Corfu 2022

European Bank
for Reconstruction and Development

This project is funded by the European Union

Transition of Georgia to a new waste management in the sense of circular economy using the examples of Tbilisi ~~and Batumi~~

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The International Consortium Members - Introduction

Prof. Czurda & Partners
International Consulting

ICP
Environmental and
Geotechnical Engineering

ENVIROPLAN S.A.
Consultants & Engineers

Project location – Georgia, Tbilisi and Adjara

Inhabitants in Million

Georgia:	~3,975
Tbilisi (1):	~ 1,050
Batumi (3):	~ 0,122
Adjara region:	~ 0,355

The Project

Background

The **Municipality has identified solid waste collection and disposal**, as well as reform of the existing waste management system **as a key priority for Tbilisi**. In **2016 the Government of Georgia has adopted the National Waste Management Strategy and Action Plan, which imposes certain obligations on the municipalities of Georgia, including Tbilisi**. **This has been updated in May 2022**
As part of these obligations, the City seeks to improve the sector management within an ambitious timeframe.

The Project beneficiary is Tbilisi City hall parallel with Tbilservice Group Ltd. , a municipally owned company in charge of solid waste and construction waste management in the city, street lighting, maintenance of underground passes, as well as other services.

Main Features of the Project

General objectives

<u>to formulate for Tbilisi a strategy on</u>

- municipal solid waste (MSW) prevention,
- waste separation at source and
- collection, recycling and recovery activities

Main Features of the Project

Main Tasks

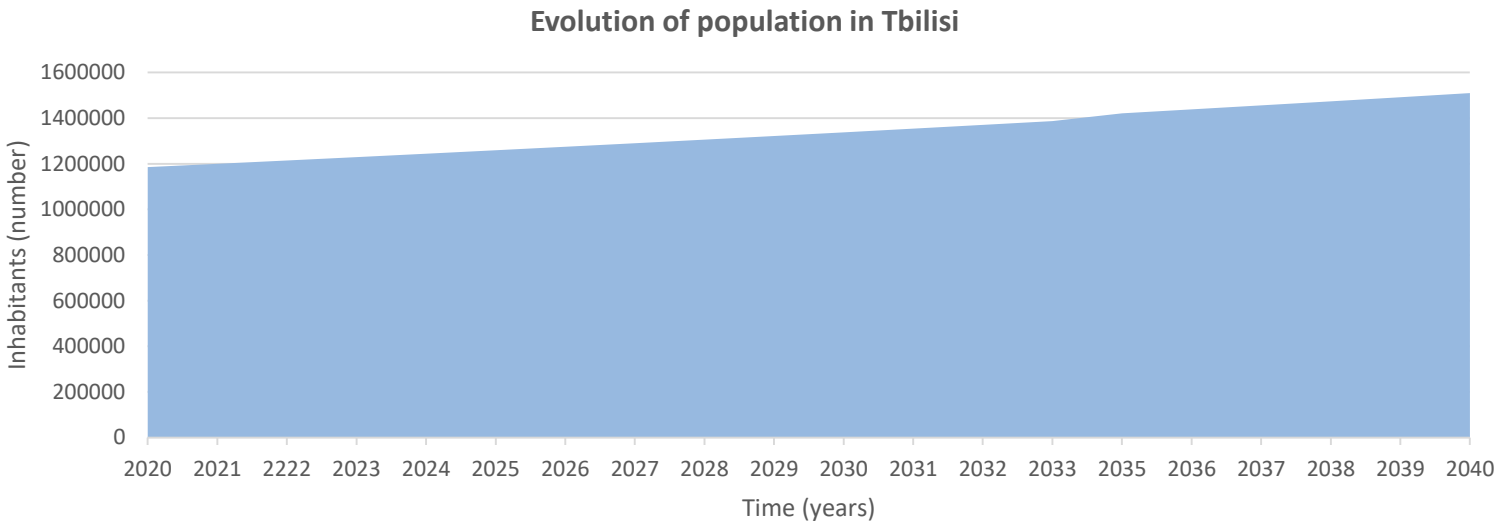
Task 1: Baseline Study and future projection

Task 2: Develop the waste prevention and recycling Strategy for Tbilisi

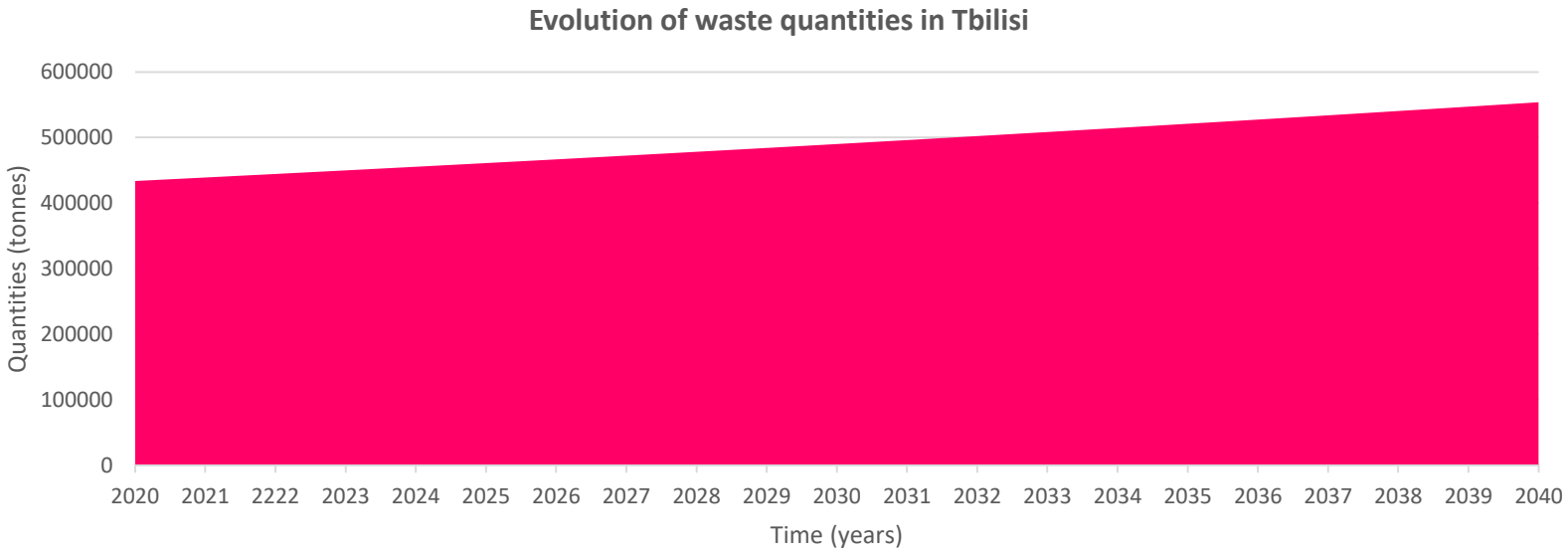
Task 3: Cost and revenue analysis of waste prevention and recycling scenarios

Task 4: Action Plan for the implementation of selected waste prevention activities and recycling scenarios

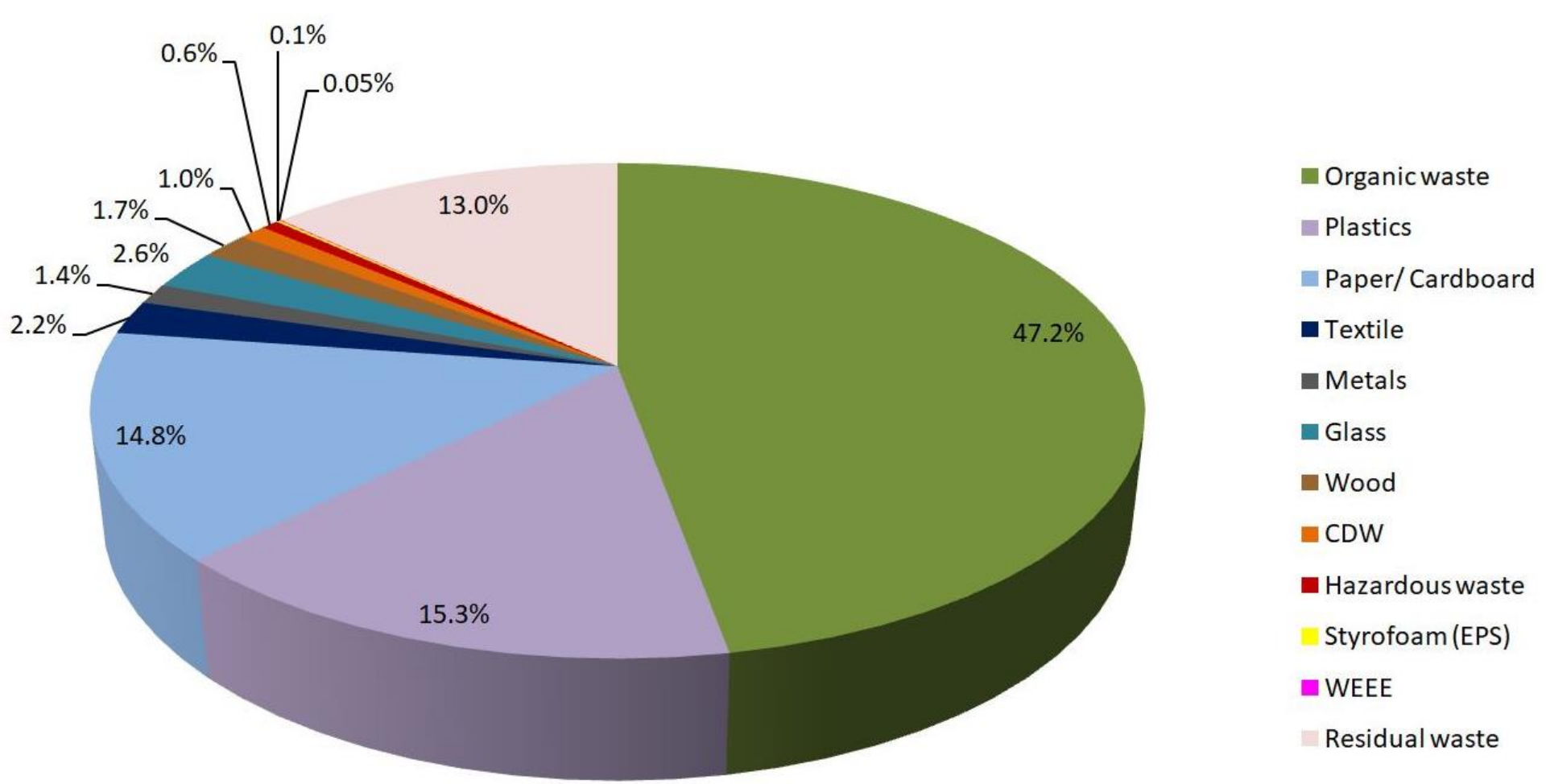
Projection for Tbilisi - Population



Projection for Tbilisi – Waste quantities



Waste composition



Waste composition

- Share of **organic waste** represents **approximately 47%**;
- Share of **recyclable materials** (plastics, paper/cardboard, metals, glass, wood and textile) represents **approximately 38%** (maximum potential);
- Very low share of **WEEE < 0.1%**;
- Share of **hazardous waste** is **estimated < 1%** and contained medical waste (needles and medicines), used oils, old paints, batteries and accumulators, ink cartridge for printers, air filters for cars, etc.;
- Share of **packaging waste** is **estimated by 30%** of the total MSW of Tbilisi City;
- Share of **packaging waste for the Deposit Fund System** is **estimated by 4%** of the total MSW of Tbilisi City.

Targets – EU and Georgia

Category	EU	Georgia
Prevention	Prevention objectives are significantly reinforced, in particular, requiring Member States to take specific measures to tackle food waste and marine litter as a contribution to achieve EU commitments	No targets according to existing national waste management strategy; Draft National Waste Management Action Plan includes qualitative targets for waste prevention and also, for plastic waste prevention (see above). For the latter, at the actions level it is envisaged to develop a regulation on single-use plastic by 2026; also it is envisaged to design 2 prevention programmes, with 1 plastic prevention programme
Collection	Separate collection obligations are strengthened and extended to: - hazardous household waste by end 2022 - bio-waste by end 2023 - textiles by end 2025	- Collection of municipal solid waste: 95% by 2025 according to the draft national waste management action plan and 100% by 2030 by existing national waste management strategy - Collection and transportation of municipal hazardous waste: 50% by 2025 according to the draft national waste management strategy and 100% by 2030 by existing national waste management strategy

Targets – EU and Georgia

Category	EU	Georgia
Landfill	Reduce waste going to landfill to a maximum of 10% of municipal waste by 2035	No quantitative targets
Biodegradable Waste	Prohibition to landfill biodegradable waste that has been separately collected for recycling in accordance with Directive 2008/98/EC	No targets under existing national waste management strategy; Only qualitative targets and actions are included in the draft updated National Waste Management Action Plan; At the actions' level, the draft plan gives quantitative indicators for implementing waste biodegradable waste composting and recovery pilot projects
Hazardous Waste	-	No targets under existing strategy; Updated Draft Waste Management Action Plan includes qualitative targets and actions for hazardous wastes; At the actions' level, the draft plan gives a quantitative indicator for piloting (at least 1 project) hazardous wastes energy recovery through incineration

Targets – EU and Georgia

Category	EU	Georgia
Construction & Demolition Waste (CDW)	70% of non-hazardous CDW by 2020	No general targets at national level. Draft updated National Waste Management Action Plan includes a qualitative target and actions for CDW; At the municipal level, Batumi Green Cities Action Plan under strategic objective SW2 Reduce waste to landfill and increase recycling includes following quantitative targets for CDW: - 25% CDW recycling rate by 2025 - 90% of CDW either recycled or disposed in a permitted landfill by 2025

Targets – EU and Georgia

Category	EU	Georgia
Recycling targets	65% of municipal waste by 2035 (including biodegradable waste for recycling)	Updated Draft National Waste Management Action Plan does not include quantitative targets for recycling except for EPR targets; Existing national waste management strategy includes following recycling targets:
- **Paper and cardboard**	-	80% of paper and cardboard by 2030
- **Glass**	-	80% of glass by 2030
- **Metal**	-	90% of metals by 2030
- **Plastic**	-	80% of plastic by 2030
		Batumi Green Cities Action Plan includes source separation/recycling target:
- **Total MSW**		40% source separation for recycling by 2025

Targets – EU and Georgia

Category	EU	Georgia
Extended producer responsibility (EPR)		
• **Packaging waste**	70% of packaging waste by 2030	No general target approved yet, the draft regulation is under discussion
- **Paper and cardboard**	85% of paper and cardboard packaging waste by 2030	No specific target approved yet, the draft regulation is under discussion
- **Glass**	75% of glass packaging waste by 2030	No specific target approved yet, the draft regulation
- **Metals**	-	No specific target approved yet, the draft regulation
- **Ferrous metals**	80% of ferrous metals packaging waste by 2030	No specific target approved yet, the draft regulation
- **Aluminium**	60% of aluminium packaging waste by 2030	No specific target approved yet, the draft regulation
- **Plastic**	55% of plastic packaging waste by 2030	No specific target approved yet, the draft regulation
- **Wood**	30% of wood packaging waste by 2030	No specific target approved yet, the draft regulation

Category	EU	Georgia
Extended producer responsibility (EPR)		
• **End of life vehicle (ELV)**	Reuse and recovery (by av. weight): 95% by 2030 Reuse and recycling (by av. weight): 85%	No specific target approved yet, the draft regulation
• **Batteries**	Collection target for (portable) batteries: 45% Minimum recycling efficiencies for batteries and accumulators (by av. weight): - 65% of lead acid - 75% of nickel cadmium - 50% of others	80% of used batteries by 2032
• **Accumulators**	Collection target: virtually 100% (prohibition of disposal) Recycling efficiencies as above	90% of accumulators by 2032
• **Tyres**	Collection target: virtually 100% (prohibition of disposal)	90% of used tyres by 2032
• **Special hazardous waste (used oils)**	Collection target: virtually 100% (prohibition of disposal)	90% of waste oils by 2032
• **Electrical and Electronic Waste (WEEE)**	Collection target: 65% of the av. weight of EEE placed on the market in the three preceding years or 85% of WEEE generated. Recovery target: According to EEE categories (Annexes III and V) - cat. 1 or 4: 85% recovery and 80% preparation for reuse and recycling; - cat. 2: 80% recovery and 70% preparation for reuse and recycling; - cat. 5 or 6: 75% recovery and 55% preparation for reuse and recycling; - cat. 3: 80% recycling.	80% of WEEE by 2032

Targets

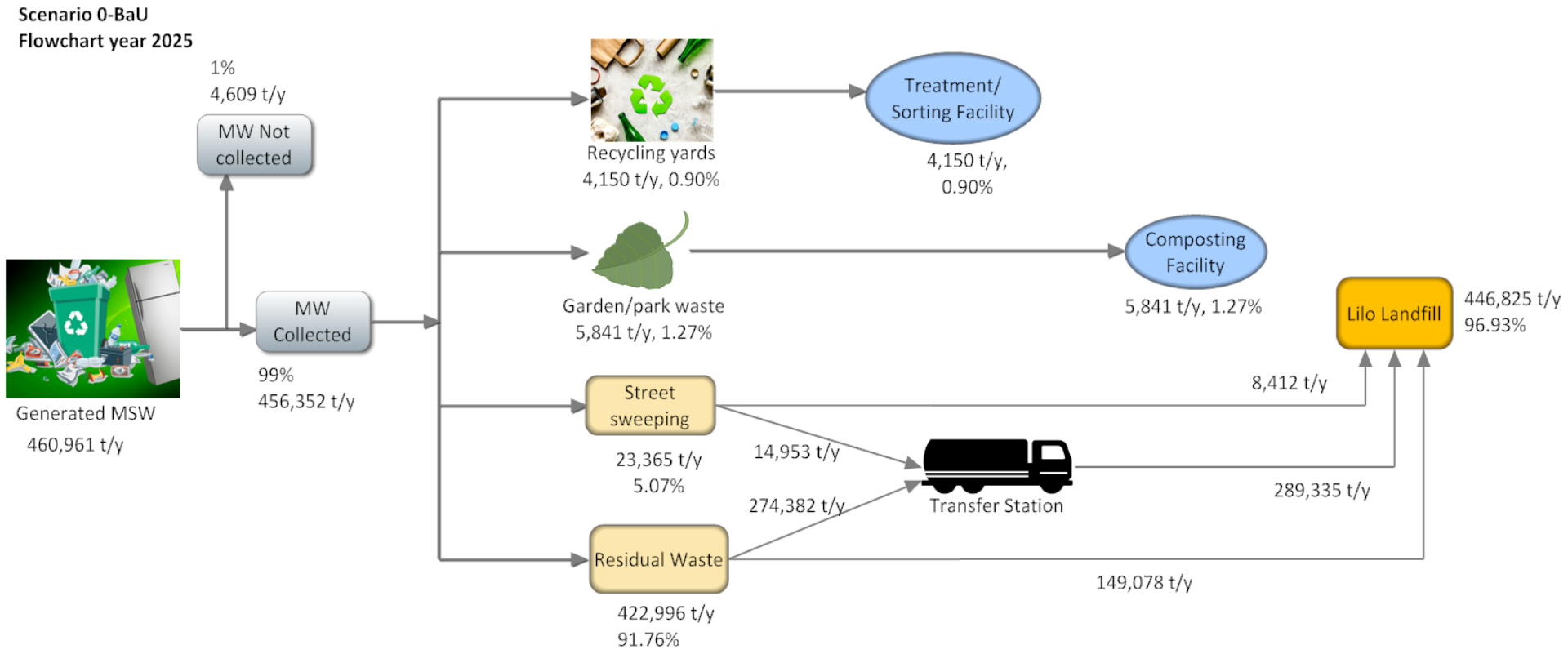
Category	Targets for Tbilisi City	Quantification	Responsible entity
Prevention	At least 2 prevention initiatives	As quantification is depending on type, size and location of the initiative, quantification at this stage is not possible.	TCH / TSG
Collection	- Collection of MSW: ○ 100% by 2025 ○ 100% by 2030 - Collection and transportation of hazardous waste: ○ 75% by 2025 ○ 100% by 2030	- Collection of MSW: 490,024 tons by 2030 - Collection and transportation of HW: approximately 45,000 to 55,000 tons by 2030	TCH / TSG
Landfill	Reduce biodegradable waste going to landfill	Max. 120,174 tons of biowaste by 2040 are going on the landfill	TCH / TSG
Biodegradable Waste	Recycle biodegradable waste	226,431 tons by 2040 (BMW diversion from landfill)	TCH / TSG and Ecoservice Group
Hazardous Waste	80% of hazardous wastes should be treated by 2025 in Tbilisi****	approximately 36,000 to 44,000 tons by 2030	TCH / TSG

Targets

Category	Targets for Tbilisi City	Quantification	Responsible entity
Recycling targets	No general targets	-	TCH / TSG
- **Paper and cardboard**			TCH / TSG
- **Glass**			TCH / TSG
- **Metal**			TCH / TSG
- **Plastic**			TCH / TSG
EPR targets	Most EPR regulations approved yet (except packaging waste), the respective regulation is under development	-	Producers
- **Batteries**	80% of used batteries by 2030	Up to 288 tons by 2030	Producers
- **Accumulators**	90% of accumulators by 2030	Up to 3,870 tons by 2030	Producers
- **Tires**	90% of used tires by 2030	Not quantifiable at this stage	Producers
- **Special hazardous waste (used oils)**	90% of waste oils by 2030	Up to 2,340 tons by 2030	Producers
- **Electrical and Electronic Waste (WEEE)**	80% of WEEE by 2030	Up to 9,600 tons by 2030	Producers

Tbilisi – Current Situation

Waste management flows



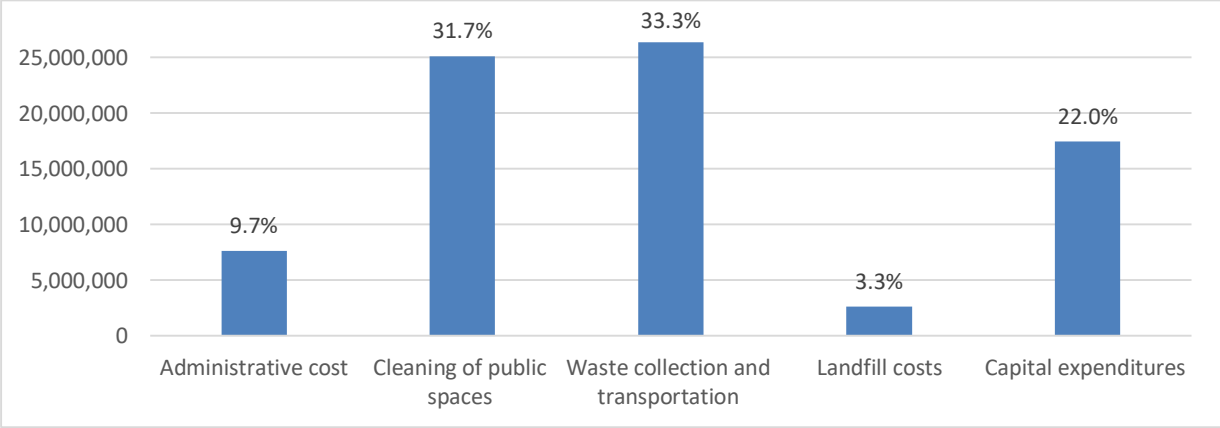
Tbilisi – Current Situation

Revenues, 2019

Source of Income	2019
Fees paid by the population, GEL	28,103,168
Fees paid by legal entities, GEL	20,209,543
Subsidies by Tbilisi budget, GEL	29,970,297
Fees and subsidies by Tbilisi budget to TSG, GEL	78,283,008
TSG's own income from direct contractors, GEL	6,280,287
Total revenues for waste service, GEL	84,563,295
Total revenues for waste service, EUR	21,228,924

Tbilisi – Current Situation

Operational cost, 2019



Total Operational Cost for 2019 amounted to 79,000,000 GEL. Operational cost for waste management only (≈ 68% of total) matches closely with Revenues

Tbilisi – Current Situation

(OPEX) Indicators for waste management service

Indicator	Value
Unit waste collection and transportation cost	72.3 GEL/t
Unit cost for landfill operation	18.2 GEL/t
Unit cost for administration	19.1 GEL/t
Unit cost for overall waste management (excluding street cleaning)	**110 GEL/t**
Unit cost for waste management per person (weighted average)	38.5 GEL/p-y
Unit cost for waste management per household (weighted average)	133 GEL/HH-y
Unit cost for waste management and street cleaning (for comparative reasons)	**178 GEL/t**

Scenarios for Tbilisi

Overview of Scenarios

Scenarios	Collection			Treatment				Landfill	
	1 bin	2 bins	3 bins	Sorting/ MRF	Aerobic	Anaerobic (biogas)	Bio-drying	Non-stabilized	Stabilized
S 0	✓							✓	
S 1a	✓			✓				✓	
S 1b	✓			✓	✓[1]				✓
S 1c	✓			✓			✓[2]		✓
S 1d	✓			✓	✓[1]	✓			✓
S 2a		✓		✓				✓	
S 2b		✓		✓	✓[1]				✓
S 2c		✓		✓			✓[2]		✓
S 2d		✓		✓	✓[1]	✓			✓
S 3a			✓	✓	✓[3]			✓	
S 3b			✓	✓	✓[1] ✓[3]				✓
S 3c			✓	✓	✓[3]		✓[2]		✓
S 3d			✓	✓	✓[1] ✓[3]	✓			✓

Scenarios for Tbilisi

Scenarios evaluated

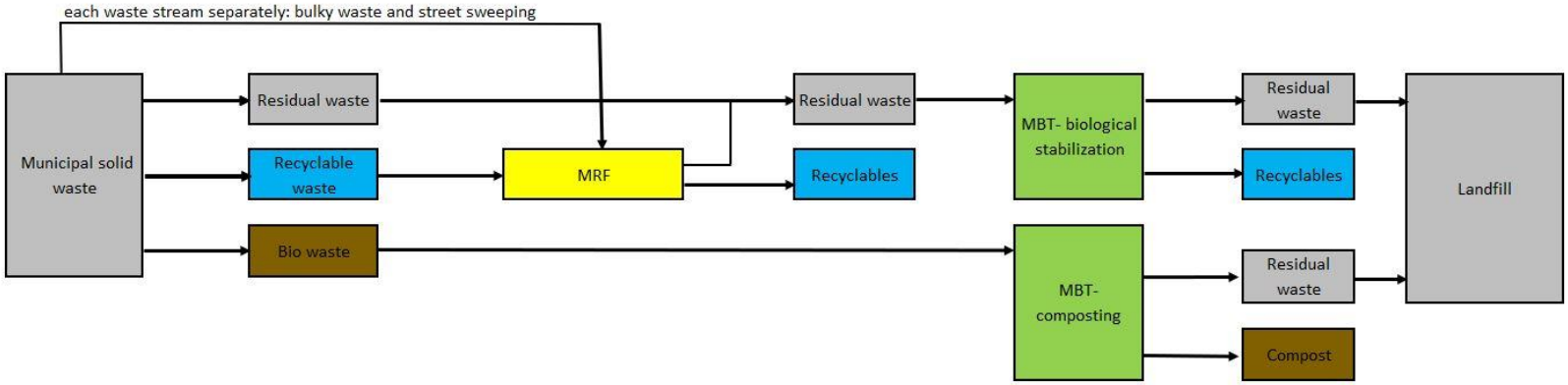
- Scenario 0: Business as Usual (BAU)
- Scenario 2b: Separate waste collection + MRF + MBT + landfill (MBT configured to stabilisation)
- Scenario 2c: Separate waste collection + MRF + MBT + landfill (MBT configured to produce RDF for the cement industry through bio-drying)
- Scenario 2a + 3a: Separate waste collection + MRF + landfill + composting
- Scenario 2b+3b: Separate waste collection + MRF + MBT + landfill + composting
- Scenario 2c+3c: Separate waste collection + MRF + MBT with bio-drying + landfill + composting

Scenarios for Tbilisi

Preferred Scenario

Scenario 2b + 3b

Separate collection (3 bins) + sorting + aerobic stabilization + landfill



Scenarios for Tbilisi – Combination sc. 2 (90%) and sc. 3 (10%)

INPUT 2025	460961 t/y		Share (%) in relation to total input			
Scenarios	**Sub-Scenarios**		**Recyclables**	**RDF**	**Compost**	**Landfill**
Scenario 2+ 3 2 bin+3 bin system + treatment Share of total input MSW: 100%	Scenario (2+3)a Separate waste collection + MRF + landfill	S(2+3)a	28%	0%	2%	69%
	Scenario(2+3)b Separate waste collection + MRF + MBT + landfill	S (2+3)b	29%	0%	2%	41%
	Scenario (2+3)c Separate waste collection + MRF + MBT with Biodrying + landfill	S (2+3)c	30%	35%	2%	26%
	Scenario (2+3)d Separate waste collection + MRF + MBT with Biogas + landfill	S (2+3)d	29%	0%	2%	33%

Cost Assessment (CAPEX) for implementation

Investment	Scenarios					
	0 (BAU)	2b	2c	2a + 3a	2b + 3b	2c + 3c
Waste prevention activities		710,000	710,000	710,000	710,000	710,000
Recycling yards		1,475,000	1,475,000	1,475,000	1,475,000	1,475,000
Waste collection*	16,977,000	16,977,000	16,977,000	17,657,400	17,657,400	17,657,400
Composting plant				1,711,000	1,711,000	1,711,000
MRF		14,160,000	14,160,000	14,160,000	14,160,000	14,160,000
MBT		56,286,000	56,286,000		53,985,000	53,985,000
Landfill*	9,474,000	9,474,000	9,474,000	9,474,000	9,474,000	9,474,000
Total [EUR]	**26,451,000**	**99,082,000**	**99,082,000**	**45,187,400**	**99,172,400**	**99,172,400**
Total [EUR/t]	**57.4**	**214.9**	**214.9**	**98.0**	**215.1**	**215.1**
Total [GEL]	**105,364,913**	**394,683,239**	**394,683,239**	**179,999,489**	**395,043,338**	**395,043,338**
Total [GEL/t]	**228.6**	**856.1**	**856.1**	**390.5**	**856.9**	**856.9**

Cost Assessment (OPEX) for implementation

Activity/ Facility	Scenarios					
	0 (BAU)	2b	2c	2a + 3a	2b + 3b	2c + 3c
Administrative costs by TSG [EUR]	1,977,000	1,977,000	1,977,000	1,977,000	1,977,000	1,977,000
Recycling yards						
Operational costs, full [EUR]		232,150	232,150	232,150	232,150	232,150
Revenues [EUR]		335,000	335,000	335,000	335,000	335,000
Waste collection						
Operational costs, full [EUR]	10,784,600	10,156,400	10,156,400	10,248,670	10,248,670	10,248,670
Revenues [EUR]						
Composting plant						
Operational costs, full [EUR]				276,330	276,330	276,330
Revenues [EUR]				65,700	65,700	65,700
MRF						
Operational costs, full [EUR]		2,361,540	2,361,540	2,361,540	2,361,540	2,361,540
Revenues [EUR]		1,900,000	1,900,000	1,900,000	1,900,000	1,900,000
MBT						
Operational costs, full [EUR]		11,059,550	14,239,550		10,615,950	13,665,950
Revenues [EUR]		274,320	274,320		274,320	274,320
Landfilling						
Operational costs, full [EUR]	4,553,900	2,369,900	1,801,900	3,313,900	2,313,900	1,649,900
Revenues [EUR]						
EPR						
EPR contribution [EUR]		4,388,290	4,730,770	3,197,050	4,338,655	4,666,250
Total operational costs, full [EUR]	**17,315,500**	**28,156,540**	**30,768,540**	**18,409,590**	**28,025,540**	**30,411,540**
Total revenues and EPR [EUR]	**0**	**6,897,610**	**7,240,090**	**5,497,750**	**6,913,675**	**7,241,270**
Total net [EUR]	**17,315,500**	**21,258,930**	**23,528,450**	**12,911,840**	**21,111,865**	**23,170,270**
Total [EUR/t]	**37.6**	**46.1**	**51.0**	**28.0**	**45.8**	**50.3**
Total net [GEL]	**68,974,563**	**84,682,822**	**93,723,228**	**51,433,023**	**84,097,003**	**92,296,454**
Total [GEL/t]	**149.6**	**183.7**	**203.3**	**111.6**	**182.4**	**200.2**

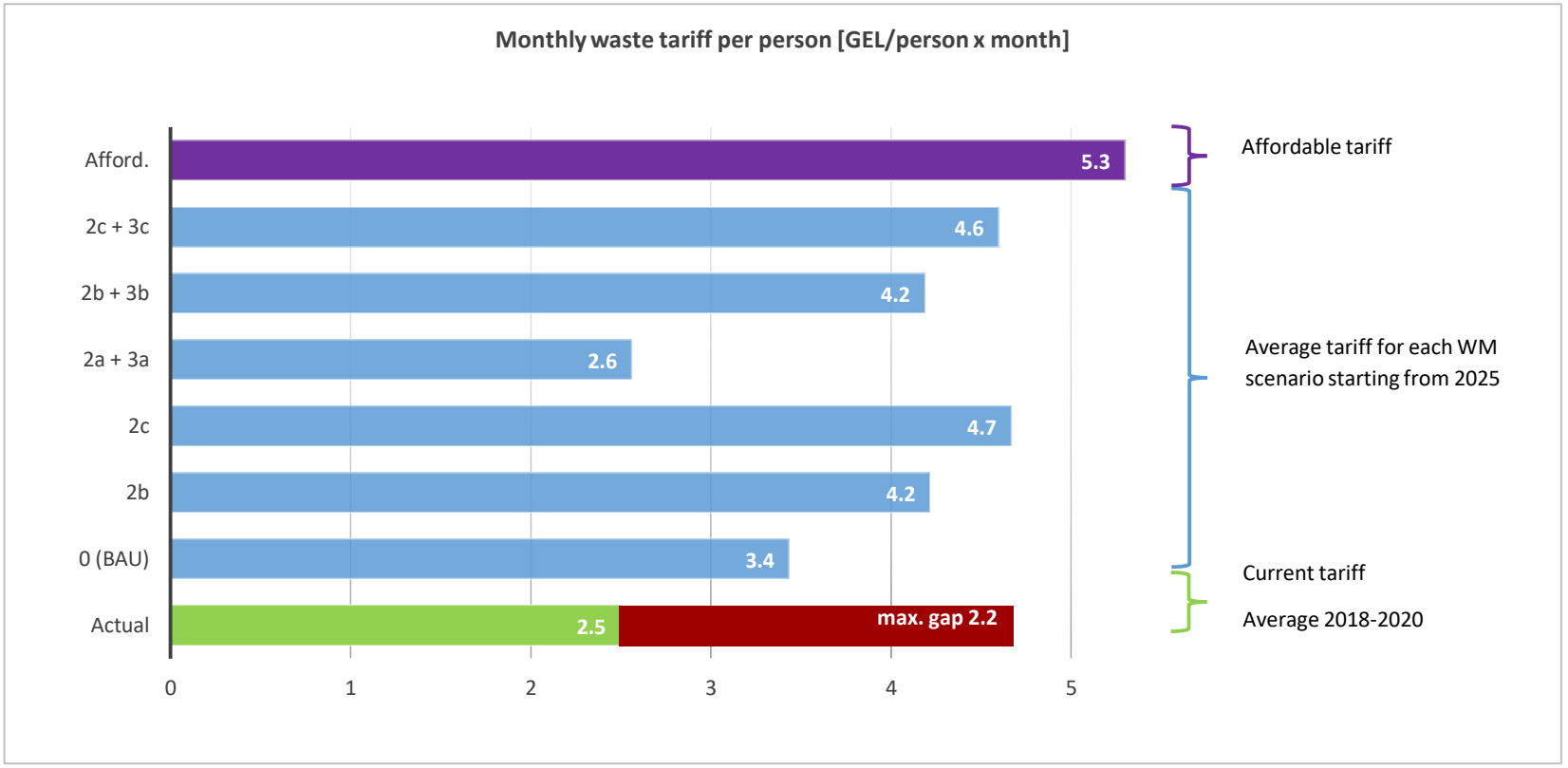
Cost Assessment (OPEX) for implementation

Annual OPEX for Waste management elements excl. revenues

Element	Cost, €/y	Cost, €/t incoming waste
Waste collection - transportation	≈ 10,000,000 €/y	23 €/t waste
Recycling Yards	232,000 €/y	11 €/t
MRF	2,360,000 €/y	24 €/t
Composting Plant	276,000 €/y	21 €/t
MBT - biostabilisation	≈ 11,000,000 €/y	35 €/t
MBT - biodrying	≈ 14,000,000 €/y	45 €/t
Landfill	≈ 4,500,000 €/y	10 €/t

Tariffs

Increase of tariffs



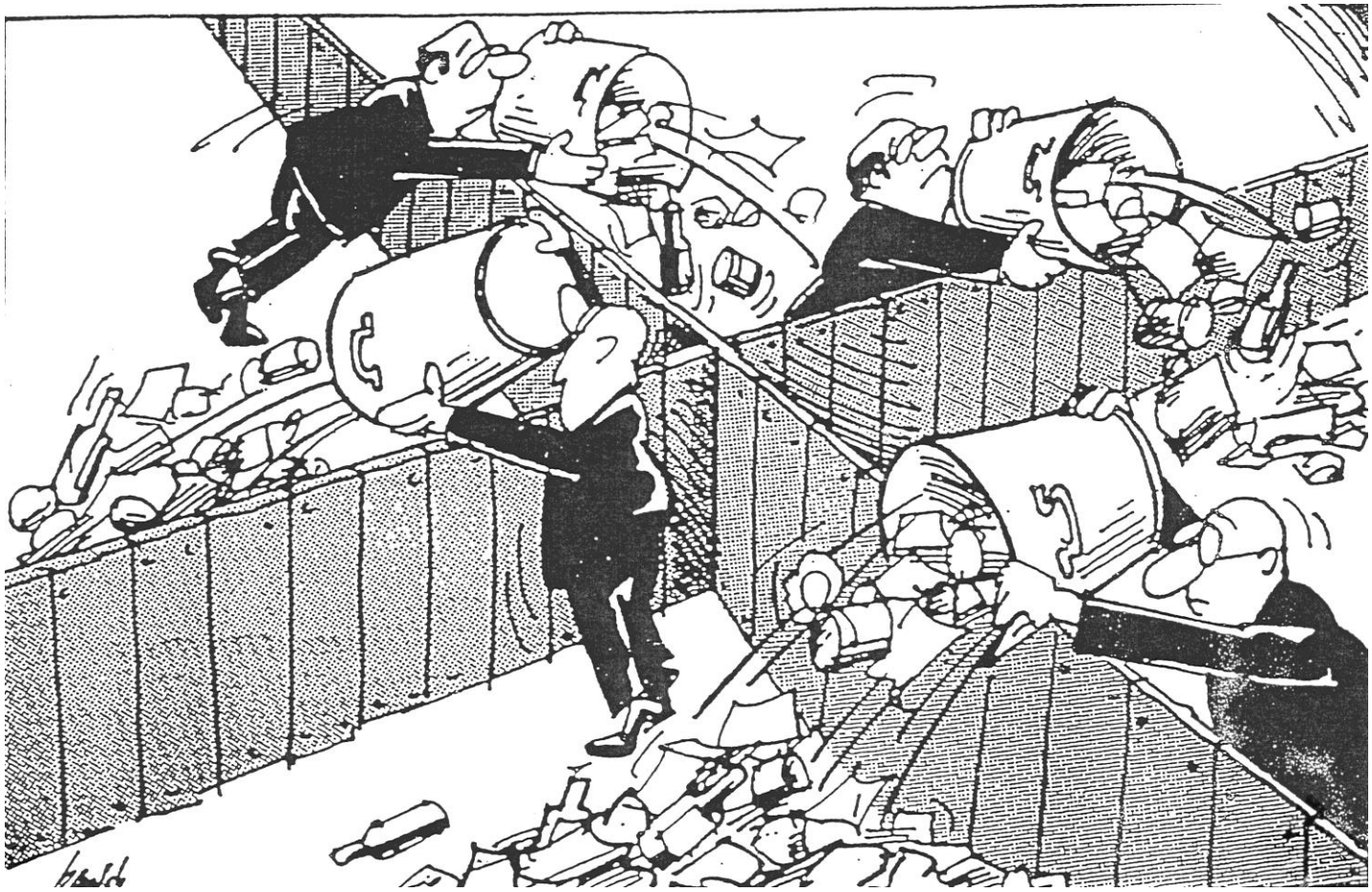
Conclusions

- Only recycling targets for packaging are existing at the moment
- -Reduction of biodegradable waste going to landfill is a challenge
- The charging of waste management users must be increased for both households and legal entities
- Sufficient revenues out of tariffs only in the big cities of Georgia, other are subsidized up to 100 %
- If users of secondary fuel (RDF) are available close to Tbilisi, the most advantageous scenario is the combination of Scenarios 2c+3c
- If no users of secondary fuel (RDF) are available, the most advantageous scenario is the combination of Scenarios 2b+3b
- RDF as new energy source might become more and more interesting

Closing remarks

Waste Management Strategy – Why required?

Closing remarks



to avoid mis-management

Thank you very much

Πολλές ευχαριστίες

For further questions contact me under:

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