

# Batumi Green City Action Plan



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# Foreword from Mayor

List of acronyms	
Acronym	Definition
AA	EU-Georgia Accession Agreement
AR	Autonomous region
AR5	IPCC 5th Assessment Report on climate change
BAU	'Business as usual' scenario; particularly in regards to emissions trajectories
BOD	Biochemical Oxygen Demand
BRC	Batumi Raptor Count
CNG	Compressed Natural Gas
CoB	City of Batumi
CoM	CoM
EBRD	European Bank for Reconstruction and Development
EU WFD	EU Water Framework Directive
GCAP	Green City Action Plan
GEDF	Georgian Energy Development Fund
GHG	Greenhouse gas
GSE	Georgian State Electrosystem
HPP	Hydropower plant
IBA	Important Bird Area
ICLEI	International Council of Local Environmental Initiatives
IPCC	Intergovernmental Panel on Climate Change
IWRM	Integrated water resources management
MRF	Materials recovery facilities
NBSAP	National Biodiversity Strategy and Action Plan
NEAP	National Environment Action Plan
NEEAP	National Energy Efficiency Action Plan
NRW	Non-revenue water
SABUKO	Society for Nature Conservation
SEA	Strategic environmental assessment
SEAP	Strategic Environmental Assessment, Batumi in partnership with Covenant of Mayors
SECAP	Sustainable Energy and Climate Action Plan
SIDA	Swedish International Development Cooperation Agency
SPA	Special Protected Area
tCO <sub>2</sub> e	Tonnes of carbon dioxide equivalent
TNA	Technology Needs Assessment
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
WMP	Waste Management Plan
WMTR II	Waste Management Technology in Regions II
WSUD	Water sensitive urban design

**Our vision:**

**We will integrate green thinking and innovation into the development of our city. This will make Batumi a more liveable, secure and prosperous city for residents and visitors alike.**

## Introduction

The Green City Action Plan (GCAP) for Batumi aims to identify, prioritise and address the most pressing environmental challenges, and establish a vision and projects to enable a green future for Batumi. Batumi's GCAP has been developed over the last 15 months with input from over 70 stakeholders. It proposes 47 specific actions that include infrastructure investments, policy measures, capacity development, and advocacy, all of which are designed to help achieve our vision for a green Batumi.

Actions in the GCAP are proposals only – some may require additional detailed feasibility studies, funding or statutory approvals before implementation could commence. Each action in this GCAP, where applicable, sets out the initial steps that would be required for implementation.

# Executive Summary



## Batumi's GCAP process

The Green Cities process follows a consistent methodology used by all cities developing and implementing a GCAP. The methodology follows four main steps: (1) Green Cities Baseline; (2) Green City Action Plan; (3) Green City Implementation, and (4) Green City Reporting.

Stakeholder input has been a key feature of the Batumi GCAP process. Stakeholders were identified and mapped at the start of the GCAP process, a Stakeholder Engagement Plan was developed, and two governance bodies were established including an Internal Advisory Group and Steering Committee.

Civil society and non-government organisations were also engaged throughout the GCAP process, including at the kick-off event and further consultation roundtables. CoB thanks these stakeholders for their invaluable input on sustainability challenges and opportunities for Batumi.



## Priority environmental challenges facing Batumi

The City of Batumi identified the following issues relating to air quality, biodiversity, GHG, green spaces, climate resilience, and soil quality to be priority environmental challenges to address.

Description of challenges – state indicators		Description of challenges – pressure indicators	
<b>Air quality</b>	<ul style="list-style-type: none"> <li>Ageing vehicle fleet <b>(AQc1)</b></li> <li>Construction site dust <b>(AQc2)</b></li> <li>High sulphur content of fuels <b>(AQc3)</b></li> <li>Pollution from shipping activities <b>(AQc4)</b></li> </ul>	<b>Land use</b>	<ul style="list-style-type: none"> <li>Car-oriented urban form <b>(LUc1)</b></li> <li>No integration of climate change and natural hazards <b>(LUc2)</b></li> <li>Green space protection and expansion <b>(LUc3)</b></li> <li>Inconsistent land use implementation <b>(LUc4)</b></li> </ul>
<b>Biodiversity</b>	<ul style="list-style-type: none"> <li>Rapid and wide-spread urban development <b>(Bc1)</b></li> <li>Low biodiversity awareness <b>(Bc2)</b></li> <li>Illegal hunting of migratory bird species <b>(Bc3)</b></li> <li>Protection of the Chorokhi River Delta <b>(Bc4)</b></li> </ul>	<b>Solid waste</b>	<ul style="list-style-type: none"> <li>Unsustainable construction waste practices <b>(SWc1)</b></li> <li>Unsanitary landfill condition <b>(SWc2)</b></li> <li>Illegal waste dumping <b>(SWc3)</b></li> <li>Lack of recycling awareness and required infrastructure <b>(SWc4)</b></li> <li>Lack of information on land contamination <b>(SWc5)</b></li> </ul>
<b>Greenhouse gases</b>	<ul style="list-style-type: none"> <li>Ageing fleet and car-dependent transport sector <b>(GHGc1)</b></li> <li>Absence of building efficiency standards and ageing stock <b>(GHGc2)</b></li> <li>No emissions control at landfill <b>(GHGc3)</b></li> <li>No structured approach to implementation of GHG reduction <b>(GHGc4)</b></li> <li>Outdated emissions data <b>(GHGc5)</b></li> </ul>	<b>Energy supply and buildings</b>	<ul style="list-style-type: none"> <li>Poor quality building stock <b>(ESc1)</b></li> <li>High electricity consumption and supply pressures <b>(ESc2)</b></li> <li>Lack of implementation and awareness of standards and certifications <b>(ESc3)</b></li> <li>Limited local capacity to implement new standards <b>(ESc4)</b></li> <li>Outages and network resilience planning <b>(ESc5)</b></li> </ul>
<b>Green spaces</b>	<ul style="list-style-type: none"> <li>Competing land use priorities <b>(GSc1)</b></li> <li>Limited green space connectivity <b>(GSc2)</b></li> <li>Lack of green space accessibility <b>(GSc3)</b></li> <li>Green space typology <b>(GSc4)</b></li> </ul>	<b>Transport</b>	<ul style="list-style-type: none"> <li>Aging and inefficient private, municipal, and marshrutka vehicle fleets <b>(Tc1)</b></li> <li>Lack of vehicle parking infrastructure <b>(Tc2)</b></li> <li>High levels of congestion on key routes <b>(Tc3)</b></li> </ul>
<b>Climate and disaster resilience</b>	<ul style="list-style-type: none"> <li>Lack of adaptation strategy/plan for Batumi <b>(Cc1)</b></li> <li>Limited information regarding energy network resilience planning <b>(Cc2)</b></li> <li>No consideration of climate change in building codes <b>(Cc3)</b></li> <li>Vulnerability of certain populations to extreme heat <b>(Cc4)</b></li> </ul>	<b>Water quality and availability</b>	<ul style="list-style-type: none"> <li>High water losses in the old network <b>(Wc1)</b></li> <li>Informal wastewater treatment <b>(Wc2)</b></li> <li>Flood risk and coastal erosion <b>(Wc3)</b></li> <li>High water consumption in the hotel sector <b>(Wc4)</b></li> </ul>
<b>Soil quality</b>	<ul style="list-style-type: none"> <li>Lack of data on contaminated sites <b>(SQc1)</b></li> <li>Ineffective solid waste disposal practices <b>(SQc2)</b></li> <li>Urban form and built infrastructure <b>(SQc3)</b></li> <li>Poor vehicle quality and congestion <b>(SQc4)</b></li> </ul>	<b>Industries</b>	<ul style="list-style-type: none"> <li>Low industrial energy efficiency <b>(Ic1)</b></li> <li>Lack of recycling among industrial facilities <b>(Ic2)</b></li> <li>No consistent policies or incentives <b>(Ic3)</b></li> <li>Low uptake of international sustainability standards <b>(Ic4)</b></li> </ul>

# Actions for a Green Batumi

Our strategic objectives	Targets (2025 unless otherwise stated)	Actions (and associated strategic objectives and challenges it addresses)
<b>Evidence-based land use planning and development management</b>		
<b>LU1</b> Develop an approach to land use and spatial planning that draws in up-to-date evidence and is implemented transparently	Plan is being implemented	<b>LU01:</b> Establish a new urban land use plan (LU1) (LUc4; GSc1; Cc1) <b>LU02:</b> Conduct a risk evaluation of the City's climate change and disaster risk, and integrate results into future spatial plan (LU1) (Cc1 – Cc3; Wc3; LUc2)
<b>LU2</b> Increase the total amount of quality green and public open spaces in Batumi	10% increase by area	<b>LU03:</b> Establish new 'greenways' (LU2; LU3) (GSc1–GSc4; LUc3; Bc1)
<b>LU3</b> Improve the equity of green and public open space distribution	20% increase in citizens within walking distance of green/public open space	<b>LU04:</b> Invest in new or improved green and public open space in currently under-served areas (LU3) (GSc1–GSc4; LUc3; LUc4)
<b>Minimising waste and pollution</b>		
<b>SW1</b> Improve construction and demolition practices to protect environmental values	25% of construction and demolition waste is recycled  90% of construction and demolition waste is either recycled or disposed of in a licenced facility	<b>SW01:</b> Invest in the development of a construction and demolition waste processing site and associated infrastructure (SW2) (SWc1; SWc3) <b>SW02:</b> Increase enforcement of non-compliance of unsustainable construction site practices (SW1; SW3) (AQc2; SWc1) <b>SW03:</b> Work with construction and demolition companies to incentivise sustainable site practices through capacity-building and training programmes (e.g. dust/runoff control or training on hazardous construction materials) (SW1; SW3) (SQc2; SWc1; AQc2)
<b>SW2</b> Reduce waste to landfill and increase recycling	40% of the MSW collected is source-separated for recycling	<b>SW04:</b> Undertake comprehensive remediation of current landfill upon closure (SW1; SW3; CR3) (SWc2; SQc2; GHGc3; GSc3) <b>SW05:</b> Invest in landfill gas recovery from the new landfill (SW1; CR3) (GHGc3; ESC2) <b>SW06:</b> Accelerate investment in waste separation and material recovery facilities (SW1; SW2) (SWc1; SWc4; Ic2) <b>SW07:</b> Establish an organic waste pilot scheme with major hotels in Batumi (SW1; SW3) (SWc2)
<b>SW3</b> Identify and remediate sources of environmental pollution	Register of sites established and active programme of remediation commenced	<b>SW08:</b> Undertake comprehensive mapping of former industrial sites, expected areas of contamination and illegal dump sites (SW3) (SWc3; SWc5; SQc2) <b>SW09:</b> Invest in monitoring systems and increase resourcing for enforcement of illegal waste dumping, which can be, in part, funded by penalties (SW1; SW3) (SWc3; SWc4)

Our strategic objectives	Targets (2025 unless otherwise stated)	Actions (and associated strategic objectives and challenges it addresses)
<b>Efficient and resilient energy systems</b>		
<b>ES1</b> Improve energy and material efficiency of buildings and infrastructure	100% of new buildings being developed to high standard of energy efficiency	<b>ES01:</b> Accelerate implementation of building energy efficiency standards in Batumi (ES1) (ESc1; ESC3; GHGc2) <b>ES02:</b> Invest in small scale renewable energy on municipal buildings (ES2) (ESc2; GHGc4) <b>ES03:</b> Implement energy efficiency scheme for municipal buildings (ES1; ES2) (GHGc2; GHGc4)
<b>ES2</b> Increase the use of renewable energy sources such as wind and solar power	20% increase by 2020; 50% by 2030	<b>ES04:</b> Invest in upgrade of all municipal outdoor lighting (e.g. street lamps) to LED (ES1) (ESc2) <b>ES05:</b> Establish a programme to provide energy efficient light bulbs to vulnerable residents at low or no cost (ES1) (ESc1; ESC2) <b>ES06:</b> Partner with local universities to increase local skills and support an emerging industry around energy efficiency and green buildings (ES1; ES2) (ESc4)
<b>ES3</b> Enhance the resilience of electricity networks to supply pressures and natural hazards	Reduction in public infrastructure at risk  No prolonged electricity outages	<b>ES07:</b> Provide incentives for the installation of solar water heaters (ES1; ES2) (ESc2) <b>ES08:</b> Create a comprehensive electricity network resilience plan for Adjara AR (ES3) (ESC5; Cc2) <b>ES09:</b> Increase promotion of the 'net metering scheme' to encourage greater uptake (ES2; ES3) (ESc2; GHGc4)
<b>Providing sustainable and diverse mobility options</b>		
<b>T1</b> Increase the share of public and active transport modes	50% active and public transport mode share by 2025; 70% by 2030	<b>T01:</b> Design and implement behaviour-change programme to address perceptions around public and active transport (T1) (GHGc1; LUc1) <b>T02:</b> Optimise public transportation routes, including municipal buses and marshrutkas (T1; T2) (Tc1; Tc3; AQc1; GHGc1)
<b>T2</b> Transition to more sustainable municipal and private vehicles	Electric vehicles comprise 5% of private vehicles and 50% of municipal bus fleet	<b>T03:</b> Increase investment in upgrading of the municipal fleet to energy efficient and low-polluting vehicles (T1; T2) (Tc1; AQc1; GHGc1; LUc1) <b>T04:</b> Increase investment in dedicated bus lane infrastructure (T1) (Tc3) <b>T05:</b> Offer free parking for electric vehicles (T2) (Tc2)
<b>T3</b> Enhance the resilience of the transport network	By 2025, network decision-making supported by intelligent transport systems for 30% of the network; 100% by 2030	<b>T06:</b> Invest in further electric vehicle infrastructure (T2) (Tc1; AQc3) <b>T07:</b> Establish an electric taxi fleet (T2) (Tc1; AQc3) <b>T08:</b> Trial a pilot of full pedestrianisation in Batumi's 'Old City' during weekends (T1) (LUc1; GHGc1) <b>T09:</b> Investigate feasibility of a ferry service along the coast (T1) (Tc3) <b>T10:</b> Upgrade the Batumivelo system (T1) (LUc1; GHGc1) <b>T11:</b> Incorporate pedestrian and cycling pathways into a new land use plan and invest in new infrastructure (T1) (LUc1) <b>T12:</b> Participate in Google Transit Partners programme (T1) <b>T13:</b> Establish transport network resilience plan and undertake periodic tests (T3) (Cc1) <b>T14:</b> Introduce hourly paid parking (T1) (LUc1; GHGc1)

Our strategic objectives	Targets (2025 unless otherwise stated)	Actions (and associated strategic objectives and challenges it addresses)
<b>Integrated water cycle management</b>		
<p><b>W1</b> Continue to modernise and expand potable water and wastewater services in under-served or hard to reach areas</p>	<p>Wastewater network: 70% of city covered by modernised wastewater network by 2025; and 95% by 2030</p> <p>Potable water network:</p> <ul style="list-style-type: none"> <li>Modernised service for 80% area of newly acquired territories by 2025; 100% coverage by 2030</li> <li>Reduce non-revenue water to 25% on average across network by 2030</li> </ul>	<p><b>W01:</b> Investment in the modernisation of potable water distribution of under-served areas of Batumi (W1) (Wc1)</p> <p><b>W02:</b> Further investment in wastewater network to include hard-to-reach areas (W1) (Wc2)</p> <p><b>W03:</b> Provide support to improve wastewater connections within the boundaries of private properties (W1) (Wc1; Wc2)</p> <p><b>W04:</b> Procure new equipment to detect contamination of stormwater (W2) (Wc1)</p>
<p><b>W2</b> Protect Batumi's coastal assets and ecosystem services from severe weather and development pressures</p>	<p>50% reduction in value of coastal assets at risk</p>	<p><b>W05:</b> Integrate Water Sensitive Urban Design (WSUD) and Sustainable Drainage System (SuDS) principles into urban planning and construction permitting (W4) (Wc3)</p>
<p><b>W3</b> Improve water efficiency among residential and commercial users</p>	<p>Water efficiency is integrated into construction permitting</p>	<p><b>W06:</b> Ensure protection and maintenance of Batumi's coastal ecosystem services (W2) (Bc4; LUc2; WC3)</p>
<p><b>W4</b> Improve drainage and flood resilience through integrated approaches</p>	<p>Water Sensitive Urban Design principles are integrated urban planning and construction permitting rules</p> <p>No increase in incidences of flash flooding</p>	<p><b>W07:</b> Require low-flow fittings as part of the construction permitting process, including for public infrastructure (W3) (Wc4; ES1)</p>
<b>Building our capacity to deliver</b>		
<p>N/A</p>	<p>N/A</p>	<p><b>CB01:</b> Establish necessary skills and roles within Batumi Municipality and municipal-owned companies (All)</p> <p><b>CB02:</b> Establish a municipal green procurement policy and associated process (SW2; ES1; ES3; W3)</p> <p><b>CB03:</b> Establish annual awards or other incentives to encourage green business practices (SW2; ES1; ES3; W3)</p> <p><b>CB04:</b> Establish a partnership with hotel industry on environmental sustainability (SW2; ES1; ES3; W3)</p>

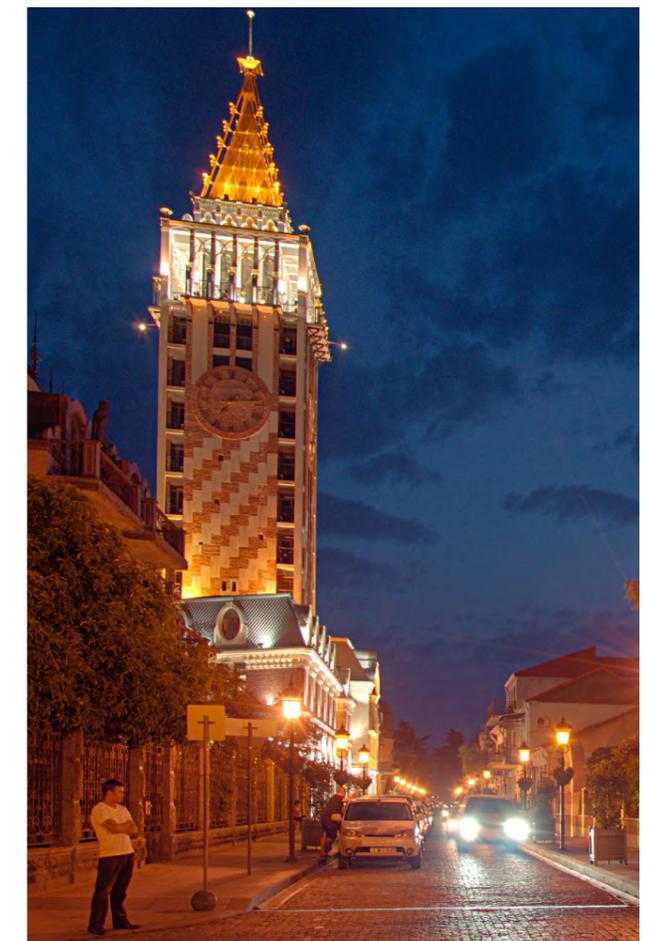
# Implementing the GCAP and tracking progress

CoB will put in place structures to ensure GCAP actions are implemented and their potential to make Batumi a greener city is understood and maximised. The key roles and responsibilities that will be put in place to implement the GCAP and track its progress (delivery and impact) will include the Green City Coordinator, the GCAP Coordination Board and Green Champions.

A transparent process has been established for monitoring, evaluating and reporting on implementation of the Batumi GCAP. Supported by two Excel-based tools, the aims of this approach are to:

- Track implementation progress of GCAP actions (Progress Monitoring Plan (PMP))
- Identify whether each implemented action is having the desired results and impacts, linking back to state and pressure indicators (Impact Monitoring Plan (IMP))
- Facilitate learning about what is and what is not working, both in terms of the actions and the management and delivery structures in place within CoB
- Determine what adjustments need to be made during GCAP implementation to maximise the potential for positive impact.

The results of GCAP monitoring can be complementary to other planning agendas and activities in CoB. Therefore, the Green City Coordinator will aim to align the monitoring and evaluation process with other city processes, such as planned development of a SECAP under the Global Covenant of Mayors on Climate and Energy. Aligning GCAP monitoring with other planned activities within CoB will help to streamline data collection with other stakeholder engagement initiatives, reducing duplication and improving efficiency.



# Part 1: Batumi Today



# 1 Introduction

# 1.1 Overview and purpose of the GCAP

Over the last decade, the City of Batumi (CoB) has been taking significant action to improve its environmental and sustainability credentials, particularly through investment in water and wastewater infrastructure. CoB acknowledges there is much more to be done, and has expressed a desire to take a more systematic approach to addressing urban environmental challenges in future. To facilitate this, CoB is participating in the European Bank for Reconstruction and Development (EBRD) Green Cities programme. Launched to facilitate a better and more sustainable future for cities and their residents, the programme recognises the need for participating cities to:

1. Preserve the quality of their environmental assets and use natural resources sustainably
2. Mitigate and adapt to the risks of climate change
3. Ensure that environmental policies and developments contribute to the social and economic wellbeing of residents.<sup>1</sup>

As part of EBRD Green Cities, the CoB has received support from global engineering, design and advisory consultancy AECOM to develop a Green City Action Plan (GCAP). Completing the GCAP is an important opportunity for the CoB to identify, prioritise and address the most pressing environmental challenges, and establish a vision and projects to enable a green future for Batumi. The GCAP has the following aims:

1. Establish an up-to-date evidence base for defining and prioritising the environmental challenges of Batumi ('Green City Baseline')
2. Identify the City's key environmental challenges and priority sectors ('Green City Challenges')
3. Identify and prioritise policy options and actions that the CoB can take to improve its environmental sustainability ('Green City Policy Options and Actions')
4. Build local capacity to ensure successful implementation of the Plan
5. Monitor relevant indicators and report on progress and outcomes.

Batumi's GCAP has been developed over the last 14 months with input from over 70 stakeholders. It proposes 47 specific actions that include infrastructure investments, policy measures, capacity development, and advocacy, all of which are designed to help achieve our vision for a green Batumi.

**Actions in the GCAP are proposals only - some may require additional detailed feasibility studies, funding or statutory approvals before implementation could commence.** Each action in this GCAP, where applicable, sets out the initial steps that would be required for implementation.

<sup>1</sup>EBRD, 'EBRD Green Cities.' Available at: <https://www.ebrdgreencities.com/about> [Accessed 19 June 2019].

# 1.2 How to read this document

## Part 1: Batumi Today

- **Chapter 1: Introduction** (this section) introduces the GCAP, describes the methodology, spatial coverage of the GCAP, and details the GCAP's alignment with other policies in Batumi.
- **Chapter 2: Baseline conditions in Batumi.** Defines the baseline environmental, social, and economic conditions based on analysis of consistent environmental indicators used across all cities that participate in EBRD Green Cities.



## Part 2: Batumi's Green Future

- **Chapter 3: Actions for a Green Batumi.** Details the GCAP actions that Batumi will implement to address key sustainability challenges and opportunities. These actions are further divided into specific themes:
  - 3.1 Evidence-based land use planning and development management
  - 3.2 Minimising waste and pollution
  - 3.3 Efficient and resilient energy systems
  - 3.4 Providing sustainable and diverse mobility options
  - 3.5 Integrated water cycle management
  - 3.6 Building our capacity to deliver.
- **Chapter 4: Implementing the GCAP and tracking our progress.** Describes protocols for implementation, as well as the monitoring and evaluation programme.

Further detail on stakeholders who participated in development of this Plan, along with environmental indicator data, is provided as appendices.

## 1.3 Batumi's GCAP process

The Green Cities process follows a consistent methodology used by all cities developing and implementing a GCAP. This methodology was developed by the EBRD in conjunction with the Organisation for Economic Cooperation and Development (OECD) and the International Council of Local Environmental Initiatives (ICLEI). The methodology follows four main steps: (1)

Green Cities Baseline; (2) Green City Action Plan; (3) Green City Implementation, and (4) Green City Reporting. Figure 1 illustrates how steps 1 and 2 of the process was implemented in Batumi, including the stakeholder engagement that was undertaken during the Kick-Off Meeting, Prioritisation, and Visions and Objectives workshop.

Figure 1. Batumi's GCAP process mapped against the EBRD Green Cities methodology



### Stakeholder Engagement in Batumi

Stakeholder input has been a key feature of the Batumi GCAP process. Stakeholders were identified and mapped at the start of the GCAP process, a Stakeholder Engagement Plan was developed, and two governance bodies were established.

The first was an Internal Advisory Group (IAG) established based on the decree of the Mayor of Batumi. Comprising 12 representatives from relevant sectors covered by the EBRD Green Cities Framework (such as heads/deputies of relevant structural units of Batumi City Hall, as well as heads/deputies of non-commercial entities and LLCs of Batumi Municipality), the group provided technical advice and recommendations around Batumi's sustainability challenges and opportunities. The IAG was involved in all GCAP milestone deliverables. For the implementation phase, the IAG will transition to the role of the GCAP Coordination Board and continue to provide technical advice and feed back on delivery of actions.

In addition to the IAG, a Steering Committee was also established to provide guidance, oversight and ultimate City of Batumi approval of the GCAP. The Steering Committee constitutes senior City of Batumi officials who hold decision-making power, e.g. the Mayor and representatives of Batumi City Council. The Committee had a role on advising on the overall strategic objective of the GCAP, ensuring it was aligned with City priorities, providing comment on key deliverables, and approving the final GCAP.

Civil society and non-government organisations were been engaged throughout the GCAP process, including at the kick-off event and further consultation roundtables. CoB thanks these stakeholders for their invaluable input on sustainability challenges and opportunities for Batumi.

## I Green City Baseline

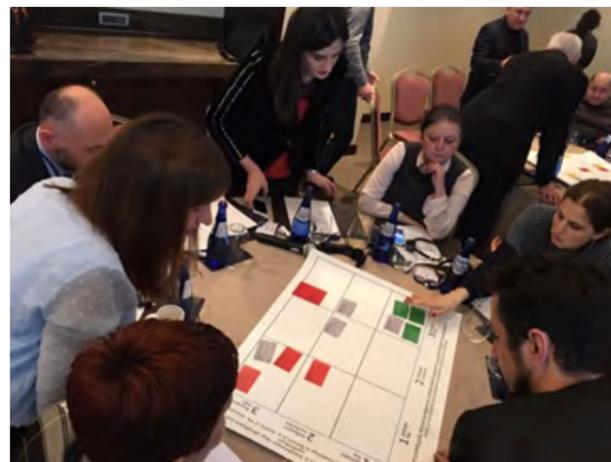
We commenced the GCAP process by seeking to understand the underlying conditions in Batumi that drive environmental performance, including political and governance structures, existing plans and programmes, and environmental values.

This began with the development of a **Political Framework Report**, which laid out the supra-national, National, Regional, and municipal legislative and regulatory frameworks that govern environmental management. A key outcome here was understanding those areas where CoB has direct influence through its status as a self-governing city, versus those where policy-making responsibility lies at other levels of government. The Political Framework report also identified existing projects in Batumi that were already addressing environmental, social, and economic conditions, which are appropriately integrated into the GCAP.

In parallel to assessing the Political Framework, the project team compiled an extensive Indicator Database. The database includes longitudinal information on environmental values spanning air, water, climate and disaster risk, soil, greenhouse gas (GHG) emissions, biodiversity and green/public open space. This was accompanied by data on those sectors that may be exerting pressure on Batumi's environment, including transport, land use, water cycle management, solid waste, industry, energy supply, and buildings. More detail on the Pressure-State-Response (PSR) that underpins the Indicators Database is provided in Section 2.

Indicator data was then subject to technical analysis by a team of specialists. A Technical Assessment Report report was subsequently developed that identified a long-list of key challenges facing Batumi, which complemented the initial key challenges identified during the stakeholder engagement meetings held in August 2018.

During the Technical Assessment stage, Batumi's preliminary challenges were further prioritised with the help of stakeholders. A Prioritisation Workshop was held in Batumi in February 2019, attended by members of the Internal Advisory Group. Participants validated the challenges, considering their relative importance for the city and its residents, as well as the extent to which the Municipality and its partners can meaningfully address each one. Workshop participants also developed and prioritised actions that could be taken to address the challenges. Alongside this workshop, a series of validation meetings were held with interested parties, including utilities companies and environmental NGOs. The result was a **Prioritisation Report**, which brings together technical expertise with stakeholder perceptions of challenges facing Batumi.



## II Green City Action Development

Following the Prioritisation Workshop, those actions that were determined by stakeholders to be feasible and potentially beneficial were developed in more detail, including consideration of implementation steps and funding options. These were then reviewed by sector experts for clarity and robustness. To better assess feasibility and appetite for implementation, further consultation was held in May 2019 with municipal stakeholders. At this time, the Internal Advisory Group was also convened to provide input into Batumi's long-term **Vision** and medium-term **Objectives** for the GCAP.

Further analysis of each proposed GCAP action was subsequently undertaken, focusing on the broader benefits that could be expected, as well as the impact on GHG emissions profile (where relevant). This informed a final round of consultation with municipal departments to confirm the full list of actions included in this completed **Green City Action Plan**.

## III Green City Implementation

The Green City Implementation phase will operationalise the actions described in this document **Green City Action Plan**. Success at this stage requires the real commitment of each action owner, as well as Municipal leadership, including allocation of necessary financial and human resources. Batumi is already highly active in a range of sectors (e.g. water cycle management), and hence some actions documented in this plan are well underway.

## IV Green City Reporting

The GCAP is supported by a detailed **Monitoring and Evaluation Plan**, which documents activities that will be undertaken to track implementation progress of GCAP actions, as well as the impact these actions are having on the state of Batumi's environment. This document sets the requirements for periodic reporting and follow-up actions that will be taken in response to outcomes of monitoring and evaluation (e.g. modification of actions that have proven less effective than expected).

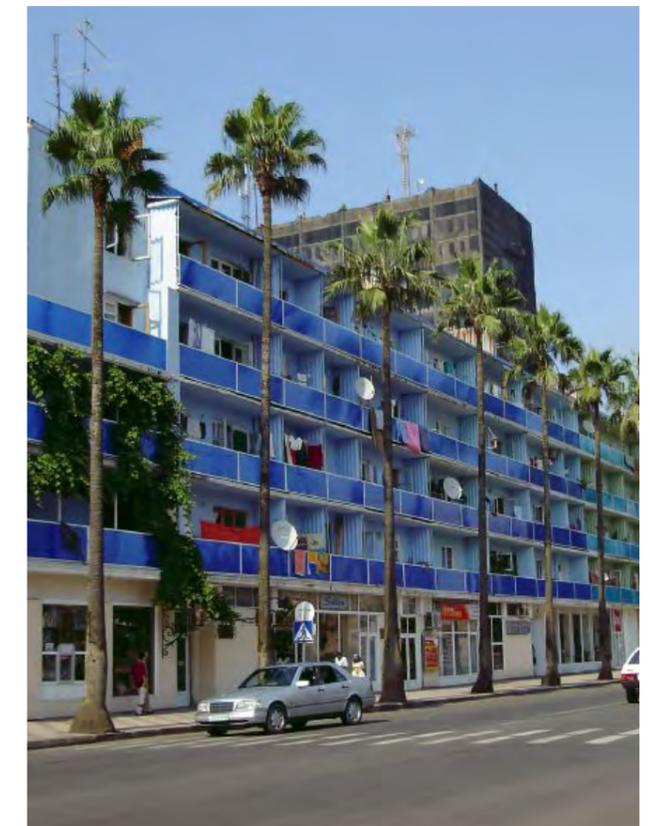
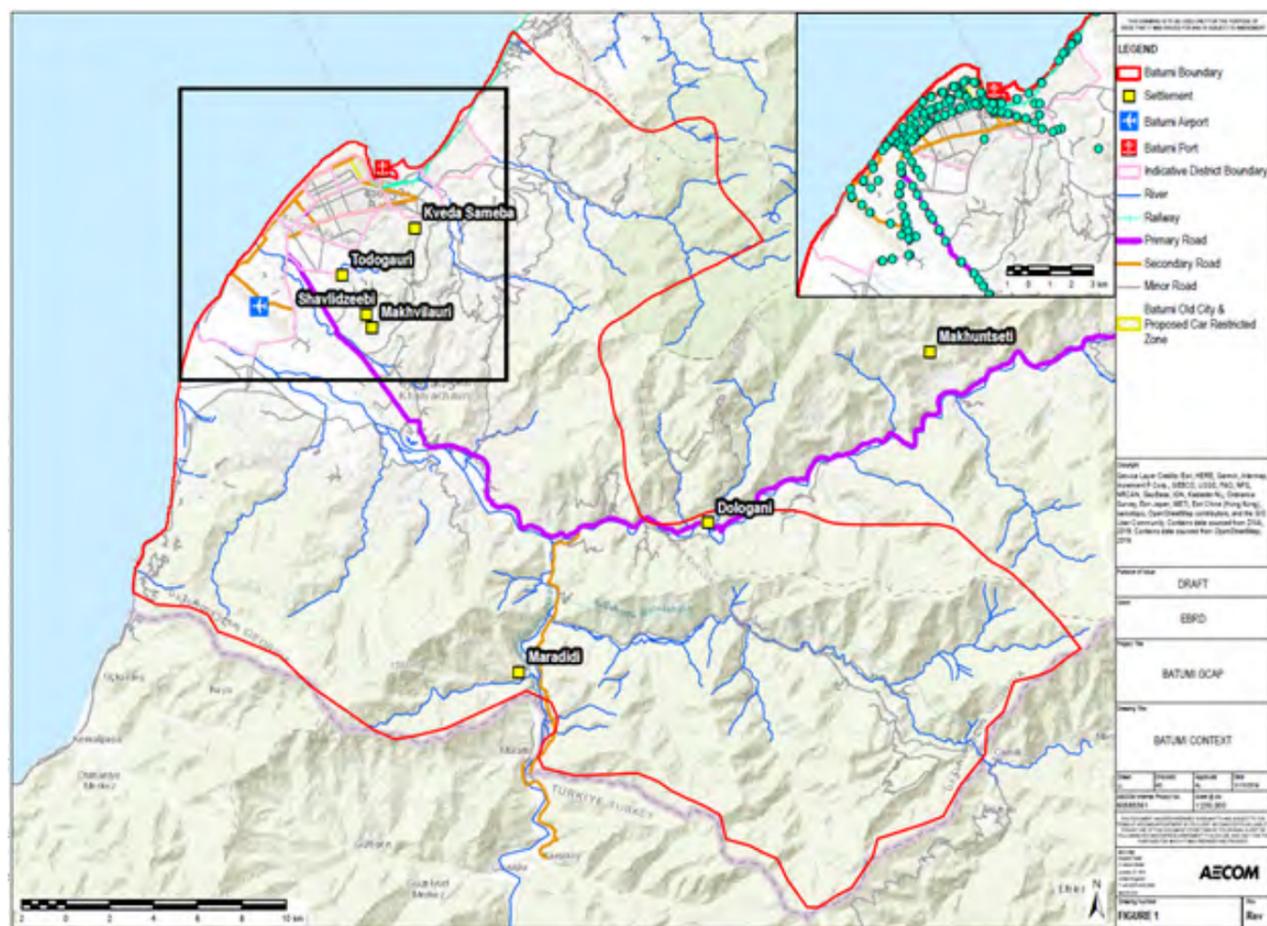


Figure 2. City of Batumi

The City of Batumi is divided into seven boroughs covering 64.9 km<sup>2</sup>. This GCAP focuses on issues and actions within the institutional mandate of the municipal government; however, some proposed actions also have a role for the Adjara Autonomous Republic (AR) and/or the National and transnational agencies



# 2 Baseline conditions in Batumi

## 2.1 Baseline conditions in Batumi

A tourist resort popular with Georgians and overseas visitors, Batumi is in a period of rapid development. This brings significant opportunities for economic development and to boost quality of life for citizens, but is coupled with risks and challenges both for the wellbeing of Batumi's 166,000 residents and the region's natural environment.

This section of the GCAP summarises the physical, social, and economic context for Batumi, along with the key challenges facing environmental quality and natural resource availability. It is based on available data, interviews and validation with stakeholders.

This is a snapshot of more detailed analysis undertaken in the Political Framework Report and Technical Assessment Report, which helped to inform identification of the Green City Actions described in Section 3. The full suite of environmental indicator data is included as Appendix A.

### Batumi at a Glance

- 2019 population of 166,000 – second largest city in Georgia
- Batumi is located on the site of the ancient Greek colony in Colchis called "Bathus" or "Bathys" which means "deep harbour".
- Adjara AR had the third highest number of granted construction permits in 2017 (1,141 or 10.9% of total granted permits), with only Tbilisi (5,032) and Kvemo Kartli (1,325) having a higher rate.
- Sea level rise of 20 cm during the 20th century significantly modified 53 km of Batumi's coastline, resulting in 150 ha of territory being lost to the Black Sea

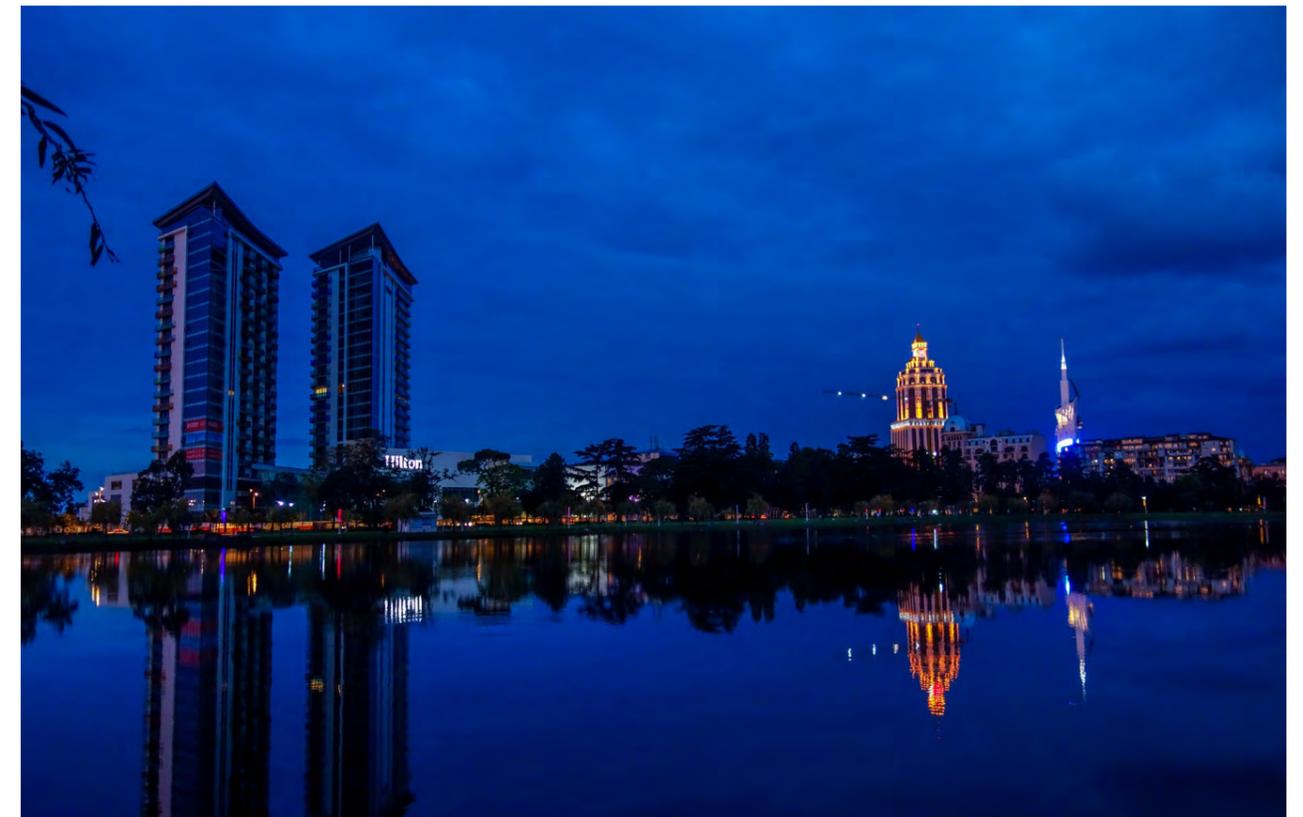
## 2.2 Physical context

Batumi is the capital of the Autonomous Republic (AR) of Adjara and is located on the Black Sea in the south-west region of Georgia. With a warm and temperate climate, it is also the wettest city in Georgia and the Caucasus region. The average annual temperature is 14.2°C, ranging from 22.2°C in August to a January average of 6.3°C. Average relative humidity levels range from 70-80% (Climate Data, 2018).

As seen in Figure 2, Batumi's topography is generally flat, extending to the south and south-west across the Chorokhi River valley and delta. The Korilistskali River flows to meet the Black Sea to the north-east of the city. Batumi is bounded by foothills and the Lesser Caucasus Mountains to the east; terrain is also steeper in the south

where the Turkish border lies. The region is subject to natural hazards such as landslides, mudflows, floods, droughts, and strong winds. There is strong evidence that frequency and severity of some extreme events will increase due to climate change.

The Black Sea coast and Batumi Port are important assets for the city. The Port is situated to the north-east of the city centre in Batumi Bay, to the south of which lies Batumi city centre and the 'Sea Side Zone'. The Sea Side Zone is home to the bulk of tourist infrastructure and activity (see Section 2.3 for further information), including the 7 km long Batumi Boulevard. There are two small recreational lakes in the Sea Side Zone of the city: Nurigeli (0.06 km<sup>2</sup>) and Ardagani (0.045 km<sup>2</sup>).



## 2.3 Social context

### 2.3.1 Demographics

The latest 2019 data shows that the total population of Batumi is 166,000, making it Georgia's second largest city after the capital Tbilisi. Although Adjara AR has experienced a decrease in its total population, consistent with a national trend of outward migration since the collapse of the Soviet Union, Batumi has increased in population by 32% since 2000. Many Georgians have moved to Batumi in search of better jobs or economic opportunities, and Batumi is also a recipient of migrants from abroad seeking employment, mostly in the tourism sector. Batumi's expansion also reflects the expansion of its territorial boundaries between 2009 and 2011 to encompass the areas of Gonio, Kvartati, Green Cape, Adlia, Angisa, Injalo and Makhvilauri.

Georgians are the predominant ethnic group in Georgia – according to the 2014 Census they made up 86.8% of the population. Orthodox Christianity is the prevalent religion in Georgia, while Islam is the second largest religious group. Although the Adjara region has historically been predominantly Muslim, according to the 2014 Census, 70% were Orthodox Christians and 30% were Muslim.

### 2.3.2 Health

In 2014, Georgian life expectancy was 68.8 years for men and 77.3 years for women. This is one of the highest rates of life expectancy in the Commonwealth of Independent States (CIS) region, but it is lower than the EU average (WHO, 2017). The leading causes of death in Georgia are non-communicable diseases, including circulatory diseases, cancer, diabetes and respiratory diseases. Despite ongoing challenges with urban air quality (see Section 2.5.1), the mortality rate from respiratory system diseases in 2014 (27 per 100,000 population) was very low compared to the European region (45 per 100,000 in 2013) and the CIS region (48 per 100,000) (WHO, 2017).

### 2.3.3 Social resilience

Despite steady economic growth in recent years, in 2016 it was estimated that 21.3% of Georgia's population lives below the national poverty line (ADB, 2016). Disabled persons and those impacted by recent wars and political instability such as internally displaced persons (IDPs) are disproportionately afflicted by poverty (Gassmann, et al. 2013). As of 2014, there were almost 4,000 IDPs in Batumi (MRA.gov.ge, 2014). In addition, the State Resettlement Policy (2007) initiated the construction of multi-family buildings to accommodate IDPs, with three constructed in Batumi (Mathema, et al. 2016). While rapid development in Batumi presents economic development opportunities, it also carries the risk of widening existing economic and social inequities.



## 2.4 Economic context

Adjara AR is one of the fastest developing regions in Georgia. It attracts a large proportion of total foreign investment into Georgia, especially in the construction industry, which made up 13.7% of the total gross value added (GVA) for Adjara AR in 2017 (GeoStat – Regional Statistics, 2018).

In 2018, unemployment in Adjara AR was 9.1%, which is 2.6% lower than the national average (12.7%). The rate for Adjara AR has improved significantly since 2007 when unemployment stood at 29.8% (GeoStat – Regional Statistics, 2019). The active labour force in Adjara AR in 2018 was 186,300, with the highest number of people employed in wholesale/retail and construction (GeoStat – Regional Statistics, 2019). Average monthly income in 2016 in Adjara AR was GEL 845.4 (EUR 292).

### 2.4.1 Tourism

Tourism made up 6.9% of Georgia's GDP and 68% of service export in 2017 (Georgian Tourism in Figures, 2017) and is particularly crucial for Batumi as the key tourist city in Adjara AR. Hospitality (hotels and restaurants) employed 6,510 people and contributed EUR 43 million in GVA to Adjara AR in 2016. The highest numbers of international tourists in Batumi come from Azerbaijan, Armenia, Russia and Turkey.

The rapid growth experienced in the tourism sector has also had an impact on the tourist accommodation market, significantly boosting demand during the high summer season (June – September) with low occupancy rates outside this period.

### 2.4.2 Construction and infrastructure development

Rapid tourism growth over recent years has also stimulated rapid growth of Batumi's construction sector; it contributes over EUR 120 million in

GVA and employs over 9,000 people (Geostat – Regional Statistics, 2019).

Currently, there are several planned and ongoing construction projects of high-end branded hotels in Batumi, including Babylon Tower, Pullman Hotels and Resort, Le Meridien and Swissotel. There has also been extremely rapid construction of residential apartments, a large percentage of which are sold to foreign investors. Infrastructure development projects have accompanied this residential construction boom, such as upgrading roads, water infrastructure, educational facilities, and a new 20,000 capacity football stadium. Many of these projects have received financial support from the Adjara AR government, as well as a range of international financial institutions (IFI). The rapid development has not been conducted in accordance with a masterplan or up-to-date framework for development control, placing physical (e.g. electricity distribution) and social infrastructure under strain in some areas.

### 2.4.3 Logistics and industry

Adjara AR is considered a transport hub for sea, air and land. Batumi International Airport serves international flights to 22 destinations and has a capacity of 600 passengers per hour and 600,000 passengers a year, Batumi Sea Port another key logistics centre has 11 wharves and five terminals, including oil, container, railway ferry, dry cargo and marine passenger terminals and Batumi also has a modern railway station with capacity to serve more than 500,000 passengers annually (Economics in Figures, 2018). These logistic hubs are also a significant contributor to the local economy and source of employment in Batumi.

There are few large industrial and manufacturing enterprises located in Batumi. The main industrial activities are ship repair and services in the Batumi port and oil terminal, which has a capacity of 15 million tonnes per year. There are almost 11,000 small and medium enterprises in Adjara AR.

## 2.5 Governance context

### 2.5.1 City of Batumi's responsibilities

Batumi has been a self-governing city since 2006, which means it has autonomy in how it manages and delivers a range of municipal services, including:

- Managing natural resources of local importance (including water, forests, land owned by the Municipality)
- Ensuring spatial and territorial planning
- Developing local infrastructure (parks, squares, roads, street lights etc.)
- Managing municipal waste and wastewater
- Undertaking environmental protection and ensure water supplies
- Establishing and ensure operation of pre-school and extramural educational institutions
- Organising local transport
- Developing local facilities for disabled persons, children and the elderly
- Undertaking economic development and employment
- Providing social aid and healthcare
- Establishing and implement policies around youth and gender equality.

However, many areas covered by the GCAP (e.g. energy) require significant collaboration and advocacy from Adjara AR and National ministries. The relevant regional and national bodies of importance to the Batumi GCAP include:

- Adjara AR
  - Ministry of Finance and Economy of Adjara AR (including Department of Spatial Planning and Technical Supervision, Economic Development Department, Budget

Department, Department of Tourism and Resorts, and the Roads and Melioration Systems Management Department)

- Ministry of Health and Social Care of Adjara AR (including the Directorate of Environment and Natural Resources of Adjara AR)
- Ministry of Agriculture of Adjara AR
- Government of Georgia
  - Ministry of Economy and Sustainable Development (including the Energy Policy Department, Georgian National Tourism Administration and Construction Policy Department)
  - Ministry of Environment and Agriculture (including the Agency of Protected Areas, National Environmental Agency and the Environmental Information and Educational Centre)
  - Ministry of Finance
  - Ministry of Regional Development and Infrastructure (including Municipal Development Fund.

Refer to Table 2 in Section 2.7 for a summary of CoB's level of jurisdiction over different policy-making and investment in different sectors.

### 2.5.2 Existing plans and strategies

The GCAP works to complement Batumi's existing plans and strategies that address municipal priorities. Table 1 summarises key plans and strategies, and more complete list can be found in Appendix D.

Table 1. Key existing plans and strategies relevant to the GCAP



Plan or strategy	Timeframe	Description	Related GCAP Action Areas					
			1	2	3	4	5	
Climate Change Strategy of Adjara	2013	Discusses climate change vulnerabilities of Adjara region. Includes adaptation and GHG mitigation project proposals.						
National Biodiversity Strategy and Action Plan (NBSAP)	2020	Includes measures to be implemented for biodiversity conservation, including inland water ecosystems, biodiversity of the Black Sea, forest ecosystems and protected areas.						
Batumi Action for Cleaner Air	2016 - 2021	National voluntary commitments developed in the framework of 8th Environment for Europe Ministerial Conference, including planned measures in transport.						
Third National Environment Action Plan (NEEAP)	2017 - 2021	Sets national priorities and actions for environment protection. Relevant objectives for Batumi's GCAP include expansion of the protected areas network, improving management of protected areas, and promoting sustainable ecotourism development.						
Sustainable Energy Action Plan	2014	Batumi's most recent GHG emissions inventory. Includes an emission reduction target of 22% compared to business-as-usual (BAU) by 2020.						
National Renewable Energy Action Plan	2018	Aims to diversify energy supply resources, optimise exploitation of renewable energy resources, and create of a unified Energy Efficiency approach.						
Rehabilitation of Municipal Infrastructure Facilities in Batumi	2007 - 2022	Ongoing programme of rehabilitation and extension of the water supply and sewerage networks in Batumi and surrounds.						
Strategic Development Plan of Batumi Municipality	2018 - 2021	Defines spatial/urban planning and regulation of land use as key priorities for sustainable development of the Batumi.						
Green Cities: Integrated Sustainable Transport for the City of Batumi and the Adjara Region	2015 - 2019	Supported by UNDP, includes analysis and development sustainable transport plans, including public transport network optimisation scenarios; revised plans for municipal parking; sustainable urban transport corridors; improvements to safety and quality of cycling infrastructure, and potential development of an electric taxi system.						
Waste Management Strategy and Action Plan	2016 - 2030	Strategy prepared in accordance with the Waste Management Code and EU-Georgia Association Agreement.						

The following sections (2.5 and 2.6) summarise the key findings from the review of environmental indicators and additional technical analysis. Preliminary findings were validated in roundtable sessions attended by representatives of public agencies, businesses and non-government organisations that are active in Batumi.

The analysis applied a Pressure-State-Response (PSR) Framework (Figure 3), which is used by EBRD Green Cities to help cities analyse challenges and identify their root causes. The framework comprises:

- **State indicators** – used to understand a particular value of environmental quality (e.g. air quality), resource availability (e.g. water shortages), or risk (e.g. exposure to flooding). See Section 2.5.
- **Pressure indicators** – based around sectors and used to understand the factors that may be undermining or detrimentally impacting environmental values (e.g. old, inefficient vehicles can harm air quality). See Section 2.6.

- **Response indicators** – help us to understand the actions that are being taken, or could be taken, to address pressures and improve the ultimate state of the environment (e.g. promoting use of public transportation). Current responses are covered in both Sections 2.5 and 2.6 under the heading 'What is already being done?'

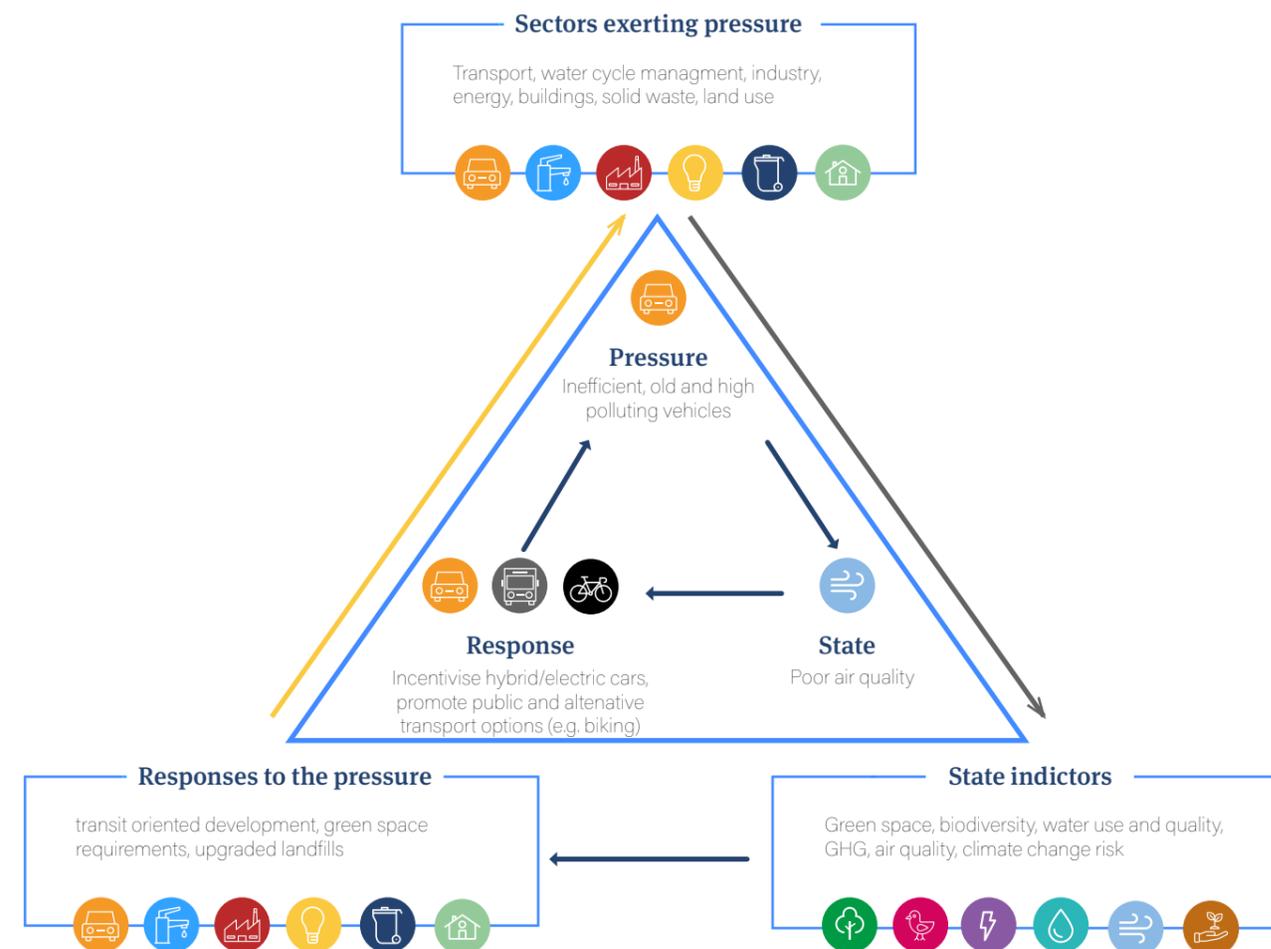
For each indicator category, a diagram is included depicting the extent to which activities in each GCAP sector (e.g. solid waste management; transport) can influence different environmental values (e.g. biodiversity and ecosystems; air quality).

	Sectoral activities have a <b>strong</b> influence on the state indicator
	Sectoral activities have a <b>moderate</b> influence on the state indicator
	Sectoral activities have a <b>minor</b> influence on the state indicator

## Legend

	State indicators (measures of environmental quality, resource availability and risk)		GCAP sectors
	Air quality		Buildings
	Biodiversity		Energy supply
	Climate risk and adaptation		Industries
	Greenhouse Gases (GHG)		Land use
	Green spaces		Solid waste
	Soil quality		Transport
	Water quality/availability		Water cycle management

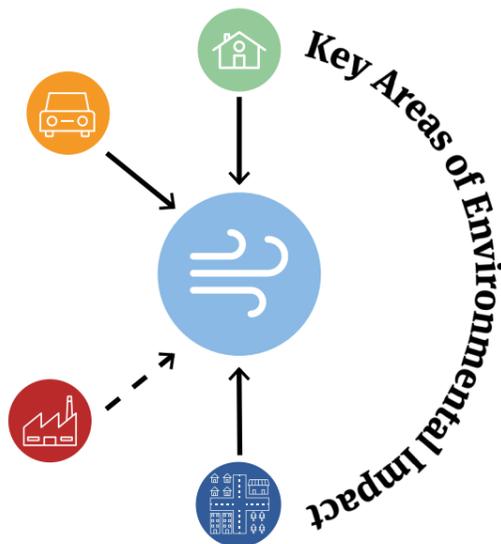
Figure 3. The PSR Framework



## 2.6 Baseline environmental values

### 2.6.1 Air quality

Air quality is an important issue for residents of Batumi. Emissions from vehicles are a key contributor to pollution, although monitoring data is restricted to two busy monitoring locations within the city – Katamadze and Abuseridze Streets – which do not necessarily give a good indication of air quality more generally. Data from these stations indicates elevated levels of particulate matter, SO<sub>2</sub> and NO<sub>x</sub>.



### What is already being done?

- National fuel quality standards exist for petrol and diesel and have been gradually tightened to Euro 5
- Georgia recently introduced mandatory technical vehicle inspections
- Reduced excise for hybrid and electric cars
- Caps on the maximum allowable concentrations (MACs) for certain pollutants
- National Environment Agency monitors air quality and regulates emissions
- CoB has purchased 10 electric buses and charging infrastructure with EBRD assistance
- CoB has undertaken significant work with the support of UNDP to produce a Sustainable Urban Mobility Plan and Awareness Raising Plan for sustainable transport modes.

### Key challenges

Although availability of air quality data was variable, the following challenges for air quality in Batumi were identified and prioritised by stakeholders:

ID	Description of challenge	Relevant GCAP sector(s)
AQc1	<b>Ageing vehicle fleet:</b> Reducing emissions from road vehicles is a key challenge due to the vehicle fleet having an average age greater than 18 years (with the trend increasing).	  
AQc2	<b>Construction site dust:</b> Although data is lacking, anecdotal evidence indicates that the rate of construction in Batumi is contributing to particulate matter pollution	  
AQc3	<b>High sulphur content of fuels:</b> Despite plans to gradually align fuel standards with the EU, SO <sub>2</sub> monitoring data suggests that some fuel used for road vehicles has sulphur content exceeding current standards. Maritime fuel is considerably higher in sulphur than vehicular fuel.	  
AQc4	<b>Pollution from shipping activities:</b> Activities at the port, most notably emissions from ships and trucks moving goods, contribute to pollution in areas near the port (including populated areas).	

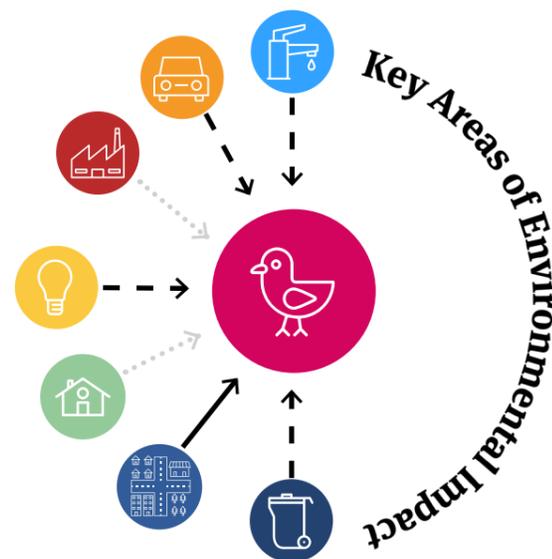
## 2.6.2 Biodiversity and ecosystems

Batumi is located near some significant biodiversity hotspots, including a world-famous bird migration corridor known as the 'Batumi Bottleneck'. 36 species of raptors have been recorded here, and on peak days during the September migration their numbers reach over 100,000<sup>2</sup>. The entire Batumi coastline and city surrounds (excluding the city centre) constitute an Important Bird Area (IBA). It is likely that the Batumi IBA will eventually become a Special Protected Area (SPA) when the Birds Directive (Directive 2009/147/EC) is implemented as part of the 2018-2020 Action Plan of Parliament Committee on Environmental Protection and Natural Resources, and therefore its careful management needs to be prioritised.

The most important areas for biodiversity in Batumi are the wetlands, sandbars and meadows where the Chorokhi River meets the Black Sea (i.e. the Batumi Chorokhi Delta). Urban parks such as Batumi Boulevard, 6 May Park and the Botanical Garden provide some biodiversity value, although any habitat they provide is fragmented and the spaces are more valuable for recreational and amenity purposes. CoB and Adjara AR aspire to increase the amount of environmental tourism, particularly in nearby high mountain areas.

## What is already being done?

- National Biodiversity Strategy and Action Plan (BSAP) from 2014-2020 places special importance on conservation of the Black Sea coast
- 2018-2020 Action Plan of Parliament Committee on Environmental Protection and Natural Resources makes commitments to:
  - Develop a system to monitor conservation status of key habitats and protected species
  - Finalise a new law on biodiversity
  - Identify potential 'Emerald Sites'
  - Identify and designate Special Preservation Areas for bird species.
- NGOs SABUKO and Batumi Raptor Count are raising awareness and promoting bird watching.



<sup>2</sup><https://www.birdlife.org/europe-and-central-asia/news/preserving-batumi-bottleneck>

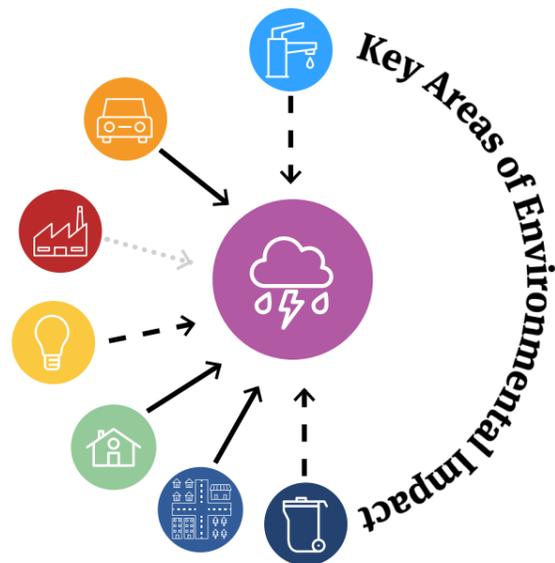
## Key challenges

The following key challenges contributing to increasing Batumi's GHG footprint were identified and prioritised by stakeholders:

ID	Description of challenge	Relevant GCAP sector(s)
Bc1	<b>Urban development:</b> Open green spaces within the city (e.g. parks) and greenfield areas provide habitat for flora and fauna species. Many such spaces have come under significant pressure from urban expansion.	
Bc2	<b>Biodiversity awareness:</b> Awareness of the region's biodiversity values is relatively low among citizens. While CoB has little control over biodiversity policy it can play a role in awareness-raising efforts and popularisation of sustainable eco-tourism.	NA
Bc3	<b>Illegal hunting of migratory bird species:</b> Proper enforcement measures are required to reduce the risks to bird species.	NA
Bc4	<b>Protection of the Chorokhi River Delta:</b> Batumi and surrounds is likely to be considered a Special Protection Area under the EU Birds Directive, making protection of this area an important priority. Limited data is currently collected on species in this areas and Adjara AR more broadly.	 

### 2.6.3 Greenhouse gases

According to Batumi’s last carbon emissions inventory taken in 2011, the City emits approximately 1.71 tonnes of CO<sub>2</sub>e per capita annually. This value is below Georgia’s average of 3.14 tonnes CO<sub>2</sub>e per year, which is in part attributable to Batumi’s lack of fossil fuel plants and localised industrial activities. However, it is likely that Batumi’s emissions have increased over the past eight years in line with accelerating development of the built environment. The transport, buildings and waste sectors are the main contributors to Batumi’s GHG emissions.



### What is already being done?

- National Energy Efficiency Action Plan and the new Law on Energy Efficiency and Law on Energy Efficiency in Buildings are both pending.
- Adjara AR Climate Change Strategy (2013) included GHG mitigation policies and potential project proposals, including GHG mitigation from existing and proposed landfills; however, there is limited evidence of implementation.
- Sustainable Energy Action Plan (2014) has a city-wide GHG emissions reduction target of 22% by 2020 compared to BAU. The city has committed to producing an updated inventory as part of a new Sustainable Energy and Climate Action Plan (SECAP) as part of the Global Covenant of Mayors for Climate and Energy.
- EBRD is financing the purchase of 10 new electric buses to be operated by Batumi Avtotransporti LLC, which will emit zero emissions directly from the vehicles.

### Key challenges

The following key challenges contributing to increasing Batumi’s GHG footprint were identified and prioritised by stakeholders:

ID	Description of challenge	Relevant GCAP sector(s)
GHGc1	<b>Ageing fleet and car-dependent transport sector:</b> The high age of the vehicle fleet contributes to significant emissions which is compounded by the lack of alternative transportation options.	
GHGc2	<b>Absence of building efficiency standards and ageing stock:</b> Building emissions result from high rates of energy consumption, lack of awareness about efficient energy use, and a current lack of energy efficiency standards.	
GHGc3	<b>No emissions control at landfill:</b> The current landfill lacks any active capture or management of landfill gases.	
GHGc4	<b>No structured approach to implementation of GHG reduction:</b> There is a lack of monitoring and evaluation of progress made a new inventory with realistic growth assumptions is needed to inform effective future policy decisions.	
GHGc5	<b>Outdated emissions data:</b> Despite the positive intent shown in joining the CoM and producing a SEAP, the data is now severely outdated given the rapid development that has subsequently occurred in Batumi.	

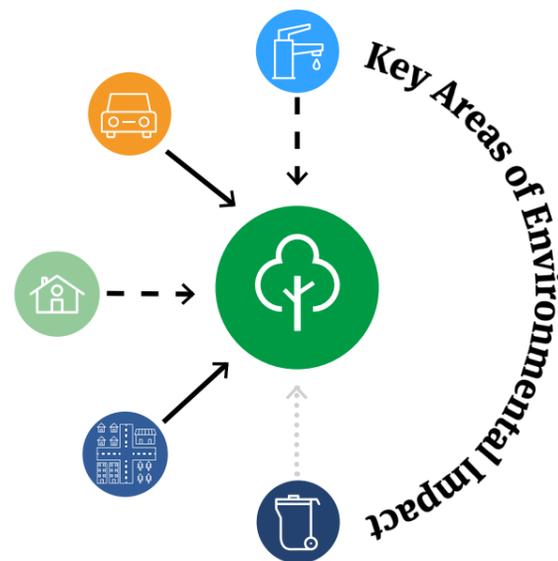
### 2.6.4 Green and public open spaces

A lack of consistent data makes it difficult to analyse the extent and availability of green and public open space in Batumi. From above, much of Batumi is relatively green owing to street trees; however, apart from Batumi Boulevard, 6 May Park, and a few other smaller parks and public squares, the availability of quality public open green space is limited.

Nearby natural sites include extensive Botanical Gardens near Chakvi to the north, Tkhilnari Waterfalls (15 km away) and Mtirala National Park (30 km away). Batumi’s SEAP highlighted that green spaces are fragmented, which constrains habitat value and wildlife movement. Aside from Batumi Boulevard, there are few opportunities for residents and visitors to enjoy large, contiguous tracts of green space or move seamlessly between different spaces.

### What is already being done?

- Batumi’s Land Use Plan (2009) includes a chapter on green spaces and calls for Batumi to become a garden city and to establish a unified system for the development and management of green spaces.
- The Urban Development and Policy Service of Batumi City Hall is preparing to procure technical support for a new use plan for Batumi.
- Resolution #50 of Batumi City Council on the rules of land use on the territory of Batumi and construction regulation (September 14, 2012) defines baseline coefficients for green spaces that must be considered during new construction projects. However, enforcement is inconsistent.



### Key challenges

The following key challenges impacting green and public open spaces in Batumi were identified and prioritised by stakeholders:

ID	Description of challenge	Relevant GCAP sector(s)
GSCc1	<b>Competing land use priorities:</b> Batumi’s rapid development means that green space is competing with other developments such as residential and commercial construction, and transport infrastructure.	
GSCc2	<b>Green space connectivity:</b> Batumi’s green spaces were not planned with the aim of connectivity for the benefit of ecosystems, ecosystem services, and citizen health and wellbeing.	
GSCc3	<b>Green space accessibility:</b> Many of the green spaces are geared towards tourists, which may crowd out use by residents. Moreover, given a significant portion of green space is located along the coast or near Batumi City centre, it creates a disparity of access between those located in those areas and those living in other areas.	
GSCc4	<b>Green space typology:</b> Most of Batumi’s green space is multi-functional, with human use largely prioritised. However, there is a lack of balance between green space for recreational demands versus green space for ecological needs.	

## 2.6.5 Climate and disaster resilience

Batumi is increasingly feeling the effects of climate change and natural hazards, including rising sea levels, increased incidence of flooding and landslides, and coastal erosion. Specifically, analysis in the Georgian Roadmap on Climate Change Adaptation finds that Batumi has among the highest sensitivity to floods, coastal erosion and riverbank erosion in the country.

### What is already being done?

- National Department of Environment and Climate Change establishes and implements policy in climate change.
- The Georgian Roadmap on Climate Change adaptation has assessed vulnerability to a range of climate change hazards for every Municipality in Georgia.
- Ongoing National project supported by UNDP to scale up multi-hazard early warning systems and the use of climate information.
- Technology Needs Assessments have been undertaken proposing various adaptation needs, including beach nourishment at Adlia and sediment retainers at Batumi underwater canyon.
- Climate Change Strategy of Adjara AR (2013) outlines climate change vulnerability of the region and outlines a range of adaptation project proposals, but it is understood that none have moved onto implementation stage.

Variable	Change for period 2021-2050	Change for period 2071-2100
Change in annual mean temperature (°C)	1.41	Between 3.18 and 3.32
Change in annual number of days with temperatures <8°C	-0.03	-0.04
Change in annual number of days with temperatures >25°C	6.53	24.77
Change in annual mean precipitation (mm)	-2.23	Between -7.2 and -5.4
Change in annual mean days with heavy rainfall (>20mm)	-0.88	Between -7.3 and -4.7

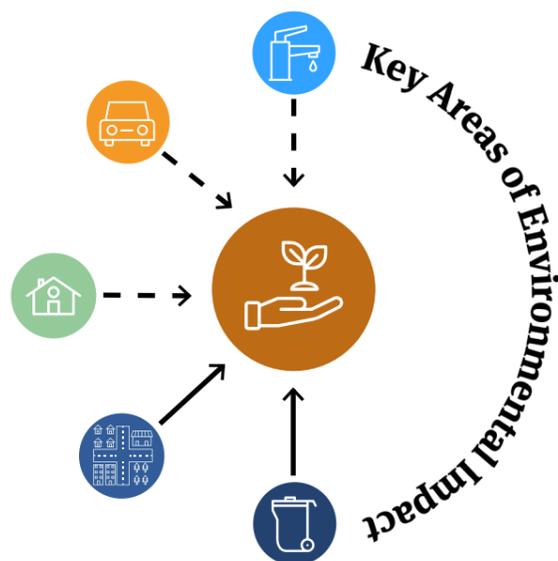
## Key challenges

The following key challenges impacting climate and disaster resilience in Batumi were identified and prioritised by stakeholders:

ID	Description of challenge	Relevant GCAP sector(s)
Cc1	<b>Lack of adaptation strategy/plan for Batumi:</b> Batumi lacks plans to build the resilience of urban systems and service delivery to climate change impacts. Climate change and natural hazard risks are not systematically considered in land use planning in Batumi.	
Cc2	<b>Limited information regarding energy network resilience planning:</b> Limited information impedes adequate planning for the future resilience of the energy sector, both in terms of availability to meet peak demand and maintenance of largely amortised transmission and distribution infrastructure.	
Cc3	<b>Climate change in building codes:</b> Building codes and standards give no specific consideration to the expected effects of climate change, which may result in quicker weathering of materials and more extreme weather events.	
Cc4	<b>Flooding and coastal erosion:</b> Batumi is vulnerable to flooding and coastal erosion that will be exacerbated by climate change.	
Cc5	<b>Vulnerability of certain populations to extreme heat:</b> The urban heat island effect can create oppressive summer conditions in Batumi. Heatwaves disproportionately affect the already vulnerable, which is relevant to Batumi given the higher density of people living below the poverty line.	

## 2.6.6 Soil quality

Waste management practices, deforestation and historic industrial activities have all undermined soil quality in Batumi. Additionally, average rates of erosion may increase in future alongside more intense precipitation events in Batumi under climate change.



## What is already being done?

- The National Environmental Action Programme (NEAP) 2017-2021 sets National priorities and actions for soil protection; for example, to improve monitoring systems for degraded and contaminated soil and the recovery of degraded land.
- The National Agriculture Development Strategy seeks to address soil degradation through the management of pesticides and fertilizers, waste monitoring, and improving the melioration system.
- The Climate Change Strategy of Adjara AR provides recommendations for soil improvement and conservation, such as protection of soils from extreme natural events, developing a database of soil types and the use of agro-tech to limit erosion.
- CoB has a procurement process underway for contractor to construct a new sanitary landfill. Existing landfill is to be closed; EBRD is undertaking a feasibility study into remediation options as an extension of the Adjara Solid Waste Project. Remediation activities will help reduce levels of soil and groundwater pollution being generated by the current landfill.

## Key challenges

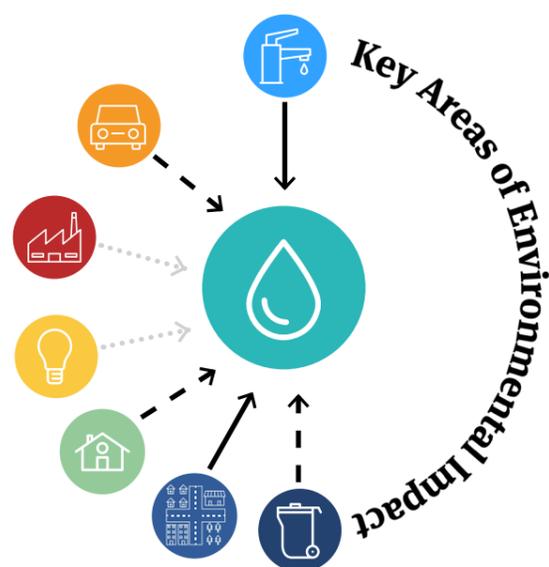
The following key challenges facing soil quality in Batumi have been identified and prioritised by stakeholders:

ID	Description of challenge	Relevant GCAP sector(s)
SQc1	<b>Lack of data on contaminated sites:</b> Currently, there is no register of contaminated sites arising from current or legacy industrial activities, although anecdotally such sites are known to be widespread	 
SQc2	<b>Ineffective solid waste disposal practices:</b> Illegal dumping and an unsanitary main landfill contribute to poor soil quality in proximate areas.	
SQc3	<b>Urban form and built infrastructure:</b> The current state of urban form has a high proportion of impervious surfaces and a low ratio of urban green space for use as buffer zones. Additionally, there are currently no standards or incentives for new construction to meet green design requirements.	
SQc4	<b>Poor vehicle quality and congestion:</b> Transportation exerts pressure on soil quality because of the high age of the vehicle fleet and associated fuel product leakage, as well as heavy traffic/congestion.	   

## 2.6.7 Water quality and availability

Georgia has an abundance of water resources. With abstraction levels at around 2% of total reserves, National water consumption appears to be at a sustainable level.

Data availability on surface water quality in Batumi's catchment was limited. Available data mostly related to biochemical oxygen demand (BOD), which provides only a partial understanding of quality. BOD levels were found to be generally good in the Chorokhi River, while levels within the Korolistskali and Mekinistskali Rivers were reported as having improved to acceptable levels in recent years. The BOD content of the Kubastskali and Bartskhana Rivers are generally poorer and requires active management to improve its quality. This could be due to a number of reasons including agricultural run-off and limited protection of riparian zones outside Batumi.



## What is already being done?

- At the National level, the Chorokhi-Adjaristaskali River Basin Plan (2016-2021) has been established with the aim of improving water quality across transboundary basins; covers Armenia, Azerbaijan, Belarus, Moldova, and Ukraine in addition to Georgia.
- CoB and Batumi Water established a new wastewater treatment plant constructed at Adlia in 2010.
- Significant investment over the last decade in the potable water and foul sewer networks. 91% of the population is currently covered by the foul sewer network and almost all residents have 24/7 access to piped drinking water.

## Key challenges

Refer to Section 2.6.5 for further discussion of key challenges for Batumi's water cycle

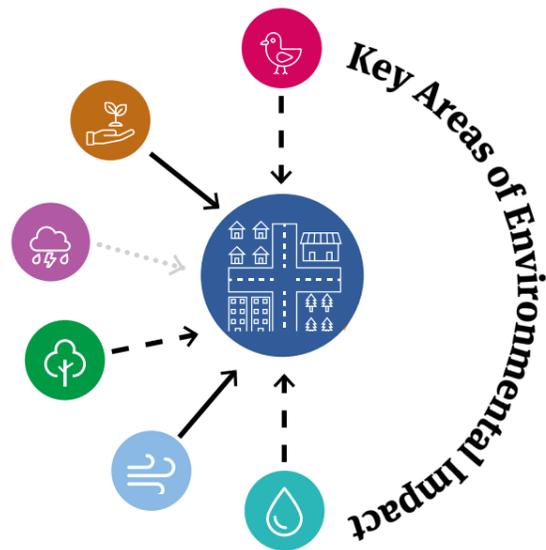


## 2.7 Baseline sectoral performance

Section 2.6 describes key challenges and existing management approaches being undertaken in the different sectors in Batumi (e.g. solid waste management, transport, land use planning). The sectors align with the pressure indicator categories in the PSR framework; for further information on the underlying indicator data please refer to Appendix A.

### 2.7.1 Land use

Despite past efforts to implement strategic planning approaches in Batumi, much of Batumi's recent rapid development and expansion has occurred largely outside of any formal planning strategy.



### What is already being done?

- In 2005, the 'Law of Georgia on Foundations of Spatial Arrangement and Urban Development' was enacted, which began to regulate the process of spatial planning. This is supported by the Spatial Planning, Architecture and Construction Code Of Georgia.
- In response, Adjara AR Government established the Adjara Spatial Planning Scheme. At the local level, Batumi is one of the few cities in Georgia which has subsequently developed a land use plan and began to apply some systematic approaches to regulating development. The Strategic Development Plan of Batumi Municipality (2018-2021) defines lists urban planning and regulation of land use as key priorities for sustainable development of the City

### Key challenges

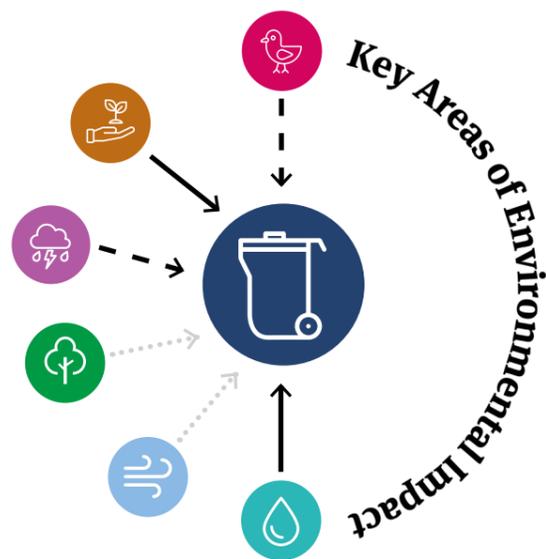
The following challenges for land use planning in Batumi were identified and prioritised by stakeholders:

ID	Description of challenge	Relevant GCAP sector(s)
LUc1	<b>Car-oriented urban form:</b> Most transit in Batumi takes place in personal vehicles. Much of the city was planned around vehicles and new development is generally car-oriented.	
LUc2	<b>No integration of climate change and natural hazards:</b> Batumi's climate change risks include heatwaves and flooding from both rainfall and increasing sea-levels. These risks are not systematically considered in land use planning in Batumi, meaning future development decisions may not take account for climate change and increase the City's vulnerability (e.g. increasing flood risk by creating more unsealed areas and increasing pressure on reticulated drainage).	Cross-cutting
LUc3	<b>Green space protection and expansion:</b> As noted in Section 2.5.4, most of Batumi's quality public open space is disproportionately located in tourist areas and along the coast. Moreover, existing green space lacks connectivity to support habitat value. Current construction permitting regulations include a coefficient for green space provision, but this is not adequate and is not always consistently applied.	
LUc4	<b>Inconsistent implementation:</b> Anecdotally, it is understood that existing land use planning guidance (e.g. system of greening coefficients) is regularly not adhered to when evaluating proposed new developments.	Cross-cutting

## 2.7.2 Solid waste

Georgia is accelerating efforts to improve resource efficiency, reduce waste generation and address historic pollution across its cities and regions. Driven in part by the EU-Georgia Association Agreement, the National Government has introduced a range of policy measures in recent years, including a requirement for municipalities to introduce waste separation from 2019, and a staged ban on production and import of plastic bags.

Although recycling bins have been introduced along Batumi Boulevard and some private companies collect recyclable material in the city, the required facilities to meet the city's targets do not exist, nor has funding been committed to such facilities.



## What is already being done?

- In 2018, the National Government banned production and import of thin (15 microns or less) plastic bags. From 1st April 2019 the Government is planning to ban all plastic bags of any thickness.
- From 2019 all Georgian municipalities must introduce source separation, although this has yet to be implemented in Batumi.
- As part of the SIDA and EBRD-funded 'Solid Waste Management Project in Adjara', the Ministry of Economy and Finance of Adjara AR is currently conducting a process of closing non-sanitary landfills located in Batumi (Gonio settlement) and Kobuleti territory.
- Batumi's Waste Management Plan sets 2020 targets for recycling (30% of paper, 20% of glass, 70% of metals and 30% of plastic). However, the required facilities to meet these targets do not exist, nor has funding been committed to such facilities.
- International organisations, NGOs and donors provide significant support in the area of waste management local and National Government. For example, EBRD is undertaking a feasibility study for remediation of Batumi's landfill as an extension of the Adjara Solid Waste Project.

## Key challenges

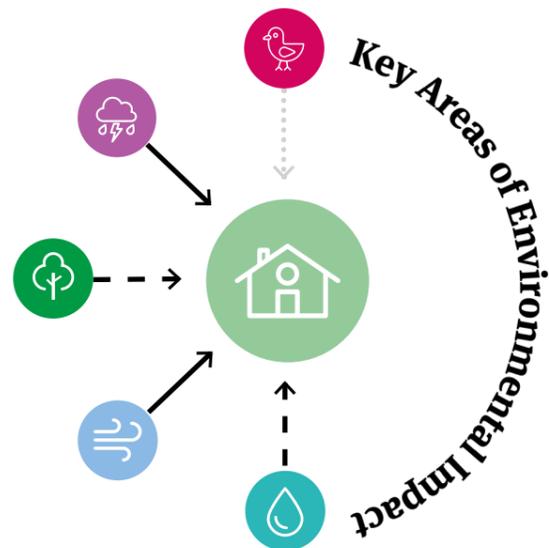
The following challenges for solid waste management in Batumi were identified and prioritised by stakeholders:

ID	Description of challenge	Relevant GCAP sector(s)
SWc1	<b>Unsustainable construction waste practices:</b> Batumi's rapid construction rate is producing large volumes of waste. Recycling construction materials is not common practice and inappropriate disposal is a major problem.	
SWc2	<b>Unsanitary landfill condition:</b> Batumi's main current landfill is well below EU standards. Located nearby to the Chorokhi River, it is an active source of land, water and air pollution.	
SWc3	<b>Illegal waste dumping:</b> Illegal dumping sites are commonplace in Batumi. Current resourcing and approaches to enforcement are insufficient to tackle the problem.	
SWc4	<b>Lack of recycling awareness and required infrastructure:</b> Public awareness of sustainable resource management and the waste hierarchy is generally low. This is coupled with a lack of recycling facilities.	Cross-cutting
SWc5	<b>Lack of information on land contamination:</b> Batumi is known to have significant tracts of land contaminated by current and former industrial uses. However, only anecdotal information is available about the locations and extent of contamination.	

### 2.7.3 Energy supply and buildings

Driven by the EU-Georgia Association Agreement, there have been significant National legislative reforms aimed at improving building energy efficiency. CoB has little regulatory control over energy generation and distribution issues – policy is set at the National level and distribution is implemented in Adjara under contract by Energo-Pro (electricity) and Socar (gas).

Around 80% of electricity in Adjara is generated by hydropower schemes, with the remainder generated primarily via thermal power plants (TPPs) and imported from neighbouring countries. The emissions intensity of electricity generation is higher in summer, when lower river flows reduce the potential for hydropower generation and demand is higher for summer cooling.



### What is already being done?

- The National Government has created the Georgian Energy Development Fund (GEDF) to support renewable energy technologies, leading to Georgia’s first large-scale wind farm at Kartli. Large-scale investment in new hydropower schemes is ongoing.
- At National level, the Draft Law of Georgia on Energy Efficiency of Buildings was pending adoption at time of writing. The National Government has also expressed a desire to work towards developing nearly zero energy buildings (NZEB), which is a significant stretch goal that has yet to be achieved at scale anywhere in the world. It will require a step-change in design and development practices.
- CoB is tendering for support to implement energy efficiency retrofits of all municipal kindergartens.
- CoB operates a programme in Batumi to co-finance (with Condominium Associations) rehabilitation and energy efficiency works in residential apartment buildings.
- Batumi Municipality developed a Sustainable Energy Action Plan (SEAP) in 2014 setting the aim of reducing its GHG emissions by 22% compared to business-as-usual (BAU) by 2020.

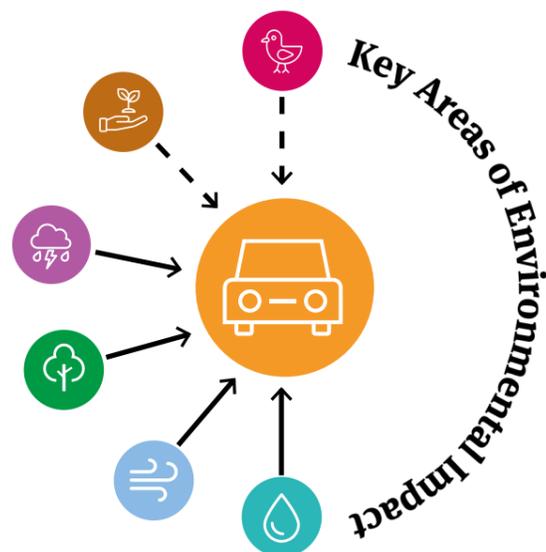
### Key challenges

The following challenges for energy supply and buildings in Batumi were identified and prioritised by stakeholders

ID	Description of challenge	Relevant GCAP sector(s)
ESc1	<b>Poor quality building stock:</b> Almost 90% of the residential buildings in Batumi date from the pre-1990s Soviet period, and are characterised by thin walls, single-glazed wooden windows, water leakage and a low thermal resistance coefficient. Many new buildings in Batumi have also been constructed in recent years when efficiency standards have been absent.	
ESc2	<b>High electricity consumption and supply pressures:</b> Total electricity use in Batumi’s households was 4.3 times higher in 2017 than 2007. Batumi’s energy grid is facing pressure from rapid construction, an expected future increase in households with air-conditioning, and the emerging National level pressure of cryptocurrency mining.	
ESc3	<b>Lack of implementation and awareness of standards and certifications:</b> No energy efficiency standards are currently present in Batumi, although legislation is currently pending in the National parliament. Only two enterprises in Batumi have been certified to ISO 50001 and/or ISO 14001. Refer also to challenge Ic4.	
ESc4	<b>Limited local capacity to implement new standards:</b> Public awareness of energy efficiency is generally low, and there is currently a lack of qualified professionals (e.g. designers, auditors) in Adjara to support roll-out of more stringent building efficiency standards. Actions responding into this challenge are covered in Section 3.6 – ‘Building our capacity to deliver’.	Climate and disaster resilience
ESc5	<b>Outages and network resilience planning:</b> Electricity supply in Batumi is prone to sporadic outages. Existing electricity and gas networks are also not well-equipped to support the rate of new connections being requested. Limited information was available to the GCAP team on the level of planning for natural disasters and other hazards that could disrupt the network.	

## 2.7.4 Transport

Mobility is an important issue for CoB and its citizens. Transportation mode share is dominated by personal vehicles, which contributes to high congestion and associated impacts on air quality and greenhouse gas emissions. The sector is also characterised by old and inefficient private, marshrutka, and municipal vehicle fleets, inadequate off-street parking infrastructure, and the lack of safe, connected, and accessible alternative transport options (e.g. cycling and pedestrian avenues).



## What is already being done?

- At a National level, there is reduced excise for new and hybrid cars, no excise duty for electric cars, increased excise on vehicles older than 14 years.
- Compulsory vehicle inspections recently introduced and being implemented.
- Construction of Batumi Bypass and Batumi (Chorokhi)-Sarpi Roads.
- Purchase of electric buses with EBRD support.
- CoB has the Batumivelo share bike scheme, although the bicycles and supporting infrastructure are in increasingly poor condition.
- UNDP 'Green Cities: Integrated Sustainable Transport for Batumi and Adjara' project, including new municipal parking strategy, sustainable urban transport corridors, development of public transport optimisation scenarios, an improved bicycle system and provision of transport modelling software.

## Key challenges

The following challenges for transport in Batumi were identified and prioritised by stakeholders:

ID	Description of challenge	Relevant GCAP sector(s)
Tc1	<b>Aging and inefficient private, municipal, and marshrutka vehicle fleets:</b> Vehicles in Batumi's are 18.2 years old on average. Many vehicles in the marshrutka fleet adhere to Euro 2 standards, which fall well below the current National requirement of Euro 5 (increasing to Euro 6 in future).	
Tc2	<b>Lack of vehicle parking infrastructure:</b> There is a tendency of residents to drive even short trips; drivers must circle the city centre for extended periods to find a park or resort to illegal or unsafe methods, such as parking on the pavement or in bike lanes.	
Tc3	<b>High levels of congestion on key routes:</b> The culture of private vehicle use, slow speed of municipal buses (including the short distance between bus stops), high number of marshrutkas, and inadequate parking all contribute to congestion.	
AQc3	<b>Fuel quality:</b> Refer to AQc3.	

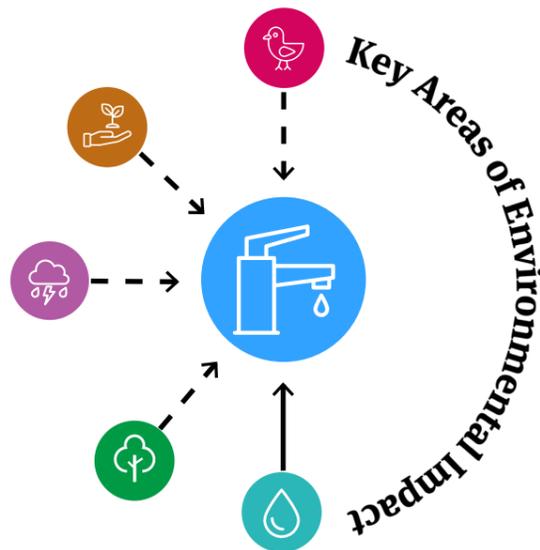
## 2.7.5 Water cycle management

Batumi's water supply network extends to around 285km. Prior to 2007, Batumi's water management processes were resulting in significant non-revenue water. As with the supply network, prior to recent network and wastewater treatment upgrade, a significant amount of untreated wastewater was entering rivers and the Black Sea. Since 2007, Batumi City, in collaboration with the German bank KfW, has been developing a four stage upgrade of both the supply and wastewater treatment networks. This has resulted in considerable improvements to water management across the water cycle. Much of the potable water network (89%) has been improved and water losses are now estimated to be around 25%. This is on a par with European nations but quite high for a new network.

Although it has not been possible to find specific data on the number of dwellings damaged, surface water and fluvial flooding presents a risk to Batumi. There have been several flooding events in the past 10 years with significant events occurring in 2018 and 2014. Reduced permeability and poor maintenance of drainage gullies have been cited as key reasons for the flooding.

## What is already being done?

- Nationally, a range of mechanisms exist to regulate water quality, including the Law of Georgia on Water and conditions on what can be discharged. The new Law of Georgia on Water Resource management is also pending.
- Locally, the most major ongoing activity in this sector is the project 'Rehabilitation of Municipal Infrastructure Facilities in Batumi (2007 – 2022)'. This project has upgraded wastewater treatment plant and the piped infrastructure, improving wastewater discharge and decreasing the amount of potable water loss.



## Key challenges

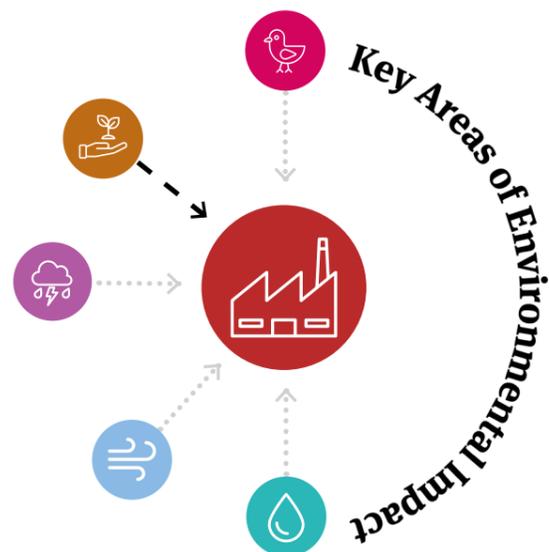
The following challenges for water cycle management in Batumi (including potable water supply, surface water, wastewater and coastal management) were identified and prioritised by stakeholders:

ID	Description of challenge	Relevant GCAP sector(s)
Wc1	<b>High water losses in the old network:</b> Batumi has been pursuing a refurbishment of its water network; however, high water losses from leaks still occur from part of the network that has not been rehabilitated.	
Wc2	<b>Informal wastewater treatment:</b> Many Batumi residents are not properly connected to the city's wastewater network. This poses risks to public health and can degrade environmental assets that are important for biodiversity and nature tourism.	
Wc3	<b>Flood risk and coastal erosion:</b> Batumi's topography means that certain neighbourhoods are prone to riverine flooding, while flash flooding is a reasonably regular occurrence in parts of the city when drainage infrastructure is overwhelmed by heavy rain. Use of Water Sensitive Urban Design features is not commonplace in Batumi. Additionally, climate change means storm surges and coastal erosion are an increasing risk to Batumi's waterfront.	
Wc4	<b>High water consumption in the hotel sector:</b> As a major regional tourist destination, Batumi's hotel industry is a significant source of water consumption.	

## 2.7.6 Industries

There are very few large enterprises and no heavy manufacturing industries are located within Batumi, although Batumi Oil Terminal and Batumi Port significant employers. According to the Geostat Business Registry, more than 90% of registered entities represent small and medium sized enterprises. Of the industrial activities that are present in Batumi, energy is derived from a mixture of electricity, natural gas, and coal. Energy efficiency of most manufacturing enterprises in Georgia is low.

One of the fastest growing industry sub-sectors is construction, which is mainly driven by the growth in tourism. There are several planned and ongoing construction projects of high-end branded hotels and residential complexes in Batumi.



## What is already being done?

- Third National Environmental Action Plan (2017-2021) – sets National priorities and actions in the field of environmental protection, including green economy growth.
- UNIDO project 'Reducing GHG Emissions through Improved Energy Efficiency in the Industrial Sector in Georgia' explores ways to reduce GHG emissions and improve productivity of the Georgian industry.
- Finance and Technology Transfer Centre for Climate Change (FINTECC) provides grants and technical assistance to companies for implementation of emissions reduction and resilience technologies.

## Key challenges

The following challenges for industries in Batumi were identified and prioritised by stakeholders:

ID	Description of challenge	Relevant GCAP sector(s)
lc1	<b>Low industrial energy efficiency:</b> Low energy prices and ageing assets means that energy efficiency of industrial facilities is generally poor.	
lc2	<b>Lack of recycling:</b> There is a low level of recycling among industrial facilities.	
lc3	<b>No consistent policies or incentives:</b> There is an absence of consistent energy efficiency policy and financial incentives for more environmentally sustainable industrial practices.	
lc4	<b>Low uptake of international sustainability standards:</b> Few enterprises in Batumi carry environmental certifications such as ISO14001 for Environmental Management Systems (exceptions include Batumi Port and Batumi Oil Terminal).	Cross-cutting

## 2.8 Summary of environmental baseline

In conclusion, we have identified a total of 50 priority environmental challenges for the city. These priority environmental challenges relate to air quality, biodiversity, GHG, green spaces, climate resilience, and soil quality.

Table 2 provides a summary of these challenges, and Table 3 and Table 4 describe these 50 challenges in detail. Ultimately, our GCAP actions respond to a holistic consideration of the influences and interactions of the pressure areas on environmental values. Given industry's limited operation in Batumi, there is less focus on this pressure area in Section 3.

Table 2. Summary of priority environmental challenges.

		ENVIRONMENTAL VALUES					
		Air quality	Water quality	Soil quality	Biodiversity	Green spaces	Climate mitigation, adaptation & disaster risk
PRESSURE AREAS	<b>Land use</b> Lack of land-use plan and associated enforcement	Planning encourages private car use	Diffuse urban pollution		Provision of integrated green space Rapid rate of development	Lack of climate integration in land use planning	
	<b>Buildings &amp; Energy</b>	Construction site practices Fossil-fuel dominated energy supply	High water consumption in hotel sector	Construction site practices		Poor quality building stock increases GHG emissions Resilience of energy networks	
	<b>Transport</b>	Transport emissions Car-dependent transport					
	<b>Industry</b>					Industrial emissions	
	<b>Water cycle management</b>		Non-revenue water loss in old network		Protection of the Chorkhi River Delta Provision of green space	Coastal erosion and sea-level rise	
	<b>Solid waste</b>	Illegal waste dumping			Biodiversity impacts of non-compliant landfill		

Table 3 summarises the priority environmental challenges identified for Batumi's environment and performance of the sectors with a role to play and environmental management. It also documents important stakeholders and the extent to which CoB has jurisdiction to set policy and make investments relating to each indicator category.

City of Batumi's level of influence over topic	
<b>High</b>	Has full autonomy to set policy and/or make investment decisions.
<b>Medium</b>	Has autonomy to set policy and/or make investment decisions around some aspects only; or Has the capacity to make investments but must comply with policy set by Adjara AR or National Government actors.
<b>Low</b>	No autonomy to set policy and/or make investment decisions. The City's main vector to influence policy and investments is advocacy.

Table 3. Priority environmental challenges, stakeholders and level of municipal influence – environmental values

Indicator category	Key challenges	Level of influence for CoB	Critical stakeholders		Relevant sectors (Pressure indicator categories)
			Policy making	Investments in or affecting Batumi	
<b>State indicators</b>					
<b>Air quality</b>	<b>AQc1</b>	<b>Ageing vehicle fleet</b>	National Government is responsible for setting emissions standards and taxation policies that can incentivise upgrades to newer vehicles. CoB can make supporting investments.	Urban Transport and Transport Policy Division; Department of Environmental Pollution, National Environmental Agency (NEA)	
	<b>AQc2</b>	<b>Construction site dust</b>	Municipality can work with construction firms to reduce dust, although its capacity to enforce non-compliance is constrained by National laws.	Health and Social Protection Service Municipal Infrastructure Directorate	
	<b>AQc3</b>	<b>High sulphur content of fuels</b>	Fuel composition is regulated by the National Government and will have to align with EU standards under Directive 2007/26/EC.	Department of Environmental Pollution, National Environmental Agency (NEA)	
	<b>AQc4</b>	<b>Pollution from shipping activities</b>	Maritime sulphur emissions are governed by the IMO under the Annex VI of the International Convention for the Prevention of Pollution from ships. CoB has little influence.	Department of Environmental Pollution, National Environmental Agency (NEA)	

Indicator category	Key challenges	Level of influence for CoB	Critical stakeholders		Relevant sectors (Pressure indicator categories)	
			Policy making	Investments in or affecting Batumi		
<b>State indicators</b>						
<b>Biodiversity and ecosystem</b>	Bc1	Urban development	CoB has the ability to set its own land use plan and regulate local development; however, aspects must align with the National framework	Municipal Policy Planning, Risk Management and Monitoring Division Architecture and Urban Policy Division Municipal Property Management Service	National Ministry of Environment Protection and Agriculture Directorate for Environment and Natural Resources of Adjara AR)	
	Bc2	Biodiversity awareness	CoB has the ability to promote awareness about existing regulation and was in which citizens can protect and support biodiversity.	Biodiversity and Environment Integrated Management Service (part of Directorate for Environment and Natural Resources of Adjara AR) Batumi Botanical Garden; Greenery and landscape planning service	National Ministry of Environment Protection and Agriculture Directorate for Environment and Natural Resources of Adjara AR)	NA
	Bc3	Illegal hunting of migratory bird species	CoB can review	Department of Environmental Supervision		
	Bc4	Protection of the Chorokhi River Delta	Currently, environmental enforcement is managed at the National and Regional levels. However, CoB can address this challenge through land use and development controls.	Georgian Ministry of Environment Protection and Agriculture; Directorate for Environment and Natural Resources of Adjara AR		
<b>Greenhouse gases</b>	GHGc1	Ageing fleet and car-dependent transport sector	See AQc1	Transport Policy Division Department of Environmental Pollution, National Environmental Agency (NEA)		
	GHGc2	Absence of building efficiency standards and ageing stock	The National Government is responsible or setting laws on energy efficiency, but CoB has a significant role in effective local implementation.	Ministry of Economy and Sustainable Development Architecture and Urban Policy Service Municipal Policy Service	NA	

Indicator category	Key challenges	Level of influence for CoB	Critical stakeholders		Relevant sectors (Pressure indicator categories)	
			Policy making	Investments in or affecting Batumi		
<b>State indicators</b>						
<b>Greenhouse gases</b>	GHGc3	No emissions control at landfill	CoB can make investment decisions about future management of landfill gas.	Municipal Infrastructure Directorate		
	GHGc4	No structured approach to implementation of GHG reduction	CoB can set its own targets and approach to emissions reduction in its SECAP, although it will need to give regard to National policies.	Ministry of Energy and Natural Resources Ministry of Environment Protection and Agriculture	NA	
	GHGc5	Outdated emissions data	CoB has the authority to gather data and compile inventories.	Municipal Policy Service		
<b>Green and public open spaces</b>	GSc1	Competing land use priorities	Batumi has authority to set its own objectives around green spaces and prioritisation of land uses.	Municipal Policy Service	Municipal Infrastructure Directorate	
	GSc2	Green space connectivity		Batumi Greening and Landscape Planning Service	Directorate for Environment and Natural Resources	
	GSc3	Green space accessibility				
	GSc4	Green space typology		Municipal Infrastructure Directorate.	Forestry Agency of Adjara AR	
<b>Climate and disaster resilience</b>	Cc1	Lack of adaptation strategy/plan for Batumi	CoB has the authority to develop a Municipal climate resilience plan.			
	Cc2	Limited information regarding energy network resilience planning	CoB has limited influence over energy generation and distribution. However, it is a key stakeholder and needs to advocate strongly for improvement in this area.	Energy Policy Department, Ministry of Economy and Sustainable Development Municipal Policy Department	Municipal Infrastructure Directorate Directorate for Environment and Natural Resources	
	Cc3	Climate change in building codes	Residential and commercial building codes fall under National Government jurisdiction; however, CoB can advocate strongly for consideration of climate change. CoB manages municipal buildings	Ministry of Economy and Sustainable Development Municipal Infrastructure Directorate	Forestry Agency of Adjara AR	

Indicator category	Key challenges	Level of influence for CoB	Critical stakeholders		Relevant sectors (Pressure indicator categories)	
			Policy making	Investments in or affecting Batumi		
<b>State indicators</b>						
Climate and disaster resilience	Cc4	<b>Flooding and coastal erosion</b>	CoB will need to collaborate closely with National and Regional governments to address these issues. Flash flooding can largely be addressed at the Municipal level through investments in improved drainage.	Municipal Infrastructure Directorate	Municipal Infrastructure Directorate Directorate for Environment and Natural Resources	
	Cc5	<b>Vulnerability of certain populations to extreme heat</b>	CoB can address this via land use planning, adaptation planning and community outreach.	Municipal Policy Service	Forestry Agency of Adjara AR	
Soil quality	SQc1	<b>Lack of data on contaminated sites</b>	CoB has the authority to investigate contaminated sites; however, policy around remediation and land transfer is set at a National level.	Health and Social Protection Service		
	SQc2	<b>Ineffective solid waste disposal practices</b>	Waste management policy is set Nationally; however, CoB and Sandasuptaveba LLL have local implementation responsibilities and autonomy to trial innovative approaches..	Municipal Policy Service		
	SQc3	<b>Urban form and built infrastructure</b>	CoB's approach to building regulations must align with National policy, but as a self-governing city it has significant autonomy.	Municipal Policy Service		
	SQc4	<b>Poor vehicle quality and congestion</b>	CoB does not have authority to regulate vehicle quality, but it can address congestion through planning and pricing incentives such as parking charges.	Ministry of Environment Protection and Agriculture Urban Transport and Transport Policy Division		

Table 4. Priority environmental challenges, stakeholders and level of jurisdiction – pressure areas

Pressure Value	Key challenges	Level of jurisdiction	Critical stakeholders		Relevant environmental values (State indicator categories)	
			Policy making	Investments in or affecting Batumi		
Land use	LUc1	<b>Car-oriented urban form</b>	The Municipality has the authority to develop and enforce land use planning, which can incorporate both climate risk mitigation and green space standards, so long as these align with the National Framework.	Municipal Infrastructure Directorate		
	LUc2	<b>No integration of climate change and natural hazards</b>		Municipal Policy Service, Architecture and Urban Policy Division Municipal Property Management Service	Directorate for Environment and Natural Resources Forestry Agency of Adjara AR Municipal Infrastructure Directorate	Cross-cutting
	LUc3	<b>Green space protection and expansion</b>		Batumi Greening and Landscape Planning Service Municipal Policy Service	National Ministry of Environment Protection and Agriculture Directorate for Environment and Natural Resources of Adjara AR	
	LUc4	<b>Inconsistent implementation</b>		Architecture and Urban Policy Division	Municipal Infrastructure Directorate	Cross-cutting
Solid waste	SWc1	<b>Unsustainable construction waste practices</b>	Municipal Policy Service			
	SWc2	<b>Unsanitary landfill condition</b>	Municipal Policy Service	Ministry of Regional Development and Infrastructure of Georgia (MRDI) Hygiena LLC		
	SWc3	<b>Illegal waste dumping</b>	Health and Social Protection Service	Sandasuftaveba LLC		

Preasure Value	Key challenges		Level of jurisdiction	Critical stakeholders		Relevant environmental values (State indicator categories)
				Policy making	Investments in or affecting Batumi	
Solid waste	SWc4	Lack of recycling awareness and required infrastructure	CoB also has the authority to promote awareness about waste hierarchy and recycling through communication campaigns. CoB is also responsible for the provision of recycling logistical services.	Municipal Policy Service; Environmental Supervision Department, Ministry of Internal Affairs	Ministry of Regional Development and Infrastructure of Georgia (MRDI)	Cross-cutting
	SWc5	Lack of information on land contamination	CoB has the authority to map and assess the quality of these sites, although this would need to occur in collaboration with National and Regional bodies.	Health and Social Protection Service	Hygiena LLC Sandasuftaveba LLC	
Energy supply and buildings	ESc1	Poor quality building stock	The National Government is responsible for setting building standards; however, the Municipality plays a major role in implementation and enforcement.	Ministry of Economy and Sustainable Development Municipal Infrastructure Directorate; Architecture and Urban Policy Service	Private Construction Companies Municipal Infrastructure Directorate	
	ESc2	High electricity consumption and supply pressures	Georgia has a National energy network (Georgia State Electrosystem), and hence supply pressures can be influenced by activities in other jurisdictions. Day-to-day operation of the local electrical network is the responsibility of Energo-Pro. CoB has little direct influence, but it is key stakeholder and hence should advocate strongly for its interests.	Energy Policy Department, Ministry of Economy and Sustainable Development	Private Construction Companies Municipal Infrastructure Directorate Energo-Pro	
	ESc3	Lack of implementation and awareness of standards and certifications	CoB has the ability to promote standards and certifications but cannot compel others to adopt standards above and beyond those set by the National Government.	Municipal Policy Service Architecture and Urban Policy Service		
	ESc4	Limited local capacity to implement new standards	The Municipality can enter into partnerships to address local skill gaps, but effectively addressing this issue requires policy interventions at the National and Regional levels.	Municipal Policy Service Architecture and Urban Policy Service	Municipal Policy Service Architecture and Urban Policy Service	
ESc5	Outages and network resilience planning	See ESc2.	Energy Policy Department, Ministry of Economy and Sustainable Development Municipal Policy Service	Department of the Energy Reforms and Projects, Ministry of Economy and Sustainable Development Municipal Infrastructure Directorate "Adjar-ganateba" LLC	Climate and disaster resilience	

Preasure Value	Key challenges		Level of jurisdiction	Critical stakeholders		Relevant environmental values (State indicator categories)
				Policy making	Investments in or affecting Batumi	
Energy supply and buildings	ESc4	Limited local capacity to implement new standards	The Municipality can enter into partnerships to address local skill gaps, but effectively addressing this issue requires policy interventions at the National and Regional levels.	Municipal Policy Service Architecture and Urban Policy Service	Municipal Policy Service Architecture and Urban Policy Service	
	ESc5	Outages and network resilience planning	See ESc2.	Energy Policy Department, Ministry of Economy and Sustainable Development Municipal Policy Service	Department of the Energy Reforms and Projects, Ministry of Economy and Sustainable Development Municipal Infrastructure Directorate "Adjar-ganateba" LLC	Climate and disaster resilience
Transport	Tc1	Aging and inefficient private, municipal, and marshrutka vehicle fleets	CoB has the authority to regulate marshrutkas operating routes within the City.	Ministry of Economy and Sustainable Development Urban Transport and Transport Policy Division	National Ministry of Infrastructure and Regional Development	
	Tc2	Lack of vehicle parking infrastructure	In collaboration with Adjara AR Government, CoB has authority over land use planning and enforcement and can set its own policies around parking prices and active transportation options.	Urban Transport and Transport Policy Division	Batumi Avtotransport Ltd (LLC)	
	Tc3	High levels of congestion on key routes		Batumi Avtotransport, LLC		
	Refer to AQc3	Fuel quality	This is regulated by the National Government and will have to align with EU standards under Directive 2007/26/EC.	Department of Environmental Pollution, National Environmental Agency (NEA) Urban Transport and Transport Policy Division	Department of Environment and Climate Change, National Ministry of Environment Protection and Agriculture Directorate for Environment and Natural Resources of Adjara AR	

Preasure Value	Key challenges		Level of jurisdiction	Critical stakeholders		Relevant environmental values (State indicator categories)
				Policy making	Investments in or affecting Batumi	
Water cycle management	Wc1	High water losses in the old network	Past investments in the water infrastructure improvements indicate that CoB can take action in this area in collaboration with the National Government.	Ministry of Regional Development and Infrastructure	Ministry of Regional Development and Infrastructure of Georgia (MRDI) Batumi Water LLC	
	Wc2	Informal wastewater treatment		Ministry of Environment Protection and Agriculture Batumi Water LLC	NCNEE "Municipal infrastructure Directorate" "Batumi water supply system rehabilitation project" - KFW	  
	Wc3	Flood risk and coastal erosion – refer also to Cc4	CoB will need to collaborate closely with National and Regional governments to address these issues. Flash flooding can largely be addressed at the Municipal level through investments in improved drainage.	Ministry of Environment Protection and Agriculture Municipal infrastructure Directorate	Directorate for Environment and Natural Resources Forestry Agency of Adjara AR Municipal Infrastructure Directorate	  
	Wc4	High water consumption in the hotel sector	CoB has the authority to partner with, albeit not set standards for, the hotel sector.	Batumi Water LLC	Ministry of Regional Development and Infrastructure of Georgia (MRDI) Batumi Water LLC NCNEE "Municipal infrastructure Directorate" "Batumi water supply system rehabilitation project" – KFW Hotels in Batumi	
Industries	Ic1	Low industrial energy efficiency	Rules are set at the National level; however, CoB does have the capacity to influence industrial environmental performance on a local scale through collaboration and voluntary incentive programmes.	Ministry of Economy and Sustainable Development	'Enterprise Georgia' Agency	
	Ic2	Lack of industrial recycling		National Ministry of Environmental Protection and Agriculture	Ministry of Economy and Finance of Adjara AR Department of Tourism and Resorts of Adjara AR	    
	Ic3	No consistent policies or incentives		Enterprise Georgia' Agency	Ministry of Regional Development and Infrastructure of Georgia (MRDI)	
	Ic4	Low uptake of international sustainability standards		Ministry of Economy and Sustainable Development		Cross-cutting



# Part 2: Batumi's Green Future

# 3 Actions for a Green Batumi

Chapter 3 of the GCAP transitions from the challenges facing Batumi's environment to how action can be taken to address these challenges across different sectors.

This section comprises six chapters, each of which described a thematic **action area** aligning with one or more of the sectors covered by the PSR framework. Each action area is further divided into **strategic objectives** that articulate more specific aims for the coming years. These are underpinned by a suite of tangible **actions**, each of which comprises a specific investment or project that can help to achieve one or more strategic objectives.

**Actions in the GCAP were developed collaboratively with CoB and a range of stakeholders; however, they remain proposals only. While some can be implemented quickly, most will require additional detailed feasibility studies, funding or statutory approvals before implementation could commence.**

The strategic objectives were developed with input from key stakeholders during the May 2019

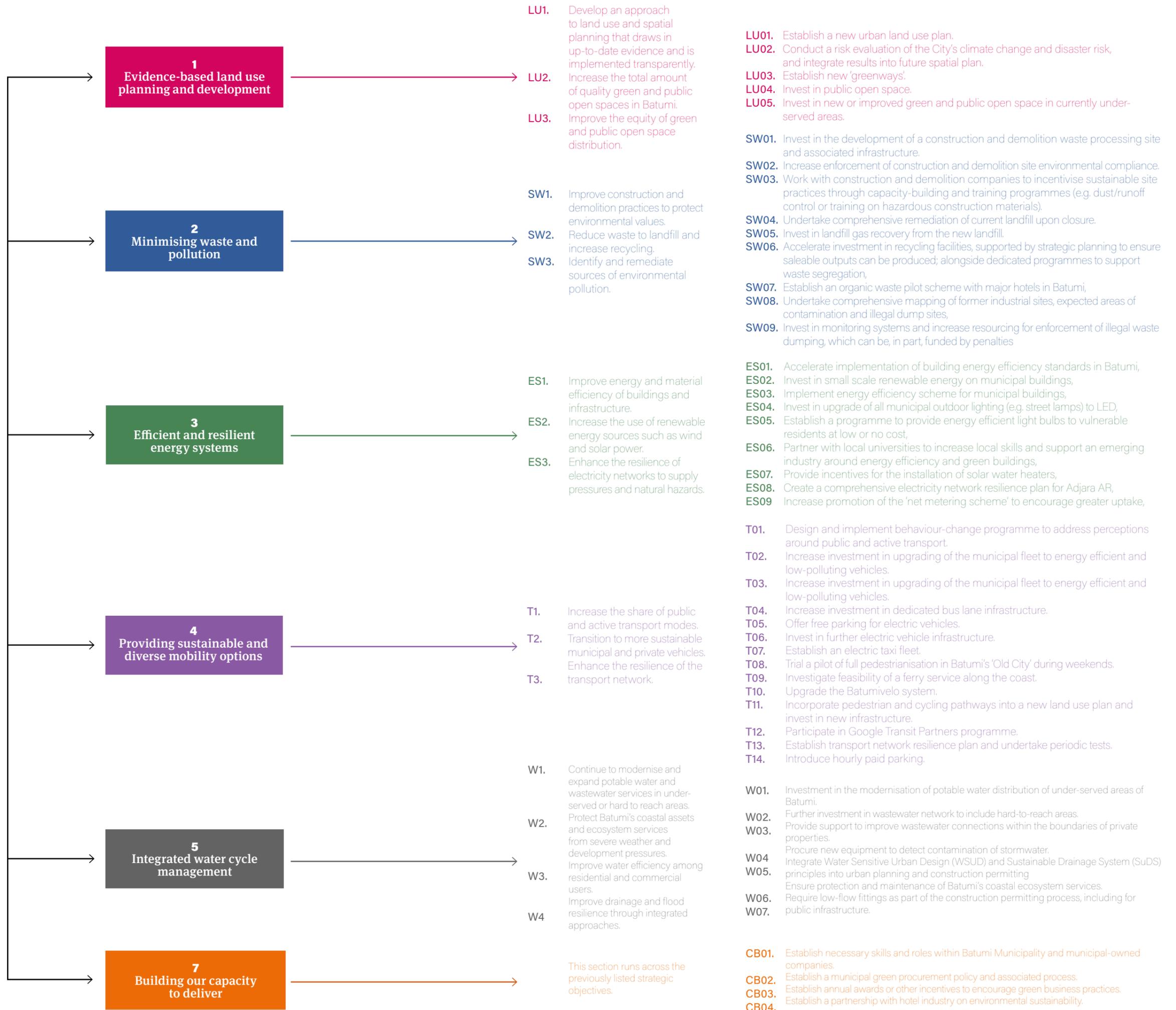
workshop in Batumi. Strategic objectives are accompanied by mid-term targets varying from 5 to 15 years into the future, depending on the issue being addressed.

Although climate change adaptation, mitigation and disaster resilience are critical issues for Batumi, Georgia and globally, no specific chapter is provided on these topics. Rather, to reflect the cross-cutting nature of this issue, relevant actions are integrated throughout the actions chapter. Where an action has a climate change benefit this is noted. Batumi's strategic objectives for climate and resilience are:

- **CR1** Increase the resilience of infrastructure and systems to acute shocks and chronic stresses
- **CR2** Increase the resilience of individuals to acute shocks and chronic stresses; particularly Batumi's most vulnerable citizens
- **CR3** Reduce GHG emissions in line with CoB commitments made under the Covenant of Mayors and seek opportunities to accelerate action.



Batumi will become an innovative, safe, and inclusive city that promotes liveability through sustainable and green actions.



## Types of actions

The short-term actions included in this GCAP fall under the following categories:

- **Capital projects:** infrastructure investments that CoB will undertake either using municipal funds or with support from donor agencies.
- **Policy measures:** new legislation or policy enacted to drive more environmentally-friendly activities. The GCAP notes where the policy measure falls within CoB's remit as a self-governing city, versus those instances where collaboration with other levels of government would be required to achieve the policy change.
- **Plans and strategies:** provide a more detailed roadmap for improving performance in a specific sector or area (e.g. a Climate Adaptation Plan).
- **Behavioural:** measures specifically seeking to shift behaviour of a cohort in a targeted direction (e.g. towards more public transport use). While policy measures may also have a behavioural component, actions in this category focus specifically on behaviour-change, such as awareness campaigns.
- **Training:** actions seeking are those that seek to increase capacity through knowledge exchange.
- **Enforcement:** measures seeking to improve compliance with policies and regulations, typically through monitoring and potential penalties.

## Financial and benefits assessment

For each action, financial costs and selected broader benefits have been assessed. The costs are denoted in Georgian lari (ლ) and cover the capital expenditures (CapEx), operational expenditures (OpEx) of actions, and other design and development costs (e.g. consultant fees). Actions may require CapEx and/or OpEx, or may not require investment at all.

Additionally, for each action area, the potential benefits generated by the collection of actions is discussed. This benefits assessment scored the collection of actions against the following criteria (see Appendix A for the scoring methodology):

Economic development	Social inclusion	Health, wellbeing, and safety
<ul style="list-style-type: none"> <li>▪ Economic growth</li> <li>▪ Employment creation</li> <li>▪ Economic efficiency</li> <li>▪ Revenue generating activities</li> <li>▪ Avoided damages</li> </ul>	<ul style="list-style-type: none"> <li>▪ Access to basic services</li> <li>▪ Skills development</li> <li>▪ Social equity</li> <li>▪ Strengthens social fabric</li> </ul>	<ul style="list-style-type: none"> <li>▪ Public health – more active lifestyles</li> <li>▪ Public health – reduced pollution</li> <li>▪ Workplace safety</li> </ul>

Finally, for applicable actions, information is also provided on expected carbon savings.

# Learning from others

As the beginning of each action area, a case study from another city is included. These case studies provide inspiration around the benefits that can be achieved when a city makes a strong commitment to action around environmental sustainability

## Learning from other regions – Adapting overhead lines in response to increasing temperatures in the UK

Increasing summer temperatures in the UK pose risks to power lines as warmer power lines experience decreases in carrying capacity up nearly 10%, which can result in accidents, power cuts, revenue losses, and cascading network failures. Lines can also sag from thermal expansion, increasing the risk of electrocution or fires when lines meet trees or wooden infrastructure. As of 2018, Western Power Distribution (WPD) in the UK has begun to implement several adaptation options to improve electrical efficiency during heatwaves, including increase the height of supporting poles, installing conductors that have hotter operating limits, and/or using low-sag conductors.

As Batumi increasingly feels the adverse impacts of climate change, it will be important to invest in and develop projects using materials and approaches which will build resiliency to effects such as heat waves, increased rain fall and rising sea levels.



# 3.1 Evidence-based land use planning and development management

The spatial layout of a city is truly cross-cutting in terms of its influence on environmental values and performance, which is why **evidence-based land use planning and development management** was identified with stakeholders as the highest priority action area in this GCAP.

In response to the challenges identified in Section 2, CoB selected the following strategic objectives for this action area:

Our strategic objectives		Related challenges	Targets (2025 unless otherwise stated)
LU1	Develop an approach to land use and spatial planning that draws in up-to-date evidence and is implemented transparently	Bc1, GSc1-GSc4, Cc1, Cc4, SQc3, LUc1-LUc4, Tc2, Tc3	Plan is being implemented
LU2	Increase the total amount of quality green and public open spaces in Batumi	GSc1-GSc4, LUc3	10% increase by area
LU3	Improve the equity of green and public open space distribution	GSc1-GSc4, LUc3	20% increase in citizens within walking distance of green/public open space

## Learning from other cities – Barcelona Tree Master Plan 2017-37

Barcelona faces some similar climate change challenges to Batumi – increasing heatwaves due to the urban heat island effect, droughts, and sea level rise. Additionally, air quality in Barcelona has been historically poor – the WHO estimates that a reduction in pollutants could reduce mortality by 3,500 lives annually. The Trees Master Plan was developed in response to these challenges and as part of Barcelona’s wider Green Infrastructure and Biodiversity Plan. The plan aims to improve urban and natural connectivity, enhance the city’s natural heritage, the resilience of the city to climate change, and provide co-benefits to residents.



Table 5. Green City Actions for Land Use and Green Spaces

Green City Actions for land use and green spaces are summarised below. Detailed descriptions of each action, including projected costs and benefits, follow on pages 40 - 43.

ID	Strategic Objective	Action	Type	Indicative costs			Total
				CAPEX	OPEX	Design & Development	
LU01L	LU1 (cross-cutting benefits)	Establish a new urban land use plan	Plan / Policy			900,000-2,000,000	2020-2023
LU02	LU1	Conduct a risk evaluation of the City's climate change and disaster risk, and integrate results into future spatial plan	Investigation			362,000	2021-2022
LU03	LU2, LU3	Establish new 'greenways'.	Capital project	385,000-578,000			2021-2025
LU04	LU3	Invest in new or improved green and public open space in currently under-served areas.	Capital project	30,000,000-50,000,000			2021-2023

LU01: Establish a new urban land use plan		
<b>Strategic objective</b>	<b>LU1:</b> Develop an approach to land use and spatial planning that draws on up-to-date evidence and is implemented transparently	
<b>Description</b> What will be done?	Building on Batumi's 2018–2021 Strategic Development Plan, CoB will develop a new land-use plan that is based on up-to-date evidence and integrates the objectives of the GCAP, findings of the SECAP process and relevant climate projections. CoB will commit resources for implementation (e.g. qualified land use planners to consider development applications), and to transparent and consistent implementation of rules, such as greening coefficients. Development of the plan will give regard to transport-oriented development, standards for equitable access to nature and services, urban ecology, green space protection and linkage, and heat island reduction.	
<b>Rationale</b> Why is it being proposed?	Batumi's last land-use plan was developed in 2009. Since then, its implementation has been inconsistent ( <b>LUc4</b> ). Batumi's rapid development means that green, public, open and other important spaces are competing with other land uses such as roads and high density residential developments ( <b>GSc1</b> ). Additionally, climate change impacts and natural hazard risks are not accounted for in land use planning ( <b>Cc1</b> ). Evidence-based and strategic land use planning is required for an expanding and developing city like Batumi.	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Allocate funding.</li> <li>2. Procure appropriate specialist support.</li> <li>3. Determine budget and human resource implications to implement in full and integrate into forward planning.</li> </ol>	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Policy Department
	<b>Stakeholders</b>	Architecture and Urban Policy Division; Municipal Property Management Service; Urban Transport and Transport Policy Division; major construction companies, Batumi Sea Port and Oil Terminal; Georgian Railway, International Airport
	<b>Financing options</b>	Municipal budget
	<b>Revenue/savings opportunities</b>	A coherent spatial plan is likely to lead to a more efficient urban space, where people are more connected to services and livelihoods. This, in turn, can generate revenue as economic productivity increases (for example, transit-oriented development would reduce peoples' commutes times between home and work).
	<b>Timeline</b>	2020-2023
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>▪ Average annual growth rate of built-up areas</li> <li>▪ Percentage of urban development that occurs on existing urban land rather than on greenfield land</li> <li>▪ Population density on urban land</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> NA <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> 900,000-1,800,000 GEL	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	YES
	<b>Health improvements</b>	YES
	<b>CO<sub>2</sub> savings</b>	NA

LU02: Conduct a risk evaluation of the City's climate change and disaster risk, and integrate results into future spatial plan		
<b>Strategic objective</b>	<b>LU1:</b> Develop an approach to land use and spatial planning that draws on up-to-date evidence and is implemented transparently. <b>CR1</b> Increase the resilience of infrastructure and systems to acute shocks and chronic stresses <b>CR2</b> Increase the resilience of individuals to acute shocks and chronic stresses; particularly Batumi's most vulnerable citizens.	
<b>Description</b> What will be done?	CoB will undertake a systematic evaluation of climate and natural hazard risks to city systems. Covering a range of timeframes and climate projections, this is a critical piece of evidence to inform future spatial planning and disaster risk reduction actions.	
<b>Rationale</b> Why is it being proposed?	Batumi faces multiple climate hazards, including sea level rise, more frequent and severe flash flooding, and increasing heatwaves ( <b>Cc1 - Cc4</b> ). However, these hazards are not adequately integrated into planning, putting residents and municipal services at risk ( <b>LUc2</b> ).	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Fund an inter-agency project team to lead the Climate Change Risk Assessment (CCRA).</li> <li>2. Procure appropriate specialist support.</li> <li>3. Integrate the findings of the CCRA into the developing spatial plan.</li> </ol>	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Policy Department
	<b>Stakeholders</b>	Architecture and Urban Policy Division; Municipal Property Management Service; Urban Transport and Transport Policy Division; major construction companies, Batumi Sea Port and Oil Terminal; Georgian Railway, International Airport
	<b>Financing options</b>	Municipal budget
	<b>Revenue/savings opportunities</b>	The City will avoid damages by conducting a risk assessment, allowing them to install preparatory measures to mitigate the impacts of climate and natural hazards.
	<b>Timeline</b>	2021-2022
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>▪ Percentage of public infrastructure at risk</li> <li>▪ Percentage of households at risk</li> <li>▪ Estimated economic damage from natural disasters floods droughts earthquakes etc. as a share of GDP</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> NA <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> 362,000 GEL	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	NO
	<b>CO<sub>2</sub> savings</b>	NA

LU03: Establish new 'greenways'		
<b>Strategic objective</b>	<b>LU2:</b> Increase the quality and total amount of green and public open spaces in Batumi <b>LU3:</b> Improve the equity of green and public open space distribution	
<b>Description</b> What will be done?	CoB will work with Batumi Boulevard and Batumi Greening Service to link the Boulevard with other green spaces using newly established corridors. This could involve strategic road closures to enable creation of new spaces.	
<b>Rationale</b> Why is it being proposed?	At present, much of Batumi Boulevard is not well linked with green spaces in other parts of the city ( <b>GSc1-GSc4; LUc3; Bc1</b> ). There is strong evidence from cities around the world that linking green spaces into a contiguous network encourages pedestrianisation, improves amenity and can potentially increase wildlife movement ( <b>Bc1</b> ).	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Designate a project team within Batumi Green Service and establish roles and authorities.</li> <li>2. Short-list areas that could be adapted to greenways (e.g. Melikishvili St between Rustaveli Ave and Ninioshvili St).</li> <li>3. Consult local stakeholders and select pilot location.</li> </ol> <p>Allocate necessary budget for the capital costs for the full project timeline and conduct first pilot.</p>	
<b>Type of action</b>	Capital project	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Batumi Greening and Landscape Planning Service
	<b>Stakeholders</b>	Batumi Boulevard, relevant ecosystem-focused NGOs, local academics and researchers.
	<b>Financing options</b>	Municipal budget; donor agencies; public private partnership
	<b>Revenue/savings opportunities</b>	Increasing these green space linkages could boost tourism and property values. Additionally, events could be held in and around these linkages, which could provide revenue to CoB (e.g. from park permitting fees).
	<b>Timeline</b>	2021 – 2025
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Percentage of public infrastructure at risk</li> <li>Percentage of households at risk</li> <li>Estimated economic damage from natural disasters floods droughts earthquakes etc. as a share of GDP</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 385,000 – 578,000 GEL to conduct a small pilot <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES
	<b>CO<sub>2</sub> savings</b>	28.99 tCO <sub>2</sub> e over asset lifetime

LU04: Invest in new or improved green and public open space in currently under-served areas		
<b>Strategic objective</b>	<b>LU3:</b> Improve the equity of green and public open space distribution.	
<b>Description</b> What will be done?	CoB will set statutory green and public open space ratios for city districts based on EU accessibility standards (e.g. 400m or nine minutes' walk from residences) in alignment with the EU-Georgia Association Agreement. CoB will then commission a systematic analysis of green and public open space in Batumi and develop a targeted investment strategy for areas with low ratios.	
<b>Rationale</b> Why is it being proposed?	Between 2009 and 2011 Batumi acquired several new territories; however, this expansion was not based on any formal assessment. As such, there is limited understanding of the existing public open spaces in these new areas ( <b>GSc1-GSc4; LUc3; LUc4</b> ). Additionally, much of Batumi's existing public open space is centred around the coastline, meaning resident access to quality spaces is low in many districts. Access to green space has well-known benefits to human and ecosystem health.	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Establish a project team.</li> <li>2. Set statutory targets and undertake spatial analysis of green and public open space.</li> <li>3. Identify investment target areas and allocate adequate funding.</li> </ol>	
<b>Type of action</b>	Capital project	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Batumi Greening and Landscape Planning Service
	<b>Stakeholders</b>	Batumi City Hall (to adopt and enforce statutory policy), Civil society groups, construction/development companies, Municipal Infrastructure Development
	<b>Financing options</b>	Municipal budget; donor agencies; public-private partnership
	<b>Revenue/savings opportunities</b>	Like action LU04, revenue opportunities may result from events held in these public and green spaces (e.g. derived from permitting fees etc.). Similarly, improved green and public spaces could improve property values and may boost tourism.
	<b>Timeline</b>	2021-2023
	<b>Key metrics for evaluation</b>	<ul style="list-style-type: none"> <li>Open green space area ratio per 100 000 inhabitants</li> <li>Share of green space areas within urban limits</li> </ul>
<b>Estimated cost</b>	<b>CAPEX:</b> 30,000,000 - 50,000,000 GEL. This assumes an aim for 10sqm of public green spaces per capita. <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> Significant advisory support would be required to implement new green spaces on a large scale; too many assumptions are required to provide a meaningful estimate of this figure.	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	YES
	<b>Health improvements</b>	YES
	<b>CO<sub>2</sub> savings</b>	3,791 tCO <sub>2</sub> e over asset lifetime

### 3.1.1 Benefits of evidence-based land use planning and development management actions

Benefit Category	Indicator	Score	Total Score
Economic development	Economic growth	1	7
	Employment creation	2	
	Increased economic efficiency	1	
	Revenue generating activities	2	
	Avoided damage costs	1	
Social inclusion	Access to basic services	2	6
	Skills development	0	
	Social equity	2	
	Strengthens social fabric	2	
Health, wellbeing and safety	Public health – more active lifestyles	2	3
	Public health – reduced pollution	1	
	Workplace safety	0	

#### Economic development impacts

Land use and spatial planning provide the foundation on which urban residents go about their daily lives, including what they can access and what opportunities are available to them. The proposed land use actions can support economic development, from job creation to generating revenue.

#### Employment creation

Batumi can expand existing or generate new employment opportunities by developing a new land use plan and establishing new open spaces. The new land use plan will require technical expertise to develop and implement the plan. Additionally, green and open space development will provide new employment opportunities during the construction phase to construction workers, landscape designers, gardeners, and additional contractors. Moreover, it will require management and maintenance workers after initial development.

#### Economic efficiency

The new land use plan will also support economic efficiency by creating a more stable investment environment for developers and other investors, helping the city maximise its potential. Moreover, the land use plan will incorporate the most up-to-date evidence to pursue effective and diverse transport options, which can have the added benefit of increasing economic productivity as, for example, residents spend less time in traffic.

#### Economic growth

Green and open space development, coupled with a comprehensive land use plan, will improve the public realm. This, in turn, will boost the attractiveness of the city to visitors and residents alike, supporting tourism activities and encouraging residents to engage with the public realm. Some estimates put the value of urban green spaces at £7-£17 per visit<sup>3</sup>. Green space can also boost values of nearby properties, contributing to economic growth. Additionally, green and open space construction can stimulate economic growth indirectly through its supply chain.

#### Revenue generating activities

Open and green space development will generate revenue by providing new space and opportunities for public events such as concerts, celebrations, and establishing kiosks or cafes. The Municipality would be able to generate further revenue from permitting fees or selling advertising space throughout these areas.

#### Avoided damage costs

The climate risk assessment will identify risks that can then be incorporated into and possibly addressed in the new land use plan. For example, as Section 2.5.5 noted, Batumi has faced significant impacts from flooding, impacts which will increase under climate change. As a result, the new land use plan can identify areas of flood risk and incorporate sustainable drainage principles which will lessen flood-related damages to property, people, and infrastructure, resulting in significant savings for the Municipality, private organisations and residents. Green space development can also enable healthy lifestyles and reduce air pollution, thereby reducing negative health impacts and their associated costs.

#### Social inclusion

**Access to basic services**, including public open spaces, is an important enabler of **social equity**. The new land use plan can contribute to both these goals by delivering standards for equitable access to nature and services, which are especially critical for lower-income and vulnerable communities. Equitable green space access can also improve health outcomes, thereby reducing social inequality derived for poor health.<sup>4</sup>

Public open spaces can also **strengthen the social fabric** because they play a critical role facilitating connection and shared experiences of communities. Parks welcome people of all ages

and backgrounds and provide free informal and formal spaces for community's activities, fostering social interaction and public engagement.

#### Health, wellbeing and safety

Urban parks and gardens improve public health by enabling more active lifestyles. They provide safe routes for walking and cycling as well as spaces for physical activity, social interaction, and recreation. Active lifestyles reduce the risks of obesity, cardiovascular disease, and poor mental health, thereby reducing the costs to health services and the associated economic productivity losses for both individuals and businesses (e.g. having to take a leave of absence from work).

Additionally, green spaces – particularly trees – improve public health by filtering harmful pollutants from the air. In Batumi, these pollutants include particulate matter, sulphur dioxide, and nitrogen oxides, which are linked to premature death, cardiovascular disease, chronic respiratory infections, cancer and neurological issues.



<sup>3</sup> Department for Environment, Food & Rural Affairs (2015) Environmental Value Look-Up Tool. Available at: <https://eftec.co.uk/project/%20%09environmental-value-look-up-tool> [Accessed 17 July 2019].

<sup>4</sup>Jennings, V. & Bamkole, O. (2019) The relationship between social cohesion and urban green space: an avenue for health promotion. International Journal of Environmental Research and Public Health 16:3.

## 3.2 Minimising waste and pollution

In line with Georgia's increasing efforts to reduce waste generation and improve energy efficiency, **minimising waste and pollution** is also a key priority of Batumi, and is evident in increasing investment into this sector such as the development of the new EU-compliant landfill which will serve Batumi and the wider Adjara AR region.

In response to the challenges identified in Section 2, CoB selected the following strategic objectives to minimise waste and pollution:

Our strategic objectives		Related challenges	Targets (2025 unless otherwise stated)
SW1	Improve construction and demolition practices to protect environmental values	AQc2, SWc1	<b>25%</b> of construction and demolition waste is recycled 90% of construction and demolition waste is either recycled or disposed of in a licenced facility
SW2	Reduce waste to landfill and increase recycling	SQc2, SWc4, Ic2	<b>40%</b> of the MSW collected is source-separated for recycling
SW3	Identify and remediate sources of environmental pollution	SQc1, SWc2, SWc3, SWc5	Register of sites established and active programme of remediation commenced

### Learning from other cities – Zero Waste in Svilengrad, Bulgaria

Svilengrad was the first Municipality in Bulgaria to commit to the Zero Waste Cities Initiative. The Municipality of Svilengrad, together with Ecopack, introduced a door-to-door collection system for 1,000 single-family households. Additionally, they commenced a pilot scheme for high-rise multi-family buildings, providing three green eco-islands with electronic key access for local residents. Eco-islands are where a natural micro-habitat exists amidst a larger differing ecosystem. These could be developed in Batumi as well given its rich biodiversity and the rapid rate of development it is experiencing.

Similar mini eco-islands exist now in all kindergartens in Svilengrad, with the aim of ensuring early training on correct attitudes and behaviours towards waste. With these initiatives Svilengrad has kick-started its journey towards achieving zero waste and has several other initiatives in the pipeline, including establishing a new 3,000 tonnes/year composting installation.



Table 6. Green City Actions for Waste and Pollution Management

Green City Actions for waste and pollution management are summarised below. Detailed descriptions of each action, including projected costs and benefits, follow on pages 48 – 56.

ID	Relevant Strategic objectives	Action	Indicative Costs			Type	Timeline
			CAPEX	OPEX	Design & Development		
SW01	SW2	Invest in the development of a construction waste processing site and associated infrastructure.	525,000-875,000 GEL	100,000-150,000 GEL	50,000 GEL	Capital project	2021 – 2025
SW02	SW1 SW3	Increase enforcement of non-compliance of unsustainable construction site practices.	NA	NA	15,000-16,000 GEL	Enforcement	2020 - 2025
SW03	SW1 SW3	Work with construction companies to incentivise sustainable site practices through capacity-building and training programmes (e.g. dust/runoff control or training on hazardous construction materials).	NA	7,500 GEL	-	Training	2020 - 2025
SW04	SW1 SW3	Undertake comprehensive remediation of current landfill upon closure.	3,400,000-7,000,000 GEL	70,000-400,000 GEL	-	Capital project	2020 - 2021
SW05	SW1	Invest in landfill gas recovery from the new landfill.	22,330,000 GEL	319,000-638,000 GEL	-	Capital project	2021 - 2022
SW06	SW1	Accelerate investment in recycling facilities, supported by strategic planning to ensure saleable outputs can be produced; alongside dedicated programmes to support waste segregation.	10,700,000-16,000,000 GEL	3,500,000-5,000,000 GEL	-	Capital project	2020 - 2025
SW07	SW1 SW3	Establish an organic waste pilot scheme with high-end hotels in Batumi.	70,000 GEL	-	90,000 GEL	Capital project	2020 - 2025
SW08	SW3	Undertake comprehensive mapping of former industrial sites, expected areas of contamination and illegal dump sites.			1,200,000-2,000,000 GEL	Plan/Strategy	2020
SW09	SW1 SW3	Invest in monitoring systems and increase resourcing for enforcement of illegal waste dumping, which can be in part funded by penalties.	26,000 GEL	7,500 GEL	TBC	Capital project	TBD

SW01: Invest in the development of a construction waste processing site and associated infrastructure		
<b>Strategic objective</b>	<b>SW2:</b> Reduce waste to landfill and increase recycling	
<b>Description</b> What will be done?	CoB will prioritise proper construction and demolition (CDW) waste recycling. Contingent upon the outcomes of a feasibility study, it will negotiate purchase of recommended equipment (e.g. 'smart skips', processing plant for CDW, mini-crushers/screeners) and a suitable site stockpiling and recycling. The study will include consideration of the most effective mechanisms to drive participation in the scheme by major constructors.	
<b>Rationale</b> Why is it being proposed?	Rapid construction in Batumi generates large amounts of construction waste. Currently, this waste is disposed of indiscriminately, with no consideration of the toxicity of the materials ( <b>SWc1</b> ). It is often disposed of in illegal dumping areas ( <b>SWc3</b> ).	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Carry out feasibility study to address issues such as sources of CDW, output specifications for processed materials, site location, costs and contractual arrangements. The study should also give regard to potential risks relating to historic use of asbestos cement.</li> <li>2. Allocate budget for project development.</li> <li>3. Coordinate appropriate incentive, enforcement and collection mechanisms to ensure waste is properly disposed at the new facility.</li> </ol>	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	City of Batumi in partnership with Sandasuftaveba Ltd.
	<b>Stakeholders</b>	Sandasuftaveba Ltd; Higiena Ltd; leading construction companies in Batumi; CENN
	<b>Financing options</b>	Donor agencies, Municipal budget, Public-private partnership (contingent on feasibility study outcomes).
	<b>Revenue/savings opportunities</b>	Savings associated with reduced illegal dumping and associated clean-up costs. Recycled construction materials can also be a saleable asset, with revenue generated potentially shared with firms as an incentive for providing their waste.
	<b>Timeline</b>	Feasibility study to commence in FY2021. Period to roll-out the scheme is expected to be 36 months.
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Proportion of construction waste as part of municipal solid waste (MSW)XX</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 525,000 – 875,000 GEL (estimate contingent on feasibility study outcomes) <b>OPEX:</b> 100,000 – 150,000 GEL <b>Design &amp; Development costs:</b> 50,000 GEL	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES
	<b>CO<sub>2</sub> savings</b>	56.67 tCO <sub>2</sub> /year

SW02: Increase enforcement of construction site environmental compliance		
<b>Strategic objective</b>	<b>SW1:</b> Improve construction practices to protect environmental values <b>SW3:</b> Identify and remediate sources of environmental pollution	
<b>Description</b> What will be done?	CoB will dedicate increased support to monitoring of construction site environmental management and instigate a system of fines for unsustainable practices (e.g. dust, illegal waste disposal).	
<b>Rationale</b> Why is it being proposed?	Batumi's rapid rate of construction means that ensuring environmentally sound construction practices is paramount. Specifically, Batumi faces exceedingly high levels of PM2.5 and above-benchmark levels of PM10, some of which may be attributable to construction site dust (AQc2; SWc1). Minimising this and other negative construction side-effects through enforcement of existing regulations for construction management will support Batumi in becoming a green city.	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Recruit and train staff to carry out inspections and monitoring, and purchase required monitoring equipment.</li> <li>2. Publicise changes to public and construction industry.</li> </ol>	
<b>Type of action</b>	Enforcement	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	City of Batumi
	<b>Stakeholders</b>	Sandasuftaveba Ltd; Higiena Ltd; leading construction companies in Batumi; CENN
	<b>Financing options</b>	Municipal budget
	<b>Revenue/savings opportunities</b>	Savings opportunities will largely derive from improved health outcomes from Batumi's citizens.
	<b>Timeline</b>	2020 –2025
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>PM pollution near construction sites.</li> <li>Runoff and improper waste disposal at construction sites.</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> NA <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> 15,000-16,000 GEL	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES
	<b>CO<sub>2</sub> savings</b>	NA

SW03: Work with construction companies to incentivise sustainable site practices through capacity-building and training programmes (e.g. dust/runoff control or training on hazardous construction materials)		
<b>Strategic objective</b>	<b>SW1:</b> Improve construction practices to protect environmental values <b>SW3:</b> Identify and remediate sources of environmental pollution	
<b>Description</b> What will be done?	CoB will develop and conduct periodic training for construction site managers on good site environmental management practices (e.g. (e.g. dust/runoff control). Participation in the training, which will be held biannually, will be included as a condition of all construction permits for major developments. It is recommended that this be combined with training on workplace health and safety, similar to the Health, Safety and Environment (HSE) scheme used in the United Kingdom.	
<b>Rationale</b> Why is it being proposed?	Dust from construction is a major contributor to Batumi's air quality challenges ( <b>AQc2</b> ), and controls to reduce the off-site impacts of building construction works (e.g. runoff) are often limited ( <b>SQc2; SWc1</b> )	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Develop training materials in cooperation with construction industry</li> <li>2. Amend construction permits to include requirements for training</li> <li>3. Develop a 'Train the Trainer' programme.</li> </ol>	
<b>Type of action</b>	Training	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Architecture and Urban Policy Division
	<b>Stakeholders</b>	Sandasuftaveba Ltd; Higiena Ltd; leading construction companies in Batumi; CENN
	<b>Financing options</b>	Municipal budget
	<b>Revenue/savings opportunities</b>	Reduced environmental health and clean-up costs.
	<b>Timeline</b>	2020 - 2021
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>▪ Average annual concentration of PM2.5, PM10, TSP</li> <li>▪ Biochemical Oxygen Demand in rivers and lakes</li> <li>▪ Concentration of heavy metals in soil</li> <li>▪ Abundance of bird species</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> NA <b>OPEX:</b> 7,500 GEL <b>Design &amp; Development costs:</b> 30,000 GEL	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES
	<b>CO<sub>2</sub> savings</b>	NA

SW04: Undertake comprehensive remediation of current landfill upon closure		
<b>Strategic objective</b>	<b>SW1:</b> Improve construction practices to protect environmental values <b>SW3:</b> Identify and remediate sources of environmental pollution <b>CR3:</b> Reduce GHG emissions in line with CoB commitments made under the Covenant of Mayors and seek opportunities to accelerate action.	
<b>Description</b> What will be done?	EBRD is currently supporting CoB with a feasibility study into closing and remediating the existing Batumi landfill with support from EBRD. This action reflects the ongoing commitment to this study and allocation of budget towards appropriate remediation, including recovery of landfill gas for energy generation.	
<b>Rationale</b> Why is it being proposed?	Landfill remediation ensures that contaminants do not adversely affect water and soil quality in the area ( <b>SWc2; SQc2</b> ). Additionally, remediation reduces methane released into the atmosphere ( <b>GHGc3</b> ) and can potentially repurpose the land as a valuable public resource such as public open space ( <b>GSc3</b> ).	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Based on results of Feasibility Study, confirm: <ol style="list-style-type: none"> <li>a. Contract mechanism</li> <li>b. Technical requirements</li> <li>c. Financing arrangements</li> <li>d. Develop design/specifications and tender documents</li> </ol> </li> </ol> Procure and supervise of the works	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Architecture and Urban Policy Division
	<b>Stakeholders</b>	Sandasuftaveba Ltd; Higiena Ltd; leading construction companies in Batumi; CENN
	<b>Financing options</b>	Municipal budget
	<b>Revenue/savings opportunities</b>	The city could potentially turn the land into a developable piece of property (commercial or park) which could generate revenue via taxes or via permitting fees.
	<b>Timeline</b>	2020-2021
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>▪ Biochemical Oxygen Demand in rivers and lakes</li> <li>▪ Concentration of heavy metals in soil</li> <li>▪ Remaining life of landfills</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 3,400,000 – 7,000,000 GEL <b>OPEX:</b> 70,000 – 400,000 GEL <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	NO
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES
	<b>CO<sub>2</sub> savings</b>	0.15 to 0.32 MtCO <sub>2</sub> e savings over lifetime of energy recovery project

SW05: Invest in landfill gas recovery from the new landfill		
<b>Strategic objective</b>	<b>SW1:</b> Improve construction practices to protect environmental values <b>CR3:</b> Reduce GHG emissions in line with CoB commitments made under the Covenant of Mayors and seek opportunities to accelerate action.	
<b>Description</b> What will be done?	The construction of the new EU-compliant landfill will provide an opportunity to invest in gas recovery, where biogas that results from the decomposition of organic landfill material could be harnessed for energy and reduce GHG emissions from the landfill. CoB will pursue development of gas recovery, pending feasibility study.	
<b>Rationale</b> Why is it being proposed?	The current landfill lacks any active capture or management of landfill gases ( <b>GHGc3</b> ). Landfill gas capture presents an opportunity for Batumi to capitalise on its commitments to resource efficiency and diversifying its energy supplies. Landfill gas capture can be used to power landfill operations, and excess energy can be fed back into the grid ( <b>ESc2</b> ).	
<b>Steps for implementation</b>	1. Ensure that gas capture and utilisation facilities are included in design of new landfill 2. Liaise with relevant energy authorities to ensure that suitable capacity is available for grid connection.	
<b>Type of action</b>	Capital project	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Sandasuftaveba Ltd
	<b>Stakeholders</b>	Sandasuftaveba Ltd; Higiena Ltd; CENN; Energo-Pro
	<b>Financing options</b>	International finance institution; public private partnership
	<b>Revenue/savings opportunities</b>	Revenue could be generated from the sale of excess energy.
	<b>Timeline</b>	5 years (2020 – 2024)
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> <li>Heating cooling consumption in buildings fossil fuels residential buildings fossil fuels</li> <li>Electricity consumption in industries per unit of industrial GDP</li> <li>Heat consumption in industries per unit of industrial GDP</li> <li>Share of industrial energy consumption from renewable energy</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 22,330,000 GEL <b>OPEX:</b> 319,000 – 638,000 GEL <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES
	<b>CO<sub>2</sub> savings</b>	1.91 to 4.11 MtCO <sub>2</sub> e savings over lifetime of landfill/ energy recovery project

SW06: Accelerate investment in recycling facilities, supported by strategic planning to ensure saleable outputs can be produced; alongside dedicated programmes to support waste segregation		
<b>Strategic objective</b>	<b>SW1:</b> Improve construction practices to protect environmental values	
<b>Description</b> What will be done?	This will be undertake a feasibility and market sizing study with a view to investing in recycling infrastructure, such as a materials recovery facility. In parallel with development of the facility, CoB will work with Sandasruptaveba Ltd to support residential and commercial materials segregation and recycling (behavioural campaigns, physical containers, route planning).	
<b>Rationale</b> Why is it being proposed?	The National Government is pursuing Extended Producer Responsibility (EPR) legislation, which is a form of product stewardship. Producers become responsible for products once they become waste and will help to pay for the costs of proper disposal. CoB is also currently non-compliant with new requirements to provide for source separation of waste streams ( <b>SWc1; SWc4; lc2</b> ).	
<b>Steps for implementation</b>	This action will depend upon the outcomes of a feasibility study currently being supported by the EBRD. 1. Assess current infrastructure, markets and regulations in Georgia for recycling 2. Identify key materials with greatest potential for recycling 3. Identify requirements for collection and recycling, including any funding or financial support 4. Identify suitable partners for investment in new facilities 5. Consider regulatory and financial measures for enhancing source separation 6. Develop and deliver public information and behavioural campaigns.	
<b>Type of action</b>	Capital project; behavioural; plan/strategy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Infrastructure Commission
	<b>Stakeholders</b>	Sandasuftaveba Ltd; Higiena Ltd; CENN
	<b>Financing options</b>	Municipal budget; IFIs; public-private partnership
	<b>Revenue/savings opportunities</b>	Revenue could be generated from the sale of excess energy.
	<b>Timeline</b>	7 years (2020 – 2024+)
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Share of the population with weekly municipal solid waste MSW collection</li> <li>Proportion of MSW that is sorted and recycled total and by type of waste, e.g. paper glass batteries PVC bottles metals</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 10,700,000 - 16,000,000 GEL <b>OPEX:</b> 3,500,000 - 5,000,000 GEL <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	YES
	<b>Health improvements</b>	YES
	<b>CO<sub>2</sub> savings</b>	NA

SWo7: Establish an organic waste pilot scheme with major hotels in Batumi		
<b>Strategic objective</b>	<b>SW1:</b> Improve construction practices to protect environmental values <b>SW3:</b> Identify and remediate sources of environmental pollution	
<b>Description</b> What will be done?	CoB will invest in a small-scale open windrow composting system or anaerobic digester facility (depending on feasibility study outcomes) that will be used as part of the pilot scheme with hotels. CoB will work with Sandasruptaveba Ltd to provide food waste bins to the hotels and manage the collection to supply the digester.	
<b>Rationale</b> Why is it being proposed?	Batumi's hospitality industry generates significant amounts of organic waste, all of which currently goes to landfill. However, Batumi's current landfill is well below EU standards and is unable appropriately collect and treat organic waste ( <b>SWc2</b> ). International branded hotels may provide a good starting point for a pilot to divert this waste, due to their enterprise-wide sustainability policies.	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Confirm suitable partners in the hospitality sector who generate considerable quantities of food waste</li> <li>2. Undertake feasibility study, covering available technologies, locations and requirements for supporting infrastructure</li> <li>3. Determine funding requirements</li> <li>4. Procure, install and operate organic waste treatment facility</li> <li>5. Review results and identify potential for further roll-out.</li> </ol>	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Infrastructure Commission
	<b>Stakeholders</b>	Sandasruptaveba Ltd; Higiena Ltd; CENN; Higiena LTD; Batumi hotel industry
	<b>Financing options</b>	Public-private partnership, IFIs,
	<b>Revenue/savings opportunities</b>	Revenue could be generated from the sale of excess energy from anaerobic digestion.
	<b>Timeline</b>	2020-2023
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>▪ Percentage of collected MSW composted</li> <li>▪ Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>▪ Annual CO<sub>2</sub> emissions per unit of GDP</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 2,500,000 - 4,300,000GEL <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> 90,000 GEL	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES
	<b>CO<sub>2</sub> savings</b>	64.94 tCO <sub>2</sub> e per year

SWo8: Undertake comprehensive mapping of former industrial sites, expected areas of contamination and illegal dump sites		
<b>Strategic objective</b>	<b>SW3:</b> Identify and remediate sources of environmental pollution	
<b>Description</b> What will be done?	CoB will advocate to Adjara AR and National Governments for a programme of contaminated site mapping. Using a range of sources, such as historic aerial photography and direct site inspections, the study would provide valuable information about priority areas requiring remediation.	
<b>Rationale</b> Why is it being proposed?	Legacy industrial sites are often highly contaminated, potentially resulting in off-site impacts through the water table. These can lead to human health impacts and reduced quality of life. Batumi is anecdotally thought to have a range of contaminated sites, but at present little is known about the physical and chemical extent of the contamination ( <b>SWc3; SWc5; SQc2</b> )	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Develop scope and specifications</li> <li>2. Identify and secure necessary funding</li> <li>3. Procure contractor to carry out mapping exercise</li> </ol>	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Health and Social Protection Service
	<b>Stakeholders</b>	Academic and research institutions
	<b>Financing options</b>	Municipal budget; as part of research projects (money from grants etc.)
	<b>Revenue/savings opportunities</b>	-
	<b>Timeline</b>	2020-2022
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>▪ Biochemical Oxygen Demand in rivers and lakes</li> <li>▪ Concentration of heavy metals in soil</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> NA <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> 1,200,000-2,000,000 GEL	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES
	<b>CO<sub>2</sub> savings</b>	NA

SW09: Invest in monitoring systems and increase resourcing for enforcement of illegal waste dumping, which can be in part funded by penalties		
<b>Strategic objective</b>	<b>SW1:</b> Improve construction practices to protect environmental values <b>SW3:</b> Identify and remediate sources of environmental pollution	
<b>Description</b> What will be done?	CoB will increase funding and staff resourcing to enforce penalties against illegal dumping. Part of this will involve investing in monitoring systems (e.g. CCTV) around areas that are currently experiencing illegal dumping or may be at higher risk of illegal dumping (e.g. dead-end streets).	
<b>Rationale</b> Why is it being proposed?	Illegal waste dumping is an ongoing problem ( <b>SWc3</b> ) in Batumi and is rooted in poor solid waste management practices, as well as insufficient resources and approaches to tackle this issue ( <b>SWc4</b> )	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Identify staff and technology resources required</li> <li>2. Develop list of illegal dumping "blackspots" where monitoring may be effective</li> <li>3. Identify and secure necessary funding</li> <li>4. Publicise measures as a deterrent</li> <li>5. Liaise with local media to publicise any penalties as a further deterrent.</li> </ol>	
<b>Type of action</b>	Capital project; enforcement	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	City of Batumi
	<b>Stakeholders</b>	Sandasuftaveba Ltd
	<b>Financing options</b>	Municipal budget; financed by penalties.
	<b>Revenue/savings opportunities</b>	Penalties
	<b>Timeline</b>	1 year and ongoing. (2020)
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>• Abundance of bird species all species</li> <li>• Abundance of other species</li> <li>• Percentage of MSW which is disposed of in open dumps controlled dumps or bodies of water or is burnt</li> <li>• Percentage of MSW landfilled disposed of in EUcompliant sanitary landfills</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 26,000 GEL <b>OPEX:</b> 7,500 GEL <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES
	<b>CO<sub>2</sub> savings</b>	NA

### 3.2.1 Benefits of minimising waste and pollution actions

Benefit Category	Indicator	Score	Total Score
<b>Economic development</b>	Economic growth	1	9
	Employment creation	2	
	Increased economic efficiency	2	
	Revenue generating activities	2	
	Avoided damage costs	2	
<b>Social inclusion</b>	Access to basic services	2	3
	Skills development	1	
	Social equity	0	
	Strengthens social fabric	0	
<b>Health, wellbeing and safety</b>	Public health – more active lifestyles	0	3
	Public health – reduced pollution	2	
	Workplace safety	1	

#### Economic development

An effective and efficient waste management system can have several beneficial impacts on economic growth, including by generating new markets and revenues over the long-term, while simultaneously reducing waste and associated pollution.

#### Employment creation

The proposed actions to minimise waste and pollution will likely require supporting technical or consultancy services. This will generate a wide range of jobs across multiple occupations and sectors such as:

- Design, engineering, project management and construction jobs for the construction phase of the new waste and recycling facilities.
- Collection, processing, management and maintenance jobs at the construction waste, anaerobic digestion and recycling facilities.
- Inspection and enforcement jobs in the Municipal Government to monitor compliance with sustainable construction practices and illegal dumping.

- Specialist consultants to train construction companies, map former industrial sites and test for contamination.

Overall, these actions have the potential to generate up to 100 new jobs once operational, most of which would likely be local.

#### Increased economic efficiency

Several of the proposed actions within this sector will increase economic efficiency. Improving the sustainability of on-site construction practices, for one, will reduce cumbersome or potentially hazardous incursions from construction into pedestrian areas (e.g. barriers on pavement or streets, respirable dust). Similarly, monitoring and enforcing illegal dumping will reduce the city's current expenditures on maintenance and cleaning to remediate these dumpsites. Additionally, CDW has high potential to be recycled into future construction projects, thereby reducing the need for virgin materials and their associated costs. Finally, many actions will indirectly build capacity within the Municipality around implementing the waste hierarchy.

### Economic growth

The landfill gas recovery facility will produce local energy from a dependable feedstock. Should the energy be fed back into the grid it can help improve security of supply, benefiting the local and national economy more broadly by reducing the susceptibility to economic losses from power outages and reducing the need for imports during peak periods.

### Revenue generating activities

Several waste actions have the potential to generate revenue. Depending on the operating model chosen, the construction waste processing facility could be a source of new revenue for the Municipality through user fees. There may be potential for other revenue from the resale of the recycled materials produced from the processing facility. For example, masonry crushing can be used to make road bases or concrete blocks. Similarly, the new landfill gas recovery facility will generate revenue from selling electricity to the grid. Alternatively, it can reduce costs for the city by producing electricity which can power the landfill.

The existing landfill also has the potential to generate revenue following its closure and remediation because the city can sell (and tax) the property for development or conservation. Finally, the roll out of recycling practices in the city presents the opportunity to create markets for recycled goods over the long-term and generate revenue for the operators and producers of these goods.

### Avoided damage costs

The proposed actions can reduce the negative environmental and health impacts associated with illegal dumpsites and the old and non-EU-compliant landfill, both of which may produce leachate that can contaminate soil and waterways. This contamination, in turn, can place costs on health infrastructure and potentially on agricultural yields if soil and water contamination occur in an agrarian area. Furthermore, air pollution generated from unsustainable construction site practices can detrimentally impact the health of local communities.

### Social inclusion

Actions specifically promoting recycling operation and culture in Batumi will improve residents' access to basic services by improving waste disposal.

### Health, wellbeing and safety

Untreated waste or waste that has been improperly disposed of can adversely impact the health of surrounding areas. Studies indicate that exposure to waste-related pollutants can increase the risk of cancer, birth defects, and respiratory diseases. Residents may be exposed to pollutants through the air, soil, or water, particularly because hazardous waste is often improperly disposed of in these areas. Thus, addressing illegal enforcement and remediating the existing landfill will improve health outcomes for residents.



## 3.3 Efficient and resilient energy systems

There has been significant national energy legislative reforms with the aim of improving Georgia's building energy efficiency, such as the National Renewable Energy Action Plan that was published in 2018 and the Draft Law of Georgia on Energy Efficiency of Buildings. Batumi recognises the drive on the national level, and is also committed to make its **energy systems efficient and resilient**.

In response to the challenges identified in Section 2, CoB selected the following strategic objectives for make energy systems efficient and resilient:

Our strategic objectives		Related challenges	Targets (2025 unless otherwise stated)
ES1	Improve energy and material efficiency of buildings and infrastructure	GHGc2, GHGc4, Cc3, ESc1, ESc3, ESc4, Wc4, Ic1	100% of new buildings being developed to high standard of energy efficiency
ES2	Increase the use of renewable energy sources such as wind and solar power	NA	20% increase by 2020; 50% by 2030
ES3	Enhance the resilience of electricity networks to supply pressures and natural hazards	Cc1, LUC2, ESc2, ESc5	<ul style="list-style-type: none"> <li>Reduction in public infrastructure at risk</li> <li>No prolonged electricity outages</li> </ul>

### Learning from other cities – Seoul's Data-Driven Building Retrofit Programme

Following rapid population growth, in 2012 Seoul conducted an energy audit which showed that over half of the city's energy consumption resulted from buildings. In response, the Seoul Municipal Government (SMG) provided 8-year loans to buildings and service companies with up to 1.75% interest per year (half the market interest) to retrofit municipal buildings. The programme was eventually extended to all types of buildings and, by 2013, 14,000 buildings were participating.

Additionally, SMG created the Energy Welfare Fund from the monetised energy savings from the retrofits. The Fund provides subsidies for those suffering from energy poverty and will support targeted retrofits in senior citizen and community welfare centres. Batumi can build a similar programme that works for the retrofit the existing building stock through government of IFI-sponsored loans to developers.



**Table 7. Green City Actions for Energy Systems**

Green City Actions for energy systems are summarised below. Detailed descriptions of each action, including projected costs and benefits are presented below.

ID	Relevant Strategic objectives	Action	Indicative Costs			Type	Timeline
			CAPEX	OPEX	Design & Development		
ES01	ES1	Accelerate implementation of building energy efficiency standards in Batumi	-	15,000-16,000 GEL	-	Policy	2020 – 2025
ES02	ES2	Invest in small scale renewable energy on municipal buildings	5,900,000-8,870,000	-	-	Plan/Strategy	2021 - 2025
ES03	ES1, ES2	Implement energy efficiency scheme for municipal buildings	23,696,200-35,544,400 GEL	-	-	Capital project	2022 - 2025
ES04	ES1	Invest in upgrade of all municipal outdoor lighting (e.g. street lamps) to LED	11,962,040 - 17,943,000 GEL	-	-	Capital project	2020 - 2022
ES05	ES1	Establish a programme to provide energy efficient light bulbs to vulnerable residents at low or no cost	66,000 GEL	-	-	Policy	2020 - 2025
ES06	ES1, ES2	Partner with local universities to increase local skills and support an emerging industry around energy efficiency and green buildings	Dependent on the outcomes of further discussions to agree on partnership mechanisms.			Plan/Strategy	2021
ES07	ES1, ES2	Provide incentives for the installation of solar water heaters	NA	NA	NA	Plan/Strategy	2021
ES08	ES3	Create a comprehensive electricity network resilience plan for Adjara AR	NA	NA	885,000-1,328,000 GEL	Plan/Strategy	2020 - 2021
ES09	ES2, ES3	Increase promotion of the 'net metering scheme' to encourage greater uptake	NA	Negligible	NA	Plan/Strategy	2020 - 2025

ES01: Accelerate implementation of building energy efficiency standards in Batumi		
<b>Strategic objective</b>	<b>ES1:</b> Improve energy and material efficiency of buildings and infrastructure	
<b>Description</b> What will be done?	CoB will update its own construction permitting rules to mandate energy efficiency requirements that are in line with the pending National Law on Energy Efficiency in Buildings. The rules will also institute mandatory public reporting energy efficiency performance	
<b>Rationale</b> Why is it being proposed?	Most of Batumi's energy consumption occurs in buildings. This is in part due to the energy inefficient Soviet infrastructure ( <b>ESc1</b> ) and in part since there are currently no standards for inclusion of energy efficient materials and practices in new developments ( <b>ESc3</b> ). This means that Batumi is committing to more carbon emissions than could be if energy efficiency was prioritised because these new developments will be operational for decades to come ( <b>GHGc2</b> ). Ultimately, these developments will likely need post-occupancy retrofits in future to compensate for their lack of energy efficiency standards. This, combined with the fact that energy efficiency standards will soon be mandatory on a National level, means that implementing municipal standards is key.	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>Liaise with the National Government to identify the main objectives and targets of the National Law on Energy Efficiency in Buildings.</li> <li>Translate the National Law into an applicable municipal policy.</li> <li>Ensure Municipality is appropriately structured and resourced to implement the new standards.</li> </ol>	
<b>Type of action</b>	Policy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Policy Department
	<b>Stakeholders</b>	Leading construction companies in Batumi, City of Batumi; Municipal Infrastructure Directorate
	<b>Financing options</b>	Municipal budget
	<b>Revenue/savings opportunities</b>	Savings opportunities will come from reduced energy costs, decreased pressure on energy networks, and public health benefits from more comfortable homes. Implementing new standards can also spur a new industry and source of jobs for Batumi residents (see Action CB01 to see details of a proposed action to build these skills in Batumi).
	<b>Timeline</b>	2020 (less than a year)
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Electricity consumption in buildings</li> <li>Heating/cooling consumption in buildings</li> <li>Number of projects with green building certification</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> NA <b>OPEX:</b> 15,000-16,000 GEL <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES
	<b>CO<sub>2</sub> savings</b>	NA

ES02: Invest in small scale renewable energy on municipal buildings		
<b>Strategic objective</b>	<b>ES2:</b> Increase the use of renewable energy sources such as wind and solar power	
<b>Description</b> What will be done?	CoB will set evidence-based targets for renewable energy generation on municipal buildings and on municipal land. CoB will provide a timeline and invest to meet targets. CoB should consider rooftop solar on municipal buildings, solar on pergolas or similar infrastructure in public parks, solar thermal energy systems for buildings, public toilets or sports facilities.	
<b>Rationale</b> Why is it being proposed?	CoB has direct control over municipal buildings. Developing a municipal renewable energy generation strategy is a simple step to reducing Batumi's overall energy consumption in buildings ( <b>ESc2</b> ) and meeting GHG emissions targets within its SEAP ( <b>GHGc4</b> )	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Allocate funding to the Municipal Infrastructure Directorate to fund the capital costs of the project.</li> <li>2. Conduct feasibility study to determine most suitable buildings and cost-effective measures.</li> <li>3. Based on the results of the feasibility study, set out implementation timeline and begin implementing projects on specific buildings.</li> </ol>	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Infrastructure Directorate
	<b>Stakeholders</b>	Energopro; municipal facilities' managers
	<b>Financing options</b>	IFIs, Municipality
	<b>Revenue/savings opportunities</b>	The Municipality will accrue long-term savings from energy bill reduction. Any excess energy can be sold back to the grid and generate revenue.
	<b>Timeline</b>	2021-2025 (4 years)
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>▪ Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>▪ Annual CO<sub>2</sub> emissions per unit of GDP</li> <li>▪ Electricity consumption in buildings</li> <li>▪ Heating cooling consumption in buildings fossil fuels residential buildings fossil fuels</li> <li>▪ Heating cooling consumption in residential buildings fossil fuels</li> <li>▪ Heating cooling consumption in nonresidential buildings fossil fuels</li> <li>▪ Proportion of total energy derived from RES as a share of total city energy consumption in TJ</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 5,900,000 - 8,870,000 GEL (based on rooftop solar PV only) <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	NO
	<b>CO<sub>2</sub> savings</b>	667.07 tCO <sub>2</sub> e per year

ES03: Implement energy efficiency scheme for municipal buildings		
<b>Strategic objective</b>	<b>ES1:</b> Improve energy and material efficiency of buildings and infrastructure <b>ES2:</b> Increase the use of renewable energy sources such as wind and solar power	
<b>Description</b> What will be done?	CoB will invest in energy efficiency upgrades to municipal building stock. In addition to an existing commitment to retrofit 24 kindergartens, the city commits to investigating further retrofits to municipal administration building and the Batumi Library. The approach will consider various technologies, including energy efficient lighting, insulation, upgraded windows, and HVAC systems.	
<b>Rationale</b> Why is it being proposed?	The Municipal government has direct control over public buildings. Developing a strategy for municipal energy efficiency upgrades is directly within CoB's remit. In addition to demonstrating leadership, it will also assist with meeting Batumi's commitments around energy consumption GHG emissions reduction ( <b>GHGc2; GHGc4</b> ).	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Conduct a feasibility study to prioritise buildings and types of energy efficiency upgrades.</li> <li>2. Allocate necessary funding and tender for upgrades where capital works are required.</li> </ol>	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>	   	
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Property Management Service
	<b>Stakeholders</b>	Batumi City Hall, Municipal Services Development Agency, external suppliers
	<b>Financing options</b>	Municipal budget; public-private partnership; grant
	<b>Revenue/savings opportunities</b>	The Municipality will save money in the long-term from a reduction in building energy costs.
	<b>Timeline</b>	2020-2025
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>▪ Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>▪ Annual CO<sub>2</sub> emissions per unit of GDP</li> <li>▪ Electricity consumption in buildings</li> <li>▪ Heating cooling consumption in buildings fossil fuels residential buildings fossil fuels</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 23,700,000 – 35,550,000 GEL <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	NO
	<b>CO<sub>2</sub> savings</b>	NA

ESo4: Invest in upgrade of all municipal outdoor lighting (e.g. street lamps) to LED		
<b>Strategic objective</b>	<b>ES1:</b> Improve energy and material efficiency of buildings and infrastructure	
<b>Description</b> What will be done?	CoB will invest in a programme to phase out remaining inefficient incandescent light bulbs in street lighting. This will require mapping existing street lighting infrastructure and identifying priority replacement areas. This investment will be delivered to maximise co-benefits, such as safety for pedestrians walking at night.	
<b>Rationale</b> Why is it being proposed?	TCoB has direct control over municipal public lighting. Such lighting can often account for about 30% a Municipality's energy bill (Green Investment Bank, 2014) <b>(ESc2)</b> .	
<b>Steps for implementation</b>	1. Establish priority co-benefits 2. Develop a phase-in plan for the remaining areas.	
<b>Type of action</b>	Capital project	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Property Management Service
	<b>Stakeholders</b>	Batumi Infrastructure Commission
	<b>Financing options</b>	Municipal budget
	<b>Revenue/savings opportunities</b>	LED bulbs use less energy and have greater longevity than incandescent bulbs, meaning they will cost less to operate and require fewer replacements.
	<b>Timeline</b>	2020+ (programme development will be 1 year, replacement will be ongoing)
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP.</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 11,962,000 – 17,943,000 GEL <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	NO
	<b>CO<sub>2</sub> savings</b>	NA

ESo5: Establish a programme to provide energy efficient light bulbs to vulnerable residents at low or no cost		
<b>Strategic objective</b>	<b>ES1:</b> Improve energy and material efficiency of building and infrastructure	
<b>Description</b> What will be done?	CoB will establish a programme of small grants and subsidies for low-income households to install energy efficient lightbulbs. Due to legal requirements, this action will need to be implemented via an intermediary NGO.	
<b>Rationale</b> Why is it being proposed?	Much of Batumi's energy use occurs in buildings, in part due to the inefficient quality of the Soviet-era building stock <b>(ESc1; ESc2)</b> . Low-income residents are unlikely to be able to afford the up-front costs of energy efficient fixtures, but the energy savings could have significant benefits for net income and quality of life, helping to reduce levels of energy poverty.	
<b>Steps for implementation</b>	1. Identify and partner with an NGO who can support with implementation. 2. Define eligibility requirements for the programme. 3. Establish timeline and longer-term budget requirements to cover operation of the scheme. 4. Allocate a grant to the partner NGO to enable implementation. 5. Support effective marketing and outreach.	
<b>Type of action</b>	Policy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Investment Policy and Grant Project Management Division
	<b>Stakeholders</b>	NGOs; Energo-Pro
	<b>Financing options</b>	Municipal budget; donors/philanthropy
	<b>Revenue/savings opportunities</b>	Individual buildings and residents will have savings opportunities through reduced electricity bills.
	<b>Timeline</b>	2020+
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 66,000 GEL, based on provision of free LED bulbs to approximately 3,000 homes. <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	YES
	<b>Health improvements</b>	NO
	<b>CO<sub>2</sub> savings</b>	31 tCO <sub>2</sub> e per year

ESo6: Partner with local universities to increase local skills and support an emerging industry around energy efficiency and green buildings		
<b>Strategic objective</b>	<b>ES1:</b> Improve energy and material efficiency of buildings and infrastructure <b>ES2:</b> Increase the use of renewable energy sources such as wind and solar power	
<b>Description</b> What will be done?	The forthcoming National Law on Energy Efficiency in Buildings will require Georgian cities to apply stricter standards around building energy efficiency. As such, there will be significant demand for qualified professionals who can work with developers and construction companies to guide energy efficient construction. At present, there is a lack of qualified professionals in Batumi and Adjara AR, for example designers or auditors, to support the roll-out of new building energy efficiency standards ( <b>ESC4</b> ). CoB will partner with local academic institutions to establish different innovative partnership mechanisms to support this emerging industry (e.g. energy efficiency internships for university students, collaboration on planning course content, and using the city as a 'living lab' for energy efficiency research).	
<b>Rationale</b> Why is it being proposed?	Energy efficiency expertise will be required given the upcoming National legislation. Without a proactive focus on skills development, Batumi's businesses will need to rely on specialists from Tbilisi and internationally.	
<b>Steps for implementation</b>	1. Determine interest and capacity among Batumi's institutions. 2. Establish formal partnerships with interested institutions and determine most effective support mechanisms.	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Services Development Agency
	<b>Stakeholders</b>	Batumi Business Incubator; Local academic institutions
	<b>Financing options</b>	NA
	<b>Revenue/savings opportunities</b>	This programme carries a potential for economic growth through the upskilling Batumi's residents.
	<b>Timeline</b>	2020 – 2022
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Number of buildings with green building certification (NEW)</li> </ul>	
<b>Estimated cost</b>	Dependent on the outcomes of further discussions to agree on partnership mechanisms.	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	YES
	<b>Health improvements</b>	NO
	<b>CO<sub>2</sub> savings</b>	NA

ESo7: Provide incentives for the installation of solar water heaters		
<b>Strategic objective</b>	<b>ES1:</b> Improve energy and material efficiency of buildings and infrastructure <b>ES2:</b> Increase the use of renewable energy sources such as wind and solar power	
<b>Description</b> What will be done?	As part of permitting rules, CoB will establish mandatory requirements for new developments to include on-site renewable energy generation and/or solar water heating.	
<b>Rationale</b> Why is it being proposed?	A significant portion of Batumi's energy consumption occurs in buildings, and the rapid rate of construction has also increased pressure on capacity of distribution networks ( <b>ESc2</b> ). Requiring on-site renewable energy generation and/or solar water heating will reduce the pressure on the current energy supply and support Batumi's GHG emissions reduction goals in its SEAP.	
<b>Steps for implementation</b>	1. Develop policy based on best practice examples and integrate into future land use planning and development control documents. 2. Establish enforcement mechanism to ensure requirement is met.	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>	 	
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Policy Department
	<b>Stakeholders</b>	SOCAR Gas; Batumi Water LLC; Energo-Pro; construction companies/developers.
	<b>Financing options</b>	NA
	<b>Revenue/savings opportunities</b>	Buildings generating their own energy will save on purchase of energy.
	<b>Timeline</b>	2020
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> NA <b>OPEX:</b> 1,000,698 GEL, assuming pilot installing for 160 properties <b>Design &amp; Development costs:</b> 100,000 GEL for feasibility study	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	NO
	<b>CO<sub>2</sub> savings</b>	None – covers feasibility study only

ESo8: Create a comprehensive electricity network resilience plan for Adjara AR		
<b>Strategic objective</b>	<b>ES3:</b> Enhance the resilience of electricity networks to supply pressures and natural hazards	
<b>Description</b> What will be done?	CoB will seek more active partnership with Energo-Pro to increase its efforts around network resilience planning to better align with international best practice. Reflecting shared interest, CoB hope to work with Energo-Pro and other stakeholders in the energy supply chain to produce a comprehensive electricity network plan that considers supply risks, as well as enhanced proactive action to address natural hazard risks.	
<b>Rationale</b> Why is it being proposed?	Natural, climate, and manmade risks require forward planning for the resilience of the electrical network. Batumi's electricity supply is subject to sporadic outages and there is no known network resilience plan, despite Georgia experiencing hazards such as storms, heatwaves, flooding, and escalating demand pressures ( <b>ESc5; Cc2</b> ). The GCAP Technical Assessment identified that resilience planning for Batumi's electricity supply could be significantly strengthened.	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>The Municipal Policy Department will partner with Energo-Pro and GSE.Advocacy; Plan/Strategy</li> <li>The Department will support these to entities and connect them to relevant resources to undertake this resilience plan.</li> </ol>	
<b>Type of action</b>	Advocacy; Plan/Strategy	
<b>Environmental values positively affected</b>	 	
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Policy Department take the lead in advocating for this plan; however, its development falls outside the responsibilities of a Self-Governing City. It is recommended that development of the plan itself be overseen by the Adjara AR Government.
	<b>Stakeholders</b>	Adjara AR Government, National Government, Energo-Pro, Georgian State Electrosystem
	<b>Financing options</b>	Municipal budget; public-private partnership
	<b>Revenue/savings opportunities</b>	With a scenario-tested electricity resilience network in place, the city will avoid potential losses that would result from electricity outages (these losses would result from municipal service disruption, lost work hours, repair costs, etc.).
	<b>Timeline</b>	2021 – 2022
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Estimated economic damage from natural disasters floods droughts earthquakes etc. as a share of GDP</li> <li>Percentage of public infrastructure at risk</li> <li>Percentage of households at risk</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> NA <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> 885,000 - 1,330,000 GEL	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	NO
	<b>Health improvemnets</b>	NO
	<b>CO<sub>2</sub> savings</b>	NA

ESo9: Increase promotion of the 'net metering scheme' to encourage greater uptake		
<b>Strategic objective</b>	<b>ES2:</b> Increase the use of renewable energy sources such as wind and solar power <b>ES3:</b> Enhance the resilience of electricity networks to supply pressures and natural hazards	
<b>Description</b> What will be done?	CoB will undertake greater marketing of the National net metering scheme, partnering with Energo-Pro to disseminate information about the scheme's benefits and how to participate.	
<b>Rationale</b> Why is it being proposed?	The National Government established a net metering scheme whereby households and small businesses can generate electricity from on-site renewables of up to 100 kW capacity and receive credits for any excess electricity they feed into the grid. However, uptake in Batumi is very low, presenting a missed opportunity to reduce grid-based energy use and greenhouse gas emissions ( <b>ESc2; GHGc4</b> )	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>Undertake survey to understand people's current understanding and perception of the programme.</li> <li>Develop an outreach programme, including newsletters, social media campaigns, etc.</li> <li>Monitor the impacts of the outreach programme and tailor accordingly.</li> </ol>	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Policy Department
	<b>Stakeholders</b>	Energo-Pro
	<b>Financing options</b>	Municipal; National
	<b>Revenue/savings opportunities</b>	Households and small businesses will incur savings or revenue from either the use of electricity generated on-site or from excess revenue fed back into the grid.
	<b>Timeline</b>	2020-2022
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Proportion of total energy derived from RES as a share of total city energy consumption</li> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> NA <b>OPEX:</b> Negligible <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES
	<b>Social inclusion</b>	YES
	<b>Health improvemnets</b>	NO
	<b>CO<sub>2</sub> savings</b>	NA

### 3.3.1 Benefits of efficient and resilient energy systems actions

Benefit Category	Indicator	Score	Total Score
Economic development	Economic growth	2	7
	Employment creation	2	
	Increased economic efficiency	2	
	Revenue generating activities	0	
	Avoided damage costs	1	
Social inclusion	Access to basic services	0	3
	Skills development	2	
	Social equity	1	
	Strengthens social fabric	0	
Health, wellbeing and safety	Public health – more active lifestyles	0	1
	Public health – reduced pollution	0	
	Workplace safety	1	

#### Economic development

Not only do the proposed actions work to decrease Batumi's carbon emissions, they also enhance the diversity of the energy supply and create new opportunities to generate revenue and develop the skills of Batumi's residents.

#### Employment creation

The actions have the potential to support and create employment across sectors, skills and industries throughout the energy supply chain. Specifically, both renewable energy and building energy efficiency tend to support more local jobs than other sectors and will continue to expand their need for employment, especially following the implementation of the National Law on the Energy Efficiency of Buildings. A World Bank study estimated that jobs in building retrofits create 16.7 jobs per million dollars spent, with most of these occurring in the construction sector, followed by manufacturing and administrative or professional activities. Construction jobs are highly localised, and this estimation would equate to 13 jobs created per €1 million spent in Batumi.

Investment in wind and solar was estimated to create around 13 jobs per €2.9 million spent, compared to five jobs in the oil and gas

industry. These jobs would occur mostly in the manufacturing and construction sectors.

#### Economic efficiency

Reducing energy consumption and increasing domestic, renewable energy production increases economic efficiency by reducing the number of power outages. At present, brief power outages are relatively commonplace in Batumi, and electricity demand is increasing rapidly. Outages generate maintenance and repair costs but can also decrease productivity levels and business activity.

Additionally, energy efficient buildings lower public and private energy bills. For example, LEED certified buildings in the US require 25% less energy and 11% less water than standard buildings.

#### Economic growth

These actions will contribute to economic growth by creating a new market for energy efficient and small-scale renewable energy devices (e.g. LED bulbs, solar panels, smart meters, insulation, double-glazed windows) which can benefit local suppliers. Additionally, building retrofits can spur neighbourhood uplift, whether by increasing property values or generally improving the public realm.

#### Avoided damage costs

As a package, the proposed energy-related actions can help reduce the cost of damages associated with power outages or with disruption to network infrastructure. For example, implementing a cohesive electricity resilience plan will ensure that natural or human-caused incidents or disaster are adequately anticipated to reduce the need for maintenance and repairs, while supply-side interventions (e.g. shifting to LED street lighting) can reduce instances of damage to transmission infrastructure caused by high peaks in demand.

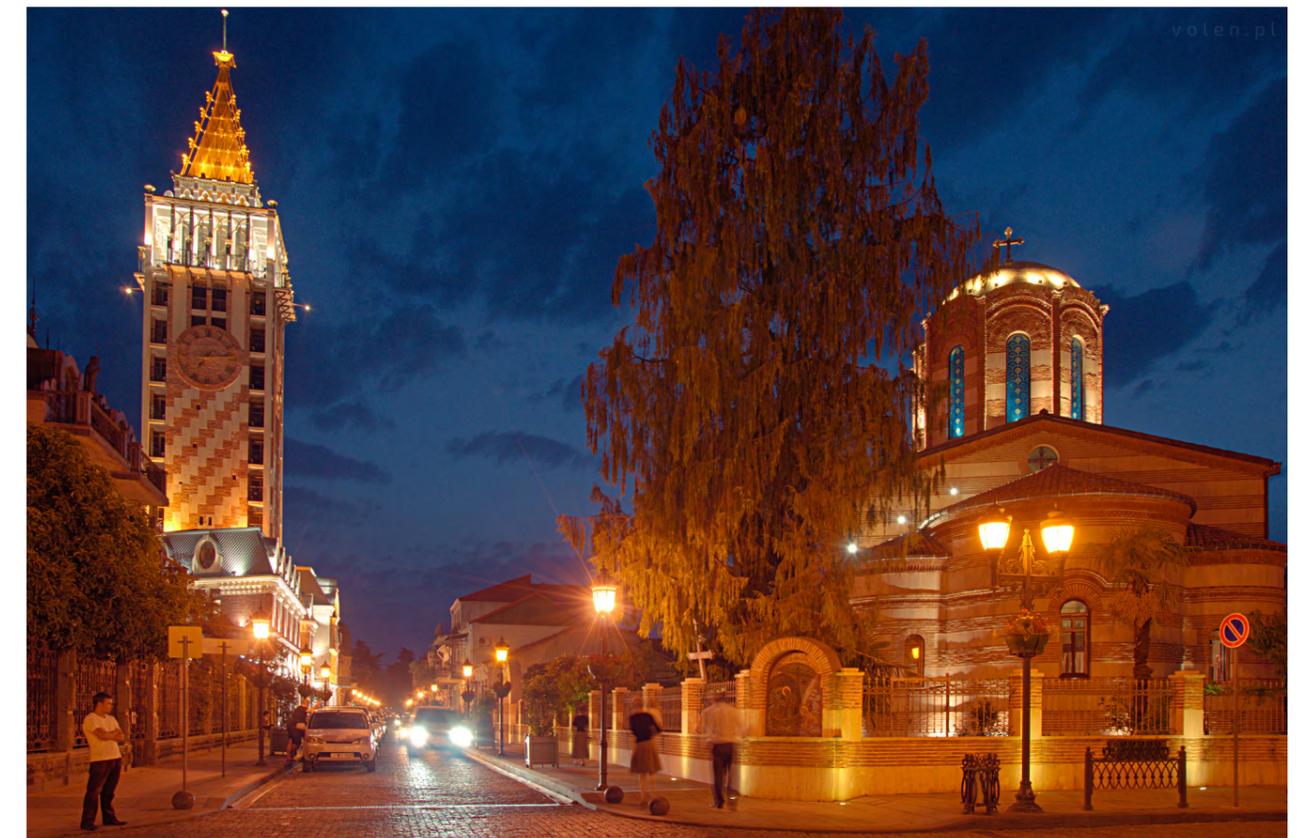
#### Social inclusion

The implementation of the measures listed in this package will likely involve some external professional expertise but mostly presents an opportunity for **new skills** and new jobs which will benefit the local population. This process of skills uplift would be supported by the proposed programs in partnership with local universities.

By helping to reduce energy consumption (and therefore the proportion of income spent on heating and light), the actions above can lessen fuel poverty amongst the most deprived groups and improve **social equity**.

#### Health and wellbeing

Overall, by improving building energy efficiency, occupants will feel more comfortable in their residences and places of work. This is particularly true during temperature extremes, such as heatwaves and cold snaps.



## 3.4 Providing sustainable and diverse mobility options

Mobility is an important issue for Batumi and its residents. The CoB, through the launch of the UNDP 'Green Cities' Project, has already committed to making Batumi's urban transport system more sustainable. Therefore, it is no surprise that **providing sustainable and diverse mobility options** was highlighted as a key area by stakeholders for this GCAP.

In response to the challenges identified in Section 2, CoB selected the following strategic objectives for sustainable and diverse mobility options:

Our strategic objectives		Related challenges	Targets (2025 unless otherwise stated)
T1	Increase the share of public and active transport modes	AQc1, AQc3, GHGc1, SQc4, LUC1, Tc3,	50% active and public transport mode share by 2025; 70% by 2030
T2	Transition to more sustainable municipal and private vehicles	AQc3, GHGc1, SQc4, LUC1, Tc1, Tc2	Electric vehicles comprise 5% of private vehicles and 50% of municipal bus fleet
T3	Enhance the resilience of the transport network	Cc1	By 2025, network decision-making supported by intelligent transport systems for 30% of the network; 100% by 2030

### Learning from other cities – Sunday Cycling in Bogotá

Bogotá, Colombia, is world-renowned for its cycling. Every Sunday, more than 100km of roads in the city are shut down to motor vehicles, allowing cycling and other pedestrian activities to dominate in an event known as Ciclovía. Dating back to 1974, organisers realised that many people enjoyed cycling but had been afraid to ride in regular traffic. Since then, Ciclovía has become a way for different communities to interact, for new cyclists to practice their skills, and for everyone to enjoy the city with their friends and family in an active yet relaxed environment. Moreover, cycling culture continues beyond Sundays – Ciclovía has normalised active transport and helped Colombia become an unexpectedly cycling-friendly nation. Batumi has already taken steps to expand its cycling infrastructure, however, it can learn from the Ciclovía model to build cycling culture – where residents can learn to feel comfortable on the roads and respected by motorists.



Table 8. Green City Actions for Sustainable Mobility

Green City Actions for sustainable mobility are summarised below. Detailed descriptions of each action, including projected costs and benefits are presented below.

\*Note that the UNDP Integrated Sustainable Transport for Batumi and Adjara Region project has considered mobility issues in greater detail than the GCAP process. It has recommended a range of proposed projects for Batumi, several of which are included in this section since they align with the GCAP objectives and prioritisation of key challenges. It is noted in this section where projects are sourced from UNDP recommendations, but please note that it is outside of the scope of this GCAP to validate the data or assumptions made by the UNDP project.

ID	Relevant Strategic objectives	Action	Indicative Costs			Type	Timeline
			CAPEX	OPEX	Design & Development		
To1	T1	Design and implement behaviour-change programme to address perceptions around public and active transport	-	179,000 - 269,000 GEL	-	Behavioural	2020 – 2023
To2	T1, T2	Optimise public transportation routes, including municipal buses and marshrutkas	Total cost in Batumi SUMP listed as 2,170,000 – 13,640,000 GEL			Behavioural	2021 - 2025
To3	T1, T2	Increase investment in upgrading of the municipal fleet to energy efficient and low-polluting vehicles	125,317,000 GEL		-	Plan/Strategy	2020 - 2025
To4	T1	Increase investment in dedicated bus lane infrastructure	2,377,000 - 5,955,900 GEL		-	Capital project	2020 – 2023
To5	T2	Offer free parking for electric vehicles	12,000 - 41,000 GEL	800 - 1,000 GEL	-	Capital project; Plan/Strategy	2020 – 2022
To6	T2	Invest in further electric vehicle infrastructure	957,000 - 1,435,000 GEL		-	Policy	2020 – 2025
To7	T2	Establish an electric taxi fleet	15,790,000 - 19,140,000 GEL		-	Capital project	2020 – 2023
To8	T1	Create a comprehensive electricity network resilience plan for Adjara AR	227,800 - 345,000 GEL	45,500 - 69,000 GEL	-	Capital project	2020 - 2021
To9	T1	Investigate feasibility of a ferry service along the coast			75,000 – 150,000 GEL – feasibility study only	Plan/Strategy	2021

ID	Relevant Strategic objectives	Action	Indicative Costs			Type	Timeline
			CAPEX	OPEX	Design & Development		
T10	T1	Upgrade the Batumivelo system	NA – city in ongoing scoping discussions with potential contractors			Capital project	2020 – 2023
T11	T1	Incorporate pedestrian and cycling pathways into a new land use plan and invest in new infrastructure	Covered by Action LU01			Capital project	2020 – 2023
T12	T1	Participate in Google Transit Partners programme	Negligible			Capital project	2020
T13	T3	Establish transport network resilience plan and undertake periodic tests	-	-	285,000 - 430,000 GEL	Policy	2020 – 2022
T14	T1	Introduce hourly paid parking	Refer to analysis in Batumi SUMP			Policy	2020 – 2022



T01: Design and implement behaviour-change programme to address perceptions around public and active transport		
<b>Strategic objective</b>	<b>T1:</b> Increase the share of public and active transport modes	
<b>Description</b> What will be done?	CoB commits to implementing a range of behaviour change mechanisms identified in the Awareness Raising Plan (ARP) to influence urban travel behaviour and support smarter choices in the City of Batumi, which was produced with the support of UNDP in 2018.  Further consideration will also be given to additional innovative measures using data analytics and online channels, which are not included in the ARP.	
<b>Rationale</b> Why is it being proposed?	Batumi currently has a functioning public bus system and has begun investing in a new fleet with support from EBRD. However, patronage levels are relatively low and the city's ARP for public and active transport has yet to be implemented. Parts of Batumi also offer cycling infrastructure and pedestrian paths, but private vehicle travel remains the preferred mode of transport ( <b>GHGc1; LUc1</b> ).	
<b>Steps for implementation</b>	1. Develop a targeted marketing campaign that will implement the findings of the ARP.	
<b>Type of action</b>	Behavioural	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Urban Transport and Transport Policy Division
	<b>Stakeholders</b>	Batumi Avtotransport LLC; CoB; Adjara AR Ministry of Transportation
	<b>Financing options</b>	Municipal funding.
	<b>Revenue/savings opportunities</b>	Greater uptake of public transportation will result in higher revenues for the city.
	<b>Timeline</b>	2020-2021
<b>Impact measures</b>	<b>Impact measures (from PSR indicator framework):</b> <ul style="list-style-type: none"> <li>All air quality indicators</li> <li>All water quality indicators</li> <li>Concentration of heavy metals in soils (zinc, cadmium)</li> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> <li>Transport modal share in commuting cars motorcycles taxi bus metro tram bicycle pedestrian</li> <li>Transport modal share in total trips</li> <li>Motorisation rate</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> NA <b>OPEX:</b> 179,300 – 269,000 (for 6-month campaign) <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES - increased economic efficiency
	<b>Social inclusion</b>	YES - access to basic services; social equity
	<b>Health improvements</b>	YES - public health more active lifestyles and reduced pollution
	<b>CO<sub>2</sub> savings</b>	NA

To2: Optimise public transportation routes, including municipal buses and marshrutkas		
<b>Strategic objective</b>	<b>T2:</b> Transition to more sustainable municipal and private vehicles <b>T3:</b> Improve fuel quality	
<b>Description</b> What will be done?	Pending appropriate stakeholder consultation, CoB will implement UNDP transport project recommendations around public transport route optimisation.  For marshrutkas, this will include reductions in the overall number, a requirement for all to install GPS systems, and introducing a competitive process for licence renewal including stricter vehicle standards. This will be coupled by revisions to public bus routes in order to better serve customer demand and incentivise use.	
<b>Rationale</b> Why is it being proposed?	Bus routes are currently not well matched to demand, and the historic use of marshrutkas means that bus stops are located at very short intervals, thereby reducing the efficiency of the services. Marshrutkas are popular and flexible mode of transport for many Batumi residents. However, marshrutkas also tend to be older vehicles and/or diesel, which detrimentally impact air quality <b>(Tc1; Tc3; AQc1; GHGc1)</b>	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Identify and instate standards for marshrutka vehicle standards and publicise these standards to operators.</li> <li>2. Begin licence renewal procedures. Those vehicles that pass will also install GPS systems.</li> <li>3. Simultaneously, re-design the public bus routing system to eliminate redundancy and improve efficiency.</li> </ol>	
<b>Type of action</b>	Behavioural	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Urban Transport and Transport Policy Division
	<b>Stakeholders</b>	Batumi Avtotransport LLC; marshrutka operators; public transport and marshrutka users
	<b>Financing options</b>	Municipal, public-private partnership
	<b>Revenue/savings opportunities</b>	See estimated benefits.
	<b>Timeline</b>	2021-2025 (4 years)
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>All air quality indicators</li> <li>All water quality indicators</li> <li>Concentration of heavy metals in soils (zinc, cadmium)</li> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> <li>Transport modal share in commuting cars motorcycles taxi bus metro tram bicycle pedestrian</li> <li>Transport modal share in total trips</li> <li>Motorisation rate</li> <li>Proportion of the population living within 20 minutes to everyday services grocery stores clinics etc.</li> </ul>	
<b>Estimated cost</b>	Total cost in Batumi SUMP listed as 2,170,000 – 13,640,000 GEL	
<b>Estimated benefits</b>	<b>Economic development</b>	YES - increased economic efficiency
	<b>Social inclusion</b>	YES - access to basic services; social equity
	<b>Health improvements</b>	YES - public health more active lifestyles and reduced pollution
	<b>CO<sub>2</sub> savings</b>	NA

To3: Increase investment in upgrading of the municipal fleet to energy efficient and low-polluting vehicles		
<b>Strategic objective</b>	<b>T2:</b> Transition to more sustainable municipal and private vehicles <b>T3:</b> Improve fuel quality	
<b>Description</b> What will be done?	CoB will continue and expand its efforts to replace old municipal buses with a low emission fleet, including electric, CNG, and hybrid vehicles. The city will engage with IFIs for funding strategies and will set a deadline for replacement of the full fleet, which is expected to require approximately 105 buses in addition to the 10 already purchased with EBRD support.	
<b>Rationale</b> Why is it being proposed?	The EBRD has previously supported Batumi in the purchase of 10 electric buses. However, most of the Batumi Avtotransport fleet is old, inefficient and comfort for passengers can be improved. A comprehensive upgrade programme will be a key driver of modal shift and improved air quality <b>(Tc1; AQc1; GHGc1; LUc1)</b>	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Establish annual targets for fleet replacement.</li> <li>2. Engage with funders around finance options.</li> <li>3. Roll out the fleet upgrades in accordance with targets and monitor benefits.</li> </ol>	
<b>Type of action</b>	Capital project	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Urban Transport and Transport Policy Division
	<b>Stakeholders</b>	Batumi Avtotransport LLC
	<b>Financing options</b>	IFIs; Municipal budget.
	<b>Revenue/savings opportunities</b>	After initial outlay, the operating costs of electric vehicles and hybrids will be lower than for the existing fleet, especially given the low cost of electricity in Georgia. Increased revenue may also be generated through higher public transport patronage. Air quality benefits may also lead to avoided healthcare costs.
	<b>Timeline</b>	2020 onwards
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>All air quality indicators</li> <li>All water quality indicators</li> <li>Concentration of heavy metals in soils (zinc, cadmium)</li> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> <li>Frequency of bus service</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 125,317,000 GEL (assumes purchase of 105 additional buses only) <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES - revenue/savings generating activities; increasing economic efficiency
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES - public health - reduced pollution
	<b>CO<sub>2</sub> savings</b>	NA

To4: Increase investment in dedicated bus lane infrastructure		
<b>Strategic objective</b>	<b>T1:</b> Increase the share of public and active transport modes	
<b>Description</b> What will be done?	Dedicated bus lanes allow buses to travel faster than private vehicles, which can make public transport both attractive and decrease idling emissions. CoB and Batumi Avtotransport will invest in expansion of these facilities in line with UNDP recommendations.	
<b>Rationale</b> Why is it being proposed?	Traffic congestion on main routes, as well as the close spacing of bus stops, means that average bus speeds in Batumi are approximately 14km/h ( <b>Tc3</b> ). As a result, there is little incentive for people to take public transit if it is no faster than driving private vehicles. Increasing dedicated bus lane infrastructure and enforcing its use, particularly in major downtown thoroughfares, may decrease congestion due to buses stopping less frequently in front of vehicles, as well as improve public transport efficiency.	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>Based on UNDP recommendations, procure technical expertise to identify and develop expanded bus lanes.</li> <li>Allocate appropriate funding to enforcement of proper bus lane use upon completion.</li> </ol>	
<b>Type of action</b>	Capital project	
<b>Environmental values positively affected</b>	 	
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Infrastructure Directorate
	<b>Stakeholders</b>	Batumi Avtotransport; Urban Transport and Transport Policy Division
	<b>Financing options</b>	Municipal, donor agencies, public-private partnership.
	<b>Revenue/savings opportunities</b>	The city will accrue revenue from increased use of public transport.
	<b>Timeline</b>	2020 – 2025+
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>All air quality indicators</li> <li>All water quality indicators</li> <li>Concentration of heavy metals in soils (zinc, cadmium)</li> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> <li>Transport modal share in commuting cars motorcycles taxi bus metro tram bicycle pedestrian</li> <li>Transport modal share in total trips</li> <li>Motorisation rate.</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 2,374,000 - 5,964,000 GEL <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES - increasing economic efficiency
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES - public health – reduced pollution
	<b>CO<sub>2</sub> savings</b>	NA

To5: Offer free parking for electric vehicles		
<b>Strategic objective</b>	<b>T2:</b> Transition to more sustainable municipal and private vehicles	
<b>Description</b> What will be done?	CoB will designate a proportion of parking areas in high-demand areas as free for electric vehicles, repainting the spaces and adding prominent signage.	
<b>Rationale</b> Why is it being proposed?	Vehicle emissions degrade Batumi's air quality, which is notably poorer in the city centre where drivers often idle waiting for parking spaces ( <b>Tc2</b> ). While Batumi is currently home to only a handful of fully electric vehicles, the uptake of plug-in hybrid vehicles has been encouraging. Designating free EV parking spaces will send a powerful public signal incentivising EV use, contributing to increased uptake of the technology in the medium to long term. Electric vehicles will lower the operating costs of the municipal fleet over time, with generally lower maintenance costs, and EVs will not be dependent on the volatile prices of oil.	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>Identify appropriate locations for dedicated EV parking spaces, focusing on highly visible places.</li> <li>Re-paint spaces and add install new signage.</li> <li>Monitor and enforce correct use of the spaces.</li> </ol>	
<b>Type of action</b>	Capital project	
<b>Environmental values positively affected</b>	 	
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Policy Department
	<b>Stakeholders</b>	EV owners; Architecture and Urban Policy Division; Urban Transport and Transport Policy Division
	<b>Financing options</b>	Municipal budget
	<b>Revenue/savings opportunities</b>	Electric vehicles will lower OpEx of the municipal fleet over time as EVs will not be dependent on the volatile prices of oil and generally have fewer associated maintenance costs. Hybrids will also decrease cost as they have better mileage per gallon.
	<b>Timeline</b>	2020-2022
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>All air quality indicators</li> <li>All water quality indicators</li> <li>Concentration of heavy metals in soils (zinc, cadmium)</li> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> <li>Transport modal share in commuting cars motorcycles taxi bus metro tram bicycle pedestrian</li> <li>Share of total passenger car fleet run by electric hybrid fuel cell, LPG, CNG energy total and by type (Total)</li> <li>Transport modal share in total trips</li> <li>Motorisation rate</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 12,000 - 41,000 GEL <b>OPEX:</b> 800 – 1,100 GEL <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES - revenue/savings generating activities
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES - public health – reduced pollution
	<b>CO<sub>2</sub> savings</b>	80% saving in energy intensity

To6: Invest in further electric vehicle infrastructure		
<b>Strategic objective</b>	<b>T2:</b> Transition to more sustainable municipal and private vehicles	
<b>Description</b> What will be done?	Drawing on UNDP projections on new EV uptake over the coming years, CoB will invest in rapid charging infrastructure to meet this demand and induce additional demand. Such investments can include rapid charging stations adjacent to municipal parking spaces, mandatory electric vehicle charging points in new developments, and charging points at existing gas stations. This initial action includes 15 new public charging stations.	
<b>Rationale</b> Why is it being proposed?	A mix of measures are required to modernise Batumi's ageing vehicle fleet ( <b>Tc1</b> ), especially when coupled with the issue of poor fuel quality ( <b>AQc3</b> ). Electric vehicles are an important part of the future transportation mix, but its uptake is contingent on provision of adequate charging infrastructure.	
<b>Steps for implementation</b>	1. Explore financing opportunities. 2. Deploy new charging infrastructure	
<b>Type of action</b>	Capital project; policy	
<b>Environmental values positively affected</b>	 	
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Infrastructure Directorate
	<b>Stakeholders</b>	Private sector providers; SOCAR, Energo-pro; Urban Transport and Transport Policy Division; electric vehicle manufacturers and dealers.
	<b>Financing options</b>	Public-private partnership; IFIs; municipal budget
	<b>Revenue/savings opportunities</b>	Depending on the financing structure, CoB could derive revenue from the charging infrastructure.
	<b>Timeline</b>	2020- 2024
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>All air quality indicators</li> <li>All water quality indicators</li> <li>Concentration of heavy metals in soils (zinc, cadmium)</li> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 957,000 - 1,435,000 GEL <b>OPEX:</b> NA <b>Design/development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES - revenue/savings generating activities
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES - public health – reduced pollution
	<b>CO<sub>2</sub> savings</b>	NA

To7: Establish an electric taxi fleet		
<b>Strategic objective</b>	<b>T2:</b> Transition to more sustainable municipal and private vehicles	
<b>Description</b> What will be done?	The 2017 UNDP project <b>Integrated Sustainable Urban Transport for the City of Batumi and the Adjara Region</b> concluded that introduction of an e-taxi fleet in Batumi is feasible, with an expansion of Batumi Avtotransport Ltd identified as a possible mechanism for implementation, through vehicle leasing to private taxi companies/drivers. CoB will undertake further investigations into potential partners and funding sources.	
<b>Rationale</b> Why is it being proposed?	Electric taxis will provide an energy efficient method of semi-public transportation for residents. Additionally, an e-taxi fleet will support the economic operation of the EV charging structure proposed in T06.	
<b>Steps for implementation</b>	1. Procure specialist support to develop a spatial plan for EV charging deployment. 2. Explore financing opportunities. 3. Deploy new charging infrastructure.	
<b>Type of action</b>	Capital project	
<b>Environmental values positively affected</b>	 	
<b>Plan for delivery</b>	<b>Action owner</b>	Urban Transport and Transport Policy Division
	<b>Stakeholders</b>	Existing taxi companies; Batumi Avtotransport, LLC
	<b>Financing options</b>	Municipal, public-private partnership, IFI
	<b>Revenue/savings opportunities</b>	Revenue opportunities will present through rider payment to the e-taxi service
	<b>Timeline</b>	2020 -2023
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>All air quality indicators</li> <li>All water quality indicators</li> <li>Concentration of heavy metals in soils (zinc, cadmium)</li> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 15,790,000 – 19,140,000 GEL (covers purchase of fleet only) <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES – revenue/savings generating activities
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES – public health – reduced pollution
	<b>CO<sub>2</sub> savings</b>	NA

To8: Trial a pilot of full pedestrianisation in Batumi's 'Old City' during weekends		
<b>Strategic objective</b>	<b>T1:</b> Increase the share of public and active transport modes	
<b>Description</b> What will be done?	In keeping with UNDP recommendations, CoB will establish a pilot programme to trial car-free periods in the city centre. Starting with one weekend day per month, the UNDP recommends restricting general access only to residents and deliveries during defined hours. Implementation will require investment in enforcement mechanisms such as bollards and new signage. Car-free days will allow for more public events in the city centre (encouraging biking, walking, physical activity, street markets etc.), and will encourage an increasing pedestrian culture.	
<b>Rationale</b> Why is it being proposed?	Part of increasing non-motorised modes of transit in Batumi is dependent on building the associated culture (LUc1; GHGc1). Weekend pedestrianisation allows cyclists (and other pedestrians) to grow more comfortable using other modes of transit which will hopefully increase the use of non-motorised vehicles even on 'motorised' days. Evidence also exists from other cities of pedestrianisation leading to land value uplift and increased tourism.	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Establish a project team to oversee implementation.</li> <li>2. Confirm target streets for pilot activities and inform stakeholders (e.g. store owners) about plans.</li> <li>3. Establish a monitoring and evaluation framework to assess the impact of the pilots.</li> <li>4. Run pilots.</li> <li>5. Expand the scheme based on outcomes of programme evaluation, including investment infrastructure such a permanent bollards and signage.</li> </ol>	
<b>Type of action</b>	Capital project	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Policy Service
	<b>Stakeholders</b>	Batumi Avtotransport; bike-sharing companies; local businesses; Urban Transport and Transport Policy Division; civil society organisations; local health services
	<b>Financing options</b>	Municipal; public-private partnership
	<b>Revenue/savings opportunities</b>	The city can generate revenue from business partners (e.g. food stalls, local businesses that would like to sell their products on these pedestrianised days).
	<b>Timeline</b>	2020 – 2021
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>▪ All air quality indicators</li> <li>▪ All water quality indicators</li> <li>▪ Concentraion of heavy metals in soils (zinc, cadmium)</li> <li>▪ Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>▪ Annual CO<sub>2</sub> emissions per unit of GDP</li> </ul>	
<b>Estimated cost</b>	<p><b>CAPEX:</b> 227,800 – 345,000 GEL based on cost estimates for 'car free old city' measures dictated in the UNDP Sustainable Urban Mobility Plan, specifically rising bollards.</p> <p><b>OPEX:</b> 45,500 – 69,000 GEL</p> <p><b>Design &amp; Development costs:</b> NA</p>	
<b>Estimated benefits</b>	<b>Economic development</b>	YES – economic growth
	<b>Social inclusion</b>	NO
	<b>Health improvemnets</b>	NO
	<b>CO<sub>2</sub> savings</b>	NA

To9: Investigate feasibility of a ferry service along the coast		
<b>Strategic objective</b>	<b>T1:</b> Increase the share of public and active transport modes	
<b>Description</b> What will be done?	CoB will conduct a study into the feasibility of a summer ferry service linking key Batumi coastal locations with Kobuleti and Chakvi. The service would primarily target tourists but could also serve as an alternative for residents. Successful delivery would require partnership with the National Ministry for Transportation, which has jurisdiction over maritime matters.	
<b>Rationale</b> Why is it being proposed?	A ferry service would provide a unique means of transport and potential tourist attraction, potentially reducing levels of vehicle-based traffic between Kobleti, Chakvi and Batumi during the tourist season ( <b>Tc3</b> ).	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Engage with National Ministry of Transportation.</li> <li>2. Commission feasibility study.</li> </ol>	
<b>Type of action</b>	Capital project	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Urban Transport and Transport Policy Division
	<b>Stakeholders</b>	Batumi Sea Port, local maritime companies, connected towns
	<b>Financing options</b>	Private contractor to finance and operate under licence
	<b>Revenue/savings opportunities</b>	The water taxi will generate revenue for the city through ridership fees. Additionally, the city and towns along the taxi route will likely see increased revenues from tourism.
	<b>Timeline</b>	2021
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>▪ All air quality indicators</li> <li>▪ All water quality indicators</li> <li>▪ Concentraion of heavy metals in soils (zinc, cadmium)</li> <li>▪ Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>▪ Annual CO<sub>2</sub> emissions per unit of GDP</li> </ul>	
<b>Estimated cost</b>	<p><b>CAPEX:</b> NA – feasibility study only</p> <p><b>OPEX:</b> NA</p> <p><b>Design &amp; Development costs:</b> 75,000 – 150,000 GEL – feasibility study only</p>	
<b>Estimated benefits</b>	<b>Economic development</b>	YES – revenue generating activities
	<b>Social inclusion</b>	NO
	<b>Health improvemnets</b>	YES – public health – reduced pollution
	<b>CO<sub>2</sub> savings</b>	NA

T10: Upgrade the Batumivelo system		
<b>Strategic objective</b>	<b>T1:</b> Increase the share of public and active transport modes	
<b>Description</b> What will be done?	When Batumi's bike share scheme was introduced it was pioneering for the region. However, the infrastructure is now aged, and the geographic spread of docking stations is limited (20 in total), especially given the city's rapid growth in recent years. CoB will invest in a refresh of the system, which is currently expected to include 25 new terminals for bicycles and scooters, as well as updated rolling stock.	
<b>Rationale</b> Why is it being proposed?	Residents rarely use Batumi's cycling networks, in part due to a car-oriented urban form ( <b>LUc1</b> ). These networks require upgrading to increase their attractiveness as an efficient and safe means of transport, both for residents and visitors. The aim of improving these networks is to increase the share of non-motorised transport in Batumi to improve human and environmental health ( <b>GHGc1</b> ).	
<b>Steps for implementation</b>	1. Develop appropriate financing mechanism to fund upgrade. 2. Procure contractor to upgrade (and potentially operate) the system.	
<b>Type of action</b>	Capital project	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Urban Transport and Transport Policy Division
	<b>Stakeholders</b>	Batumi Avtotransport, LLC, private contractors, developers
	<b>Financing options</b>	Public-private partnership
	<b>Revenue/savings opportunities</b>	The city can generate revenue through ridership fees. Additionally, revenue can be generated through advertising on bikes and bike stands.
	<b>Timeline</b>	2020 -2023
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>All air quality indicators</li> <li>All water quality indicators</li> <li>Concentration of heavy metals in soils (zinc, cadmium)</li> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> </ul>	
<b>Estimated cost</b>	NA – city in ongoing discussions with potential contractors	
<b>Estimated benefits</b>	<b>Economic development</b>	YES - revenue generating activities
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES - public health – more active lifestyles and reduced pollution
	<b>CO<sub>2</sub> savings</b>	NA

T11: Incorporate pedestrian and cycling pathways into a new land use plan and invest in new infrastructure		
<b>Strategic objective</b>	<b>T1:</b> Increase the share of public and active transport modes	
<b>Description</b> What will be done?	Aligning with the objectives for the UNDP Integrated Sustainable Urban Mobility Programme, CoB will work with transport agencies to plan a network of effective pedestrian and cycling corridors. This will be integrated into Batumi's new land-use plan and accompanied by investment in new infrastructure to bring the network into reality.	
<b>Rationale</b> Why is it being proposed?	Active modes of transport have not historically been prioritised in Batumi's urban development (LUc1). By integrating pedestrian and cycling corridors into the new land use plan, Batumi can create a more coherent and efficient non-motorised transport network.	
<b>Steps for implementation</b>	1. UTTP Division to work with the Municipal Policy Department on incorporating cycling and pedestrian infrastructure in the new land use plan (LU01). 2. Allocate budget and resourcing to enable implementation of new infrastructure envisioned in the land use plan.	
<b>Type of action</b>	Plan, leading to capital projects	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Urban Transport and Transport Policy Division
	<b>Stakeholders</b>	Batumi Avtotransport LLC; Municipal Policy Department; Municipal Infrastructure Directorate, Municipal Services Development Agency, private companies
	<b>Financing options</b>	Municipal, donor agencies.
	<b>Revenue/savings opportunities</b>	-
	<b>Timeline</b>	2021-2023
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Kilometres of bicycle path per 100,000 population</li> <li>Transport modal share of private vehicles in total trips</li> <li>Annual CO<sub>2</sub> equivalent emissions per capi</li> <li>Transport modal share in commuting cars motorcycles taxi bus metro tram bicycle pedestrian</li> <li>Transport modal share in total trips</li> <li>Motorisation rateta</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> NA – action covers planning only <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> NA – covered by development of land use plan	
<b>Estimated benefits</b>	<b>Economic development</b>	NO
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	Yes – public health – more active lifestyles and reduced pollution
	<b>CO<sub>2</sub> savings</b>	NA

T12: Participate in Google Transit Partners programme		
<b>Strategic objective</b>	<b>T1:</b> Increase the share of public and active transport modes	
<b>Description</b> What will be done?	Batumi Avtotransport will share its dynamic transport data (e.g. routes, stops, and live timetable information) with Google Transit, enabling this information to be integrated with Google Maps. Additionally, the city investigate making transit data open source. This approach has led to third-party development of valuable apps that have in many cities internationally, which has helped to improve accessibility and effectiveness of public transport networks for minimal financial outlay (e.g. Citymapper).	
<b>Rationale</b> Why is it being proposed?	There is currently no user-friendly online source for public transportation routes and timetable information. Improving this information can increase patronage.	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. UTTP Division to work with the Municipal Policy Department on incorporating cycling and pedestrian infrastructure in the new land use plan (LU01).</li> <li>2. Allocate budget and resourcing to enable implementation of new infrastructure envisioned in the land use plan.</li> </ol>	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>	 	
<b>Plan for delivery</b>	<b>Action owner</b>	Batumi Avtotransport, LLC
	<b>Stakeholders</b>	Urban Transport and Transport Policy Division; local technology companies
	<b>Financing options</b>	None required
	<b>Revenue/savings opportunities</b>	Revenue generated by increased public transport patronage and lower congestion due to reduced private vehicle use
	<b>Timeline</b>	2021 - 2024
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>▪ All air quality indicators</li> <li>▪ All water quality indicators</li> <li>▪ Concentraion of heavy metals in soils (zinc, cadmium)</li> <li>▪ Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>▪ Annual CO<sub>2</sub> emissions per unit of GDP</li> <li>▪ Estimated economic damage from natural disasters floods droughts earthquakes etc. as a share of GDP</li> <li>▪ Percentage of public infrastructure at risk</li> <li>▪ Percentage of households at risk</li> <li>▪ Interruption of public transport systems in case of disaster</li> <li>▪ Efficiency of transport emergency systems in case of disaster</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> Negligible <b>OPEX:</b> Negligible <b>Design/development costs:</b> Negligible	
<b>Estimated benefits</b>	<b>Economic development</b>	YES – revenue generating activities; increased economic efficiency
	<b>Social inclusion</b>	NO
	<b>Health improvemnets</b>	NO
	<b>CO<sub>2</sub> savings</b>	NA

T13: Establish transport network resilience plan and undertake periodic tests		
<b>Strategic objective</b>	<b>T4:</b> Enhance the resilience of the transport network	
<b>Description</b> What will be done?	A functioning transport network is crucial for economic development and quality of life during good times, and during a crisis (e.g. natural disaster) it becomes a critical for emergency response and evacuation. CoB, Batumi Avtotransport LLC and Adjara AR will develop an integrated transport network resilience plan to proactively prepare for potential disruptions from natural and other hazards.	
<b>Rationale</b> Why is it being proposed?	Batumi is facing increasing climate risks like coastal and riverine flooding and heatwaves, which both can impact transport operations and infrastructure ( <b>Cc1</b> ). The GCAP technical assessment identified that Batumi currently lacks formalised plans to ensure its transport networks can maintain the necessary level of service when faced with extreme weather events and other disruptions.	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Establish a Memorandum of Understanding between participating parties.</li> <li>2. Determine the need for specialist support to complete the plan and procure as required.</li> <li>3. Ensure appropriate funding and internal processes are in place based on resilience plan recommendations.</li> </ol>	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>	 	
<b>Plan for delivery</b>	<b>Action owner</b>	Batumi Avtotransport, LLC
	<b>Stakeholders</b>	Urban Transport and Transport Policy Division; Municipal Infrastructure Services
	<b>Financing options</b>	Municipal
	<b>Revenue/savings opportunities</b>	With a scenario-tested transport resilience network in place, the city will avoid potential losses that would result from disruptions to the transport network (e.g. service disruption, lost work hours, repair costs).
	<b>Timeline</b>	2021-2022
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>▪ Interruption of public transport systems in case of disaster</li> <li>▪ Efficiency of transport emergency systems in case of disaster</li> <li>▪ Estimated economic damage from natural disasters floods droughts earthquakes etc. as a share of GDP</li> <li>▪ Percentage of public infrastructure at risk</li> <li>▪ Percentage of households at risk</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> NA <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> 285,000 - 430,000 GEL for consultant support	
<b>Estimated benefits</b>	<b>Economic development</b>	YES – avoided damages
	<b>Social inclusion</b>	NO
	<b>Health improvemnets</b>	NO
	<b>CO<sub>2</sub> savings</b>	NA

T14: Introduce hourly paid parking		
<b>Strategic objective</b>	<b>T1:</b> Increase the share of public and active transport modes	
<b>Description</b> What will be done?	City to introduce hourly paid parking to be paid via a mobile app, initially at a flat rate of 1 GEL per hour. App development cost will be negligible as it has previously been developed for Tbilisi and will be shared at no charge.	
<b>Rationale</b> Why is it being proposed?	Introducing paid parking can help to disincentivise the use of private vehicles in central Batumi ( <b>LUc1; GHGc1</b> ).	
<b>Steps for implementation</b>	1. Using Tbilisi's App as a model, integrate Batumi's data for a city-specific parking app.	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Batumi Avtotransport, LLC
	<b>Stakeholders</b>	Urban Transport and Transport Policy Division
	<b>Financing options</b>	Municipal
	<b>Revenue/savings opportunities</b>	Savings will occur in the form of avoided damages.
	<b>Timeline</b>	2020
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> <li>Share of total passenger car fleet run by electric hybrid fuel 94ell, LPG, CNG energy total and by type (CNG)</li> <li>Share of total passenger car fleet run by electric hybrid fuel 94ell, LPG, CNG energy total and by type (Hybrid+electric)</li> <li>Transport modal share in commuting cars motorcycles taxi bus metro tram bicycle pedestrian</li> <li>Motorisation rate</li> </ul>	
<b>Estimated cost</b>	Refer to analysis in Batumi SUMP, which discusses complementary measures that CoB may also wish to take around parking improvements	
<b>Estimated benefits</b>	<b>Economic development</b>	YES – revenue generating activities
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES – public health – reduced pollution
	<b>CO<sub>2</sub> savings</b>	NO

### 3.4.1 Benefits of sustainable mobility actions

Benefit Category	Indicator	Score	Total Score
<b>Economic development</b>	Economic growth	2	8
	Employment creation	2	
	Increased economic efficiency	1	
	Revenue generating activities	2	
	Avoided damage costs	1	
<b>Social inclusion</b>	Access to basic services	0	2
	Skills development	0	
	Social equity	1	
	Strengthens social fabric	1	
<b>Health, wellbeing and safety</b>	Public health – more active lifestyles	2	4
	Public health – reduced pollution	2	
	Workplace safety	0	

#### Economic development

Urban mobility networks that prioritise multiple modes of transit and pedestrian comfort improve the public realm and reduce negative environmental health impacts

#### Employment creation

The scale of investment under this package of measures will support a significant number of jobs including:

- Professional and technical occupations for the development of campaigns as well as new policies and strategies.
- Construction, engineering and manufacturing jobs for the delivery of hard infrastructure such as dedicated bus lanes, new buses or EV infrastructure.
- Long-term jobs to manage and operate the water taxi and new buses, carry out inspections, and maintain the EV infrastructure.

#### Economic efficiency

Transport is a major contributor to economic efficiency. Congestion impacts businesses

and individuals alike, whether through late or cancelled deliveries, the loss of productive time, or by decreasing people's ability to access leisure activities and services. By pursuing actions that promote sustainable and diverse mobility, Batumi will likely see a corresponding reduction in congestion. A more streamlined network of marshrutkas and buses will improve the reliability of the system, its visibility to users and its interaction with other modes, contributing to a more efficient network for the whole city.

#### Economic growth

Batumi's plan to pedestrianize streets in the Old City will likely promote retail revenues and surrounding property values<sup>8</sup>, while more generally improving the public realm among Batumi's historic places.

#### Revenue generating activities

The proposed actions will generate revenues for the city in several ways, including higher ticket sales from public transport modes and fines for non-compliance with fuel quality regulations. Other potential sources of revenue include ticket sales or license fees from the water taxi service and from leasing the plots of EV charging points.

<sup>8</sup>European Platform on Sustainable Urban Mobility Plans (2016) The economic benefits of sustainable urban mobility measures – Independent review of evidence. Available at: [https://www.eltis.org/sites/default/files/report\\_summary\\_reviews\\_of\\_measures.pdf](https://www.eltis.org/sites/default/files/report_summary_reviews_of_measures.pdf) [Accessed 1 August 2019]

### Avoided damage costs

Transport damages largely result from CO<sub>2</sub> emissions, which are felt at National and international level, and air pollution, which is more localised. Air pollution can have damaging impacts on: human health through contributing to a range of conditions which reduce life expectancy and quality, productivity (e.g. as a result of the poor health of workers); the build environment (e.g. through material damages and building soiling); ecosystems (e.g. resulting in lower crop yields). The UK's latest damage cost estimates (£ per tonne) for air pollution impacts amounts to approximately: €22,873 for NO<sub>x</sub>, €23,131 for SO<sub>2</sub>, €6,000 for NH<sub>3</sub>, €105,840 for PM<sub>2.5</sub><sup>9</sup>.

### Social inclusion

The proposed mobility actions can improve social equity because they increase the options for non-motorised travel and a clearer and safer public transport system, the measures will contribute to **social equity** across genders, classes, and areas by providing residents with better access to services, employment, and leisure opportunities. Additionally, reducing private vehicle traffic can **strengthen the community's social fabric** because it can improve the public realm and increase public participation on the urban street, through community activities and events such as street parties or other street events. The more residents that engage with the public realm and interact with one another, the greater the likelihood of increasing social cohesion within a community.

### Health and wellbeing

By encouraging non-motorised travel, the measures will promote **active lifestyles**. Physical activity is associated with many improvements in health and wellbeing, including lower death rates, and lower risk of heart problems and depression<sup>10</sup>. Indeed, even small increases in physical activity among those who are the least active can bring significant health benefits<sup>10</sup>, including lowering the risks of dementia, depression, cancer and cardiovascular diseases by 20% to 30%. The World Health Organisation estimates that worldwide air pollution accounts for 29% of all deaths and diseases from lung cancer; 43% of all deaths and disease from chronic obstructive pulmonary disease; 24% of all deaths from stroke<sup>11</sup>. The associated costs of air pollution are estimated as follows<sup>12</sup>:

- Chronic mortality (no. of years of life lost due to air pollution): 157,643 GEL
- Respiratory hospital admission (assume 8-day duration): 30,571 GEL
- Cardiovascular hospital admissions (assume 9-day duration): 31,309 GEL
- Quality-Adjusted Life Years: 231,324 GEL

<sup>9</sup> DEFRA (2019) Air quality damage cost update. Available at: [https://uk-air.defra.gov.uk/assets/documents/reports/cat09/1902271109\\_Damage\\_cost\\_update\\_2018\\_FINAL\\_Issue\\_2\\_publication.pdf](https://uk-air.defra.gov.uk/assets/documents/reports/cat09/1902271109_Damage_cost_update_2018_FINAL_Issue_2_publication.pdf) [Accessed 17 July 2019].

<sup>10</sup> Department of Health (2011) Start active, stay active – A report on physical activity from the four home countries' Chief Medical Officers. Available at: [https://www.sportengland.org/media/2928/dh\\_128210.pdf](https://www.sportengland.org/media/2928/dh_128210.pdf) [Accessed 25 July 2019].

<sup>11</sup> WHO. (n.d.) 'Ambient air pollution: Health Impacts'. Available at: <https://www.who.int/airpollution/ambient/health-impacts/en/> [Accessed 1 August 2019].

<sup>12</sup> Department of Health (2011) Start active, stay active – A report on physical activity from the four home countries' Chief Medical Officers. Available at: [https://www.sportengland.org/media/2928/dh\\_128210.pdf](https://www.sportengland.org/media/2928/dh_128210.pdf) [Accessed 25 July 2019].

## 3.5 Integrated water cycle management

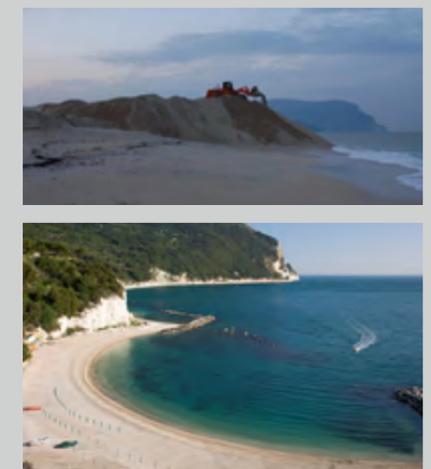
Significant investment in recent years has resulted in considerable improvements to water management across the water cycle in Batumi, however the CoB recognises that there is still room for improvement to make Batumi's **integrated water cycle management** widespread and efficient.

In response to the challenges identified in Section 2, CoB selected the following strategic objectives for water cycle management:

Our strategic objectives		Related challenges	Targets (2025 unless otherwise stated)
W1	Continue to modernise and expand potable water and wastewater services in under-served or hard to reach areas	Wc1, Wc2	Wastewater network: <b>70%</b> of city covered by modernised wastewater network by 2025; and <b>95%</b> by 2030  Potable water network: <ul style="list-style-type: none"> <li>• Modernised service for <b>80%</b> area of newly acquired territories by 2025; <b>100%</b> coverage by 2030</li> <li>• Reduce non-revenue water to <b>25%</b> on average across network by 2030</li> </ul>
W2	Protect Batumi's coastal assets and ecosystem services from severe weather and development pressures	Wc3, LUc2	<b>50%</b> reduction in value of coastal assets at risk
W3	Improve water efficiency among residential and commercial users	Wc4, ESc1, ESc3, Ic4	Water efficiency is integrated into construction permitting
W4	Improve drainage and flood resilience through integrated approaches	Wc3, LUc2, LUc3, Bc4	Water Sensitive Urban Design principles are integrated urban planning and construction permitting rules  No increase in incidences of flash flooding

### Learning from other cities – Addressing coastal erosion in Marche region, Italy

In 2005, the Le Marche region of Italy established its Integrated Coastal Area Managed Plan. Under the plan, between 2009 and 2011, the municipalities of Sirolo and Numana undertook beach nourishment with gravel and small stones. This was complemented by cliff stabilisation and the removal of a section of artificial reef. In addition to maintaining the integrity of the coastline, these actions aimed to protect local settlements and the tourism industry. Batumi has conducted coastal nourishment around Adlia and can expand this further.



**Table 9. Green City Actions for integrated Water Management**

Green City Actions for integrated water management are summarised below. Detailed descriptions of each action, including projected costs and benefits, are presented below.

ID	Relevant Strategic objectives	Action	Indicative Costs			Type	Timeline
			CAPEX	OPEX	Design & Development		
Wo1	W1	Investment in the modernisation of potable water distribution of under-served areas of Batumi	30,000,000 - 5,100,000 GEL	-	-	Capital project	TBD
Wo2	W1	Further investment in wastewater network to include hard-to-reach areas	64,000,000 - 96,120,000	-	-	Capital project	2020 - 2025
Wo3	W1	Provide support to improve wastewater connections within the boundaries of private properties	8,670,000 - 13,000,200 GEL	-	-	Plan/Strategy	2020 -2021
Wo4	W2	Procure new equipment to detect contamination of stormwater	150,000 - 225,000 GEL	-	-	Capital project	2020 - 2022
Wo5	W4	Integrate Water Sensitive Urban Design (WSUD) and Sustainable Drainage System (SuDS) principles into urban planning and construction permitting	-	-	-	Plan/Strategy	2020 - 2023
Wo6	W2	Ensure protection and maintenance of Batumi's coastal ecosystem services	48,210,000 - 72,313,000 GEL	-	-	Capital project	2020 +
Wo7	W3	Require low-flow fittings as part of the construction permitting process, including for public infrastructure	-	-	-	Policy	2020 - 2023

Wo1: Investment in the modernisation of potable water distribution of under-served areas of Batumi		
<b>Strategic objective</b>	<b>W1:</b> Continue to modernise and expand potable water and wastewater services in under-served or hard to reach areas	
<b>Description</b> What will be done?	Significant investment has been put towards modernising the water supply network in Batumi. However, there are areas that are yet to be modernised. CoB will expand extension and further rehabilitation of the potable water network to reach a city-wide target of 30% non-revenue water.	
<b>Rationale</b> Why is it being proposed?	Batumi has been modernising its water infrastructure since 2007. This project aims to expand this modernisation to decrease the non-revenue water losses and subsequently increase water efficiency <b>(Wc1)</b>	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>Undertake study mapping areas of required investment.</li> <li>Tender the project for development.</li> <li>Allocate budget for ongoing maintenance.</li> </ol>	
<b>Type of action</b>	Capital project	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Infrastructure Directorate
	<b>Stakeholders</b>	Batumi Water, LLC
	<b>Financing options</b>	IFI
	<b>Revenue/savings opportunities</b>	The savings opportunities will occur through the reduction of non-revenue water losses.
	<b>Timeline</b>	TBD
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Non revenue water (old grid)</li> <li>Non revenue water (new grid)</li> <li>Annual average of daily number of hours of continuous water supply per household</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 30,000,000 - 5,100,000 GEL <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES – increased economic efficiency; revenue/savings generating activities
	<b>Social inclusion</b>	YES – access to basic services; social equity
	<b>Health improvements</b>	YES – public health – reduced pollution
	<b>CO<sub>2</sub> savings</b>	NA

W02: Further investment in wastewater network to include hard-to-reach areas		
<b>Strategic objective</b>	<b>W1:</b> Continue to modernise and expand potable water and wastewater services in under-served or hard to reach areas	
<b>Description</b> What will be done?	Expansion of trunk network to remaining 9% of customers at per capita cost calculated by KfW, including planned project along Mejinistskali.	
<b>Rationale</b> Why is it being proposed?	Environmental and public health is in part determined by the availability of functioning wastewater networks. Ensuring the expansion of these networks to unconnected areas will decrease the infiltration of foul waste into soil and water, reducing the possibility of human or ecosystem commination ( <b>Wc2</b> ).	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Undertake study mapping areas of required investment.</li> <li>2. Tender the project for development.</li> <li>3. Allocate budget for ongoing maintenance.</li> </ol>	
<b>Type of action</b>	Capital project	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Infrastructure Directorate
	<b>Stakeholders</b>	Batumi Water, LLC
	<b>Financing options</b>	IFI, municipal
	<b>Revenue/savings opportunities</b>	
	<b>Timeline</b>	2020+ (long-term)
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Annual average of daily number of hours of continuous water supply per household</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 64,000,000 - 96,120,000 <b>OPEX:</b> NA <b>Design/development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES – increased economic efficiency; revenue/savings generating activities
	<b>Social inclusion</b>	YES – access to basic services; social equity
	<b>Health improvemnets</b>	YES – public health – reduced pollution
	<b>CO<sub>2</sub> savings</b>	NA

W03: Provide support to improve wastewater connections within the boundaries of private properties		
<b>Strategic objective</b>	<b>W1:</b> Continue to modernise and expand potable water and wastewater services in under-served or hard to reach areas	
<b>Description</b> What will be done?	Batumi has been in the process of updating its water networks. As part of this process, CoB will invest in additional efforts to improve missing and faulty connections between private properties and the trunk network. This will require procurement of materials and provision of practical support to private landowners.	
<b>Rationale</b> Why is it being proposed?	Significant finance has been committed by KfW to rehabilitate and expand water and wastewater networks in areas of Batumi, and to help separate wastewater and rainwater runoff systems. However, these works have typically focused on providing trunk infrastructure on public land. A remaining challenge for Batumi is the instance of damaged or inadequate connections between properties and the network on private land ( <b>Wc1; Wc2</b> ).	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Undertake study mapping areas of required investment.</li> <li>2. Tender the project for development.</li> <li>3. Allocate budget for ongoing maintenance.</li> </ol>	
<b>Type of action</b>	Capital project	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Infrastructure Directorate
	<b>Stakeholders</b>	Batumi Water, LLC
	<b>Financing options</b>	IFI, Municipal
	<b>Revenue/savings opportunities</b>	
	<b>Timeline</b>	2020 - 2023
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Percentage of residential and commercial wastewater that is treated according to applicable National standards</li> <li>Percentage of wastewater from energy generation activities that is treated according to applicable National standards</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 8,670,000 - 13,000,200 GEL <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES – increased economic efficiency; revenue/savings generating activities
	<b>Social inclusion</b>	YES – access to basic services; social equity
	<b>Health improvemnets</b>	YES – public health – reduced pollution
	<b>CO<sub>2</sub> savings</b>	NA

W04: Procure new equipment to detect contamination of stormwater		
<b>Strategic objective</b>	<b>W2:</b> Protect Batumi's coastal assets and ecosystem services from severe weather and development pressures	
<b>Description</b> What will be done?	As part of Batumi's ongoing efforts to enhance the management of water and wastewater, it will consider procuring and installing automated sensors to detect instances of stormwater contamination. The sensors will be capable of detecting potential instances of illegal discharges of untreated wastewater by industrial users, as well as potential instances of wastewater ingress into stormwater being discharged into rivers and the Black Sea.	
<b>Rationale</b> Why is it being proposed?	There is anecdotal evidence of uncontrolled discharges of industrial waste into stormwater, as well as cross-connections leading to untreated sewage being discharged into waterways and the Black Sea ( <b>Wc1</b> ). Overland flows from stormwater can also collect pollutants (for example, nitrogen, petroleum by-products) at dangerous levels. Equipment to detect any contamination will help to determine any necessary steps or adjustments that can be taken to reduce stormwater pollution.	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Identify potential point-source pollution sources.</li> <li>2. Install stormwater monitoring equipment.</li> <li>3. Develop stormwater treatment plan to mitigate contamination.</li> </ol>	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Infrastructure Directorate
	<b>Stakeholders</b>	Batumi Water, LLC
	<b>Financing options</b>	Municipal budget
	<b>Revenue/savings opportunities</b>	Savings opportunities will result from avoided damages for not having to clean up potential contamination of water and soil and associated public health benefits.
	<b>Timeline</b>	2021
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Percentage of water samples in a year that comply with National potable water standards</li> <li>All water bodies indicator</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 150,000 - 225,000 GEL <b>OPEX:</b> NA <b>Design/development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES – revenue/savings generating activities
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	YES – public health – reduced pollution
	<b>CO<sub>2</sub> savings</b>	NA

W05: Integrate Water Sensitive Urban Design (WSUD) and Sustainable Drainage System (SuDS) principles into urban planning and construction permitting		
<b>Strategic objective</b>	<b>W4:</b> Improve drainage and flood resilience through integrated approaches	
<b>Description</b> What will be done?	WSUD and SuDS integrates the water cycle more effectively into urban design. Common practices are bioretention systems, infiltration trenches, constructed wetlands/reedbeds and sand filters that complement or replace impervious asphalt and concrete. The CoB will integrate SuDS into a new land-use planning, as well as identify and invest in suitable sites for demonstrator projects as part of new municipal works.	
<b>Rationale</b> Why is it being proposed?	Climate change will result in increasing flooding, so SuDS will become an integral method to manage the water cycle ( <b>Wc3</b> ). However, SuDS provide benefits beyond managing flooding, including filtering pollutants from water and improving ecosystem health.	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Update planning and building regulations with WSUD and SuDS principles.</li> <li>2. Ensure these regulations are reflected in the permitted process.</li> <li>3. Allocate appropriate budget for staffing for enforcement.</li> </ol>	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Infrastructure Directorate
	<b>Stakeholders</b>	Individual developers
	<b>Financing options</b>	NA
	<b>Revenue/savings opportunities</b>	Savings opportunities will occur from the reduction in flooding and runoff-related damage.
	<b>Timeline</b>	2020
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Percentage of water samples in a year that comply with National potable water standards</li> <li>All water bodies indicator</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> NA <b>OPEX:</b> NA <b>Design &amp; Development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES – increased economic efficiency; avoided damages
	<b>Social inclusion</b>	NO
	<b>Health improvements</b>	NO
	<b>CO<sub>2</sub> savings</b>	NA

Wo6: Ensure protection and maintenance of Batumi's coastal ecosystem services		
<b>Strategic objective</b>	<b>W2:</b> Protect Batumi's coastal assets and ecosystem services from severe weather and development pressures	
<b>Description</b> What will be done?	Increasing frequency and intensity of storms, along with sea level rise, will make Batumi's coastline more susceptible to erosion. CoB and Adjara AR will invest in necessary beach nourishment and other coastal defence activities as needed. Nature-based approaches should be prioritised over engineered coastal defences where possible.	
<b>Rationale</b> Why is it being proposed?	Climate change and associated sea level rise are expected to increase the rate of coastal erosion. Also problematic is lower levels of accretion from river sediment due to construction of hydroelectric facilities upstream in the Chorokhi River and its tributaries ( <b>Bc4; LUc2; WC3</b> ) In response, beach nourishment has previously been implemented near Adlia WWTP. Ongoing investment is required to ensure the integrity of Batumi's coastline and its associated ecosystem and economic benefits are protected.	
<b>Steps for implementation</b>	1. Based on the results of a the study, develop a phased plan for beach nourishment and ongoing maintenance.	
<b>Type of action</b>	Capital project	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Infrastructure Directorate
	<b>Stakeholders</b>	
	<b>Financing options</b>	IFIs; PPP
	<b>Revenue/savings opportunities</b>	Savings opportunities from ensuring coastal erosion management.
	<b>Timeline</b>	2021 +
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> <li>Estimated economic damage from natural disasters floods droughts earthquakes etc. as a share of GDP</li> <li>Percentage of public infrastructure at risk</li> <li>Percentage of households at risk</li> <li>Abundance of other species</li> <li>Percentage of dwellings damaged by the most intense flooding in the last 10 years</li> </ul>	
<b>Estimated cost</b>	<b>CAPEX:</b> 48,210,000 - 72,315,000 GEL <b>OPEX:</b> NA <b>Design/development costs:</b> NA	
<b>Estimated benefits</b>	<b>Economic development</b>	YES – increased economic efficiency; avoided damages
	<b>Social inclusion</b>	NO
	<b>Health improvemnets</b>	NO
	<b>CO<sub>2</sub> savings</b>	NA

Wo7: Require low-flow fittings as part of the construction permitting process, including for public infrastructure		
<b>Strategic objective</b>	<b>W3:</b> Improve water efficiency among residential and commercial users	
<b>Description</b> What will be done?	Low-flow fittings can significantly reduce water use in buildings. While these are present in some new developments, including certain major hotels, their adoption in Batumi is not widespread or required by regulation. CoB will seek to make installation of these fittings a mandatory requirement of construction permitting in future.	
<b>Rationale</b> Why is it being proposed?	Analysis undertaken in 2015 puts per capita water consumption levels in Batumi at over 400 l/d <sup>13</sup> , which is well above average general consumption for existing settlements across European states (approximately 150l-200l/d). With high rates of construction expected to continue in Batumi, demand-side measures such as mandating low-flow fittings can be highly effective, particularly in high water using institutions such as hotels ( <b>Wc4; ES1</b> )	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>Update planning and build codes to require low-flow fittings</li> <li>Publicise this update.</li> <li>Allocate funding for enforcement of regulation.</li> </ol>	
<b>Type of action</b>	Policy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Policy Department, Batumi Water LLC
	<b>Stakeholders</b>	Property Developers
	<b>Financing options</b>	NA
	<b>Revenue/savings opportunities</b>	
	<b>Timeline</b>	2020 - 2021
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Water Exploitation Index</li> <li>Water consumption per capita</li> <li>Water consumption per unit of city GDP</li> <li>Percentage of buildings non industrial equipped to reuse grey water</li> </ul>	
<b>Estimated cost</b>	Covered as part of <b>LU01</b>	
<b>Estimated benefits</b>	<b>Economic development</b>	YES – increased economic efficiency; avoided damages
	<b>Social inclusion</b>	NO
	<b>Health improvemnets</b>	NO
	<b>CO<sub>2</sub> savings</b>	1.52 tCO <sub>2</sub> e

<sup>13</sup> Municipal Water and Waste Water Sector In Georgia Status Report (2015) D Melua for NISPAcee and Slovak Aid

### 3.5.1 Benefits of integrated water cycle management actions

Benefit Category	Indicator	Score	Total Score
Economic development	Economic growth	1	6
	Employment creation	2	
	Increased economic efficiency	1	
	Revenue generating activities	0	
	Avoided damage costs	2	
Social inclusion	Access to basic services	2	4
	Skills development	0	
	Social equity	2	
	Strengthens social fabric	0	
Health, wellbeing and safety	Public health – more active lifestyles	0	2
	Public health – reduced pollution	2	
	Workplace safety	0	

#### Economic development

Urban mobility networks that prioritise multiple modes of transit and pedestrian comfort improve the public realm and reduce negative environmental health impacts

#### Economic efficiency

These actions aim to decrease nonrevenue water loss, estimated at 25%, thereby increasing economic efficiency. (now estimated at 25%), Additionally, actions like low-flow fittings aim to increase the efficiency of resource consumption and will help residents in applicable developments save on their water bills.

#### Economic growth

Improvements to the water sector will enable future economic growth by delivering the infrastructure needed to support the expected population and economic growth of Batumi. Additionally, many actions work to preserve the integrity of a key economic asset: the coast. In 2016, the province of Adjara welcomed 871,000 tourists and tourism accounts for 32% of private investment in Adjara's economy<sup>14</sup>.

#### Avoided damage costs

By tackling the risk of pluvial floods and coastal

erosion, this intervention package can avoid significant damages to people and the built environment and the ensuing costs relating to: responding emergency services; health impacts on people including casualties and the costs to the health system; destruction or damage to private property and infrastructure, which then need to be replaced or repaired; loss of business days. Press articles on the severe flash flood that has occurred in 2015 in Tbilisi report the cost of 20 human lives and damages between GEL 40m – 100m.

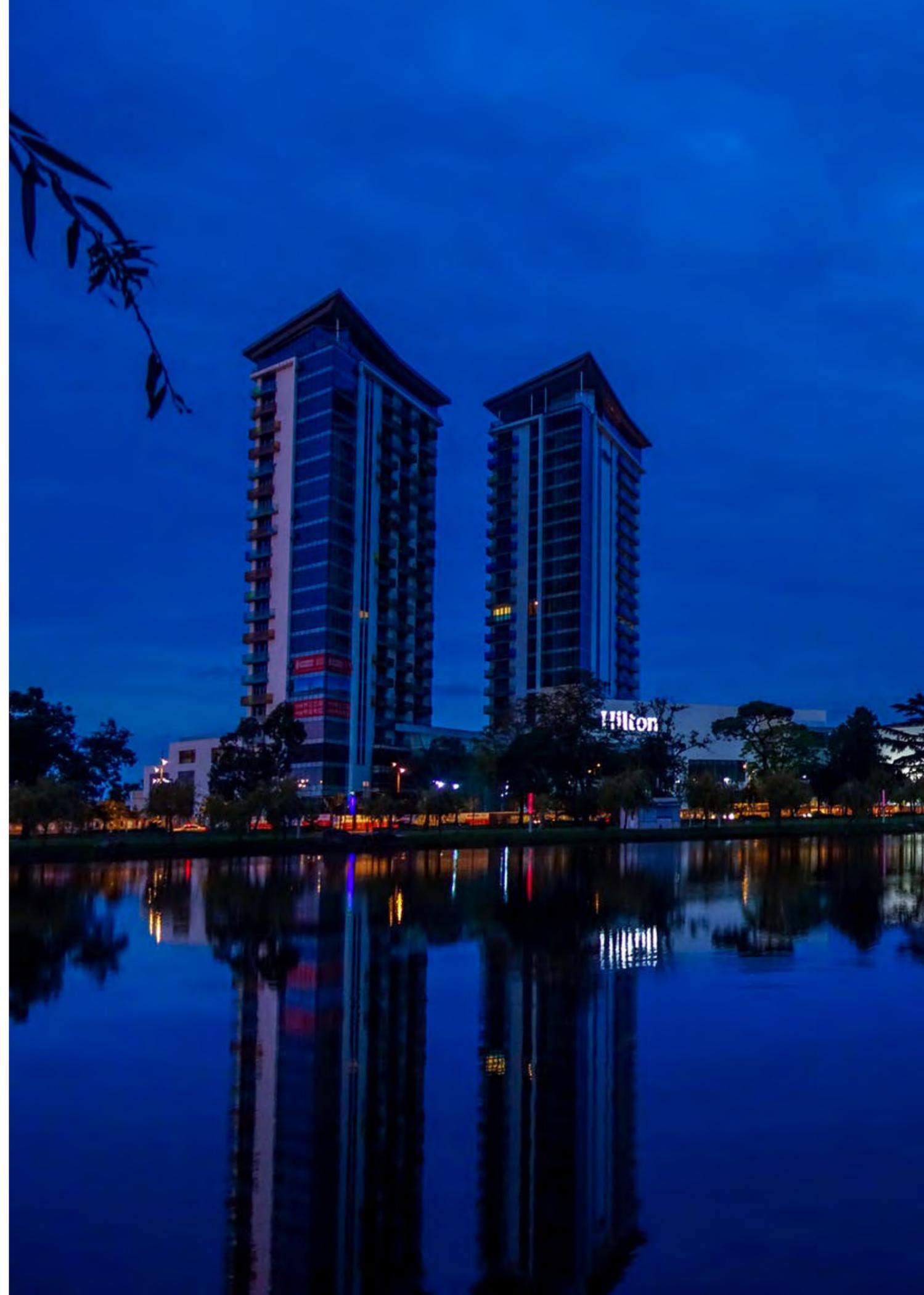
#### Social inclusion

An improved network of potable water and wastewater will guarantee a more equal and widespread access to water services, resulting in improved sanitation all over the city and in individual properties.

#### Health and wellbeing

Improvements to the wastewater management system and better detection of stormwater contamination will reduce public health risks related to water contamination. Untreated wastewater can contaminate drinking water sources and ultimately cause a range of diseases to humans as well as environmental deterioration.

<sup>14</sup>Invest in Batumi (2017) Facts and figures



## 3.6 Building our capacity to deliver

To enable delivery of the GCAP and position Batumi to be a green city long into the future, a range of skills, competencies and processes will need to be developed. A range of strategies exist to build capacity, including training, strategic hiring of new human resources, adopting new technology and institutional cooperation.

Several of the actions described in previous sections have a capacity building component relating to a specific environmental challenge; for example, partnering with local universities to increase local skills and support an emerging industry around energy efficiency/green buildings. Actions in this section focus specifically on cross-cutting capacity building opportunities in the following areas:

- Within Batumi Municipality and municipal-owned organisations: establishing the skills, competencies and roles needed to be a green city
- Externally: establish partnerships that support capacity development among other organisations with a key role to play in Batumi's sustainability, including the private sector.

### Learning from other cities – Green Purchasing Policy in Copenhagen

The Municipality of Copenhagen spends EUR 400 million annually on goods and services, which is managed by a central purchasing department. In September 1998, the Green Purchasing Policy (GPP) of Copenhagen was established to ensure environmental requirements were considered in Municipality purchasing decisions, including the environmental impact of the purchasing decision, and potential areas of energy efficiency and cost saving.

To support the implementation of the GPP, a specialist environmental task group was appointed with the role of establishing targets, communicating information about environmental considerations, and monitoring progress. A two-day training course was also provided for staff, covering environmentally-conscious thinking and tools that can be applied to help make the right purchasing decisions.

Batumi would benefit from introducing a similar policy and ensure the sustainable procurement of goods and services it purchases on a municipal level.



**Table 10. Green City Actions for Capacity Building**

Green City Actions for capacity building are summarised below. Detailed descriptions of each action, including projected costs and benefits are presented below.

ID	Relevant Strategic objectives	Action	Indicative Costs			Type	Timeline
			CAPEX	OPEX	Design & Development		
CB01	All	Establish necessary skills and roles within Batumi Municipality and municipal-owned companies	-	74,000 GEL	-	Plan/ Strategy	2020 - 2021
CB02	SW2, ES1, ES3, W3	Establish a municipal green procurement policy and associated process	-	-	20,000 – 40,000 GEL	Policy	2020
CB03	SW2, ES1, ES3, W3	Establish annual awards or other incentives to encourage green business practices	-	Negligible	Negligible	Behavioural	2020 -2021
CB04	SW2, ES1, ES3, W3	Establish a partnership with hotel industry on environmental sustainability	-	1,300 GEL	-	Plan/ Strategy	2020



CB01: Establish necessary skills and roles within Batumi Municipality and municipal-owned companies		
<b>Strategic objective</b>	<b>ALL</b>	
<b>Description</b> What will be done?	<p>CoB commits to assessing the current mix of capabilities held by its staff. Implementation of the GCAP and green city principles in general will require the following skillsets that may not currently be present:</p> <ul style="list-style-type: none"> <li>Urban planners experienced in implementation of development control mechanisms</li> <li>Climate change practitioners to develop the new land use plan and guide associated climate risk assessments</li> <li>Landscape architects support WSUD and green space-related actions</li> <li>Building energy efficiency specialists and auditors</li> <li>Appropriately qualified analyst to undertake monitoring and evaluation of GCAP impacts.</li> </ul> <p>Addressing these gaps may require a mixture of additional training, procurement of short-term consultants/ secondees, and new recruitment.</p>	
<b>Rationale</b> Why is it being proposed?	The suite of proposed GCAP actions will require building and establishing new skillsets and potential roles within CoB in order to implement, monitor, and evaluate the actions.	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>Develop outreach materials to circulate to city government staff to identify what skills gaps there they feel there are.</li> <li>Identify those that could be addressed through staffing or through trainings.</li> <li>Allocate appropriate funding for skills development.</li> </ol>	
<b>Type of action</b>	Plan/Strategy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Policy Department
	<b>Stakeholders</b>	All municipal departments and publicly-owned companies
	<b>Financing options</b>	Municipal budget
	<b>Revenue/savings opportunities</b>	Refer to the revenue opportunities and cost savings noted under other GCAP actions. The right skills within CoB are required to unlock these opportunities.
	<b>Timeline</b>	2020+
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Awareness and preparedness to natural disasters</li> </ul>	
<b>Estimated cost</b>	<p><b>CAPEX:</b> -</p> <p><b>OPEX:</b> 74,000, assuming hiring of five additional full-time staff members at the average Georgian salary in public administration. Note that CoB may wish to explore mechanisms that do not require additional direct recruitment; however, the additional effort required to comprehensively implement green city principles should not be underestimated.</p> <p><b>Design/development costs:</b> -</p>	
<b>Estimated benefits</b>	Capacity-building actions will improve the ability of all other actions to produce economic, health, and social benefits.	

CB02: Establish a municipal green procurement policy and associated process		
<b>Strategic objective</b>	<p><b>SW2:</b> Reduce waste to landfill and increase recycling</p> <p><b>ES1:</b> Improve energy and material efficiency of buildings and infrastructure</p> <p><b>ES3:</b> Increase the use of renewable energy sources such as wind and solar power</p> <p><b>W3:</b> Improve water efficiency among residential and commercial users</p>	
<b>Description</b> What will be done?	CoB will assess its current municipal procurement strategy and identify ways in which it can increase the environmental and social responsibility of the organisations involved in this strategy. This will involve a phased process of mandating higher standards of environmental performance for those organisations from which CoB procures products and services. Capacity building will be required within the Municipality to establish and implement this policy.	
<b>Rationale</b> Why is it being proposed?	The lack of a green procurement policy in the Municipality limits CoB's capacity to positively influence the sustainability of supply chains within Batumi, Adjara and Georgia more broadly.	
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>Identify internal expertise to develop procurement strategy or procure external expertise.</li> <li>Set specific objectives and standards for the policy.</li> <li>Implement the policy.</li> </ol>	
<b>Type of action</b>	Policy	
<b>Environmental values positively affected</b>		
<b>Plan for delivery</b>	<b>Action owner</b>	Municipal Policy Department
	<b>Stakeholders</b>	All municipal departments
	<b>Financing options</b>	Municipal budget
	<b>Revenue/savings opportunities</b>	Reconsideration of procurement practices could lead to cost savings – choosing greener options (e.g. recycled printer paper) is often no more expensive than conventional choices.
	<b>Timeline</b>	2020+
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Water Exploitation Index</li> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> <li>Electricity consumption in buildings</li> <li>Electricity consumption in nonresidential buildings</li> <li>Heating cooling consumption in buildings fossil fuels residential buildings fossil fuels</li> <li>Share of city enterprises with ISO50001/EMAS certification or similar</li> <li>Total value of projects with green building certification as a share of the total value of projects granted a building permit per year</li> <li>Share of industrial energy consumption from renewable energy</li> <li>Share of industrial waste recycled as a share of total industrial waste produced</li> <li>Percentage of industrial wastewater that is treated according to applicable National standards</li> <li>Water consumption per capita</li> <li>Water consumption per unit of city GDP</li> </ul>	
<b>Estimated cost</b>	<p><b>CAPEX:</b> -</p> <p><b>OPEX:</b> -</p> <p><b>Design &amp; Development costs:</b> 20,000 – 40,000 GEL</p>	
<b>Estimated benefits</b>	Capacity-building actions will improve the ability of all other actions to produce economic, health, and social benefits.	

CB03: Establish annual awards or other incentives to encourage green business practices											
<b>Strategic objective</b>	<b>SW2:</b> Reduce waste to landfill and increase recycling <b>ES1:</b> Improve energy and material efficiency of buildings and infrastructure <b>ES3:</b> Increase the use of renewable energy sources such as wind and solar power <b>W3:</b> Improve water efficiency among residential and commercial users										
<b>Description</b> What will be done?	In partnership with the Adjara Chamber of Commerce and Industry, CoB will establish a yearly award for Batumi businesses using the global Sustainable Business Awards criteria. Example prizes from similar awards include cash prizes and advertising rights. A main objective of such a programme is to generate broader interest in and knowledge of sustainable business techniques among the private sector.										
<b>Rationale</b> Why is it being proposed?	A limited number of private businesses in Batumi currently actively implement sustainability measures, most likely due to a lack of awareness. Awards are a positive mechanism for incentivising improved sustainability practices.										
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Identify different award categories.</li> <li>2. Establish incentives for participation.</li> <li>3. Publicise and host the event.</li> </ol>										
<b>Type of action</b>	Behavioural										
<b>Environmental values positively affected</b>											
<b>Plan for delivery</b>	<table border="1"> <tr> <td><b>Action owner</b></td> <td>Municipal Policy Department</td> </tr> <tr> <td><b>Stakeholders</b></td> <td>Adjara Chamber of Commerce and Industry</td> </tr> <tr> <td><b>Financing options</b></td> <td>Private sector sponsorship, Municipal budget, Adjara Chamber of Commerce</td> </tr> <tr> <td><b>Revenue/savings opportunities</b></td> <td>Potential to generate revenue through sponsorship and event attendance fees.</td> </tr> <tr> <td><b>Timeline</b></td> <td>2020+</td> </tr> </table>	<b>Action owner</b>	Municipal Policy Department	<b>Stakeholders</b>	Adjara Chamber of Commerce and Industry	<b>Financing options</b>	Private sector sponsorship, Municipal budget, Adjara Chamber of Commerce	<b>Revenue/savings opportunities</b>	Potential to generate revenue through sponsorship and event attendance fees.	<b>Timeline</b>	2020+
	<b>Action owner</b>	Municipal Policy Department									
	<b>Stakeholders</b>	Adjara Chamber of Commerce and Industry									
	<b>Financing options</b>	Private sector sponsorship, Municipal budget, Adjara Chamber of Commerce									
	<b>Revenue/savings opportunities</b>	Potential to generate revenue through sponsorship and event attendance fees.									
<b>Timeline</b>	2020+										
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Number of businesses participating in awards (NEW)</li> <li>Share of city enterprises with ISO50001/EMAS certification or similar</li> <li>Total value of projects with green building certification as a share of the total value of projects granted a building permit per year</li> </ul>										
<b>Estimated cost</b>	<b>CAPEX:</b> TBC <b>OPEX:</b> Negligible – assumed to be covered by sponsorships <b>Design/development costs:</b> Negligible – assumed to be covered by sponsorships										
<b>Estimated benefits</b>	Capacity-building actions will improve the ability of all other actions to produce economic, health, and social benefits.										

CB04: Establish a partnership with hotel industry on environmental sustainability											
<b>Strategic objective</b>	<b>SW2:</b> Reduce waste to landfill and increase recycling <b>ES1:</b> Improve energy and material efficiency of buildings and infrastructure <b>ES3:</b> Increase the use of renewable energy sources such as wind and solar power <b>W3:</b> Improve water efficiency among residential and commercial users										
<b>Description</b> What will be done?	CoB aims to establish a partnership with interested hotels, which would agree to share details of their sustainability initiatives with other hospitality businesses in Batumi.										
<b>Rationale</b> Why is it being proposed?	The hospitality sector is a large contributor to Batumi's overall resource consumption. Many international hotel chains already undertake energy efficiency and water saving measures due to their enterprise-wide Sustainability and Corporate Social Responsibility (CSR) policies. Sharing these practices is a win-win scenario, in that participating hotels have a further opportunity to demonstrate CSR, while other businesses in Batumi have the chance to learn from their experience.										
<b>Steps for implementation</b>	<ol style="list-style-type: none"> <li>1. Designate a hotel liaison to spearhead this programme.</li> <li>2. Set a Steering Meeting to discuss objectives and expectations.</li> <li>3. Continue to develop the partnership, adjusting objectives over time.</li> </ol>										
<b>Type of action</b>	Plan/Strategy										
<b>Environmental values positively affected</b>											
<b>Plan for delivery</b>	<table border="1"> <tr> <td><b>Action owner</b></td> <td>Municipal Policy Department</td> </tr> <tr> <td><b>Stakeholders</b></td> <td>Major Batumi hotels</td> </tr> <tr> <td><b>Financing options</b></td> <td>Municipal budget</td> </tr> <tr> <td><b>Revenue/savings opportunities</b></td> <td>-</td> </tr> <tr> <td><b>Timeline</b></td> <td>2020+</td> </tr> </table>	<b>Action owner</b>	Municipal Policy Department	<b>Stakeholders</b>	Major Batumi hotels	<b>Financing options</b>	Municipal budget	<b>Revenue/savings opportunities</b>	-	<b>Timeline</b>	2020+
	<b>Action owner</b>	Municipal Policy Department									
	<b>Stakeholders</b>	Major Batumi hotels									
	<b>Financing options</b>	Municipal budget									
	<b>Revenue/savings opportunities</b>	-									
<b>Timeline</b>	2020+										
<b>Impact measures</b>	<ul style="list-style-type: none"> <li>Number of businesses reached by the partnership</li> <li>Proportion of MSW that is sorted and recycled total and by type of waste, e.g. paper glass batteries PVC bottles metals</li> <li>Percentage of collected MSW composted</li> <li>Annual CO<sub>2</sub> equivalent emissions per capita</li> <li>Annual CO<sub>2</sub> emissions per unit of GDP</li> <li>Electricity consumption in nonresidential buildings</li> <li>Heating cooling consumption in buildings fossil fuels</li> <li>Share of city enterprises with ISO50001/EMAS certification or similar</li> </ul>										
<b>Estimated cost</b>	<b>CAPEX:</b> NA <b>OPEX:</b> 1,300 GEL <b>Design &amp; Development costs:</b> NA										
<b>Estimated benefits</b>	Capacity-building actions will improve the ability of all other actions to produce economic, health, and social benefits										

# 4

## Implementing the GCAP and tracking our progress

### 4.1 Implementation roles and responsibilities

#### 4.1.1 Green City Coordinator

The Municipal Policy Department within Batumi City Hall was the central body responsible for delivering this GCAP and will remain in charge of overseeing its implementation. The Municipal Policy Department will nominate a **Green City Coordinator** with the following role:

- Oversee the implementation of all GCAP actions, liaising with implementation leads in relevant departments and LLCs
- Help identify and establish Green Champions (see below) who will advocate for green city outcomes in each CoB department
- Collaborate with action leads to ensure the proper progress monitoring of actions, including opportunities to integrate monitoring and evaluation activities with existing CoB processes
- Set standards for data collection and storage
- Collaborate with the GCAP Coordination Board, seeking high-level technical input from the Board as and when required
- Champion green city actions and initiatives within CoB.

The EBRD's GCAP Methodology sets out key competencies which a Green City Coordinator should have:

- A change agent that can organise resources, support, and buy-in for innovative work

- Capable to bridge between policy and implementation, and able to build partnerships and alliances between diverse stakeholder groups
- Excellent managerial and coordination skills including organising 'green' events
- An excellent communicator and inspirational champion of 'green' measures and initiatives.

#### 4.1.2 GCAP Coordination Board

The GCAP crosses many departmental interests and therefore an Internal Advisory Group was established to provide timely cross-departmental input into GCAP development. This group will transition to the role of the GCAP Coordination Board. Comprising senior representatives across CoB departments and LLCs, the GCAP Coordination Board will meet at least twice annually to:

- Provide technical advice to Green Champions and the Green City Coordinator to assist tracking and monitoring progress of action implementation
- Provide insight into departmental priorities and opportunities for new Green City Actions.

### 4.1.3 Green Champions

Each department involved in implementing GCAP actions will identify a Green Champion who will be responsible for monitoring the progress of the relevant actions within their department. They will also be assigned a set of indicators, linked to the department's actions, that they will also be responsible for monitoring.

Departmental Green Champions will determine appropriate stakeholders for data collection and will be responsible for completing relevant sections of the Monitoring and Evaluation Tool (see Appendix E). Green Champions across departments will work collaboratively, especially on cross-cutting actions, which will help to ensure that efforts to make Batumi more sustainable are not 'siloed' within one functional area only.

### 4.1.4 Internal Auditor

The GCAP Coordinator will appoint an Internal Auditor who will independently evaluate the GCAP management process and achievements at two-year intervals. The Internal Auditor may be a CoB staff member or an external consultant but must be removed from the process of GCAP development and implementation.



## 4.2 Monitoring our progress and impact

### 4.2.1 Green City Coordinator

A transparent process has been established for monitoring, evaluating and reporting on implementation of the Batumi GCAP. Supported by two Excel-based tools, the aims of this approach are to:

- Track implementation progress of GCAP actions (Progress Monitoring Plan (PMP))
- Identify whether each implemented action is having the desired results and impacts, linking back to state and pressure indicators (Impact Monitoring Plan (IMP))
- Facilitate learning about what is and what is not working, both in terms of the actions and the management and delivery structures in place within CoB

- Determine what adjustments need to be made during GCAP implementation to maximise the potential for positive impact.

The results of GCAP monitoring can be complementary to other planning agendas and activities in CoB. Therefore, the Green City Coordinator will aim to align the monitoring and evaluation process with other city processes, such as planned development of a SECAP under the Global Covenant of Mayors on Climate and Energy. Aligning GCAP monitoring with other planned activities within CoB will help to streamline data collection with other stakeholder engagement initiatives, reducing duplication and improving efficiency.

Figure 4. Key monitoring and evaluation steps during GCAP implementation



### 4.2.2 Monitoring progress

The PMP sets out all the GCAP actions broken down by strategic objective and target, the body responsible for implementation and key milestones. The PMP also provides a timeline and sequence for each milestone over the short to medium-term.

The Green City Coordinator will be ultimately responsible for overseeing the PMP, while the Departmental Green Champions will be

responsible for updating the PMP for their respective actions and feeding this back to the Green City Coordinator on a quarterly basis. The results of the monitoring will inform the planning of subsequent stages of each action as well as any required amendments to timeframes, resources and budget.

Figure 5. Batumi's PMP

Batumi Progress Monitoring Plan						Timeline						Implementation status	Note	Date	Entered by	
Action #	Strategic Objective	Actions	Type of action	Action Owner	Relevant GCAP Targets	2020	2021	2022	2023	2024	2025					
Evidence-based land use planning and development management																
LUM	L01	Establish a new urban land use plan	Plan/Strategy	Municipal Policy Department	Plan is being implemented											

### 4.2.3 Evaluating results and impacts

It is also critical to measure the extent to which GCAP actions are having the desired impact on Batumi's sustainability, along with any possible unintended impacts. The IMP is based on the Indicator Database which established the quantitative baseline for Batumi's GCAP across state indicators measuring the quality and availability of environmental assets, as well as sectors and the pressure they exert on Batumi's environment. The IMP lists out the baseline condition for each indicator against which annual monitoring will be undertaken to measure the impact various actions will have on the indicators in the short to medium-term. The aim is to identify whether each implemented action is having the desired results and impacts.

Like the PMP, the Green City Coordinator will be responsible for overseeing the IMP, while each Departmental Green Champion will be responsible for monitoring a set of indicators that are linked to that department's actions. The Departmental Green Champions will update the IMP for their respective indicators on an annual basis and feed this back to the Green City Coordinator. As many actions will be impacting indicators across the board, it is suggested that Green Champions across departments working collaboratively to monitor annual impacts. Subsequently, the Green City Coordinator will provide an update to the Green City Board. This feedback can be provided through an annual Action Impact Meeting.

Figure 6. Batumi's IMP

Indicator Code	Indicators	Trend	Colour code	Figure 5b Indicator Database of GCAP for the latest year available	Units	Data Source / Contact Detail	Land Use / Solid Waste										
							L001	L002	L003	L004	SW01	SW02	SW03	SW04	SW05	SW06	SW07
State Indicators																	
Air quality																	
1	Average annual concentration of PM2.5	N/A	RED	27	µg/m <sup>3</sup>	Environmental Pollution Department of National Environmental Agency www.nae.gov.ge											
1.1	Average annual concentration of PM10	N/A	YELLOW	30													
1.2.a	Average daily concentration of SO2 at Abashvili street	Positive	RED	100													
1.2.b	Average daily concentration of SO2 at Katskadze street	N/A	YELLOW	36													
1.3.a	Average daily concentration of NOx at Katskadze street	Negative	RED	190													
1.3.b	Average daily concentration of NOx at Katskadze street	N/A	RED	227													
1.1.1	Average daily concentration of total suspended particulate matter	No data															

#### 4.2.4 Sharing lessons learned

The Green City Coordinator will provide concise quarterly updates to the GCAP Coordination Board on the PMP and IMP. A more detailed annual Progress Report will be produced and presented, including a summary of:

- Action implementation status and any issues encountered
- Recommendations for revisions to any GCAP actions
- Change in a 'dashboard' of key state indicators
- Potential new GCAP actions for consideration.

A public fact sheet on implementation progress will also be published on the CoB website. Press releases and case studies may also be produced to highlight specific success stories.

#### 4.2.5 Improving baseline data

A successful monitoring and evaluation process are grounded in good quality data. While completing the Indicators Database several limitations were encountered, including:

- Data for certain indicators was not available. Notable gaps include the number of contaminated sites, resilience of transport systems, consumption of heating and cooling energy in residential and non-residential buildings, and percentage of public infrastructure and households at risk of natural disasters.
- There is lack of data on the municipal level; data for some indicators were disaggregated on an Adjara AR or National level.
- In some instances, data were derived by combining multiple sources, so it could be expressed in the prescribed units. This may

limit the accuracy of the data and it will make it difficult to collate and monitor future data.

- Yearly average metrics do not capture seasonal variation that is important for indicators which are sensitive to seasonal changes, such as tourism season or weather, including energy consumption, road congestion, and waste generation.
- In some instances, the indicators requested by the PSR framework may not be the ideal measures of performance in Batumi. Where feasible, alternative metrics have been sourced to supplement the metrics required under EBRD Green Cities.

Additionally, the following indicators were also added as 'impact measures' to relevant actions:

- PM pollution near construction sites.
- Runoff and improper waste disposal at construction sites.
- Number of buildings with green building certification

# 5 Appendices

# Appendix A - Environmental Indicator Data

Legend	
<b>High</b>	High performance relative to pre-defined benchmarks in EBRD's GCAP methodology
<b>Moderate</b>	Moderate performance relative to pre-defined benchmarks in EBRD's GCAP methodology
<b>Strong</b>	Strong performance relative to pre-defined benchmarks in EBRD's GCAP methodology

Name	Units	Latest value	Trend	Context
<b>STATE INDICATORS</b>				
<b>Air quality</b>				
Average annual concentration of PM <sub>2.5</sub>		27 (Katamadze Street)	NA	Automatic monitoring commenced in mid-2016. Reflects air quality in the immediate vicinity and does not necessarily give a good indication of air quality more generally.
		30 (Katamadze Street)		
Average annual concentration of PM <sub>10</sub>	µg/m <sup>3</sup>	100 (Abuseridze Street)	Unclear	Data is available for both monitoring locations on Abuseridze and Katamadze Streets (Katamadze Street data since May 2016). Reflects air quality in the immediate vicinity and does not necessarily give a good indication of air quality more generally.
		36 (Katamadze Street)	NA	
Average annual concentration of SO <sub>2</sub>		190 (Abuseridze Street)	Increasing	As above. NO <sub>2</sub> data presented as NOX
Average daily concentration of NOX		227 (Katamadze Street)	NA	
<b>Biodiversity and ecosystems</b>				
Abundance of bird species (all species)	Annual % of change	-6%	No clear trend – erratic	Batumi is an international migration location for various bird species; as such the data includes migratory species as well as local bird species. This data is not suitable for drawing conclusions about population dynamics of local species only.
<b>Greenhouse gases</b>				
Annual CO <sub>2</sub> equivalent emissions per capita (tonnes)	Tonnes of CO <sub>2</sub>	1.71	NA	Data on CO <sub>2</sub> emissions was obtained from the SEAP emissions inventory; population data is from Geostat. This indicator is significantly lower than the national average (3.14 t CO <sub>2</sub> e/capita in 2012 according to National GHG Inventory). The difference can be partly explained by the lack of fossil fuel power plants serving Batumi and lack of large industrial facilities emitting GHG. However, even considering these factors the figure may be an underestimation.
<b>Green and open public spaces</b>				
Open green space area ratio per 100,000 inhabitants	m <sup>2</sup> /capita	6	NA	Estimated by Batumi Greening Service.

Name	Units	Latest value	Trend	Context
<b>STATE INDICATORS</b>				
<b>Climate adaptation and disaster risk</b>				
Estimated economic damage from natural disasters (floods, droughts, earthquakes etc.) as a share of GDP	%	NA	NA	NA
Percentage of households at risk		5.7	NA	Data for flooding only and based on atlas of natural hazards and disaster risks developed by CENN. Data represents risk of inundation from 2010 for Adjara; Batumi-specific data not available. Figure does not take into account effects of climate change (e.g. increased extreme rainfall, sea level rise) or of subsequent work to improve water management in Batumi.
<b>Soil quality</b>				
Concentration of zinc in soil (New Boulevard)	mg/kg	83.58	NA	The data was obtained from the 'Soil Yearbook'. In Batumi, five samples were taken at different locations. NEA observed different chemical concentrations in the samples; however, from the GCAP indicators list only Zn is available.
Concentration of zinc in soil (Batumi Airport)		102.1		
Concentration of zinc in soil (Javakhishvili Street)		283.05		
Concentration of zinc in soil (Varshanidze Street)		214.68		
Concentration of zinc in soil (Gogolis Street)		262.29		
<b>Water quality and availability</b>				
Biochemical Oxygen Demand BOD in rivers and lakes (Korolistkali river)	mg/L	2.77	Improving	Despite a spike in BOD in 2015 indicating a pollution event, the quality of the Korolistkali River is generally improving.
Biochemical Oxygen Demand BOD in rivers and lakes (Kubastskali River)		4.16	Erratic	Although trend data is erratic, the majority of recent records are below the lowest benchmark.

Name	Units	Latest value	Trend	Context
<b>PRESSURE INDICATORS</b>				
<b>Water quality and availability</b>				
<b>Biochemical Oxygen Demand BOD in rivers and lakes (Bartskhana River)</b>	mg/L	3.61	Erratic	Although the most recent records are within the median benchmark, all previous records are lower than the lowest benchmark, indicating generally poor water quality.
<b>Biochemical Oxygen Demand BOD in rivers and lakes (Chorokhi river)</b>		2.07	Erratic	Although the most recent records are within the median benchmark, all previous records are within the highest benchmark indicating generally good water quality.
<b>Biochemical Oxygen Demand BOD in rivers and lakes (Mejinistskali River)</b>		2.83	Improving	Although there are fewer data records for the Mejinistskali river, there appears to be a slight improvement in water quality over the past 3 years.
<b>Percentage of water samples in a year that comply with national potable water quality standards</b>	%	96%	NA	Batumi Water Ltd provides regular monitoring of water quality in line with the national quality standards.
<b>Water Exploitation Index</b>		60%		This indicator suggests that water abstraction (ground, fresh and surface water) is reaching unsustainable levels in Batumi. Generally Georgia has abundant fresh water and as such, this data needs further verification.
<b>Land Use</b>				
<b>Population density on urban land</b>	Residents/ km2	>4,000	NA	Data sourced from Geostat Interactive mapping; however, the uppermost point on the scale is '4,000 and over' so precise density is not provided. Based on total municipal area (including rural and semi-rural areas) and population, average density across the entire municipality is closer to 2,400 per sq.km.
<b>Average annual growth rate of built-up areas</b>	%	NA		No reliable data available. Also no data secondary indicator about rate of greenfield land take; a GIS solution to this gap may be possible pending availability of high quality aerial imagery (TBC)
<b>Vacancy rates of offices</b>	%	9%		Data provided by Colliers Georgia <sup>15</sup>

<sup>15</sup> <http://www.colliers.com/-/media/files/emea/georgia/research/2017-research-georgia/office-market-georgia-2017.pdf?la=en-ge>

Name	Units	Latest value	Trend	Context
<b>PRESSURE INDICATORS</b>				
<b>Solid waste</b>				
<b>Total solid waste generation per capita</b>	kg/ year/ capita	469.38	Increasing	Data for 2017 was received from Sandasuptaveba (calculated based on the number of fully-burdened trucks, measured at the entrance of the landfill). Data for previous years is based on data received from CoB 2018-2022 Waste Management Plan (WMP) and divided by Geostat population data. Although the landfill is also used by nearby settlements outside Batumi, the WMP estimates that 80% of the total waste volume comes from Batumi.
<b>Share of the population with weekly municipal solid waste collection</b>	%	95%	Erratic	Municipal waste is disposed of in containers located close to residential buildings (not individual bin per property). Waste is collected regularly (more frequent than weekly collection); frequency depends on the density of a given district.
<b>Proportion of municipal solid waste that is sorted and recycled</b>		NA	NA	No official data available; however, anecdotally the figure is thought to very low, with sporadic sorting occurring independently and at users' discretion.  A pilot survey conducted as part of the CoB WMP to identify potential for recycling in Batumi resulted in targets of 30% for paper, 20% for glass, 70% for metals and 30% for plastic.
<b>Percentage of municipal solid waste landfilled/ disposed of in EU compliant sanitary landfills</b>	%	0%	Constant	The existing landfill does not comply with EU requirements, although the planned new landfill (financed by EBRD and SIDA) will be fully compliant.
<b>Remaining life of current landfills</b>	Years	2	NA	Ministry expecting to select tenderer to construct new landfill for Adjara AR by February 2019. Construction expected to take approximately 18 months; existing landfill will then be closed.
<b>Buildings</b>				
<b>Energy consumption in buildings</b>	kWh/ m2	NA	NA	Buildings energy data could not be disaggregated from industrial consumption by Energo-pro.
<b>Electricity consumption in residential buildings</b>		34.5		Data derived based on average consumption by residential customers, divided by average residential floor space obtained from 2014-15 Winrock municipal survey for Batumi. The high consumption of electricity can be attributed to the low energy efficiency of household appliances (such as old refrigerators and inefficient light bulbs).
<b>Heating and cooling consumption in buildings (fossil fuels)</b>		NA		No official data aggregating heating/cooling from other uses. Relevant stakeholders contacted include the Ministry of Economy and Finance of Adjara AR (specifically the Department of Construction Policy) and Batumi City Hall. Energy distribution companies such as Energo-Pro do not have data on total gas/ electricity consumption.

Name	Units	Latest value	Trend	Context
<b>PRESSURE INDICATORS</b>				
<b>Buildings</b>				
Share of city enterprises with ISO50001/EMAS certification or similar	Data reflects total number of enterprises	2	NA	A database of standards holders for Georgia does not exist, so this may not reflect the full number. Data provided by a UNIDO project that is promoting energy efficiency. Batumi Port is ISO14001 and ISO50001 certified; Batumi Oil Terminal is ISO14001 certified only.
Share of population with access to heating (%)	%	95%		Data was obtained from the Winrock Municipal Survey. Even though there is high share of households with access to heating, 85.3% report that they use heating in parts of their property. There is no district heating in Batumi.
Share of population with access to cooling (%)		30%		According to the above-mentioned survey, the most common cooling system is split-system air conditioners. However, purchasing air conditioners is beyond the financial means of many Batumi residents.
<b>Energy supply</b>				
Share of population with an authorised connection to electricity	%	100%	Steady	Energo-Pro reports complete coverage of residential properties, including metering. However, the existing network is facing difficulties associated with very high pace of construction in Batumi.
Proportion of total energy derived from RES as a share of total city energy consumption in TJ (%)		28%	NA	All power plants are connected to the national grid and are not specifically allocated to any city or region. Data was calculated in NREAP based on the EU Renewable energy directive. The main RES contributor to Georgia's electricity grid is hydropower.
Average share of population undergoing prolonged power outage in case of climatic extremes over the past 5 years (%)		NA		Data not available.
<b>Transport</b>				
Average age of car fleet total and by type (total)	Years	18.2	Increasing	High average age of cars is driven by multiple factors: absence of mandatory technical inspection requirements; increase in average household incomes making second hand car ownership within reach of more residents; limited restrictions or financial incentives to dispose of older cars (excise has increased, but not significantly).
Average age of car fleet total and by type (light passenger)		19		

Name	Units	Latest value	Trend	Context
<b>PRESSURE INDICATORS</b>				
<b>Transport</b>				
Average age of car fleet total and by type (light duty vehicle)	Year	22.8	Increasing	High average age of cars is driven by multiple factors: absence of mandatory technical inspection requirements; increase in average household incomes making second hand car ownership within reach of more residents; limited restrictions or financial incentives to dispose of older cars (excise has increased, but not significantly).
Average age of car fleet total and by type (trucks)		19.3		
Percentage of diesel cars in total vehicle fleet		17%	Increasing to 2017; steady 2016	Increase is generally in line with increasing popularity of diesel vehicles in other markets during the same period. Note, however, the diesel vehicles have begun to fall out of favour with several prominent EU cities announcing phased bans.
Fuel standards for light passenger and commercial vehicles	EURO	5	Improving	The resolution on fuel quality norms sets the national standard describing the chemical composition of gasoline and diesel fuels, including sulphur content. The introduction of EURO 5 standards was facilitated as part of the EU-Georgia Association Agreement.
Share of total passenger car fleet run by electric, hybrid, fuel cell, LPG and CNG energy	%	10%	Increasing	Hybrid cars are the biggest contributor to this category, having increased sharply in popularity since 2011.
Share of total passenger car fleet run by CNG energy		4%		The number represents cars registered in Batumi that were imported as CNG fuelled cars. The majority of CNG cars on the roads in Batumi have been converted from gasoline to CNG by local providers. Due to the absence of mandatory technical controls, total figure for CNG cars is unavailable; however, the total figure is believed to be several times higher.
Share of total passenger car fleet run by electric and hybrid energy		4%		High growth of hybrid and electric cars is explained by a set of incentives introduced by the government together with the private sector. These are discussed further below.
Transport modal share in commuting car, motorcycles, taxi, bus, metro, tram, bicycle and pedestrian	% of private transport	30%	Increasing	Data for 2016 is based on Household Mobility Survey conducted by the UNDP Green City Transport project. The same project provides projections assuming that the growth rate of vehicle ownership will be 5% per year.

Name	Units	Latest value	Trend	Context
<b>PRESSURE INDICATORS</b>				
<b>Transport</b>				
<b>Transport modal share in total trips – car</b>	%	68%	Increasing	The high share of trips by car is explained by less developed public transport and entrenched behavioural patterns.
<b>Motorisation rate</b>	Number of vehicles per capita	0.18		Registered cars data source from Ministry of Internal Affairs registered cars; population data from Geostat. The car ownership rate is increasing due to increase in GDP per capita, relatively cheap second-hand cars, low parking fees, and an absence of mandatory inspection and insurances.
<b>Average number of vehicles, cars and motorbikes per household</b>	Number of vehicles per household	1		Data is obtained from the Integrated Sustainable Urban Mobility Plan for Batumi (projections are made for 2017-2020). Modelling undertaken as part of this project suggests an anticipated increase in the number of vehicles per household. Although private car is the predominant means of transport (68%), the average of one vehicle per household may still need to use other modes to meet their transport needs. The Household Mobility Survey showed that households which own one car use public transport for 24% and walk for 28% of all trips. This figure decreases for households with a higher number of vehicles.
<b>Travel speed of bus service on major thoroughfares, daily average</b>	Km/h	14	NA	Low speed explained by high traffic levels, especially during peak morning and evening peak hours. Bus stops are also located closer together than in many cities globally, meaning more time spent starting and stopping.
<b>Interruption of public transport systems in case of disaster</b>	NA	Able to run normally	NA	The most frequent natural disaster in Batumi is flooding. Batumi Avtotransport reports that public transport is able to run normally during floods. However, evidence is lacking to confirm this and will depend on magnitude of the event.
<b>Water cycle management</b>				
<b>Water consumption per capita</b>	l/d	Unreliable	Erratic	Data is highly conflicting from different sources, ranging from 120 – 287 l/d.
<b>Non-revenue water (lost water) (old network)</b>	%	75%	NA	The old network represents around 11% of the distribution network (value appears to be general estimate).
<b>Non-revenue water (lost water) (new network)</b>		25%		The new network represents around 89% of the distribution network (value appears to be general estimate).
<b>Residential and Commercial wastewater treated to national standards</b>		91%		Since 2007 KfW have been supporting a four phase project to improve the extent of waste water treatment network and reduce foul water discharge into the environment.
<b>Dwellings damaged by flooding in the last 10yrs</b>				No data although maps in Section 3 indicate numerous flood-prone areas in Batumi.

Name	Units	Latest value	Trend	Context
<b>PRESSURE INDICATORS</b>				
<b>Industries</b>				
<b>Electricity consumption in industries per unit of industrial GDP</b>	kWh / 2010 USD	0.73	Increasing	The indicator represents national data as local data was unavailable. Nominal GDP used (not adjusted for inflation) because real GDP by sector was not available. Potential exists for significant energy efficiency improvements in industry.
<b>Heat consumption in industries per unit of industrial GDP</b>	MJ / 2010 USD	2.32		Except for the iron and steel industry, which uses electricity for heat generation, other major industries use natural gas. The indicator represents national data as local data was unavailable. As with indicator #16, nominal GDP was used, which weakens the reliability.
<b>Heavy metals Pb emission intensity of manufacturing/ industries</b>	kg released per million USD GVA	0%	Steady	Any manufacturing industries that release dangerous chemicals/emissions must send regular data emission updates to the Environmental Protection Division of AR. No Pb emissions were reported in 2016-17 (verified with Air Protection Division of Ministry of Environment and Agriculture).
<b>Fossil fuel combustion in industrial processes per unit of industrial GDP</b>	MJ / USD	3.72	Erratic	Local data was unavailable, so national data (and nominal GDP) was used. Fossil fuels such as coal, oil products and gas were accounted for.
<b>Share of industrial waste recycled</b>	% of total industrial waste		NA	No aggregate data – industrial entities are not required to report on waste generated or recycling rates.
<b>Percentage of industrial wastewater that is treated according to applicable national standards</b>		93%		Data provided by Batumi Water Ltd. Batumi's wastewater treatment facilities were recently rehabilitated, thus Batumi has a high percentage of treated wastewater compared to the national average (although it is not possible to validate data accuracy).

# Appendix B - Benefits Assessment Scoring Methodology

Benefit category	Sub-category	Description	Potential scoring
<b>Health, wellbeing and safety</b>	Public health– more active lifestyles	The action establishes opportunities for activity, including through active transport and increased desire to be outside.	2 = direct 1 = indirect 0 = no
	Public health – reduced pollution	The action reduces air, soil, and water pollution, thereby improving health outcomes.	2 = direct 1 = indirect 0 = no
	Workplace safety	The action reduces air, soil, and water pollution, thereby improving health outcomes.	2 = direct 1 = indirect 0 = no
<b>Social inclusion</b>	Access to basic services	The action improves access to basic services. This includes waste collection, transport, health, and educational services.	2 = direct 1 = indirect 0 = no
	Skills development	The action provides skills training to individuals or organisations.	2 = direct 1 = indirect 0 = no
	Social equity	The action will reduce inequality.	2 = direct 1 = indirect 0 = no
	Strengthens social fabric	The action will strengthen the social fabric of Batumi. This would include the action providing opportunities for community or public engagement, and strengthening social networks and political voice.	2 = direct 1 = indirect 0 = no
<b>Economic development</b>	Economic growth	The action increases the goods or services produced in Batumi. This includes property values and individual spending.	2 = direct 1 = indirect 0 = no
	Employment creation	The action has the potential to create jobs.	2 = direct 1 = indirect 0 = no
	Increased economic efficiency	The action will reduce economic losses due to inefficiencies in the urban built environment or Batumi's institutional arrangements.	2 = direct 1 = indirect 0 = no
	Revenue generating activities	The action has the potential to generate revenue, either for the investor, the Municipality, or in comparison to the counterfactual.	2 = direct 1 = indirect 0 = no
	Avoided damages	The action will reduce the likelihood of damage or disruption to infrastructure, services, or livelihoods.	2 = direct 1 = indirect 0 = no

# Appendix C - CO<sub>2</sub> Calculations Assumptions

Action #	Action (text)	GHG impact	Unit	Assumptions made	Data sources
<b>LU03</b>	Establish new 'greenways' linking Batumi Boulevard to areas of green space located in other parts of the city and countryside	28.99	tCO <sub>2</sub> e over asset lifetime	<ul style="list-style-type: none"> <li>Most sequestration in the soil</li> <li>Baseline of no carbon sequestered (hardstanding)</li> <li>Conversion of 650 sqm to grass from concrete (100m of road, 6.5m width)</li> <li>Soil depth of at least 1m</li> <li>Intermediately managed land</li> </ul>	<a href="https://farmcarbontoolkit.org.uk/news/new-research-carbon-sequestration-and-grassland">https://farmcarbontoolkit.org.uk/news/new-research-carbon-sequestration-and-grassland</a>
<b>LU04</b>	Invest in new or improved public open space in currently under-served areas	3791	tCO <sub>2</sub> e over asset lifetime	<ul style="list-style-type: none"> <li>Most sequestration in the soil</li> <li>Baseline of no carbon sequestered (hardstanding)</li> <li>Conversion of 85,000sqm from concrete to grass</li> <li>Soil depth of at least 1m</li> <li>Intermediately managed land</li> </ul>	<a href="https://farmcarbontoolkit.org.uk/news/new-research-carbon-sequestration-and-grassland">https://farmcarbontoolkit.org.uk/news/new-research-carbon-sequestration-and-grassland</a>
<b>SW01</b>	Invest in the development of a construction waste processing site and associated infrastructure	56.67	tCO <sub>2</sub> e/ year	<ul style="list-style-type: none"> <li>Assumes 11,745 tonnes of inert and construction waste generated in Batumi annually (45% of annual inert and construction waste generated annually in Adjara region)</li> <li>Assumed that all inert and construction waste in baseline goes to landfill and as a result of the action will all be recycled instead.</li> <li>By recycling aggregate waste, emissions associated with disposal to landfill and those associated with virgin aggregate production are avoided.</li> <li>Emissions associated with open-loop recycling and secondary aggregate production (open-loop source) are still produced, though the the emissions reduction above outweigh these.</li> <li>Landfill size: 19 ha area, 30m depth.</li> <li>Electricity generation of landfill gas of ~390MWh/ million m<sup>3</sup>/ year. Assumes a bell curve over the lifetime of the LFG plant, with fewer emissions emitted towards the end of life - Therefore have assumed 10% recovery rate, or 20% of the 'average' recovery used for SW05.</li> <li>Average urban household electricity usage in Georgia = 1,740 kWh</li> </ul>	Accumulated inert and construction waste is disposed of at the existing landfill and, on average, around 30,000m <sup>3</sup> is deposited annually* - AECOM Batumi GCAP Technical Assessment Report - p57 (note that this figure is for other towns and cities in the Adjara region who also use the landfill)  *Approx 45% of all infrastructure spending in Adjara region was allocated to CoB." - AECOM Batumi GCAP Political Framework Report - p7

Action #	Action (text)	GHG impact	Unit	Assumptions made	Data sources
SW04	Undertake comprehensive remediation of current landfill upon closure	4459.41	Average MWh/ year electricity generation	<ul style="list-style-type: none"> <li>Landfill size: 19 ha area, 30m depth.</li> <li>Electricity generation of landfill gas of ~390MWh/ million m3/ year. Assumes a bell curve over the lifetime of the LFG plant, with fewer emissions emitted towards the end of life - Therefore have assumed 10% recovery rate, or 20% of the 'average' recovery used for SW05.</li> </ul>	<a href="https://www.clarke-energy.com/landfill-gas/">https://www.clarke-energy.com/landfill-gas/</a>
		2,563	Average Georgian households powered	<ul style="list-style-type: none"> <li>Average urban household electricity usage in Georgia = 1,740 kWh</li> </ul>	<a href="https://www.researchgate.net/publication/331900597_Data_on_Household_Energy_Consumption_in_Small_Urban_Rural_Settlements_of_Georgia">https://www.researchgate.net/publication/331900597_Data_on_Household_Energy_Consumption_in_Small_Urban_Rural_Settlements_of_Georgia</a>
SW05	Invest in landfill gas recovery from the new landfill	36,379	Average MWh/ year electricity generation	<ul style="list-style-type: none"> <li>Landfill size: 31 ha area, 30m depth.</li> <li>Electricity generation of landfill gas of ~3,900MWh/ million m3/ year.</li> </ul>	<a href="https://www.clarke-energy.com/landfill-gas/">https://www.clarke-energy.com/landfill-gas/</a>
		20,908	Average Georgian households powered	<ul style="list-style-type: none"> <li>Average urban household electricity usage in Georgia = 1,740 kWh</li> </ul>	<a href="https://www.researchgate.net/publication/331900597_Data_on_Household_Energy_Consumption_in_Small_Urban_Rural_Settlements_of_Georgia">https://www.researchgate.net/publication/331900597_Data_on_Household_Energy_Consumption_in_Small_Urban_Rural_Settlements_of_Georgia</a>
SW07	Establish an organic waste pilot scheme with high-end hotels in Batumi	64.94	tCO <sub>2</sub> e/ year saved for the 13 hotels included within the calculations (consisting of 973 rooms - average of 75 rooms per hotel)	- 0.11 tonnes food waste per hotel room per year on average	<a href="http://www.wrap.org.uk/sites/files/wrap/Overview%20of%20Waste%20in%20the%20UK%20Hospitality%20and%20Food%20Service%20Sector%20FINAL.pdf">http://www.wrap.org.uk/sites/files/wrap/Overview%20of%20Waste%20in%20the%20UK%20Hospitality%20and%20Food%20Service%20Sector%20FINAL.pdf</a> <a href="http://georgiantour.ge/accommodations/batumi-hotels/">http://georgiantour.ge/accommodations/batumi-hotels/</a>
To6	Modernise the entire municipal bus fleet	80%	% saving	<ul style="list-style-type: none"> <li>Energy intensity of the UK = 0.256 kgCO<sub>2</sub>e/ kWh</li> <li>Energy intensity of Georgia = 0.14 kgCO<sub>2</sub>e/ kWh</li> <li>Average EV bus energy requirement = 1.86 kWh/km</li> <li>UK Power &amp; Distribution losses for electricity = 8.35%</li> <li>Georgia Power &amp; Distribution losses for electricity = 5.79%</li> </ul>	<a href="https://www.mdpi.com/1996-1073/11/12/3267/htm">https://www.mdpi.com/1996-1073/11/12/3267/htm</a> <a href="https://data.worldbank.org/indicator/eg.elc.loss.zs">https://data.worldbank.org/indicator/eg.elc.loss.zs</a>

Action #	Action (text)	GHG impact	Unit	Assumptions made	Data sources
To9	Further investigate feasibility and financing options for electric taxi fleet	85%	% saving	<ul style="list-style-type: none"> <li>Energy intensity of the UK = 0.256 kgCO<sub>2</sub>e/ kWh</li> <li>Energy intensity of Georgia = 0.14 kgCO<sub>2</sub>e/ kWh</li> <li>Average EV car energy requirement = 0.17 kWh/km</li> <li>UK Power &amp; Distribution losses for electricity = 8.35%</li> <li>Georgia Power &amp; Distribution losses for electricity = 5.79%</li> </ul>	<a href="https://pushevs.com/2016/11/23/electric-cars-range-efficiency-comparison/">https://pushevs.com/2016/11/23/electric-cars-range-efficiency-comparison/</a> <a href="https://data.worldbank.org/indicator/eg.elc.loss.zs">https://data.worldbank.org/indicator/eg.elc.loss.zs</a>
Wo7	Require low-flow fittings as part of the construction permitting process, including for public infrastructure	1.52	tCO <sub>2</sub> e/ household/ year	<ul style="list-style-type: none"> <li>Average no. of people per Georgian household = 3.3</li> <li>Average daily shower use per household = 3no. 5 minute showers</li> <li>Average of 5 toilet flushes per person (16.5 daily flushes per household)</li> <li>Average of 5 mins of tap running time per person (bathroom basin) (16.5 mins daily per household)</li> <li>Average of 10 mins of tap running time per person (Kitchen sink) (33 mins daily per household)</li> <li>1no. 9kg washing machine load per household per day</li> <li>1no. dishwasher cycle per household per day</li> <li>Water for the shower, basin, kitchen sink, washing machine and dishwasher are heated (from 15C to 60C, 95% efficiency of heater)</li> </ul>	<a href="https://www.waterwise.org.uk/wp-content/uploads/2018/02/WRAP-2010-Procurement-Requirements-for-Water-Efficiency.pdf">https://www.waterwise.org.uk/wp-content/uploads/2018/02/WRAP-2010-Procurement-Requirements-for-Water-Efficiency.pdf</a> <a href="https://sustainability.stackexchange.com/questions/1199/how-many-kilowatt-hours-of-electricity-does-it-take-to-heat-180-litres-of-water">https://sustainability.stackexchange.com/questions/1199/how-many-kilowatt-hours-of-electricity-does-it-take-to-heat-180-litres-of-water</a>
ESo2	Invest in small scale renewable energy on municipal buildings.	667.0720585	tCO <sub>2</sub> e Per annum	<ul style="list-style-type: none"> <li>based on 10 degree pitched south facing system mounted on a flat roof utilising 52% of the roof area. 100% self consumption of the electricity - any export will contribute to lowering grid electricity carbon factor. Carbon factor used 140gCO<sub>2</sub>e/kWh</li> </ul>	<a href="https://www.pvsol.com/en/faq/pvsol-modelling-of-generation-based-on-system-in-city-of-hopat-urkey-30km-to-west-this-is-the-nearest-point-i-had-data-for-in-pvsol">https://www.pvsol.com/en/faq/pvsol-modelling-of-generation-based-on-system-in-city-of-hopat-urkey-30km-to-west-this-is-the-nearest-point-i-had-data-for-in-pvsol</a>

Action #	Action (text)	GHG impact	Unit	Assumptions made	Data sources
ESo4	Implement renewable/energy efficiency scheme for municipal buildings (e.g. efficient lighting, insulation, windows, HVAC systems).	2638	tCO <sub>2</sub> e Per annum	<p>Based on previous projects for energy saving per measure. Measures calculated for are:</p> <ul style="list-style-type: none"> <li>Double Glazed windows, based on square buildings and 25% glazed area.</li> <li>Roof insulation based again on square buildings of given area and number of stories</li> <li>Increased boiler efficiency from 70% to 87%</li> <li>External wall insulation added with 75mm rigid insulation and exterior render</li> <li>The calculation of the existing heat demand based on TM46 benchmarks for existing building types in the UK. Could not find equivalent for Georgia. Boiler changes based on the reduced demand of the buildings after Energy Efficiency measures implemented.</li> </ul>	<p><a href="#">TM46 Benchmarks and calculations of energy savings made on projects of a similar nature.</a></p> <p><a href="#">SPONS Architectural 2019</a></p>
ESo5	Invest in upgrade of all municipal outdoor lighting (e.g. street lamps) to LED.	228	tCO <sub>2</sub> e Per annum	<ul style="list-style-type: none"> <li>Power consumption of a sodium light bulb = 90W with equivalent LED replacement 54W - from Scottish Futures Trust Streetlighting Technical Model information - mid range sized streetlight of a Low Pressure Sodium type</li> <li>Based on 50% running time for year - 4380 hours CO<sub>2</sub> intensity of grid electricity 140g/kWh</li> </ul>	<p>Scottish Futures Trust Street lighting Technical Model has been used for power consumption of street lights and their LED equivalents, there are many different types and power demand lights on the market as a midrange comparison has been used</p>
ESo7	Establish a programme to provide energy efficiency measures (e.g. LED light bulbs) to vulnerable residents at low or no cost.	116862	tCO <sub>2</sub> e Per annum	<ul style="list-style-type: none"> <li>LED lamps replace Compact Fluorescent Lamps with a saving of 9W per fitting</li> <li>Lights on for 4 hours a night on average - 1460 hours a year</li> <li>Electricity Carbon factor of 140g/kWh</li> <li>Gas carbon factor of 300g/kWh</li> <li>Flat area 68m<sup>2</sup></li> <li>Glazing area 25% of wall area (6m<sup>2</sup>)</li> <li>Upgrade from single to double glazing</li> <li>Number of vulnerable households or flats</li> <li>54% of population below poverty line, 4 people per household or flat, 2019 population of 3723500</li> </ul>	<p>Light fitting datasheets for comparable lamp lumen output</p> <p>Dimensions of typical flat: Fabric Energy Efficiency for Zero Carbon Homes, A flexible performance standard for 2016. Zero Carbon Hub</p> <p>SPONS Architectural 2019</p> <p>Number of vulnerable households or flats: United Nations Economic Commission (UNECE)</p>

## Appendix D - Batumi's Existing Plans and Strategies

Plan or strategy	Timeframe	Description
<b>Climate Change Strategy of Adjara</b>	Published 2013	Discusses climate change vulnerabilities of Adjara region. Includes adaptation and GHG mitigation project proposals.
<b>National Disaster Risk Reduction Strategy of Georgia and its Action Plan</b>	2017-2020	The goal is to establish a unified disaster risk reduction (DRR) system, improve disaster preparedness and response capabilities at National and local levels, and to increase response efficiency to the possible threats. The document defines activities for reduction of natural and man-made disasters, risks and challenges faced by the country, and defines the main DRR policy directions. A subordinate Action Plan was developed, which defines concrete activities, responsible and supporting institutions.
<b>The Georgian Road Map on Climate Change Adaptation</b>	Developed in 2016. Provides long-term scenarios for 2050 and 2100	The roadmap presents analysis of climate change vulnerability of each Georgian Municipality in sectors of energy, tourism, cultural heritage, protected areas, agriculture, industry, infrastructure and social services. Long term comparative analysis (for 2050 and 2100 years) is based on climate change projections.
<b>National Biodiversity Strategy and Action Plan (NBSAP)</b>	2014-2020	Includes measures to be implemented for biodiversity conservation, including inland water ecosystems, biodiversity of the Black Sea, forest ecosystems and protected areas.
<b>Agriculture Development Strategy</b>	2015-2020	The strategy perceives degradation of soil as the most important challenge for agriculture sector. Among the proposed measures are management of use of pesticides and fertilisers, waste monitoring, improvement of melioration system and development of early warning system for natural disasters.
<b>Batumi Action for Cleaner Air</b>	2016-2021	National voluntary commitments developed in the framework of 8th Environment for Europe Ministerial Conference, including planned measures in transport.
<b>Georgian National Action Plan for Fulfilment of Commitments of EU-Georgia Association Agreement in the Field of Air Quality Management</b>	2014-2024	The Plan includes not only harmonisation with EU law in the field of air protection but also obligations taken by Georgia after joining Gothenburg Protocol.
<b>Batumi Action for Cleaner Air (BACA) Plan</b>	2016-2021	Includes National voluntary commitments developed in the framework of 8th Environment for Europe Ministerial Conference. The listed actions are in line with the planned actions National Environmental Action Programme (NEAP) and NAP on fulfilment of Commitments of EU-Georgia Association in the field of air quality management. The plan also includes planned measures in transport, as the sector represents the main air pollutant in Georgia.
<b>Third National Environment Action Plan (NEEAP)</b>	2017-2021	Sets National priorities and actions for environment protection. Relevant objectives for Batumi's GCAP include expansion of the protected areas network, improving management of protected areas, and promoting sustainable ecotourism development.
<b>Sustainable Energy Action Plan</b>	2014-2020	Batumi's most recent GHG emissions inventory. Includes an emission reduction target of 22% compared to business-as-usual (BAU) by 2020.

Plan or strategy	Timeframe	Description
<b>National Renewable Energy Action Plan</b>	Published 2018	Aims to diversify energy supply resources, optimise exploitation of renewable energy resources, and create of a unified Energy Efficiency approach. The Plan considers the following renewable energy types: hydro, wind, biomass, solar, and geothermal.
<b>Rehabilitation of Municipal Infrastructure Facilities in Batumi</b>	2007-2022	Ongoing programme of rehabilitation and extension of the water supply and sewerage networks in Batumi and surrounds.
<b>Spatial Planning, Architecture and Construction Code off Georgia</b>	Became effective on August 13, 2018	The code defines system of spatial planning and urban development in Georgia, its core principles goals and objectives as well as hierarchy of spatial planning and urban development documents and their composition. It also defines rules for development and approval of above documents.  Code defines preconditions of land use for construction and key requirements for buildings.  Code defines types of construction licences, construction oversight, construction violations as well as sanctions and administrative proceeding for considering such violations.
<b>Adjara Spatial Planning Scheme</b>	Developed according to the task order approved by the decree #79, April 8, 2011, of the minister of finance and economy of Adjara Autonomous Republic	Defines the general spatial planning framework for the territory of Adjara Autonomous Republic.
<b>General Land-Use Plan of Self-governing city of Batumi</b>	First enforced on September 14, 2012, has undergone nine amendments between 2013 and 2018	Defines the rules for land-use and construction on the territory of Batumi; in particular:  1. Composition and approval procedure of general land-use and urban construction regulation plan 2. List of general and concrete functional zones of Batumi as well as construction coefficients for concrete functional zones 3. Rules for calculation of maximum allowed height of buildings located in concrete functional zones  Other rules and additional preconditions for construction and land-use on the territory of Batumi.
<b>Strategic Development Plan of Batumi Municipality</b>	2018-2021 1	The document defines spatial/ urban planning and regulation of land-use aspects in the city as key priorities for sustainable development of the City.
<b>Green Cities: Integrated Sustainable Transport for the City of Batumi and the Adjara Region (UNDP)</b>	2015-2019	Supported by UNDP, includes analysis and development sustainable transport plans, including public transport network optimisation scenarios; revised plans for municipal parking; sustainable urban transport corridors; improvements to safety and quality of cycling infrastructure, and potential development of an electric taxi system.
<b>Low Emission Development Strategy Transport Sector (USAID)</b>	Published September 2016	Proposes a roadmap for 2030 with corresponding measures, timetable, approximate costs and assumptions and evaluations, with the aim of reducing GHG emissions, which are mostly caused by the transport.
<b>Transport Policy Study Policy Framework and Preliminary Action Plan 2016-2025 (ADB)</b>	Published 2016	Sets out a Policy Framework and Action Plan to improve Georgia's transport policy and economic efficiency and potential.

Plan or strategy	Timeframe	Description
<b>Policy Framework for Green Transportation in Georgia (World Bank)</b>	Published June 2012	Proposes measures to reduce transportation costs and contribute to the development of green transportation in Georgia, for monitoring the status of the surface and ground water according to the plan's monitoring programme.
<b>Chorokhi-Adjaristskali River Basin Plan</b>	2016-2021	Long-term goal is to protect surface and ground water of the Chorokhi-Adjaristskali River Basin District from risks to ecology. The programme's main coordinators are Ministry of Environment and Agriculture of Georgia, and Directorate for Environment and Natural Resources of Adjara AR. The National Environmental Agency and Directorate for Environment and Natural Resources of Adjara AR are also responsible
<b>Waste Management Strategy and Action Plan</b>	2016-2030	Strategy prepared in accordance with the Waste Management Code and EU-Georgia Association Agreement.
<b>Municipal Waste Management 5-Year Plan</b>	2018-2022	Aims at developing an efficient, modern integrated waste management system. The plan includes measures as well as quantitative goals to be achieved by 2022 as well as responsible entities and timeline.
<b>Development Strategy of SME in Georgia</b>	2017-2021	Sets National priorities and actions in the field of environment protection, including green economy growth. Green economy growth support includes provisions relevant to industries.

