Green City Action Plan of Tirana

Final | Version 1.0

April 2018

BASHKIA TIRANË

BMF
AUSTRIAN FEDERAL MINISTRY OF FINANCE

European Bank
for Reconstruction and Development

Forward from the Mayor

Two years ago, when we signed the Memorandum of Understanding with EBRD and committed to working together for a sustainable Tirana there were many who were skeptical. We had just come to office and faced a host of difficult problems so the idea that the City would dedicate time and energy and money to issues such as the environment and sustainability seemed at the very least unrealistic to many people. Something politicians often talk about but never do anything about.

But over the past two years Tirana has undergone a remarkable transformation. We put our energy and money where our mouth was and began work on a series of projects, policies and measures that have built the foundations of a very different model of development for the city, one that has sustainability and respect for the environment as its guiding principles.

The General Local Plan for the first time ever has provided the city with a blueprint for development that recognizes the importance of sustainability and environmentally friendly policies. Indeed it views them as crucial to the creation of a sustainable municipal environment which will stimulate the capital's economic growth and improve living conditions for our citizens.

Tirana today is on the verge of a green revolution. Very important steps have been taken in transforming the city's mobility model. The expansion of pedestrian areas, a minimum grid of 10 kilometers of bike lanes and the introduction of a new dockless bike-sharing scheme are giving new impetus to alternative means of transport. The public transportation service has improved its performance dramatically and we are currently in the final stages of opening a new bus line with a fleet that is going to be 100% electric.

Incentives in the local plan are stimulating developers to increase the energy efficiency standards of their investments, while some smart measures, such as the introduction of modest fees for plastic bags in most markets and grocery shops, has led to a 65% reduction in their use.

One of the most important projects in the General Local Plan, called the Metropolitan Forest, envisages the planting of 2 million trees that will girdle urban Tirana in a ring of parks, forests and agricultural land, thus providing the city with its green lungs, expanding the possibilities for recreation and more importantly, limiting sprawl. We have already started work on this ambitious project. We set ourselves the target of planting 100,000 trees during this season and we are now on course to surpass this target.

Perhaps the most important lesson we have learned as we have gone about implementing these projects is that we need partners and the support of the community. Of the 100,000 trees we are planting this year, 60% have been donated by businesses, citizens, institutions. It has become the perfect example of how much a city can do if all the people mobilize and work together for a good cause.

Of course, the Green City Action Plan, the policies and course of action it proposes, mark a very important milestone in this effort. Our work thus far has been guided by our values and vision for a green and sustainable Tirana. With the GCAP, we will also have access to a concrete and implementable action plan that will define the future of Tirana as a green and sustainable city.

I wish to thank all the EBRD and Arup team that have worked with us on this most important of strategic projects, for their commitment and effort and I look forward to working together in the future to translate these ideas and proposals into tangible projects that will improve the lives of the people of Tirana and serve as a model for the country as a whole.

Mayor of Tirana

Our Vision

The GCAP aims to enable people to enjoy a healthy and high-quality life in a green, resilient and inclusive Tirana that makes smart use of resources.

Contents

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This document has been funded by the Austrian Federal Ministry of Finance.

Acronyms

BOD	Biochemical Oxygen Demand
BRT	Bus Rapid Transit
CBD	Central Business District
CCRA	Climate Change Resilience & Adaptation
EBRD	European Bank for Reconstruction and Development
EMAS	EU Eco-Management and Audit Scheme
EPC	Energy Performance Certificate
ESCO	Energy Service Company
EU	European Union
EV	Electric Vehicle
FAR	Floor Area Ratio
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIVT	Green Infrastructure Valuation Toolkit
GMT	Guarantee Minimum Tonnage
GSB	Green Spaces & Biodiversity
HWRC	Household Waste Recycling Centre
ICE	Internal Combustion Engine
IFI	International Financial Institution
ILO	International Labour Organization
IPT	Inductive Power Transfer
IPTS	Integrated Public Transport System
ISO	International Organization for Standardization
ITS	Intelligent Transport System
JICA	Japan International Cooperation Agency
KRRT	The Territory Regulatory Council
LED	Light Emitting Diode
LGU	Local Government Unit
LPG	Liquefied Petroleum Gas
MoT	Municipality of Tirana
MSW	Municipal Solid Waste
NATP	National Agency on Territorial Planning
NH4	Ammonium
NOx	Nitrogen Oxides
OECD	Organisation for Economic Co-operation and Development
PM	Particulate Matter
PPP	Public Private Partnership
PV	Photovoltaic
REEP	Regional Energy Efficiency Programme
RIBA	Royal Institute of British Architects
RM	Resource Management
SE	Sustainable Energy
SEA	Strategic Environmental Assessment
SEAP	Sustainable Energy Action Plan
SM	Sustainable Mobility
SOx	Sulphur Oxides
SUMP	Sustainable Urban Mobility Plan
TAP	Trans Adriatic Pipeline
UKT	Ujesjelles Kanalizime Tirana (Tirana Water Company)

Executive Summary

1. Introduction

The Green City Action Plan (GCAP) provides our vision and a concrete set of actions to address the pressing environmental challenges affecting Tirana over the coming years, and to secure investment in priority environmental infrastructure projects.

The GCAP aims to enable people to enjoy a healthy and high-quality life in a green, resilient and inclusive Tirana that makes smart use of resources.

The GCAP is based on a robust evidence base collected over the past year on Tirana's environmental challenges and policies, supported by interviews and workshops with city stakeholders and technical experts, and consultations with the public. The GCAP supplements key city plans and strategies, including Tirana's General Local Plan, the Masterplan of Tirana, the Sustainable Energy Action Plan, the Vulnerability Assessment and Adaptation Plan for Tirana, and the Integrated Intersectoral Plan for Durana (Tirana – Durres) economic zone.

2. Key Challenges

Tirana's baseline assessment led to several findings which were used to prioritise the main challenge areas for the city:

- **Transport.** Tirana is heavily reliant on diesel cars and buses. Major investment in roads, bus and cycle routes and in zero emission electric buses is taking place, which has resulted in a gradual reduction in air pollution over the last reporting years. This will enable our citizens to shift to cleaner forms of transport such as cycling and clean buses.

- **Green & Blue Infrastructure.** The plan for a new orbital forest with planting of 2 million trees has begun in order to reduce urban sprawl and increase the open green space area ratio per capita. The city's rivers are polluted due to the discharge of untreated wastewater.

- **Resource Management.** The proportion of Municipal Solid Waste (MSW) that is sorted and recycled is low, however MSW collection is undergoing a significant extension and is due to serve the entire municipality by 2019. This will be supported by investment in the Sharra landfill and an energy from waste facility to improve solid waste treatment for Tirana.

- **Water.** Tirana currently lacks constant water supply throughout the city, and water consumption and the percentage of water losses due to non-revenue water consumption are currently high. The municipal water company UKT has made plans to invest in waste water treatment and water supply over the coming years.

- **Energy.** Tirana benefits from an entirely renewable electricity supply from hydroelectric dams. Recent community support programmes have enabled investment in building energy efficiency, although there is considerable room for extending these small-scale programmes to buildings across the city.

- **Resilience.** We have identified measures to improve resilience to extreme weather events, including floods and the urban heat island effect. In addition, we plan to improve emergency preparedness and our capacity to adapt to our changing environment.

3. Strategic Objectives

Leading from the prioritised challenges above, we have set ourselves eleven strategic objectives to address those challenges. We will strive to achieve these objectives within five thematic areas:

1. Sustainable Mobility
2. Green Spaces & Biodiversity
3. Sustainable Energy
4. Resource Management
5. Climate Change Resilience & Adaptation

Executive Summary

1. Sustainable Mobility Strategic Objectives

SO.1A *Shift to public and active transport*: Increase the proportion of people using non-motorised modes of transport and use public transport.

SO.1B *Smart Mobility*: Increase the uptake of ITS solutions to improve transport planning, both by bus operators and commuters.

SO.1C *Ending sprawl*: Introduce measures that discourage sprawl to reduce the length of commute into central Tirana.

2. Green Spaces & Biodiversity Strategic Objectives

SO.2A *More and better green space*: Create green spaces that people can enjoy and improve the quality of existing green assets to achieve greater biodiversity.

SO.2B *Better river water quality:* Reduce the impact of human activities on the quality of river water by improving treatment of wastewater.

3. Sustainable Energy Strategic Objectives

SO.3A *Secure and diverse energy supplies:* Ensure that energy is available from a variety of sources to ensure security of supply in the long term.

SO.3B *Higher energy efficiency of buildings and infrastructure:* Ensure that buildings and infrastructure require less energy to build and operate and thus have minimal environmental impact.

4. Resource Management Strategic Objectives

SO.4A *Reduce waste to landfill and increase waste recycling*: Improve the use of resources by recycling a larger proportion of waste and creating a process for reusing rather than disposing of unused items.

SO.4B *Reduce water losses:* Manage non-revenue water losses to ensure that water resources are used effectively.

5. Climate Change Resilience & Adaptation Strategic Objectives

SO.5A *Higher resilience of Tirana's infrastructure in the face of chronic stresses and shock events*: When building and maintaining infrastructure, ensure that it is resilient to adverse events such as flooding or landslides.

SO.5B *Higher resilience and preparedness of business, community and the Municipality*: Ensure that all stakeholders in the city are prepared to respond to natural disasters when they occur.

4. Green City Actions

The actions within the five thematic areas will enable us to achieve the goals of the strategic objectives, and include: ***capital investment programmes and projects***, and prerequisite ***policy, legislative or regulatory measures***. All actions and policy measures within each Strategic Objective are summarised in the Summary Roadmap on the next pages.

In addition, actions were identified within ***resources and capacity building*** of the City as well as ***public awareness***. Actions within these cross-cutting themes are crucial for ensuring the successful implementation of the capital projects and policy measures, and they focus on data collection and monitoring, capacity building of the Municipality, capacity building of the private sector and promotion, education and raising awareness of the public.

5. Action Costing

The following assessment maps out the cost and funding needs for each of the actions within the five thematic areas, as identified from the MoT mid-term budget and from estimates developed for the GCAP. The funding sources indicate where the leading and supporting funding is expected to come from. This is discussed in more detail against each action.

6. Next steps

The Green City Implementation period will begin later this year and will take place over a 12-36 month period over which committed actions and policy measures will be delivered, step by step.

Towards the end of the implementation period we will undertake a review and reporting exercise to assemble evidence and findings of how successful the plan has been. This will provide the evidence to support a refresh of the GCAP, leading to a new cycle of commitment and implementation.

Theme	Capital Costs		Operational Costs		Potential Funding Sources			
	Lekë (millions)	Euros (€ '000s)	Lekë (millions)	Euros (€ '000s)	City Budget	National Government	IFIs & Donors	Private Sector
Sustainable Mobility	5,110	€ 38,134	884	€ 6,597	✓✓✓	✓	✓✓	✓✓
Green Spaces & Biodiversity	22,964	€ 171,373	996	€ 7,433	✓✓	✓	✓	✓✓
Sustainable Energy	5,455	€ 40,709	117	€ 873	✓	✓✓✓	✓✓	✓✓✓
Resource Management	39,673	€ 296,067	4,033	€ 30,097	✓	✓✓✓	✓✓	✓
Climate Change Resilience & Adaptation	221	€ 1,649	295	€ 2,201	✓✓	✓	✓	✓
Resources & Capacity	0	€ 0	458	€ 3,418	✓✓	✓	✓✓	✓

Summary Roadmap

Sustainable Mobility											
No	Short-term actions and policy measures	Strategic Objective	Implementing Body	CAPEX (Lekë '000s)	OPEX (Lekë '000s)	Potential Funding Sources	Timeline				
							2018	2019	2020	2021	2022 +
HIGH-PRIORITY ACTIONS											
SM1	Reallocation of street space to buses and cyclists	**SO.1A**	MoT	670,000	17,000	MoT					
SM2	Implementation of an Integrated Public Transport System (IPTS)	**SO.1A**	MoT	0	31,000	MoT					
SM7	Provision of integrated cashless ticketing for different transport modes	**SO.1B**	MoT	46,000	90,000	MoT; Donor/ IFI					
SM8	Sustainable Urban Mobility Plan and related SEA	**SO.1A, 1B, 1C**	MoT	0	114,000	MoT; Donor/ IFI					
OTHER ACTIONS											
SM3	Implementation of Bus Rapid Transit (BRT) infrastructure	**SO.1A**	MoT	2,010,000	506,000	MoT					
SM4	Replacement of buses with low emission buses	**SO.1A**	MoT	2,320,000	268,000	MoT					
SM5	Implementation of a dockless bike rental system	**SO.1A**	Private sector; MoT	0	7,000	Private sector					

Summary Roadmap

Sustainable Mobility											
No	**Short-term actions and policy measures**	**Strategic Objective**	**Implementing Body**	**CAPEX (Lekë '000s)**	**OPEX (Lekë '000s)**	**Potential Funding Sources**	**Timeline**				
							2018	**2019**	**2020**	**2021**	**2022 +**
OTHER ACTIONS (CONTINUED)											
SM6	Upgrade to taxi fleet with hybrid or electric models	**SO.1A**	Private sector; MoT	64,000	3,000	Private sector					
SM9	Introduction of a road code and traffic rules for cycling	**SO.1A, 1B, 1C**	MoT	0	3,000	MoT					
SM10	Strengthening of the modal priority policy	**SO.1A, 1B, 1C**	MoT	0	1,000	MoT					

Summary Roadmap

Green Spaces & Biodiversity											
No	Short-term actions and policy measures	Strategic Objective	Implementing Body	CAPEX (Lekë '000s)	OPEX (Lekë '000s)	Potential Funding Sources	Timeline				
							2018	2019	2020	2021	2022 +
HIGH-PRIORITY ACTIONS											
GSB1a	Planting of Metrobosco forests and restoration of lakes	**SO.2A**	MoT	2,667,000	0	MoT; Third party; Community					
GSB1b	Tree nursery strategy for the Metrobosco forests	**SO.2A**	MoT	185,000	0	MoT; Donor/ IFI					
GSB5	Implementation of legislation for the protection of green spaces	**SO.2A**	GoA; MoT	0	22,000	Govt of Albania					
GSB9	Expansion wastewater treatment service for municipal and industrial wastewater	**SO.2B**	UKT, GoA	19,537,000	880,000	Govt of Albania					
OTHER ACTIONS											
GSB2a	Provision of pocket parks in residential blocks	**SO.2A**	MoT	206,000	0	MoT; community					
GSB2b	Commercial delivery model for pocket parks in residential blocks	**SO.2A**	MoT	0	24,000	MoT; community					
GSB3	Construction of green corridors	**SO.2A**	MoT	369,000	92,000	MoT; community					
GSB4	Creation of a biodiversity inventory and database	**SO.2A**	GoA; MoT	0	10,000	GoA					

Summary Roadmap

Green Spaces & Biodiversity											
No	Short-term actions and policy measures	Strategic Objective	Implementing Body	CAPEX (Lekë '000s)	OPEX (Lekë '000s)	Potential Funding Sources	Timeline				
							2018	2019	2020	2021	2022 +
OTHER ACTIONS (CONTINUED)											
GSB6	Strategic Environmental Assessment of green spaces	**SO.2A**	MoT	0	13,000	MoT					
GSB7	Implementation of obligations for min. size and maintenance of public spaces	**SO.2A**	MoT	0	6,000	MoT					
GSB8	Requalification of public spaces	**SO.2A**	MoT	0	6,000	MoT					

Summary Roadmap

Sustainable Energy											
No	**Short-term actions and policy measures**	**Strategic Objective**	**Implementing Body**	**CAPEX (Lekë '000s)**	**OPEX (Lekë '000s)**	**Potential Funding Sources**	**Timeline**				
							2018	**2019**	**2020**	**2021**	**2022 +**
HIGH-PRIORITY ACTIONS											
SE2	Municipal building energy efficiency programme	**SO.3B**	MoT	70,000	0	Government; IFI; MoT					
SE4	Replacement of street lamps with smart and energy efficient lamps	**SO.3B**	ESCO; MoT	393,000	36,000	Private sector					
SE5	Implementation of legislation for enabling building energy efficiency measures	**SO.3B**	Government of Albania	0	27,000	Government of Albania					
OTHER ACTIONS											
SE1	Deployment of electric vehicle charging infrastructure	**SO.3A**	MoT; Private sector	603,000	54,000	Private sector					
SE3	Residential building energy efficiency programme	**SO.3B**	MoT; private sector	4,389,000	0	Government; IFI; MoT					
SE6	Mechanisms to incentivise investment in energy efficient technologies	**SO.3B**	Government of Albania; MoT	0	9,000	Government of Albania					
SE7	Effective implementation of provisions on ESCOs and EPCs	**SO.3B**	Government of Albania; MoT	0	13,000	Private sector					

Summary Roadmap

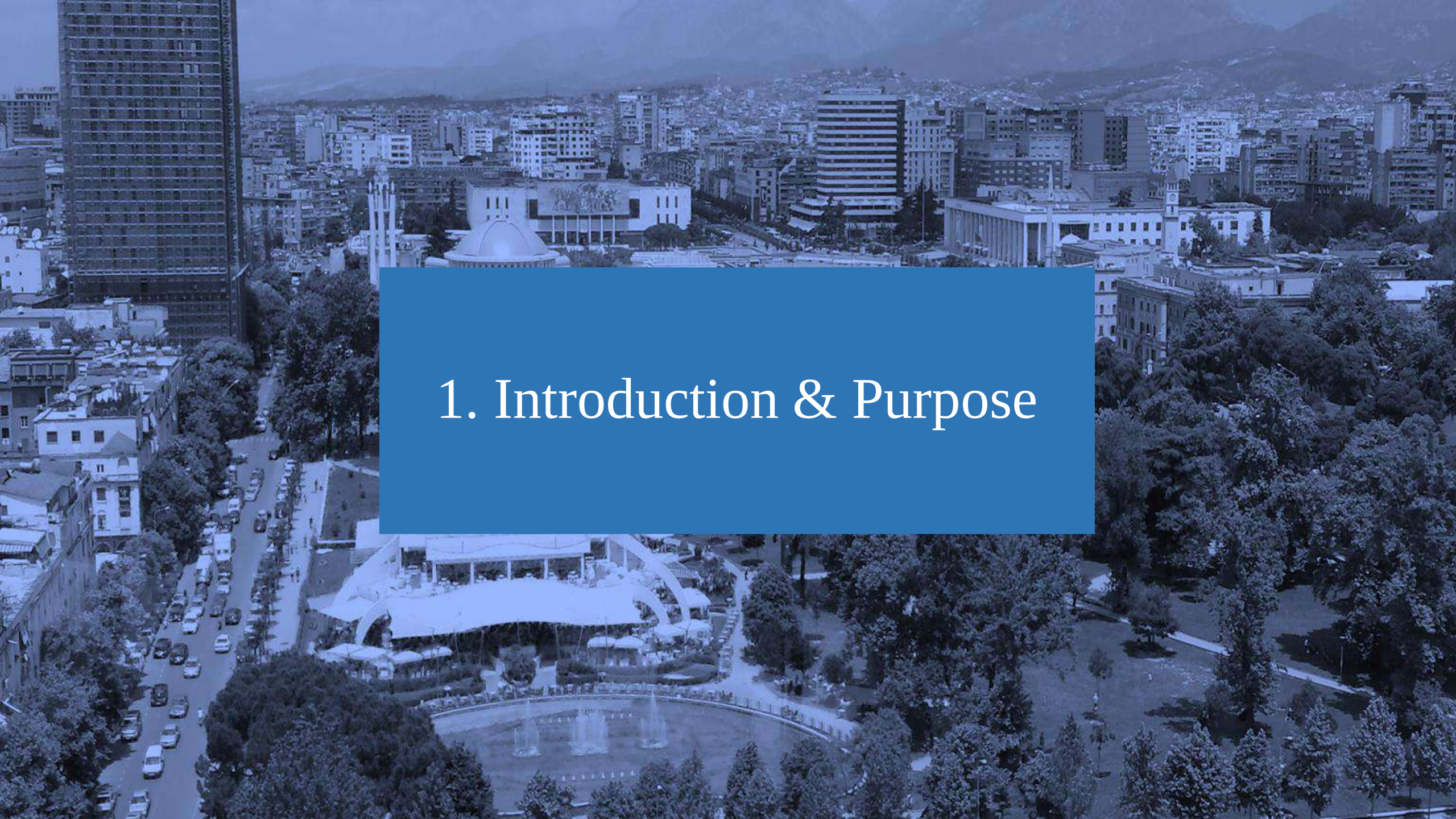
Resource Management											
No	Short-term actions and policy measures	Strategic Objective	Implementing Body	CAPEX (Lekë '000s)	OPEX (Lekë '000s)	Potential Funding Sources	Timeline				
							2018	2019	2020	2021	2022 +
HIGH-PRIORITY ACTIONS											
RM1a	Implementation of household waste collection and separation	**SO.4A**	MoT; Private waste operators	1,842,000	2,298,000	MoT					
RM2	Upgrade to water distribution network and infrastructure	**SO.4B**	UKT; Govt of Albania	36,180,000	1,085,000	UKT; MoT; Donors/IFIs					
OTHER ACTIONS											
RM1b	Household Waste Recycling Centres	**SO.4A**	MoT; Private waste operators	1,517,000	509,000	MoT					
RM3	Instalment of smart water meters in buildings	**SO.4B**	Government of Albania; UKT	134,000	141,000	UKT; Donors/IFIs					
RM4	Implementation of secondary legislation on integrated management of water resources	**SO.4B**	MoT	0	18,000	Government of Albania					

Summary Roadmap

Climate Change Resilience & Adaptation											
No	Short-term actions and policy measures	Strategic Objective	Implementing Body	CAPEX (Lekë '000s)	OPEX (Lekë '000s)	Potential Funding Sources	Timeline				
							2018	2019	2020	2021	2022 +
HIGH-PRIORITY ACTIONS											
CCRA2	Risk assessment of dam infrastructure in Tirana	**SO.5A**	MoT	0	8,000	MoT					
CCRA3	Action plan for dam rehabilitation and maintenance	**SO.5A**	MoT	209,000	150,000	MoT					
CCRA6	Preparation of an emergency action plan	**SO.5B**	MoT	0	92,000	MoT					
OTHER ACTIONS											
CCRA1	Implementation of smart and resilient urban planning	**SO.5A**	MoT	0	22,000	MoT					
CCRA4	Financial incentives for implementing private and community adaptation measures	**SO.5A**	MoT	0	12,000	MoT					
CCRA5	Update of the Early Warning system with a mapping of extreme weather events	**SO.5B**	MoT	12,000	31,000	MoT					

Summary Roadmap

Resources & Capacity											
No	Short-term actions and policy measures	Strategic Objective	Implementing Body	CAPEX (Lekë '000s)	OPEX (Lekë '000s)	Potential Funding Sources	Timeline				
							2018	2019	2020	2021	2022 +
HIGH PRIORITY ACTIONS											
RC1	Capacity building of the Municipality of Tirana	All	MoT	0	361,000	MoT; Donor/IFIs					
RC4	Implementation of improved data collection & monitoring	All	MoT	0	177,000	MoT; Donor/IFIs					
OTHER ACTIONS											
RC2	Capacity building measures for businesses	All	MoT	0	40,000	MoT; Donor/IFIs					
RC3	Public promotion, education and awareness campaigns	All	MoT	0	57,000	MoT; Donor/IFIs					
RC5	Resources to support energy efficiency measures	SO.3B	MoT	0	134,000	MoT; Donor/IFIs					



1. Introduction & Purpose

1. Introduction & Purpose

1.1 Introduction

Our vision for Tirana – set out in our 2017 General Local Plan – is for smart growth of the urban system coupled with sustainable development of the natural systems on which our city depends. This Green City Action Plan (GCAP) contributes to that vision by setting out a concrete course of actions to address the pressing environmental issues affecting our city.

The plan is part of a Green Cities Programme developed by the European Bank for Reconstruction and Development (EBRD). The GCAP follows a Memorandum of Understanding between EBRD and the Municipality of Tirana signed in 2015 on cooperation in areas such as urban transport, urban roads infrastructure, water and wastewater services, solid waste management, street lights and overall improvements in energy efficiency.

The GCAP is funded by the Austrian Federal Ministry of Finance under the Western Balkans DRIVE Fund. The methodology was developed by the EBRD with the Organisation for Economic Co-operation and Development (OECD) and the International Council for Local Environmental Initiatives (ICLEI).

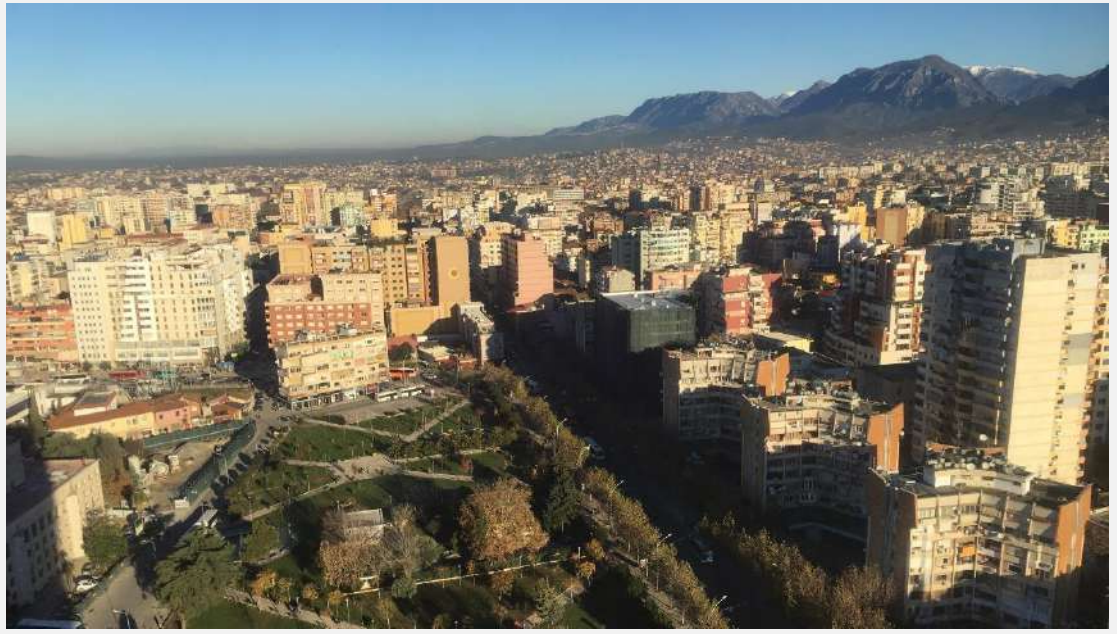
The project has been led by Arup, a global engineering, design and management consultancy, supported by local consultancy firms Abkons, Grant Thornton and Studio Legale D'Andrea.

1.2 Purpose of the GCAP

The GCAP aims to improve the environment quality of the city and help Tirana to secure investment in priority environmental infrastructure projects.

It establishes an up-to-date evidence base for defining and prioritising the environmental challenges of Tirana, and devising concrete actions and policy measures to address them.

The GCAP also provides a process for sustained monitoring and verification of the plan, and for communicating the actions and engaging with key stakeholders and the wider community.



1.3 Structure of this Plan document

This chapter provides an introduction to the GCAP, a review of how the plan aligns with other city plans and strategies, and an overview of the GCAP preparation process.

Chapter 2: **City Baseline** highlights key results from Tirana's baseline assessment (additional details of baseline indicators are provided in each topic chapter, listed below). **Chapter 3** sets out the city's **Green City Vision and Strategic Objectives**, based on the findings of the baseline.

Chapters 4-8 present the Green City actions and policy measures in each of the following Strategic Objectives themes:

- **Ch. 4**: Sustainable Mobility
- **Ch. 5**: Green Spaces & Biodiversity
- **Ch. 6**: Sustainable Energy
- **Ch. 7**: Resource Management
- **Ch. 8**: Climate Change Resilience & Adaptation

Each thematic area chapter contains the main challenges of Tirana, what we are already doing to tackle these challenges, and the proposed actions and policy measures.

Chapter 9: Resources & Capacity contains cross-cutting actions on capacity building of the municipality and businesses, and education of the public.

Chapter 10: Monitoring, Reporting and Verification sets out our plan for measuring the effectiveness of the plan, in relation both to actions taken and outcomes achieved.

Three Appendices are attached to this document and outline the indicator data collected during the Technical Assessment and then provide a set of mini-studies which support a number of key actions identified for each thematic area.

- **A1**: Mini-Studies – which provide technical detail and guidance for a selection of key opportunities and challenges faced by the city.
- **A2:** Indicator Data – summarising the indicators collected for the baseline exercise
- **A3**: Key Stakeholders – identifying the main stakeholders who have an influence on or role to plan implementing the plan.

1.4 GCAP Preparation

The Green City Action Plan for Tirana was developed using a methodology developed for the EBRD by ICLEI and OECD. The methodology sets out four main steps in the process:

- **Step 1**: Green City Baseline
- **Step 2**: Green City Action Plan
- **Step 3**: GCAP Implementation
- **Step 4: GCAP Reporting**

These steps are summarised below.

Step 1: Green City Baseline

In Step 1, we collected information on the City's policies and current plans to understand what might affect the city's ability to deliver possible green city actions. The first part of the **External Framework Report** provides the legislative and policy context at all levels and for all sectors and aspects of the City. The second part highlights particular governance, finance, environmental and social issues and insights for each sector.

We also collected data on a set of indicators that helped us assess Tirana's environmental performance. The **Technical Assessment Report** summarises the findings from the data collection process, the analysis of the indicator results, and the stakeholder engagement process undertaken to moderate the results of the data analysis.

Step 1 concluded with a **Prioritisation Report** which defined the environmental challenges for Tirana. The priorities were based on a robust evidence base of data and other contextual information. During a workshop at City Hall in June 2017, municipal staff provided their views on the city's priorities, both strategic and sector-specific. The priorities were also informed by external stakeholders, including donors and international funders.

Key priorities were identified in each of the six sectors below, along with a seventh cross-cutting theme:

1. Land Use
2. Transport
3. Solid Waste
4. Water Supply and Wastewater Treatment
5. Energy
6. Buildings
7. Climate Change Resilience and Adaptation

The Green City Baseline reports were subject to a public consultation which took place in December 2017.

Step 2: Green City Action Plan

In Step 2, the priority challenge areas identified in the Prioritisation Report were analysed to set the strategic objectives for each priority area. These were presented in the **Strategic Objectives Report**, which defined the long-term Green City vision for Tirana for the next 10-15 years.

Concrete short-term actions and policy measures (within a 3-5 year timeframe) were identified to help achieve the strategic objectives. These are outlined in the **Key Programmes and Policy Measures Report**. It is these key programmes that form the heart of the action plan.

The key programmes were informed by municipal heads of departments and other local stakeholders, who came together in three working group meetings in October and November 2017. A public consultation event in December 2017 also informed the key programmes. In addition, the shaping of the actions and their delivery strategies were informed by sector experts from the Arup-led consultant team.

Step 2 culminated in the publication of this draft **Green City Action Plan** in February 2018. The plan has been developed in an ever evolving context, amidst a range of previously committed actions which contribute to our Green City vision, and will help us achieve our ambitious green city goals for the future.

This consultation draft of the GCAP will be subject to a public consultation event in March 2018, after which the plan will be updated and presented for adoption by the Municipal Council. The timetable for adoption of the GCAP is May 2018.

Step 3: Green City Implementation

The Green City Implementation period is typically a 12-36 month period over which committed actions are delivered, step by step. This stage makes the plan real through the commitment of departmental leaders, deployment of staff resources and allocation of municipal budgets to the committed actions.

Tirana's commitment to green city action was already strong before the GCAP process began, and budget allocation and implementation of actions – such as large scale tree planting, acquisition of electric buses and expansion of bicycle sharing schemes - have in fact already begun.

Step 4: Green City Reporting

Throughout the implementation period the city will undertake a review and reporting exercise to assemble evidence and findings of how successful the plan has been. The reporting process will provide the evidence to support a refresh of the GCAP, leading to a new cycle of commitment and implementation.

1.5 How Actions were Selected and Developed

First, we reviewed a long list of current and planned actions in the city and carried out research on potential actions. The long list was also informed by local stakeholders, including Municipal staff, the donor community, and sector experts from the Arup-led consultant team.

Each action was assessed according to the following criteria: risks and challenges, ownership and delivery options, revenue or saving opportunities, and target scale. The actions were then grouped into the five strategic objective areas and scored against eleven environmental indicators from 1 (low impact) to 3 (high impact), derived from the following strategic objectives:

- Increase shift to public and active transport
- Smart mobility
- Ending sprawl
- More and better green space
- Better river water quality
- Secure and diverse energy supplies
- Higher energy efficiency of buildings and infrastructure
- Reduce waste to landfill and increase recycling
- Reduce water losses
- Increase infrastructure resilience
- Increase business, community and municipal resilience

In addition, the actions were scored against five socio-economic indicators, Y indicating potential for socio-economic impact, including the following indicators:

- Economic returns for investor
- Economic inclusion
- Public health
- Gender equality
- Community involvement

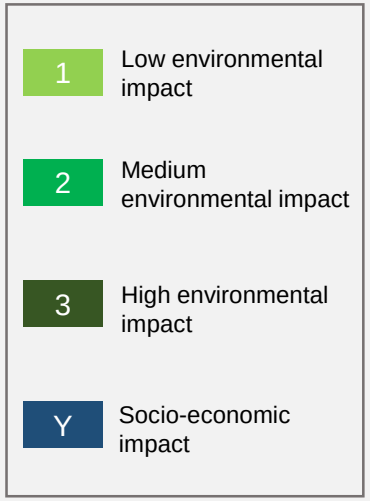


Figure 1 Key for environmental and socio-economic evaluation

The scoring was used for a preliminary prioritisation of actions and was informed by meetings with technical experts. The final set of actions agreed for the plan was prioritised through a consultation process in the form of sector-specific working group meetings, followed by individual meetings with city department representatives.

1.6 Types of Actions

A key feature of the GCAP methodology is its emphasis on identifying investment needs for capital projects. Several of the capital projects proposed in the plan have legal prerequisites in the form of policy, legislative or regulatory measures. These prerequisite measures were grouped into policy measures, with an indication of the actions which they will support.

These investment projects can be made most effective by linking them with other indirect means of influencing the behaviour of investors, operators, owners and citizens. These other types of action fall within the wider context of the enabling framework for action (see the External Framework Report for further information).

- **Capital projects** are those initiatives which involve direct investment in the built environment.
- **Policy measures** are prerequisite policies, laws and regulations to the actions, which will be implemented by the municipality, the Albanian government or other statutory bodies.
- **Capacity building** initiatives relate to actions which enable the municipality and other formal actors to improve access to information, to build skills and knowledge and to improve decision making and management processes.
- **Public awareness** initiatives include public information campaigns, community projects and engagement with local businesses to deliver local improvements to the environment.
- **Data resources** relate to the collection and monitoring of data to support evidence-based policymaking and investment decisions, and enable the long-term monitoring of the plan.

Some additional actions were identified which were deemed beneficial to the implementation of the policy measures proposed in the GCAP and to support our long-term green city vision. Although these actions are not provided as the actions core to this GCAP, they are included after the GCAP actions under a Supporting Actions sub-section.

1.7 Long-term Vision, Medium-term Targets and Short-term Actions

Within each strategic objective topic section, the overall GCAP vision was translated into a topic-specific long-term vision statement reflecting the city's ambition over the next 10-15 years (i.e. 2018-2033).

The long-term visions have in turn been converted to a set of medium-term (5-7 years) targets against which we can establish whether we are making progress towards the long-term vision. These medium-term targets are referenced against the benchmark values for "good" performance in the GCAP indicators database. Where Tirana's proposed targets did not align with an indicator, we have identified other references for the proposed target values.

Short-term actions for the next 1-3 years are set out in the form of a timeline indicating the key steps needed to enable each action to be implemented. As noted above, these actions are proposed as linked packages of measures which combine data and information gathering, policy and legislation change and capital and operational investment in the city's infrastructure and built environment.

1.8 Benefits Assessment

The quantitative benefits of the GCAP actions were estimated for the thematic areas of Sustainable Mobility, Green Spaces and Biodiversity, and Sustainable Energy. The modelled benefits included carbon savings, health benefits (mortality and morbidity risk reduction), and energy savings. The findings are contained in the Benefits Assessment sub-section in each chapter. Other benefits are qualitatively described in each chapter.

1.9 Financial and Economic Assessment

Each action proposed in this GCAP was costed by an expert team of financial consultants. The Financial and Economic Assessment sub-section in each chapter contains a summary of the budged allocated by the Municipality of Tirana, estimates of the capital and operational costs, and the funding needs of each action, in lekë and euros.

1.10 How the GCAP is Aligned with other City Plans and Strategies

During the launch session of the GCAP process, the Mayor of Tirana Erion Veliaj shared his vision and a clear view for what Tirana should strive to achieve through its GCAP.

Mayor Veliaj emphasised several key initiatives in his address:

- Planting two million new trees in Tirana by 2030
- Tackling urban sprawl through creating an orbital forest around the City
- Improving the public transport infrastructure to support pedestrians, cyclists, and buses
- Rolling out green and hybrid buses
- Creating a 'smart' and 'digital' Tirana

Much of this vision is outlined in the City's **General Local Plan**, which was officially approved in February 2017. The Tirana 030 Local Plan proposes the creation of a polycentric Tirana, creation of a green belt around the city, improvement of water distribution, establishment of Tirana as a marketplace for agricultural products, and creation of a multimodal transport hub.

The GCAP considered the local plan context and how the proposed Green City actions will also contribute to the goals outlined in the Plan. Many priority actions and programmes captured in the Local Plan have been expanded on and further developed in the GCAP.

In addition to the General Local Plan, several additional plans for Tirana have been considered during the preparation of this GCAP.

The **Masterplan of Tirana** proposes the extension of the main boulevard, re-location of the train station, a new high-rise administrative area, a pilot eco-district, recreation areas providing green spaces, and rehabilitation of the Tirana River. Much of this masterplan is already in the implementation phase.

The GCAP has further developed some of the actions, such as extending river rehabilitation to lake rehabilitation, and has elaborated on how the suggested actions in the Masterplan could be implemented, for example the provision of recreational green spaces.

The **Sustainable Energy Action Plan** of the City of Tirana was developed to fulfil the commitment of the Mayor of Tirana to reduce the CO_2 emissions in the city by more than 20% by 2020. The sustainable energy actions proposed in the GCAP are aligned with the commitment made in the SEAP, and support continued investment in energy efficiency in Tirana.

The **Vulnerability Assessment and Adaptation Action Plan for Tirana** integrates climate adaptation measures across all sectors of the City. This document aims to help equip key decision makers in the Municipality to consider how the impacts of climate change may impact the city.

This document was consulted throughout the development of the GCAP to consider how the adaptation measures outlined are considered within the context of the GCAP actions.
The **Integrated Intersectoral Plan for Tirana – Durres Economic Zone 2030** defines the territorial strategic development of the most dynamic industrial and economical poles in Albania. It provides the development framework on main development sectors.
Although limited to Tirana Municipality, the GCAP will support economic development through the major investments identified in the plan. In particular, a clean and efficient water infrastructure and a smart and sustainable transport system will critical to a sustainable economy across the corridor. Meanwhile a key focus of the development of green space actions related to the development of commercially viable delivery routes.

1.11 Spatial Coverage of the GCAP

Since the consolidation of 61 local government units (LGUs) following the law 115/2014 “On the territorial and administrative division of local government units in the Republic of Albania”, the prefecture of Tirana is made up of the municipalities of Tirana, Vorë and Kamëz. The vast majority of the land area and population fall within Tirana. The municipality's land area is now 25 times larger than it was before 2015, and its population has more than doubled from about 420,000 to almost 900,000. This creates an opportunity for the municipality to plan and implement green city actions across the entire Tirana metropolitan area.

The urban periphery of Tirana is characterised by poor infrastructure and public services provision as a legacy of a pattern of uncontrolled and informal settlements. Through the GCAP there is an opportunity to address these legacy issues and to help strengthen public support for the new governance structures of the enlarged municipality.

In addition, the GCAP can consider issues at a more strategic level, which will be of particular value for issues such as transport or water supply which are regional systems of flows that would benefit from a catchment-level approach to planning and management.

The GCAP consists of actions and policy measures that are applicable to both the inner urban and outer more rural parts of Tirana. These are signposted throughout the GCAP with the following symbols:

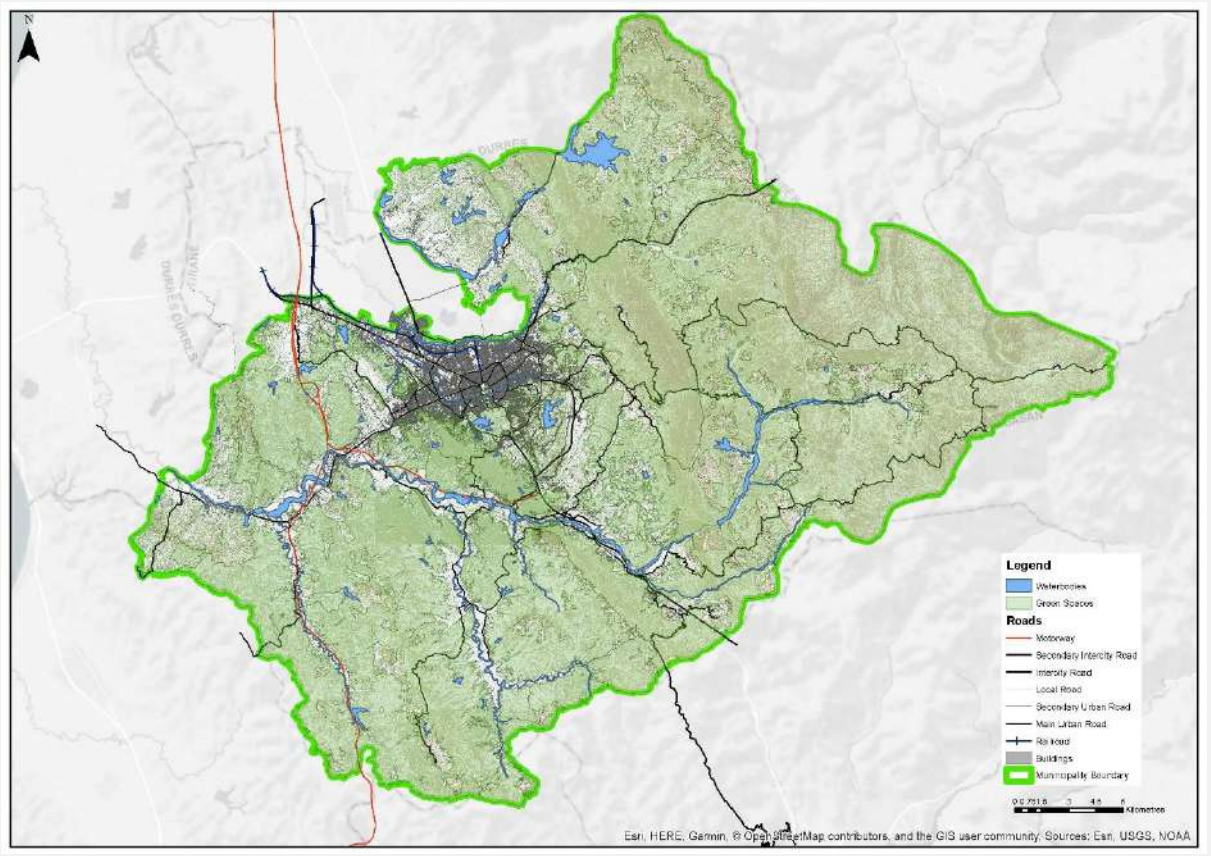
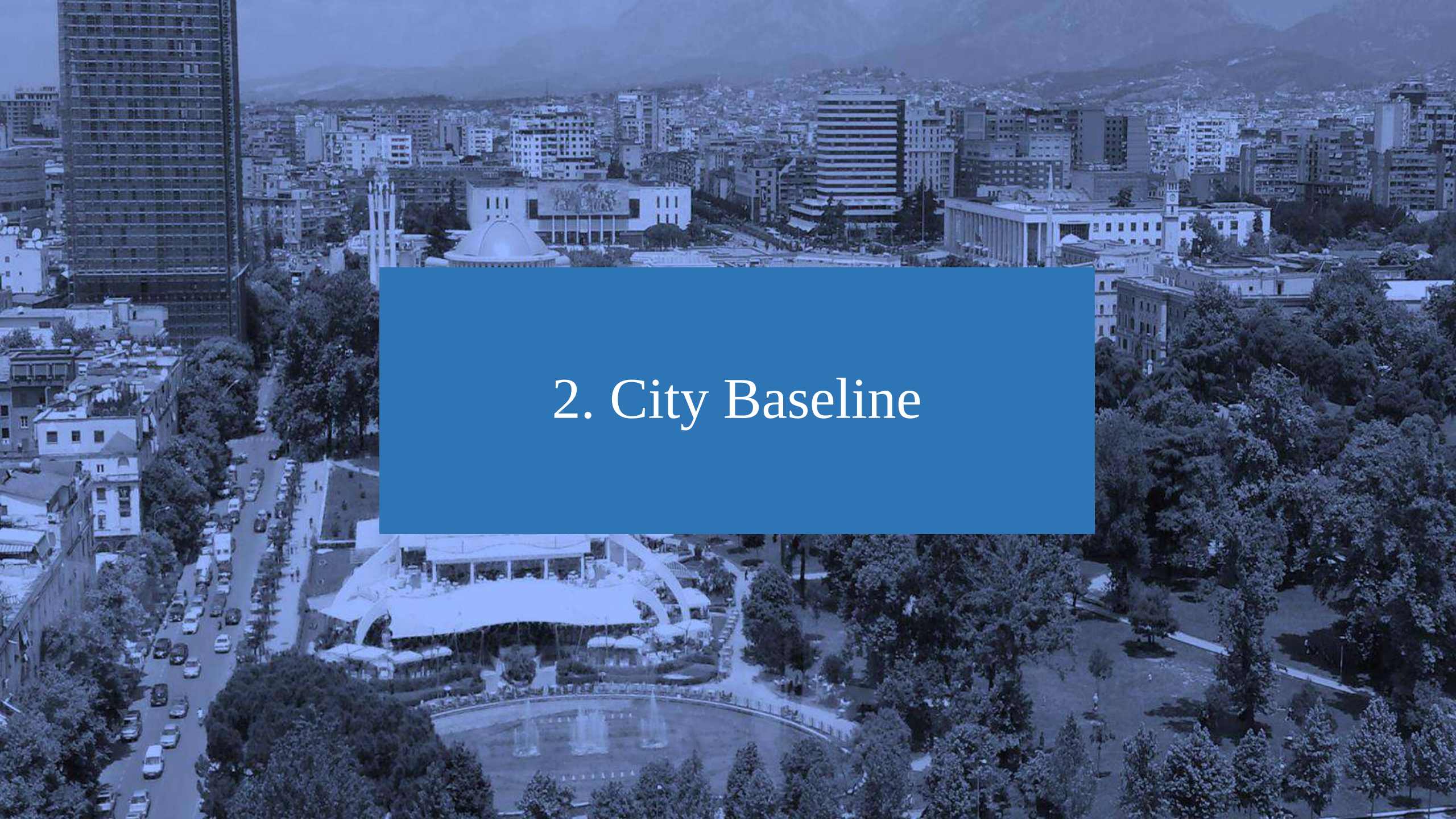


Figure 2 Maps showing spatial coverage of the GCAP actions and policy measures



2. City Baseline

2. City Baseline

2.1 External Framework

Below is a selection of findings from the External Framework report for Tirana. Full details of the social, economic and financial baseline for Tirana can be found in the External Framework document.

Social Baseline

Tirana has an estimated population around 860,000 and the overall country has one of the youngest populations in Europe. However, the dynamism of this population is underutilised as the youth unemployment remains high and the quality of education is substantially below EU standards. Overall unemployment in Albania was around 17% in 2015, but the rate for those aged 15-29 was 33%, having risen steadily from a rate of 20% ten years previously.

Albania has experienced net population decline due to significant emigration flows to other South Eastern Europe countries and the EU. According to the ILO and confirmed by a recent regional study by Friedrich Ebert Stiftung, more than two thirds of Albanian youth nurture hopes of emigration. The study found that the less educated are more likely to seek opportunities to migrate aboard and support their relatives remaining in the country with remittances. Remittances are estimated by the World Bank to constitute 8.5% of Albania's GDP.

By contrast, the Tirana-Durres corridor, within the western central plain of Albania, is experiencing rapid urbanisation and economic growth. This region is the economic centre of the country and contains over one third of the Albanian population. Other parts of the country are experiencing ageing and diminishing populations.

The resulting migration of rural populations into urban areas adds considerable pressure on the urban labour market, where it contributes towards increased informality. It also results in poor construction, sanitation, traffic congestion, and ecological damage.

Economic Baseline

The GDP of Tirana in 2013 was 643,000 Lekë per capita (equivalent to around €4,700 per capita). This was 38% above the average of the country. According to the JICA study, it is anticipated that the Albanian economy has the potential to achieve a sustained growth rate of 3 to 4% per annum. As the economic engine of the country, the Tirana Metropolitan Area is expected to achieve a higher growth rate.

Within the Tirana prefecture, recent growth indicators have been very strong. For instance, the number of active enterprises grew at nearly a 10% compound annual growth rate from 2010-2015.

At the national level, finances have shown a improving trend, with public debt-to-GDP ratio having fallen in 2016 for the first time since the global financial crisis of 2007-2008, according to the World Bank. Nevertheless the ratio remains high at 72.5%, and the government has adopted a mandate to achieve steady reductions until the level of public debt falls to 45% of GDP.

Meanwhile the World Bank expected the budget deficit to reach 2.5% of GDP in 2016, down from 4.8% in 2015, which will be achieved through a combination of increased revenues and controls on capital and current account expenditure.

The implication of this for the GCAP is that public debt finance will be a limited option for green city actions unless the action is associated with revenue or savings which can deliver short payback periods.

Some of the city's existing infrastructure has been neglected and underinvested in the period since the fall of the communist state. These underutilised assets include the national railways, stranded water reservoirs and canals. In addition, a lack of enforcement of environmental protection laws and the lack of control over them has paved the way for air, water, and soil pollution in Albania.

Recent Municipal Budget

The main goals of the medium-term budgeting approach, as outlined in the *MoT's 2016-2018 Budgeting programme* report, is to:

- Promote economic development and entrepreneurship
- Provide quality services
- Improve infrastructure and transport
- Reduce pollution
- Revitalize the cultural and athletic life in the city
- Construct large public works.

Through partnerships with different organisations and donors we are focusing on the delivery of six strategic projects:

1. Development of the North Boulevard and rehabilitation of the Tirana River.
2. Construct the public transport terminal
3. Revitalize the Skenderbej Square
4. Preserve and improve the city's parks
5. Rehabilitate the Tirana zoo
6. Improve the management and treatment of waste to relieve pressure on the Sharra landfill.

Table 1 shows a breakdown of our budget for 2016, 2017, and 2018. As illustrated, the largest proportion of the budget is towards:

1. Local public services
2. Roads and public transport management
3. Planning, management, and administration
4. Education

	Total budget (2016-2018)			***In thousands***
	Program	**2016 (Lekë)**	**2017 (Lekë)**	**2018 (Lekë)**
1	Local public services	3,835,894	4,000,000	4,200,000
2	Roads and public transport management	2,625,520	2,757,000	2,898,000
3	Planning, management, and administration	2,255,895	2,246,392	2,448,230
4	Undergraduate education and education	2,140,413	2,234,800	2,370,000
5	Housing and territory planning	569,115	700,000	670,000
6	Order and civil protection	288,640	320,000	320,000
7	Social care	221,974	260,000	260,000
8	Culture and tourism	164,100	180,000	183,000
9	Economic development and employment	118,500	135,000	137,000
10	Youth and sports	110,335	115,896	120,000
11	Environmental protection	5,000	8,000	10,000
	Total budget	12,335,386	12,957,088	13,616,230

Table 1 Total budget of the Municipality of Tirana for 2016, 2017 and 2018

2018-2021 Mid-Term Budget

The Municipality has recently prepared its mid-term budget estimate for the period 2018-2021. The provisional allocations in this budget include a variety of measures which are aligned to the green city principles documented in this action plan. The most recent budget allocations are incorporated in the estimates of funding needs to deliver the actions in this plan.

2.2 Indicator Data Collection for Tirana

Key indicators on the environmental and urban system baseline were collected at the start of the GCAP process. These indicators are categorised into Pressures, States and Responses in accordance with the Pressure-State-Response framework developed by the EBRD (see figure).

Pressures impact the environmental components, i.e. the *States,* in each of the following sectors:

- Transport
- Buildings
- Industries
- Energy
- Water
- Solid waste
- Land use.

States comprise the following environmental components:

- Air
- Water
- Soil
- Green spaces
- Biodiversity
- Climate change.

Responses are policies and actions to address the challenges in *States* and *Pressures*. The state, pressure and response indicators were benchmarked using a traffic light approach.

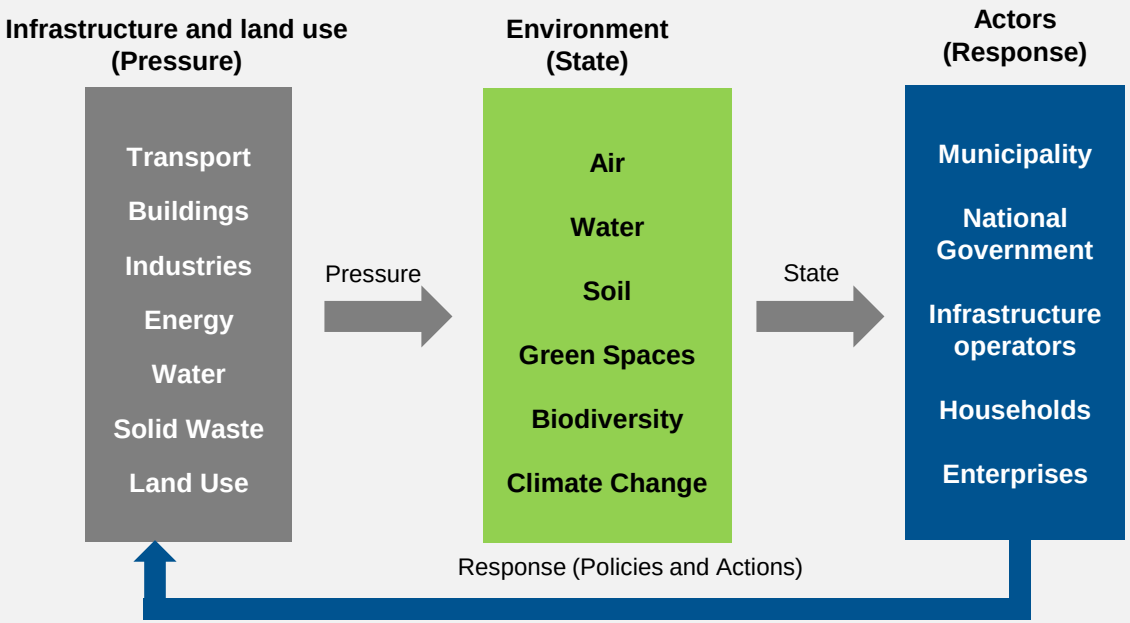


Figure 3 Summary of Pressure-State-Response (P-S-R) framework

2.3 Key Findings

Key findings from the indicators and technical analysis are identified below, with additional information in each topic chapter (Chapters 4-8). A summary schedule of indicators is provided in Appendix 1, with the full indicator set provided in the GCAP Technical Report.

Transport

Major investment in roads and bus and cycle routes are taking place across Tirana, with steady progress towards completion of the second ring road which will incorporate higher speed bus routes following the principles of bus rapid transit systems. Meanwhile a recent pilot test of zero emission electric buses has provided the stimulus for a plan to secure investment in a new clean bus fleet in the coming years.

The investments made so far are showing signs of success, with indicators of particulate matter and sulphur oxides showing improvement over recent reporting years.

Key remaining transport challenges include:

- Average age of car fleet (total and by type) is very high at 13 years on average, leading to high levels of pollutant emissions from road traffic.
- The percentage of diesel cars in total vehicle fleet is high, which also leads to deteriorated air quality.
- The length of roads dedicated exclusively to public transit per 100,000 population is low and increasing this length could lead to higher uptake of public transport.
- Kilometres of bicycle path per 100,000 population is also very low; although the use of bicycle is growing, the usage rate is still low.
- Developing further policies on the extension and improvement of public and non-motorised would encourage mode shift to public and non-motorised transport.
- Public transport emergency management needs improving in order to increase the resilience of transport systems.

Land Use, Green Space and Biodiversity

Tirana is benefitting from its new General Local Plan, which provides a clear framework for controlling future sprawl and for restoration of neglected urban areas. The plan for a new orbital forest with planting of 2 million trees by 2030 has already begun, with major planting at Farka Lake and elsewhere. The restoration of Skanderbeg square brings vitality to the city centre and demonstrates the value to the city of high quality public open spaces.

Key land use and green space challenges include:

- The Tirana River has been generally neglected and the areas around it are not effectively utilised as public spaces.
- Poor river water quality is also linked to regular discharge of untreated wastewater into the city's rivers.
- Tirana has a low open green space area ratio per 100,000 inhabitants. The provision of more, and better quality, green space was also noted as a key mayoral priority.
- Average commuting distance is high, with commuters to Tirana travelling 11.3 km on average. This is also a result of urban sprawl, which is linked to a variety of adverse environmental and socio-economic impacts.

Solid Waste

Municipal waste collection in Tirana is undergoing a significant extension, so that collection services will by 2019 be provided to the entire municipality. Meanwhile a significant investment commitment by the Government of Albania will result in the capping and treatment of leachate from the Sharra landfill and the development of an energy recovery facility to improve waste treatment for Tirana.

Although the proportion of MSW that is sorted and recycled is currently low, the extension of collection contracts to the entire municipality provides a service foundation to enable future implementation of measures to increase separation and recovery of recyclable materials.

2. City Baseline

Water

Municipal water company UKT provides a stable and steadily improving water supply and wastewater disposal service for Tirana. Planned investments in waste water treatment and water supply will help to reduce discharge of untreated sewage into water courses and to make progress towards a 24/7 water supply to the whole of Tirana.

Key water-related challenges include:

- The consumption of water per capita per day and per unit of GDP is high, compared to international benchmarks.
- There is a high percentage of water losses as a result of non-revenue water consumption.
- Further policies on drinking water pre-treatment could be introduced.
- Resilience to floods could be further improved through drainage facilities development.
- Business and community resilience to floods could be encouraged through awareness campaigns.

Energy and Buildings

Tirana benefits from a nearly 100% renewable, low carbon electricity supply from Albania's fleet of hydroelectric dams. Recent investments by the electricity infrastructure provided have largely eliminated outages and the use of polluting local diesel generators.

Recent community support programmes have enabled investment in building energy efficiency, although there is considerable room for extending these small scale programmes to buildings across the city.

Other key energy challenges include:

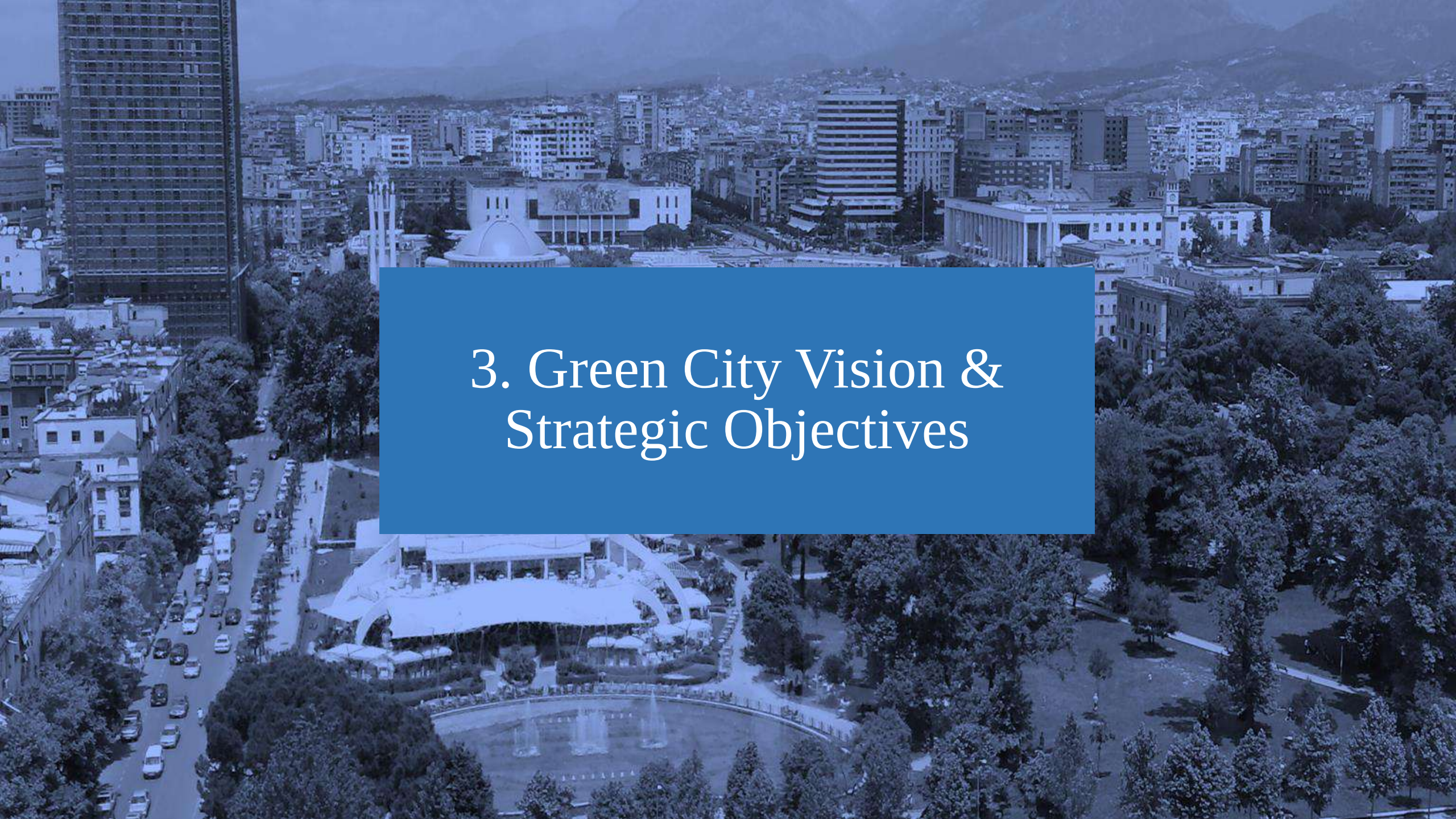
- Renewable energy facilities in residences and non-domestic buildings could be further incentivised through fiscal instruments.
- Resilience of electricity networks in case of disaster could be improved further.
- Electricity consumption in buildings is currently high according to international benchmarks.

Climate Change Resilience & Adaptation

Tirana's improvements to its municipal infrastructure demonstrated an increasing resilience to climate events during recent severe rainfall events in late 2017. Nevertheless the city can expect both more extreme storms and more extreme heat waves and dry spells, for which longer term preparations will need to be developed.

Key climate-related challenges include:

- Surface water needs to be managed better to improve resilience to floods.
- The urban heat island effect coupled with expected increases of frequency and severity of heat waves from climate change has been identified as a very high risk for Tirana. These amplifying drivers would result in more frequent heat stress events which will affect people, buildings and infrastructure in the city.
- Emergency preparedness could be improved through better planning, risk information system, and traffic management.



3. Green City Vision & Strategic Objectives

3. Green City Vision & Strategic Objectives

3.1 General Local Plan Key Objectives

The General Local Plan is the key document to be considered when developing the GCAP. It was developed by Stefano Boeri Architects and it is structured around five key systems:

- Urban
- Natural
- Water
- Agricultural
- Infrastructure

This local plan has been written with a strong consideration of the strategic goals outlined in the National General Plan. Therefore there is strong unity between the larger vision for Albania and this plan illustrates how Tirana will realise that vision.

Some of the underpinning elements are to:

- Create a polycentric Tirana
- Create a Green Belt around the city to prevent urban sprawl, to expand current green spaces, and to connect existing ones
- Improve the efficiency of water distribution across the city, improve water quality, and minimise flood risk
- Establish Tirana as a marketplace for agricultural products and to protect the agricultural land around the city
- Create a multimodal transport hub in Tirana with different types of public transportation. Key aim to make the city as accessible as possible.

The GCAP considered the General Local Plan context and how the actions identified contributed to the goals outlined in the Plan. Many priority actions and programmes have been captured in the General Local Plan. These were expanded on and further developed in the GCAP.

3.2 Green City Vision

In light of Tirana's existing city plans, the following Green City Vision was set for Tirana:

The GCAP aims to enable people to enjoy a healthy and high-quality life in a green, resilient and inclusive Tirana that makes smart use of resources.

This vision can be realised by working towards achieving the strategic objectives identified in the key thematic areas in the next section.

3.3 GCAP Strategic Objectives

Eleven green city strategic objectives were set within the following five themes to achieve our Green City Vision:

- Sustainable Mobility
- Green Spaces & Biodiversity
- Sustainable Energy
- Resource Management
- Climate Change Resilience & Adaptation

3. Green City Vision & Strategic Objectives

1. Sustainable Mobility

The sustainable mobility strategic objectives are directed towards breaking the 20th century paradigm of planning cities around the growing use of private automobiles. Sustainable mobility means addressing congestion and meeting mobility needs through greater use of public and active transport.

This will help bring about reduction of vehicle emissions and improved air quality. In combination with planning and economic measures, the aim is also to constrain urban sprawl to make more efficient use of existing urban land and infrastructure and reduce journey times into and out of the city for commuters and other urban travellers.

Smart mobility is also key to achieving sustainable mobility through improved Intelligent Transport System (ITS) solutions that navigate traffic better and inform commuters about the best mode and time of travel. Smart solutions can thus contribute to mode shift away from private vehicles.

Strategic Objectives

SO.1A *Shift to public and active transport*: Increase the proportion of people using non-motorised modes of transport and use public transport.

SO.1B *Smart Mobility*: Increase the uptake of ITS solutions to improve transport planning, both by bus operators and commuters.

SO.1C *Ending sprawl*: Introduce measures that discourage sprawl to reduce the length of commute into central Tirana.

2. Green Spaces & Biodiversity

This theme encompasses the quantity and quality of green spaces and biodiversity. Quality includes the diversity and maintenance of vegetation and blue infrastructure, including parks and rivers. Biodiversity includes the types and condition of habitats within green spaces.

The benefits of more and better green spaces include storm water storage, carbon sequestration, urban heat mitigation, improved air quality, reduced energy demand, improved quality of life, reduced pollution and greater biodiversity. A key element of this theme is reducing human impact, e.g. through poor wastewater treatment.

The objectives within this thematic area include the increase of quantity and improvement of the quality of green space, including quality, public accessibility, and location near neighbourhoods.

Strategic Objectives

SO.2A *More and better green space*: Create green spaces that people can enjoy and improve the quality of existing green assets to achieve greater biodiversity.

SO.2B *Better river water quality:* Reduce the impact of human activities on the quality of river water by improving treatment of wastewater.

3. Sustainable Energy

Albania enjoys a significant hydroelectric energy resource, which currently provides reliable, affordable and low carbon energy for Tirana. The city has the ambition, however, to improve the secure supply of energy in the long-term and ensure that it can meet its energy needs reliably through renewable sources.

It is also important to improve energy efficiency of buildings and infrastructure as they contribute to CO_2 emissions in the city and add to air pollution.

Strategic Objectives

SO.3A *Secure and diverse energy supplies:* Ensure that energy is available from a variety of sources to ensure security of supply in the long term.

SO.3B *Higher energy efficiency of buildings and infrastructure:* Ensure that buildings and infrastructure require less energy to build and operate and thus have minimal environmental impact.

4. Resource Management

Resources are valuable raw materials that need to be used effectively in order to ensure their long-term availability. Globally, people are using three times more resources than available on the planet. Therefore, it is essential to manage resources use to meet the needs of Tirana's population over the long term.

Resources include water and raw materials, that currently might go to waste. This theme also supports the concept of Circular Economy, whereby items are not produced, used and disposed of, but instead are reused, remanufactured, and its component parts are brought back into the economy as raw materials.

Strategic Objectives

SO.4A *Reduce waste to landfill and increase waste recycling*: Improve the use of resources by recycling a larger proportion of waste and creating a process for reusing rather than disposing of unused items.

SO.4B *Reduce water losses:* Manage non-revenue water losses to ensure that water resources are used effectively.

5. Climate Change Resilience & Adaptation

Tirana already has an Tirana Climate Change Adaptation Action Plan that sets out targets for the city to become more resilient against climate change impacts and avoid the negative impacts of extreme weather events in light of the city's rapid growth. However, there is still a need to implement organisational changes within the Municipality in order to increase preparedness of multiple city systems in the face of floods or other shock events.

Key areas for improvement include emergency preparedness, developing governance to manage this, and ensuring that risks are mitigating, e.g. through tackling the urban heat island effect or strengthening flood prevention.

Strategic Objectives

SO.5A *Higher resilience of Tirana's infrastructure in the face of chronic stresses and shock events*: When building and maintaining infrastructure, ensure that it is resilient to adverse events such as flooding or landslides.

SO.5B *Higher resilience and preparedness of business, community and the Municipality*: Ensure that all stakeholders in the city are prepared to respond to chronic and catastrophic impacts of climate change when they occur.

4. Sustainable Mobility

We plan to transform transport systems to offer **sustainable mobility** that creates a shift to public and active transport, offers smart transport solutions and ends urban sprawl.

4. Sustainable Mobility

4.1 Main Challenges in Tirana

1) Energy Efficiency in Transport

The growth in fleet size over the last few years points to an increasing car mode share in the capital. More people now have access to a car, albeit the fleet is older and less energy efficient than the EU average. The average age of car fleet (total and by type) is very high at 13 years on average. This is an urgent issue to be addressed, and citizens are aware that the high age of cars means more pollution and poor air quality in Tirana. This impacts air quality in the city, since cars that are 10+ years old emit approximately 36% more CO_2 than its newer counterparts.

In addition, the percentage of diesel cars in total vehicle fleet is also high at 63%, compared to the EU average of 41%. The regulation of high-polluting vehicles while incentivising energy-efficient vehicles through fiscal instruments is an urgent action for the authority. The city plans to pilot this scheme before extending it to the entire city area.

2) Air Pollution from Transport

Since 2013, two monitoring stations were installed within the urban area of Tirana. However, they are not sufficient to cover the entire city area or monitoring all sensitive areas (hot-spots from heavy traffic). Although not fully representative, they indicate very high levels (in excess of national and EU limits) of air pollution in city of Tirana.

The monitoring stations have indicated moderately high average annual concentration of $PM_{2.5}$ and PM_{10}, although these indicators have been shown to improve over time. Transport is the main contributor of pollution in city area.

3) Choice of Transport Modes

The number of kilometres of road dedicated exclusively to public transit per 100 000 population in Tirana is very low. This is an urgent and salient issue for the Municipality and inhabitants.

In addition, the number of kilometres of bicycle path per 100 000 population is also very low. This is a salient challenge to be addressed and it has moderate urgency; the use of bicycle is growing although the usage rate is still low.

The extension and improvement of public and non-motorised transport is planned and supported through investment in place, which is an urgent and salient issue to be addressed. Public and non-motorised transport is promoted through Information and awareness campaigns. This has been identified as an important issue, but not as urgent a concern as the provision of infrastructure and access to it.

4) Congestion in the City Centre

There is a significant increase in the use of car for commuting in recent years, even though Tirana is a compact city and bus coverage is reasonably high. Data suggest that congestion persists during the peak hour. Anecdotally, the reduction in speed can also be attributed in part to road side parking taking up road capacity (legal and illegal). Increased enforcement with public information campaigns can help address this problem while also raising awareness among the public of the importance of not obstructing traffic. This is of secondary urgency following the physical infrastructure improvements.

4. Sustainable Mobility

4.2 What we are Already Doing

One of the central objectives of the local plan is to improve public transport infrastructure across the city while also accommodating expected growth of the city. The plan recognises that it will be crucial to ensure the transport connects the city with the suburbs, as currently there is poor connection between the two.

The local plan includes numerous actions which focus on improving the transport system in Tirana. These include:

- Upgrade the local public transport network. Provide dedicated bus lanes, preferential routes, fare integration systems and transport mobile apps (e.g. City Mapper). There are plans to expand the total length of dedicated bus lanes from 9 km to 31 km.
- Develop two public transportation corridors. The aim is to roll out tramlines or dedicated bus rapid transit (BRT) through the east-west and north-south corridors of the city.
- Encourage pedestrian mobility. The aim is to improve the sidewalks across the city to ensure there is adequate and safe space for pedestrians. Currently, many of the sidewalks are narrow and poorly maintained. Improving pedestrian infrastructure will help improve pedestrian safety whilst also improving urban amenity and environment.
- Ensure green public procurement for city buses. There is ongoing action to change the PPP contract with bus services companies in Tirana, to require companies to specify low polluting or electric buses. This could be extended to taxi providers.
- Construct the Tirana Outer Ring Road -North Section (2018-2022).The outer ring road is currently under construction. The aim is for freight traffic to be diverted to this ring road to reduce traffic congestion within the centre.
- Construct the Tirana Public Transport Terminal (2017-2020), and the Bus Rapid Transport system (BRT) Tirana-Rinas (2018-2020).
- Establish restricted or traffic-free areas (e.g. construction of the Skanderbeg Square to be finished in summer 2017) to reduce traffic congestion in the city centre and improve air pollution.
- Improve the car parking system. The aim is to reduce illegal parking and to create a parking development in the Central Business District (CBD) that accommodates 3200 cars. An electronic car park payment system will be introduced and spaces will be specifically allocated to residents in the area.
- Introduction of information systems for traffic monitoring through establishment and operation of a traffic monitoring station and electronic billboards installed in different city areas, providing online information on traffic.
- Improve public transportation (new fleet) and construction of a dedicated 10km cycling lanes (with support of Dutch Embassy)
- Implement 5 cycling pilot projects around the City centre.

4. Sustainable Mobility

4.3 Green City Actions

GCAP Vision for Sustainable Mobility (2018-2033): By 2033, Tirana will make a significant modal shift to public and active transport, make data-driven decisions about journey and route planning, and end urban sprawl.				
Mid-term target (2018-2025)		**Short-term actions (2018-2021)**	**Owner/ Responsibility**	**Priority**
SO.1A	Increase shift to public and active transport: Achieve 70% mode split for public and active transport modes.	SM1: Reallocation of street space to buses and cyclists	Department of Transport	High
		SM2: Implementation of an Integrated Public Transport System (IPTS)	Department of Transport	High
		SM3: Implementation of Bus Rapid Transit (BRT) infrastructure	Department of Transport	Medium
		SM4: Replacement of buses with low emission buses	Department of Transport, private bus operators	High
		SM5: Implementation of a dockless bikes rental system	Department of Transport, private bike hire suppliers	Medium
		SM6: Upgrade of taxi fleet with hybrid or electric models	Department of Transport, private taxi operators	Medium
SO.1B	SO Smart Mobility: Increase Municipality's capability to analyse and make 100% data-driven decisions on all journeys based on ridership data.	SM7: Provision of integrated cashless ticketing for different transport modes	Department of Transport, private bus operators	High
SO.1C	SO3 Ending sprawl: Reduce average commuting distance to under 7.5km.	Metrobosco (see Green Spaces actions)	Department of Territorial Planning, Parks and Recreation Agency	High
All	Cross-cutting:	SM8: Sustainable Urban Mobility Plan and related SEA	Department of Transport	Medium
		SM9: Introduction of a road code and traffic rules for cycling	Department of Transport	Medium
		SM10: Strengthening of the modal priority policy	Department of Transport	Medium

**"SUMP" = Sustainable Urban Mobility Plan*

4. Sustainable Mobility

ACTION

Capital project:	**SM1: Reallocation of street space to buses and cyclists**
Description:	Carriageway changes to create more bus and cycle lanes (with less road space for parking and other vehicles). Achieved through lane painting, cycle and pedestrian rights of way at crossings, curbs for cycle lanes, raised carriageways to pavement level at key intersections, traffic signal and signage changes, cycling parking provision, bus route study and planning. Larger/longer buses will be used on major routes and shorter buses on smaller, narrower streets. In addition, underground car parks could supply parking capacity which is displaced from on-street spaces to be used for bus and cycle lanes.
Current context:	• Bus network owned and operated by private companies. • Existing origin/destination (O/D) public transport matrix (study by JICA 2012). This needs to be updated taking into consideration the new Tirana administrative boundary and extension, population growth and new urban development by 2030. • The bus line Kombinat - Kinostudio has the highest number of passengers. The second is the third ring road. These are the buses that inhabitants can choose from, rather than the buses that are more used from a wider pool of choices. • Currently only 40% of the second ring road exists. The missing road links should be developed.
Scale of project:	Multiple individual projects to be developed.
Delivery mechanism & stakeholders:	• Details will be set out in Detailed Local Plans, to be developed under the framework of the GLP. • A Sustainable Urban Mobility Plan (SUMP) could be supported by international donors; this should include a study on passenger origin-destinations to inform route planning. • MoT invests in extensive street changes, led by the Municipal Transport Department. • Explore PPP and public investment routes to enable the delivery of missing road links. • Increase enforcement activities and launch public communication campaign to raise awareness of cyclists and pedestrians and reduce parking in bus and cycle lanes.
Revenue / savings opportunities:	There is limited scope directly associated with this measure, and some potential for reduced parking revenue as parking spaces are removed. Some savings potential from coordinated utility and street works planning. Side streets could be rented from time to time, for instance used by cafes to extend seating areas at busy times. [to be expanded after economic analysis]
Key metrics (see Appendix 1):	• State indicators: Air quality (1, 1.1, 1.2, 1.3), GHG emissions (8, 8.1) • Pressure indicators: Choice of transport mode (11, 11.1, 11.4, 11.5, 11.6, 11.7), Road congestion (12)

Inner Tirana

Increase shift to public and active transport	3
Smart mobility	2
Ending sprawl	1
Increase infrastructure resilience	2
Increase business, community and municipal resilience	1
Economic inclusion	Y
Public health	Y
Gender equality	Y
Community involvement	Y

Figure 4 Results of environmental and socio-economic evaluation

4. Sustainable Mobility

ACTION

Capital project:	**SM2: Implementation of an Integrated Public Transport System (IPTS)**
Description:	The Tirana bus system today operates under a set of licences and contracts with nine private bus companies. The MoT sets routes and fares and there is no public subsidy to the system. Our intention is to grow Tirana's public transport system to achieve a range of objectives: • Improve access to public transport for the rural and fringe neighbourhoods not currently served by today's routes • Reduce journey times and improve bus speeds • Provide an integrated e-ticketing system • Replace the existing fleet of buses with zero emission electric buses • Grow the bus system into a more complex arrangement of faster BRT-type services on main arterial and radial routes (running on highways and wider roads), with smaller buses on feeder routes (running in narrower streets). A pre-condition to achieving these objectives is for us to have in place a single, integrated operational system over which it has full or at least much greater control. See Appendix 2 for details of a mini-study on implementing an IPTS and electric buses.
Scale of project:	To achieve all the objectives as per the above description, this action will be developed beyond the period of the GCAP (2018-2022) and will continue into the second phase of the GCAP.
Key metrics (see Appendix 1):	• State indicators: Air quality (1, 1.1, 1.2, 1.3), GHG emissions (8, 8.1) • Pressure indicators: Choice of transport mode (11, 11.1, 11.4, 11.5, 11.6, 11.7), Road congestion (12)

Whole of Tirana

Increase shift to public and active transport	3
Smart mobility	2
Ending sprawl	1
Increase infrastructure resilience	2
Increase business, community and municipal resilience	1
Economic returns for investor	Y
Economic inclusion	Y
Gender equality	Y

Figure 5 Results of environmental and socio-economic evaluation

4. Sustainable Mobility

ACTION

Capital project:	**SM3: Implementation of Bus Rapid Transit (BRT) infrastructure**
Description:	The BRT model offers improved journey times and reliability through the construction of dedicated routes for BRT buses, often coupled with larger capacity buses, fewer stops and sometimes a gateline on the street to allow more rapid boarding. BRT offers, in essence, a similar service to light rail systems at a much lower cost of infrastructure. BRT also offers the ability for a steady migration towards a complete BRT service, allowing smaller investment sums to generate value rapidly as the system steadily improves. A detailed study will be needed to plan the sequence of investments to enable migration to a BRT system (see also Integrated Public Transport System).
Current context:	• There is one radial route with separate bus lanes and a BRT-like service. Extending this to other routes requires further investment in road infrastructure, including completion of planned ring roads. • Budget provision has been made in the current budget for a BRT feasibility study.
Scale of project:	Multiple individual projects to be developed beyond the period of the GCAP (2018-2022) and will continue into the second phase of the GCAP.
Delivery mechanism & stakeholders:	• The BRT study will be led by MoT • A detailed investment plan following the BRT feasibility study could be supported by EBRD or other international donor/IFI. • BRT infrastructure (bus stops, signage etc.) could be delivered partially through PPP and partially through public investment.
Revenue / savings opportunities:	• Fare and advertising revenue • Increased ridership
Key metrics (see Appendix 1):	• State indicators: Air quality (1, 1.1, 1.2, 1.3), GHG emissions (8, 8.1) • Pressure indicators: Choice of transport mode (11, 11.1, 11.4, 11.5, 11.6, 11.7), Road congestion (12)

Whole of Tirana

Increase shift to public and active transport	3
Smart mobility	1
Ending sprawl	1
Increase infrastructure resilience	2
Increase business, community and municipal resilience	1
Economic returns for investor	Y
Economic inclusion	Y
Gender equality	Y

Figure 6 Results of environmental and socio-economic evaluation

4. Sustainable Mobility

ACTION

Capital project:	**SM4: Replacement of buses with low emission buses**
Description:	City-wide deployment of new electric buses or other low emission drive technology (e.g. fuel cell or hybrid).
Current context:	• Low emission buses are a priority for the Mayor. • We have a plan to take back 1-2 bus lines and operate them in a new way to establish a template for private operators. • Electric buses were tested in November 2017. • A technical and financial feasibility study is needed to determine how feasible it is for bus operators.
Scale of project:	One bus route fully served by electric buses by 2023. This action will continue to be developed beyond the period of the GCAP (2018-2022) and will continue into the second phase of the GCAP.
Delivery mechanism & stakeholders:	• Option 1: Bus companies directly purchase or lease low emission buses as a variation to the current contracts for bus routes in Tirana. • Option 2: We purchase buses as part of a wider restructuring of route planning and procuring, under which routes come under our direct operational control, or bus companies operate on a franchise basis with fixed payments for route performance.
Revenue / savings opportunities:	Revenue from bus tickets and advertisements on buses.
Key metrics (see Appendix 1):	• State indicators: Air quality (1, 1.1, 1.2, 1.3), GHG emissions (8, 8.1) • Pressure indicators: Transport energy (10.4), Choice of transport mode (11, 11.1, 11.4, 11.6, 11.7), Road congestion (12.1)

Whole of Tirana

Increase shift to public and active transport	2
Smart mobility	3
Secure and diverse energy supplies	2
Higher energy efficiency of buildings and infrastructure	3
Increase infrastructure resilience	3
Increase business, community and municipal resilience	2
Economic returns for investor	Y
Economic inclusion	Y
Public health	Y

Figure 7 Results of environmental and socio-economic evaluation

4. Sustainable Mobility

ACTION

Capital project:	**SM5: Implementation of a dockless bike rental system**
Description:	Tirana has been investing in bike lanes but uptake of cycling remains relatively limited. Providing residents with an easy way of renting and using bicycles could help stimulate wider uptake. Many cities have adopted bike rental systems with docking stations around the city, but the latest wave is for dockless bicycle hire systems which use wireless technology to enable users to check in and check out bicycles. However, these new businesses – many originating in China – have been criticised in some cities experiencing an oversupply of bikes and poor management, with bikes ending up dumped in rivers and waste ground or piling up on congested pavements. The MoT is supporting the introduction of these systems to test their benefits and impacts for the city. Additional information is provided in Appendix 2 (Dockless Bike mini-study)
Current context:	• Tirana currently has a bike sharing schemes (EcoVolis) with a small number of staffed docking stations across the city centre. • Stations are currently serviced and ticketed by staff. • Uptake of bike rentals is very low. • The Mayor recently announced the planned delivery of 4000 dockless bikes to Tirana, provided entirely through private finance.
Scale of project:	10,000 bicycles and across the city by 2020
Delivery mechanism & stakeholders:	• Promote Tirana as a good investment prospect for private bicycle suppliers • Examine the need for a licencing and regulation regime to introduce but also control such businesses • Identify the relevant laws and regulations under which the bike rental companies could be controlled, and what (if any) new powers are needed for effective regulation
Revenue / savings opportunities:	• Lower infrastructure and running costs and higher uptake than a dock-based system. • Revenue from bicycle hire and advertising on bicycle docking stations.
Key metrics:	• State indicators: Air quality (1, 1.1, 1.2, 1.3), GHG emissions (8, 8.1) • Pressure indicators: Choice of transport mode (11, 11.2, 11.5)

Inner Tirana

Increase shift to public and active transport	3
Smart mobility	3
Ending sprawl	3
Increase infrastructure resilience	1
Increase business, community and municipal resilience	2
Economic returns for investor	Y
Economic inclusion	Y
Public health	Y
Gender equality	Y
Community involvement	Y

Figure 8 Results of environmental and socio-economic evaluation

4. Sustainable Mobility

ACTION

Capital project:	**SM6: Upgrade to taxi fleet with hybrid or electric models**
Description:	Incentives to replace the existing taxi fleet with hybrid or electric models. Regulation to charge a diesel car emission charge for taxis not conforming to the upgrade requirements, or ban them altogether.
Current context:	The taxi fleet in Tirana is almost entirely diesel and petrol vehicles. Taxis make up a significant part of the stock of cars on the road. Regulation of the taxi fleet gives the MoT an opportunity to drive the transition to EVs and improve air quality by directing all taxis to be EV.
Scale of project:	40% of taxis will be EVs by 2023.
Delivery mechanism & stakeholders:	MoT imposes licence conditions to exclude higher emission taxis from Tirana's streets MoT imposes charges on higher emission taxis. MoT considers securing subsidies to enable taxi drivers to upgrade taxis and regulates high-polluting vehicles.
Revenue / savings opportunities:	Taxis will achieve operational savings from low running costs. Tirana will gain improvements in air quality.
Key metrics (see Appendix 1):	• State indicators: Air quality (1, 1.1, 1.2, 1.3), GHG emissions (8, 8.1) • Pressure indicators: Choice of transport mode (11, 11.1, 11.2, 11.3), Congestion and bus average speed (12.1)

Whole of Tirana

Increase shift to public and active transport	1
Smart mobility	1
Higher energy efficiency of buildings and infrastructure	1
Public health	Y

Figure 9 Results of environmental and socio-economic evaluation

ACTION

Capital project:	**SM7: Provision of integrated cashless ticketing for different transport modes**
Description:	Provision of a single transport ticket for different modes of transport such as buses, bicycle hire and taxis. A permanent card can be used to pay for journeys and can be linked to accounts with season tickets or pay-as-you-go ticketing. Alternatively, fare collection systems can be set up to accept bank cards and phone-based payment systems (e.g. Apple Pay, Android Pay). Multimodal stations will be built to accommodate multi types of transport (terminal and exchange stations). A bus 'hopper' 2-4-1 fare for bus journeys can also be included. Data analytics resource will be planned in order to analyse the ridership data collected through the integrated ticketing system.
Current context:	• Feasibility study on integrated ticketing has been completed. • Different transport modes are currently paid for using different ticketing systems. In addition, different bus companies also use different tickets. • However, it is part of the operators' licence to accept any improvements MoT wants to introduce, such as integrated ticketing.
Scale of project:	All bus and BRT routes planned to be covered under the integrated ticketing system by 2022.
Delivery mechanism & stakeholders:	MoT is planning a tender by the end of the year for the implementation of electronic ticketing, with PPP or concession. Potential for a full service contractor to manage ticketing system, or can be owned by MoT. The operator involved in the process will operate separated from bus private operators, with clear responsibility to manage and control this payment system.
Revenue / savings opportunities:	• Fare box revenue from ticket sales (could increase as a result of integrated ticketing). • Advertising on tickets. • Capability to plan routes more efficiently by collecting ridership data through integrated ticketing.
Key metrics (see Appendix 1):	• State indicators: Air quality (1, 1.1, 1.2, 1.3), GHG emissions (8, 8.1) • Pressure indicators: Choice of transport mode (11, 11.1, 11.2, 11.3), Road congestion (12.1)

Whole of Tirana

Increase shift to public and active transport	3
Smart mobility	2
Ending sprawl	1
Increase infrastructure resilience	2
Increase business, community and municipal resilience	1
Economic returns for investor	Y
Economic inclusion	Y
Community involvement	Y

Figure 10 Results of environmental and socio-economic evaluation

4. Sustainable Mobility

POLICY MEASURE

Policy measure:	**SM8: Sustainable Urban Mobility Plan and related Strategic Environmental Assessment**
Description:	Tirana is actively investing in a wide range of transport system improvements. A transport investment strategy was developed for Tirana in 2012. This is now out of date and it is recommended for the City to create a new Sustainable Urban Mobility Plan (SUMP), with the involvement of the public, to define a comprehensive package of measures for which investments may be sought through the recourse to Municipal funds, international donors or private public partnership model. The elaboration of a Sustainable Urban Mobility Plan shall be subject to Strategic Environmental Impact Assessment pursuant to the Law No. 91/2013 “On Strategic Environmental Assessment”.
Scope and timing:	The SUMP should be regional in scope, to include the whole of Tirana Municipality as well as key regional corridors such as Tirana-Durres and interconnections with the airport. The plan would focus on the modes and infrastructure in the control of the Municipality (i.e. roads, cycleways and buses) but should also reflect other actors’ plans for rail, air and regional highways. The SUMP is expected to take 9-12 months for completion, following a 3 month period to secure funding, agree the scope and appoint the project team. Completion is therefore planned for 2019.
Impact or outcome:	The SUMP will provide Tirana with a detailed, evidence-based plan which will enable the city to ensure that individual transport investments and actions will be designed and delivered in a coordinated manner to meet the Municipality's overall objectives for sustainable transport. Local stakeholders: • Mayor of Tirana in the quality of the executive body. • The Municipality Council in the quality of the decision-making body responsible for preparing and implementing air quality plans, for collecting of data on road traffic, for management of road transports and for adoption of road transport improvements (through the elaboration of a SUMP). National stakeholders: • Ministry of Infrastructure and Energy as the central institution in charge of sustainable urban development and planning and setting technical standards for roads all types of transport means. • Ministry of Environment and Tourism as the central institution in charge of development and implementation of policies targeting environmental protection air quality, noise and their monitoring.

Whole of Tirana

SM1	SM2	SM3	SM4	SM5	SM6	SM7
Street space	ITPS	BRT	Electric buses	Bike rental	Taxi fleet	Cash less ticket

Figure 11 Actions supported by policy measure

POLICY MEASURE

Policy measure:	**SM9: Introduction of a road code and traffic rules for cycling**
Description:	Introduction of a road code and a set of traffic rules for bicycles to ensure everybody is aware of the rights and regulations related to the use of bicycles. This is expected to improve the status of the bike as a mode of transport, remove uncertainty about the legality of the bike and improve the behaviour of cyclists as well as the behaviour of motorised vehicles drivers (car/bus/motorcycles) towards cyclists; increase of bicycle parking and provide services for bicycle repair. This measure should be supported by improvement of traffic regulations and cycling education for all ages.
Scope and timing:	The road code and a set of traffic rules for bicycles can be introduced by 2020.
Impact or outcome:	As bicycle use grows, these new rules will help change the culture of awareness among drivers to reduce accidents and improve the perceived safety for cyclists and potential cyclists. This will help to continue the trend for more cyclists on the streets. The road code will be launched with a public information campaign to raise awareness of cyclists and pedestrians
Delivery mechanism & stakeholders:	<u>National stakeholders</u>: • Ministry of Infrastructure and Energy is the central institution in charge for sustainable urban development and planning as well as for leading, managing, supervising and setting technical standards for roads and for defining and setting standards for all types of transport means. • The road code and set of rules for bicycles can be adopted pursuant to the initiative of the Ministry of Infrastructure and Energy and approved by the Assembly.

Whole of Tirana

SM1 Street space	SM2 ITPS	SM3 BRT	SM4 Electric buses	**SM5** Bike rental	SM6 Taxi fleet	SM7 Cash less ticket

Figure 12 Actions supported by policy measure

POLICY MEASURE

Policy measure:	**SM10: Strengthening of the modal priority policy**
Description:	A set of rules dedicated to intermodal non-motorized mobility should be developed and put in place. There are currently no obstacles to the implementation of the GCAP actions concerning the installation of electronic systems. This is thanks to the adoption of Law no 10/2016 "On some changes and additions in law no 8308, dated 18.3.1998“, “On road transportation ", as amended, and Minister's guideline no. 3616/3, dated 21.07.2017 “On the rules for implementing intelligent systems in the road transportation and related links of other transport ways”.
Scope and timing:	Due to the need for infrastructural rehabilitation this policy measure can be adopted for a long term period, possibly by 2030.
Impact or outcome:	The new rules will help make new integrated transport systems easier to implement, to provide alignment on road priority for non-motorized transport modes.
Delivery mechanism & stakeholders:	The policy will be prepared by or on behalf of the Municipality of Tirana. The reform of the rule book should be accompanied by: • Stronger and more visible enforcement of rules • A publicity campaign to raise awareness and explain the new rules <u>National stakeholders:</u> • Council of Ministers is responsible for the allocation of financial means for the drafting of general territorial plan and other sectorial and detailed plans • National Territory Council is responsible for taking decisions on the approval, approval with changes or postponement for subsequent review the planning documents • Ministry Energy and Infrastructure and its depending institutions such as the National Agency on Territorial Planning (NATP). The ministry is responsible for the preparation of territorial planning and development policies <u>Local stakeholders:</u> • Regional council: The Regional Council is responsible for the coordinating the planning processes at the regional level • Municipal Council • Mayor of Tirana

Whole of Tirana

SM1 Street space	**SM2** ITPS	**SM3** BRT	SM4 Electric buses	**SM5** Bike rental	SM6 Taxi fleet	**SM7** Cash less ticket

Figure 13 Actions supported by policy measure

4. Sustainable Mobility

SUPPORTING ACTIONS

In addition to the policy measures recommended above, we aim to implement the following actions to support the implementation of the policy measures:

- All policy measures will be complemented by a careful study of urban traffic flows and all related legal issues, such as definition of liability regimes, introduction of proportionate sanctions, and regulation of data protection.
- We will improve the monitoring, inspection and enforcement capacity of road transport rules.
- We will take all the needed measures leading to the maintenance or improvement of air quality, pursuant to Law No. 162/2014 “On the protection of ambient air quality”,
- We will adopt the agglomeration plan and the plan of the area for air quality after submission to the National Environmental Agency.

We will engage with the National Government on the following policy measures in order to support our long-term green city vision:

- Completion of the legal framework with the adoption of the law on combined transport and related secondary legislation.
- Completion of approximation of the legislation to the EU acquis on commercial vehicle inspections and road safety.
- Central level initiative aimed at ensuring completion of the legal framework on air quality in line with the EU acquis.
- Full transposition of the Directive on National Emission Ceilings for Certain Atmospheric Pollutants and effective implementation of the national strategy for air quality adopted in 2014.
- Completion of the national action plan on air quality, as well as the setting up of monitoring of air quality aligned with standards established by the relevant EU directives.

BENEFITS ASSESSMENT

The adoption of sustainable modes of transport may cause a dynamic shift in the way people commute in Tirana. This shift has the potential to bring about additional environmental, economic and social benefits to the city. Some of these benefits are presented below:

1. Climate change mitigation (carbon savings)

Modelling of the identified actions in the GCAP suggests that Tirana could witness an 8% increase in the use of non-motorised and 3% increase in public modes of transport by 2050.

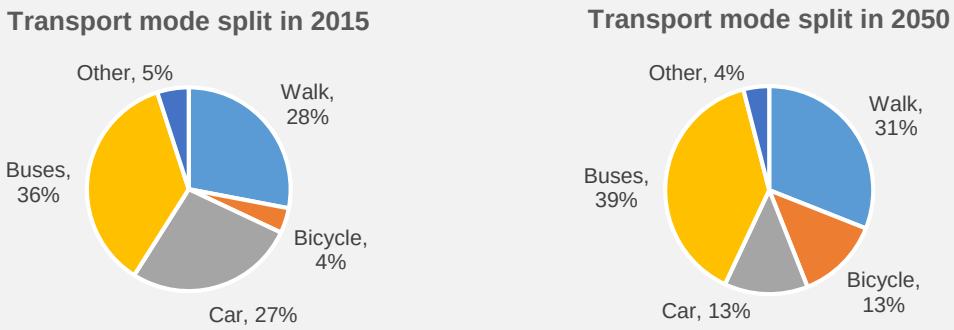


Figure 14 Transport mode split, 2015 (actual) and 2050 (potential)

If implemented, actions SM1, SM2, SM3 and SM5 are estimated to save, cumulatively, 27,000 tonnes CO_2 over the five years from 2018 to 2022, which is much larger than the anticipated savings from actions SM4 and SM6, which cumulatively will save 619 tonnes CO_2 as indicated in Table 2.

Table 2. Carbon saving from sustainable mobility actions

Action	Carbon saving over five years (tonnes CO_2)
SM1,2,3,5. Cycling and bus infrastructure	27,000
SM4. Electric buses	584
SM6. Electric taxis	35

2. Improved health and wellbeing

The mode shift away from cars and replacement of internal combustion engines with EV could lead to a reduction in NO_x, SO_2 and $PM_{2.5}$ and PM_{10} emissions, which in turn will bring health benefits.

Actions SM1 and SM5 are estimated to lead to health benefits arising from increased physical activity during walking and cycling, in terms of reduced mortality rates and morbidity risk, with cycling providing the greatest benefits as indicated in Tables 3 and 4.

Table 3. Mortality benefit from sustainable mobility actions

Active transport mode	Economic benefit from reduced mortality over five years	
Increased walking	350 million Lekë	€2,600,000
Increased cycling	3,100 million Lekë	€23,300,000

4. Sustainable Mobility

BENEFITS ASSESSMENT

Table 4. Morbidity risk reduction from sustainable mobility actions

Morbidity risk reduction	Increased walking	Increased cycling
Coronary heart disease risk reduction	8%	25%
Stroke risk reduction	8%	25%
Dementia risk reduction	4%	12%
Diabetes risk reduction	5%	16%
Depression risk reduction	5%	15%
Breast cancer risk reduction	4%	13%
Colon cancer risk reduction	3%	8%

4. Sustainable Mobility

FINANCIAL AND ECONOMIC ASSESSMENT

The following assessment maps out the cost estimates and funding needs *in lekë* for each of the actions within Sustainable Mobility, as identified from the MoT mid-term budget and from estimates developed for the GCAP.

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (Lekë '000s)	Capex estimate (Lekë '000s)	Opex over 5 years (Lekë '000s)	Devt & advisor costs (Lekë '000s)	Funding need (Lekë '000s)*
SM1	Reallocate street space to buses and cyclists	Capital project / purchase	Capital investment by MoT	Mid-term budget 2018-2021 proposes four bicycle lane projects.	116,000	670,000	17,000	21,000	574,000
SM2	Implement an Integrated Public Transport System (IPTS)	New or improved service	Capital investment by MoT	Cost estimate relates to staff and advisor costs for supporting implementation	0	0	0	31,000	31,000
SM3	Implement Bus Rapid Transit (BRT) infrastructure	Capital project / purchase	Investment and delivery by MoT	Capital costs include advisor services for construction	0	2,010,000	506,000	21,000	2,031,000
SM4	Low emission buses	Capital project / purchase	Investment and delivery by MoT	Cost estimate based on capital cost of buses and charging infrastructure for a single bus line, invested over period 2018-2023	0	2,320,000	268,000	0	2,320,000
SM5	Implement a dockless bike rental system	New or improved service	Private sector service, subject to licence or regulation by MoT	Cost estimate relates to setting up licencing and monitoring system	0	0	0	7,000	7,000
SM6	Upgrade taxi fleet with hybrid or electric models	Capital project / purchase	Private sector investment, stimulated by MoT policy	Cost is the estimated value of subsidies for purchase of EV taxi	0	64,000	3,000	0	64,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

4. Sustainable Mobility

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (Lekë '000s)	Capex estimate (Lekë '000s)	Opex over 5 years (Lekë '000s)	Devt & advisor costs (Lekë '000s)	Funding need (Lekë '000s)*
SM7	Provide integrated cashless ticketing for different transport modes	New or improved service	Procurement by or on behalf of MoT; potential for donor or IFI funding	Based on 200,000ppa and 270 buses. Standard e-card type.	0	46,000	90,000	0	46,000
SM8	Create a Sustainable Urban Mobility Plan	Policy / strategy / study	Procurement by or on behalf of MoT; potential for donor or IFI funding	Mid-term budget 2018-2021 provides funding for a feasibility study to draft the BRT plan. The cost estimate relates to a broader scope and would include collection of new origin-destination data.	21,000	0	0	114,000	93,000
SM9	Introduce a road code and traffic rules for cycling	Regulation / rule	Introduced by MoT	Cost estimate relates to staff and advisor costs for setting up new rules	0	0	0	3,000	3,000
SM10	Strengthen the modal priority policy	Regulation / rule	Introduced by MoT	Cost estimate relates to staff and advisor costs for setting up new policy	0	0	0	1,000	1,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

4. Sustainable Mobility

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

The following assessment maps out the cost estimates and funding needs *in euro* for each of the actions within Sustainable Mobility, as identified from the MoT mid-term budget and from estimates developed for the GCAP.

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (€)	Capex estimate (€)	Opex over 5 years (€)	Devt & advisor costs (€)	Funding need (€)*
SM1	Reallocate street space to buses and cyclists	Capital project / purchase	Capital investment by MoT	Mid-term budget 2018-2021 proposes four bicycle lane projects.	869,000	5,000,000	125,000	155,000	4,286,000
SM2	Implement an Integrated Public Transport System (IPTS)	New or improved service	Capital investment by MoT	Feasibility study estimate. Capex incorporated into other actions	0	0	0	232,500	232,500
SM3	Implement Bus Rapid Transit (BRT) infrastructure	Capital project / purchase	Investment and delivery by MoT	Estimate based on reference cases in other cities	0	15,000,000	3,775,000	155,000	15,155,000
SM4	Low emission buses	Capital project / purchase	Investment and delivery by MoT	Cost estimate based on capital cost of buses and charging infrastructure for a single bus line, invested over period 2018-2023	0	17,312,000	2,000,000	0	17,312,000
SM5	Implement a dockless bike rental system	New or improved service	Private sector service, subject to licence or regulation by MoT	Cost estimate relates to setting up licencing and monitoring system	0	0	0	50,000	50,000
SM6	Upgrade taxi fleet with hybrid or electric models	Capital project / purchase	Private sector investment, stimulated by MoT policy	Cost is the estimated value of subsidies for purchase of EV taxi	0	481,000	24,000	0	481,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

4. Sustainable Mobility

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (€)	Capex estimate (€)	Opex over 5 years (€)	Devt & advisor costs (€)	Funding need (€)*
SM7	Provide integrated cashless ticketing for different transport modes	New or improved service	Procurement by or on behalf of MoT; potential for donor or IFI funding	Based on 200,000ppa and 270 buses. Standard e-card type.	0	342,000	672,500	0	342,000
SM8	Create a Sustainable Urban Mobility Plan	Policy / strategy / study	Procurement by or on behalf of MoT; potential for donor or IFI funding	Mid-term budget 2018-2021 provides funding for a feasibility study to draft the BRT plan. The cost estimate relates to a broader scope and would include collection of new origin-destination data.	158,000	0	0	853,000	695,000
SM9	Introduce a road code and traffic rules for cycling	Regulation / rule	Introduced by MoT	Cost estimate relates to staff and advisor costs for setting up new rules	0	0	0	22,000	22,000
SM10	Strengthen the modal priority policy	Regulation / rule	Introduced by MoT	Cost estimate relates to staff and advisor costs for setting up new policy	0	0	0	9,000	9,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

5. Green Spaces & Biodiversity

We plan to increase the area of high-quality **green spaces** that people can enjoy and where **biodiversity** can thrive, and to improve the quality of the Lana and Tirana rivers through better treatment of wastewater.

5. Green Spaces & Biodiversity

5.1 Main Challenges in Tirana

1) Urban Sprawl

The structural form of the city and the distribution and density of land uses has a profound effect on the overall efficiency and performance of the city's physical and community infrastructure systems. While Tirana's centre has the vibrancy of a dense cosmopolitan city, towards the edges of the city is the legacy of recent periods of uncontrolled growth and informal settlements.

If left uncontrolled, the city's growth could take the form of continuing sprawl, leading to rising infrastructure costs, longer commuting times, destruction of the natural environment and productive agricultural areas, and overall rising energy and transport fuel consumption.

Tirana does not yet have policies to reduce urban sprawl. However, the Municipality is in the process of taking action to address the city's land use challenges.

2) Open Green Space

The Territorial Urban Plan of Tirana indicates that the ratio of open green space per 100,000 inhabitants is only 4.6ha. This is a low value, and inhabitants have complained about the lack of green area within their neighbourhood, indicating this is a local issue for many city areas.

3) Pollution in Water Bodies

The Tirana River on the north and the Lana River on the south are two main receiving points for city sewage and drainage. However, there is no water treatment plant in Tirana, and only 74% of consumers are connected to the city's sewerage network.

Surface water pollution levels in rivers and lakes, including Biochemical Oxygen Demand (BOD) and Ammonium (NH_4), is a key issue and sign of untreated wastewater discharges. As a comparison, the water quality recorded is more than 50% worse than the effluent quality of a typical wastewater treatment in Europe.

Most response indicators analysed in relation to wastewater treatment face implementation challenges. This includes the improvement of buildings' access to wastewater collection and treatment systems through plans and investment, and the promotion of wastewater treatment through regulations and fiscal incentives.

4) Biodiversity

Biodiversity quality data was limited for Tirana for both terrestrial and aquatic ecology. Anecdotal evidence indicates that Tirana's biodiversity quality is poor, in spite of extensive networks of parks, natural areas and street trees.

5.2 What we are Already Doing

Green Spaces

Through the local plan, we are committed to create green areas and recreation space, and expanding and improving green corridors. There are several projects which are currently being developed, including:

- Plant a Green Belt and Orbital forest with 2 million trees around Tirana. This would consist of parks, orchards, and other agricultural activities.
- Rehabilitation of existing parks (Lake Park, Farka Park, Zoo park, etc..)
- Rehabilitation and creation of neighbourhood parks, incorporating sport and recreational facilities
- Creating a new park as part of the Northern Boulevard masterplan (Pilot Project #19 from the local plan).
- Creation of “one km of green”, based around the already existing land strip between Lumi river and Rruga Dritan
- Hoxha as a part of the connected park network envisaged in Tirana (Pilot Project #14 from the local plan)
- Revival of the Castle of Ndroq as a cultural heritage site and a touristic attraction (Pilot Project #23 from the local plan)
- The Agency of Parks and Recreation has created and manages an interesting website (http://aprtirana.al/), which provides information on the green areas and parks.

Biodiversity

The local plan outlines an ambition approach to reduce biodiversity loss and to identify and implement interventions that can enhance it. It highlights Albania as one of the leading exporters of medicinal herbs in Europe. The local plan cites successful business cases where the medicinal herbs are cultivated instead picked wild.

Similarly, it presents success stories about family-run olive oil companies recently getting back in business and exporting their high-value certified produce to Europe.

The proposed instruments to enhance biodiversity in Tirana are to:

- Install biosolar green roofs on public buildings in order to integrate solar panels with extensive native vegetation on public building’s roofs (pilot project #13 from local plan)
- Create green corridors to connect existing green areas with those that will be created in the near future (i.e. “Biodiversity Bridges” as the Pilot Project #15 from the local plan).
- Develop pilot projects, with input from the local community, to create bee corridors in residential areas.
- Incorporate green infrastructure across the city.
- Rehabilitate existing parks (Lake Park, Farka Park, etc..)

5. Green Spaces & Biodiversity

Blue Spaces

The local plan is also committed to expanding blue corridors and improve the quality of water bodies through the following:

- Rehabilitating the Tirana River and Tirana River Park to make it an accessible public space (Pilot Project #8 from the local plan)
- Creation of the Erzeni River Park that from one side legally protect the environment surrounding the river, and the river itself (Pilot Project #9 from the local plan)
- Identification of damaged riverbeds and estuaries from solid waste disposal, urban waste, and illegal construction. (Ongoing) - Central Government
- Inspections for protection and exploitation of river gravel (Ongoing) - Central Government
- Strengthening river ecosystems and Erzen Ishëm
- Creation of Erzen River and Tirana River Parks by 2030 and rehabilitation of the Tirana River, Tirana River Park as an accessible public recreation area;
- Installation of permeable concrete in new developments – this is already planned for the Tirana Northern Boulevard (~2017)
- Tirana project has introduced flood protection measures through weirs and walls under the Tirana River Rehabilitation Project (~2017)
- Under the Tirana Northern Boulevard and River Rehabilitation Project urban water spaces are planned.

Wastewater Treatment

The main wastewater actions identified in Tirana master plan related to GCAP are:

- The city's first sewage treatment plant is being constructed in Kashar district, a project funded by JICA/Japan for 9.8 billion Lekë (73 million euros). The completion of the plant's construction was originally planned for the end of 2017, but has faced major delays.
- Separation of sewage and drainage network is the most challenging tasks. An overflow channel from existing main interceptor to Tirana River is envisaged for peak drainage demand.

5.3 Green City Actions

GCAP Vision (2018-2033)
By 2033, Tirana will have more high-quality green spaces that people can enjoy and where biodiversity can thrive. The quality of the Lana and Tirana rivers will improve as a result of better treatment of wastewater.

Mid-term target (2018-2025)		Short-term actions (2018-2021)	Owner/Responsibility	Priority
SO.2A	More and better green space: Achieve 20% increase in the area of green spaces.	GSB1: Planting of Metrobosco forests and restoration of lakes (incl. tree nursery)	Department of Territorial Planning, Parks and Recreation Agency	High
		GSB2: Provision of pocket parks in residential blocks	Department of Territorial Planning, Parks and Recreation Agency	Medium
		GSB3: Construction of green corridors	Department of Territorial Planning, Parks and Recreation Agency	Medium
		GSB4: Creation of a biodiversity inventory and database	Parks and Recreation Agency; Genetic Bank	Low
		GSB5: Implementation of legislation for the protection of green spaces	Department of Territorial Planning, Parks and Recreation Agency, Department of Environmental Policies and Education	High
		GSB6: Strategic Environmental Assessment of green spaces	Department of Territorial Planning, Parks and Recreation Agency	Medium
		GSB7: Implementation of obligations for minimum sizes of public green spaces and for maintenance of public spaces	Department of Territorial Planning, Parks and Recreation Agency	Medium
		GSB8: Requalification of public spaces	Department of Territorial Planning, Parks and Recreation Agency	Medium
SO.2B	Better river water quality: Reduce the discharge of wastewater into the rivers to 0%.	GSB9: Expansion of wastewater treatment service for municipal and industrial wastewater	Ministry of Public Works and Transport National Agency for Water and Sewage UKT	High

5. Green Spaces & Biodiversity

ACTION

Capital project:	**GSB1a: Planting of the Metrobosco forests and restoration of lakes**
Description:	Planning for expansion of urban forest area and greening and restoration of the city's main lakes to improve biodiversity of landscaping, improve surface water management and flood storage capacity, and increase public access to corridor green spaces. The design plan will identify the tree type, cover area, density, tree use type (commercial, recreational, flood storage, carbon sequestration), land ownership and land use (urban, agricultural, horticultural) for tree planting. The strategy for implementation of tree planting and lake restoration, to be completed by 2030, will also be defined. See overleaf and Appendix 2 for a mini-study on implementing a nursery for future tree planting.
Current context:	• 2 million trees are to be planted under the General Local Plan. • The land analysis is funded by Italian Cooperation through the Ministry of Foreign Affairs of Italy. • MoT plans to start with two small parts first as a pilot and then expand over the years. • The funding for the forest is undefined and could come from MoT funds, donations or a PPP scheme. The commercial forest cover could be funded by a PPP scheme. • The implementation strategy of the Metrobosco is currently undefined. • MoT plans to build two parks around two lakes – Kashar and Farka but needs to identify funding. • There are no extreme flooding events in Tirana, but flooding sometimes occurs with heavy rainfall.
Scale of project:	Planting of 2 million trees by 2030, with 900,000 planted by 2023
Delivery mechanism & stakeholders:	MoT identifies and reserves land for planting through planning agreements on floor area ratio (FAR) or through acquisition. Commercial horticulture areas may be provided to operators through a bidding process. Species selection will take account of multiple functions including suitability for Tirana's climate, increasing biodiversity and promoting the recreational and amenity value of green spaces.
Revenue / savings opportunities:	• Potential for commercial horticulture sites to attract income through land sales. • Potential for land value capture in areas bordering the Metrobosco. • Potential reduction of risk of surface water flooding. • Revenue from recreational space rental.
Key metrics (see Appendix 1):	• State indicators: Water body quality (2, 2.1), Land use and open space (6, 6.1), Biodiversity (7, 7.1), Resilience (9, 9.1, 9.2) • Pressure indicators: Resilience to floods (28, 28.1), Urban sprawl (34, 34.1)

Outer Tirana

Increase shift to public and active transport	1
Ending sprawl	1
More and better green space	3
Better river water quality	3
Reduce water losses	1
Increase infrastructure resilience	1
Increase business, community and municipal resilience	2
Economic inclusion	Y
Public health	Y
Gender equality	Y
Community involvement	Y

Figure 15 Results of environmental and socio-economic evaluation

5. Green Spaces & Biodiversity

ACTION

Capital project:	**Planting of the Metrobosco forests and restoration of lakes (continued)** ***GSB1b: Tree nursery strategy for the Metrobosco forests***
Description:	The General Local Plan includes a target for planting two million trees to form the orbital forest (metrobosco) by 2030. Together with the need for annual replanting of existing large parks and streets, there is a need for around 200,000 trees to be planted per year. Currently there is not enough capacity in the market to supply this number and the MoT does not have its own nursery facility. The MoT's preferred approach is to have its own nursery facilities to supply its needs; however, another option would be to procure a long-term contract for tree futures, i.e. to commit now to buy say 200,000 trees per annum five years from now. We will develop a strategy and high level business case for a tree and flower nursery. An initial scoping of this strategy is provided in the mini-study at Appendix 2

Outer Tirana

Increase shift to public and active transport	1
Ending sprawl	1
More and better green space	3
Better river water quality	3
Reduce water losses	1
Increase infrastructure resilience	1
Increase business, community and municipal resilience	2
Economic inclusion	Y
Public health	Y
Gender equality	Y
Community involvement	Y

Figure 16 Results of environmental and socio-economic evaluation

5. Green Spaces & Biodiversity

ACTION

Capital project:	**GSB2a: Provision of pocket parks in residential blocks**
Description:	Provision of pocket and small parks with trees, gardens and greenery across the city. These parks might be in the range of 500-10,000 m^2 (0.05 to 1.0 ha) and their location will be aligned with the prioritised blocks for reconstruction. The location selection criteria will balance environmental (air quality) versus socio-economic (usefulness/ attractiveness) requirements. The plan will contribute towards a strategy for pocket parks and include suggestions for temporary schemes for re-configuring streets by clearing off end of street to connect to retail space, and lay out temporary surface with plants. See also Appendix 2 for a mini-study on pocket parks.
Current context:	• There are 3 stations measuring air quality. Traffic flow should be reduced in areas with pocket parks. • MoT has prioritised the reconstruction of blocks to which funding could be tied (size of 5-10 ha, 100 blocks in total in Tirana) in the Sustainability Strategy. • MoT is drafting a map identifying open spaces in Tirana, e.g. between old communist blocks and how they are used for public use. Green roofs or vertical walls could otherwise be implemented. • MoT noted that developers do not currently build public green spaces, but get offered planning permissions for 1-2 additional floors in exchange for a requirement to build more green spaces. • Communities have responsibility to maintain their building and community spaces, by paying a small fee towards building administration.
Scale of project	Develop 5 new pocket parks by 2023
Delivery mechanism & stakeholders:	MoT identifies and reserves land for planting through planning agreements on FAR or through acquisition and engagement. Our work will be supported by information campaigns to increase awareness and support for increasing green space and biodiversity in the city. The Mayor's recent appeal for 100,000 trees to be planted this winter is a good example of this.
Revenue / savings opportunities:	• Some rental of facilities could take place (although likely to be limited in small open spaces) • Potential for land value capture in areas bordering the Metrobosco.
Key metrics:	• State indicators: Land use and open space (6, 6.1), Resilience: (9, 9.1, 9.2) • Pressure indicators: Resilience to floods: (28, 28.1)

Inner Tirana

Ending sprawl	1
More and better green space	3
Increase infrastructure resilience	1
Increase business, community and municipal resilience	2
Economic inclusion	Y
Public health	Y
Gender equality	Y
Community involvement	Y

Figure 17 Results of environmental and socio-economic evaluation

5. Green Spaces & Biodiversity

ACTION

Capital project:	**Provision of pocket parks in residential blocks (continued)** ***GSB2b: Commercial delivery model for pocket parks in residential blocks***
Description:	The MoT has experienced a significant demand from residents for new parks and play spaces and has an opportunity to use spaces within residential blocks for such parks and play spaces. A total of around 150 such spaces have been identified. These spaces are on private land with typically fragmented ownership. The spaces have a variety of uses, including unauthorised development, car parking, informal retail and café seating. The MoT has established a policy preventing any development in these spaces but it does not have the power to enter the sites and carry out the works for pocket parks and play spaces. Therefore any unilateral measures run the risk of being vandalised or removed at any time. We will develop a delivery model for securing these spaces as pocket parks, considering: • Capex and revenue model for converting the site to a pocket park and play space • Typical ownership interests in the land – number of separate landowners and whether these are local businesses, developer or private individuals or a mix of these and more • Current and potential new levers (policies, regulations) by MoT which could compel local landowners to reach an agreement on a pocket park and play space • Kinds of incentives might be attractive to landowners and communities to agree for the space to be turned into a pocket park and play space • Soft power measures which could bring parties together, such as community engagement and publicity Further information is provided in the mini-study in Appendix 2.

Inner Tirana

Ending sprawl	1
More and better green space	3
Increase infrastructure resilience	1
Increase business, community and municipal resilience	2
Economic inclusion	Y
Public health	Y
Gender equality	Y
Community involvement	Y

Figure 18 Results of environmental and socio-economic evaluation

5. Green Spaces & Biodiversity

ACTION

Capital project:	**GSB3: Construction of green corridors**
Description:	Construction of green corridors to promote the movement of plant species and animals and promote biodiversity. The plan will identify ways to collaborate efficiently with citizens so they can be more collaborative towards this action.
Current context:	• MoT plans to build green and blue corridors of biodiversity (within General Local Plan) • MoT plans to implement green facades and green terraces.
Scale of project:	Enhance 3 green corridors by 2023.
Delivery mechanism & stakeholders:	MoT identifies and reserves land for planting through planning agreements on FAR or through acquisition. This action is strongly linked to the overall proposal for the Metrobosco forest and plan for planting 2 million trees by 2030.
Revenue / savings opportunities:	Like the Metrobosco the corridor may provide limited financial impact but will provide significant economic and social benefit for the city. Property values are also known to be enhanced in proximity to green spaces. Species selection will take account of multiple functions including suitability for Tirana's climate, increasing biodiversity and promoting the recreational and amenity value of green spaces.
Key metrics:	• State indicators: Land use and open space (6, 6.1), Resilience (9, 9.1, 9.2) • Pressure indicators: Resilience to floods (28, 28.1)

Outer Tirana

More and better green space	3
Reduce water losses	1
Increase infrastructure resilience	1
Public health	Y

Figure 19 Results of environmental and socio-economic evaluation

5. Green Spaces & Biodiversity

ACTION

Capital project:	**GSB4: Creation of a biodiversity inventory and database**
Description:	A project that creates an inventory and database of all biodiversity hot spots of Tirana, its stock of forests and endangered species in order to develop future projects or strategies that promote their preservation or increase of the species. This would include the Millennial and Secular Olive Trees of Tirana in the list of protected Natural Monuments of the country and take the necessary steps to preserve them and /or put to use for agro-processing or agritourist purposes. This would also include a detailed analysis on sustainable forest management, including available forestry resources which are or could be used for heating and bioenergy production.
Current context:	Tirana and its natural areas are rich in biodiversity and agro-biodiversity with many medicinal plants in the mountainous areas that need to be protected.
Scale of project:	Top Biodiversity Rich places and Hot Spots in Tirana include: • National Dajti Park • National Park “Mali me Gropa- Bize” – “Mountain with Holes – Bize” • Beech and Oak Forests • The Millennial and Secular Olive Oil Trees (In most rural areas of Tirana especially in Ndroq, Dajti, Peza etc..) • Village of Sheshi with the Autochthonous / Endemic Black and White Grapes of Sheshi • Many other areas that cultivate autochthonous vegetables which are included in the genetic bank fund of Albania due to their rarity, etc..
Delivery mechanism & stakeholders:	This project could be delivered in collaboration with the Agency of Protected Areas and the Genetic Bank. Delivery should occur early (by 2020) so it can be used to inform priority areas for protection and enhancement.
Revenue / savings opportunities:	The biodiversity database will provide the Municipality, developers, consultants and citizens will access to a comprehensive, up to date “single point of truth” on biodiversity in Tirana. This will provide benefits through improved efficiency of impact assessments and greater focus on the impacts and benefits of proposed developments.
Key metrics:	• State indicators: Water body quality (2, 2.1) • Pressure indicators: Wastewater treatment (27, 27.1, 27.2)

Whole of Tirana

More and better green space	3
Better river water quality	1
Reduce water losses	1
Increase infrastructure resilience	1
Public health	Y
Community involvement	Y

Figure 20 Results of environmental and socio-economic evaluation

5. Green Spaces & Biodiversity

POLICY MEASURE

Policy measure:	**GSB5: Implementation of legislation for the protection of green spaces**
Description:	Metrobosco, the Lakes and green corridors areas should be given the right level of protection under the new Law of 8 May 2017 on Protected Areas, subject to zoning maps to be approved by the National Territory Council. Management of the protected areas should be organized accordingly. Careful planning is necessary in order to identify zones where licenses for the exploitation of commercial activities within the protected areas can be issued, taking into account the cumulative impact of investments on the landscape, water resources, fauna and flora. Special consideration in the planning effort must be given also to the obligations arising on the Municipality from Law No. 27/2016 “On the management of the chemicals”. It is advisable to explore possible synergies with the NaturAl project. The protection of forests and green surfaces from fire should be considered in more detail. The areas with the highest risk should be identified, and surveillance and reporting systems and preventive measures put in place to minimize risks.
Scope and timing:	The protection will apply to all major green spaces in Tirana. Preparation and adoption of the legislation is planned for 2020
Impact or outcome:	The legislation will provide stronger protection of green and biodiverse areas to ensure their long term sustainability for future generations.
Delivery mechanism & stakeholders:	<u>Local stakeholders:</u> • The inspectorate of territorial protection at Municipal level <u>National stakeholders:</u> • National Agency of Protected Areas • Ministry of Environment and Tourism

Whole of Tirana

GSB1	GSB2	GSB3	GSB4
Metrobosco forests & lake restoration	Pocket parks	Green corridors	Biodiversity database

Figure 21 Actions supported by policy measure

5. Green Spaces & Biodiversity

POLICY MEASURE

Policy measure:	**GSB6: Strategic Environmental Assessment of green spaces**
Description:	The Metrobosco, Lake Greening and Green Corridors projects might be subject to the preliminary procedure for Environmental Impact Assessment pursuant to Law no 10 440 dated 07.07.2011 “On the environmental impact assessment” and Regulation No.1 dated 15.03.2006 "On the prevention of adverse impacts on health and environment of construction activities, if they involve: agriculture, forestry; projects for the restructuring of rural land; water management projects for agriculture, including irrigation and land drainage projects; initial forestation for the purposes of conversion to another type of land use”. Pursuant to Law no 10 431 dated 09.06.2011 “On the environmental protection”, local plans and programmes in the field of agriculture, forests, water management, tourism, and territorial planning are subject to the Strategic Environmental Assessment (Law No. 91/2013 “On strategic Environmental Assessment”) and related DCM No. 219, dated 11.03.2015 “On setting the rules and procedures for the consultation with groups of interest and public as well as for the public hearing during the strategic impact assessment process”.
Scope and timing:	The SEA scope will cover the planned projects for the GCAP period, to provide a balance between a comprehensive assessment and avoiding assessments of highly uncertain longer term measures. The timing of the SEA will be aligned to next phase of green space planning.
Impact or outcome:	SEA is a required process as part of statutory plans and strategies.
Delivery mechanism & stakeholders:	<u>National stakeholders:</u> • The Territory Regulatory Council (KRRT) • National Environmental Agency • National Network of the Monitoring of the Condition of the Environment • Inspectorate of the Environment • Public Health Institute and its Departments of Health and Environment

Whole of Tirana

GSB1	GSB2	GSB3	GSB4
Metrobosco forests & lake restoration	Pocket parks	Green corridors	Biodiversity database

Figure 22 Actions supported by policy measure

5. Green Spaces & Biodiversity

POLICY MEASURE

Policy measure:	**GSB7: Implementation of obligations for minimum sizes of public green spaces and for maintenance of public spaces**
Description:	Through terms of construction of the urban planning instruments, the MoT can make it mandatory for all developers to build minimum size of public green spaces, in proportion to the volume of construction planned. There may also be incentives provided in terms of additional building volumes, or discounted permit fees, for those developers exceeding the minimum size of green spaces area in their project design for urban permit. In addition, Law on Condominium should include maintenance obligations for common areas, including green spaces, in all new developments
Scope and timing:	The obligation would cover all new major developments in Tirana municipality. An impact assessment and governance and consultation process will be necessary prior to adoption, indicating an adoption date of 2020.
Impact or outcome:	The new rule will help encourage developers to work with the Municipality to plan and deliver high quality green spaces for the city.
Delivery mechanism & stakeholders:	<u>Local stakeholders:</u> • Municipality of Tirana - General Director of Economic Development, Department of Territorial Planning, Department of Strategic Planning, Director of Environment Policy, General Director of Parks & Recreation Agency <u>National stakeholders:</u> • Ministry of Environment and Tourism; • Ministry of Agriculture, Rural Development and Water Administration • Ministry of Health

Whole of Tirana

GSB1	GSB2	GSB3	GSB4
Metrobosco forests & lake restoration	Pocket parks	Green corridors	Biodiversity database

Figure 23 Actions supported by policy measure

5. Green Spaces & Biodiversity

POLICY MEASURE

Policy measure:	**GSB8: Requalification of public spaces**
Description:	There is the need to ensure enforcement of regulation in formal and informal settlements and provide for the requalification of public spaces in order to establish playgrounds and green spaces.
Scope and timing:	The obligation would cover all new major developments in Tirana municipality. An impact assessment and governance and consultation process will be necessary prior to adoption, indicating an adoption date of 2020.
Impact or outcome:	The new rule will help encourage developers to work with the Municipality to plan and deliver high quality green spaces for the city.
Delivery mechanism & stakeholders:	<u>Local stakeholders:</u> • Municipality of Tirana - General Director of Economic Development, Department of Territorial Planning, Department of Strategic Planning, Director of Environment Policy, General Director of Parks & Recreation Agency <u>National stakeholders:</u> • Ministry of Environment and Tourism; • Ministry of Agriculture, Rural Development and Water Administration • Ministry of Health

Whole of Tirana

GSB1	GSB2	GSB3	GSB4
Metrobosco forests & lake restoration	Pocket parks	Green corridors	Biodiversity database

Figure 24 Actions supported by policy measure

5. Green Spaces & Biodiversity

ACTION

Capital project:	**GSB9: Expansion of wastewater treatment service for municipal and industrial wastewater**
Description:	Expansion of wastewater treatment service for municipal and industrial wastewater across the city.
Current context:	• Infrastructure Rehabilitation and Technical Assistance to the Tirana Water Company for the water and wastewater systems with Italian cooperation for 3.6 billion Lekë (27 million euros). • The Greater Tirana Wastewater System Improvement Project with JICA/Japan for 9.8 billion Lekë (73 million euros). • Business Plan Project for UKT, financed by USAID, awaiting approval.
Scale of project:	The wastewater treatment project now under development will provide capacity to treat approximately 30% of Tirana's residential and commercial wastewater. The remaining treatment capacity needs to be part of the next scheme. The timing of the new scheme will be determined by the Government, which will lead the financing and procurement of the scheme.
Delivery mechanism & stakeholders:	Delivery of new waste water treatment investment plan by the Government. MoT and UKT engage with government to secure delivery at the earliest opportunity. Delivery is likely to be beyond 2022 due to planning, design and construction timescales
Revenue / savings opportunities:	Wastewater treatment efficiencies and reduced cost for river cleaning
Key metrics:	• State indicators: Water body quality (2, 2.1) • Pressure indicators: Wastewater treatment (27, 27.1, 27.2)

Whole of Tirana

Better river water quality	3
Reduce water losses	1
Increase infrastructure resilience	1
Economic returns for investor	Y
Economic inclusion	Y
Public health	Y
Community involvement	Y

Figure 25 Results of environmental and socio-economic evaluation

5. Green Spaces & Biodiversity

SUPPORTING ACTIONS

In addition to the policy measures recommended above, we will implement the following actions to support the implementation of the policy measures with regards to Metrobosco, Lake Greening and Green Corridors:

- We will ensure full alignment and implementation of the Directive on Environmental Liability, The INSPIRE Directive and the Directive on Environmental Crime in order to provide the right deterrent tools against breaches of laws in the environmental sector.
- Pursuant to Law no. 8405, dated 17.09.1998 “On urban planning” as further amended, we will elaborate a detailed plan for the development and implementation of the proposed actions in compliance with National General Plan and the Tirana General Local Plan. This plan shall include relevant tree use types, i.e. recreational, commercial, flood storage, carbon sequestration.
- In the elaboration of the necessary planning documents for the development of the proposed actions, we will take into account actions for biodiversity and wildlife conservation based on Law no. 9587 dated 20.07.2006 “On the protection of biodiversity”, as amended with Law no 37/2013 and Law no 68/2014 and related secondary legislation, including DCM no. 177, dated 31.03.2005 "On the permissible emission rates and the zoning criteria for the receiving water environments, DCM No. 435, dated 12.09.2002 "On Approval of Discharge Rates in air”; Instruction No. 8 dated 27.11.2007, of the Ministry of Environment, Forests and Forestry, Water Administration and Ministry of Health "On the border levels of noise in certain environments“. Law no. 10 006/2008 "On the protection of wild fauna“, and Law no. 10 253/2010 "On hunting“.
- With reference to the Lakes greening project reference must be made to the Law No. 111/2012 “On integrated management of water resources” to ensure the setting up of a system aimed at assessing the biological status of the waters in the Lakes, connected water courses and groundwaters and planning the necessary measures to achieve “good water status” (both ecological and chemical) in accordance with the legislative provisions.
- We will establish the administrative framework applying to the management of the water basin at the Lakes and coordinate among competent bodies for the management of protected areas and the water basins. We will also elaborate a river basin management plan and flood risk management plans in these areas should be implemented.

In addition to the policy measures recommended above, we will implement the following actions to support the implementation of the policy measures with regards to Pocket Parks:

- In relation to existing blocks, the refurbishment of the common green spaces may be promoted through the application of the Condominium Law and the introduction of fiscal/financial incentives at Municipal level to stimulate refurbishment of external parts.
- We will adopt air monitoring plans and install stations measuring air quality in order to ensure protection of the health of citizens using urban parks. Traffic flow should be reduced in areas with pocket parks.
- We will draw up an action plan to reduce pesticide use or risks in public parks and gardens, sports and recreation grounds, and children’s playgrounds.
- We will establish a centre for the collection and treatment of hazardous chemicals in Tirana.

We will implement the following actions to facilitate enforcement of the current legislation related to Wastewater Treatment:

- In relation to the construction of new wastewater treatment facilities, it is recommended that innovative solutions are included in the wastewater treatment projects, relating to the post-treatment of sewage sludge and subsequent re-use of materials and water. This is in line with the EU acquis’ requirements.

5. Green Spaces & Biodiversity

SUPPORTING ACTIONS

We will engage with the National Government on the following policy measures in order to support our long-term green city vision:

- Full transposition of the Directive on National Emission Ceilings for Certain Atmospheric Pollutants and effective implementation of the national strategy for air quality adopted in 2014.

- Completion of the national action plan on air quality is also needed as well as the setting up of monitoring of air quality aligned with standards established by the relevant EU directives.

- Efforts are needed to complete, with relevant secondary legislation, the alignment with EU requirements on REACH; export and import of dangerous chemicals; on the regulation on the classification, labelling and packaging of substances and mixtures; persistent organic pollutants; animal experiments; asbestos; biocides; and mercury.

- Development of practices for the use of chemicals in agriculture must be developed. Data on the implementation of chemicals legislation must be reported and made available.

- We will promote awareness and education on green spaces and biodiversity through information campaigns and educational initiatives in schools.

5. Green Spaces & Biodiversity

BENEFITS ASSESSMENT

The improvement in quantity and quality of green spaces and biodiversity in Tirana may provide a number of environmental, economic and social benefits.

1. Climate change mitigation and adaptation

Green spaces may provide for a range of mitigation and adaptation services, including the:

- Provision for greater carbon capture and storage, thus reducing the risk of climate change.
- Protection of biodiversity in Tirana, enabling terrestrial ecosystems to remain habitable by a variety of plant and animal species.
- Protection of Tirana's urban and rural areas of high economic value from changing weather patterns such as increased floods and heat waves.

The results of modelling of the carbon benefits of action GSB1 is shown below:

Action	Carbon saving over five years (tonnes CO_2
GSB1. Metrobosco forest	88,000
GSB2. Pocket parks	18
GSB3. Green corridors	570

Table 5. Carbon saving from green spaces and biodiversity actions

2. Reduction of pollution in water bodies

Action GSB9 will enable the level of water pollution from BOD and NH_4 in rivers and lakes to reduce to zero over time, improving the protection of Tirana's aquatic ecosystems.

3. Improved quality of place, health and wellbeing

The improvement of green infrastructure through all GSB actions will enhance the quality of place perceived by our citizens, thus increasing the value that they place upon green spaces, in terms of:

- Recreation and outdoor leisure activities, such as children's playgrounds in pocket parks and leisure areas along the restored lakes around Tirana.
- Improved health and wellbeing resulting from additional physical activity from cycling and walking along trails in green corridors and the Metrobosco, reducing health service costs.
- Increased cohesion and empowerment of the community through community ownership, management and use of green spaces, as well as improved image of place through the attractiveness of outdoor spaces.

4. Increased tourism, investment and economic growth

Green spaces may enable Tirana to develop as a green and healthy region attractive to tourists, entrepreneurs and investors, in terms of:

- Attractiveness of the region to visitors and opportunities to increase tourism levels.
- Opportunities for additional value of land and property which high quality green spaces can bring.
- Opportunities for attracting new investment in terms of new employment opportunities and inward investment due to a more attractive townscape.
- Improved management of Tirana's biodiversity and land products, which may result in improved revenue from the local and exported sale of herbs and food crops.

5. Green Spaces & Biodiversity

FINANCIAL AND ECONOMIC ASSESSMENT

The following assessment maps out the cost estimates and funding needs *in lekë* for each of the actions within Green Spaces & Biodiversity, as identified from the MoT mid-term budget and from estimates developed for the GCAP.

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (Lekë '000s)	Capex estimate (Lekë '000s)	Opex over 5 years (Lekë '000s)	Devt & advisor costs (Lekë '000s)	Funding need (Lekë '000s)*
GSB1a	Planting of Metrobosco forests and restoration of lakes	Capital project / purchase	Investment and delivery by MoT; potential for third party funding and/or community support	Mid-term budget 2018-2021 proposes construction of a specific paving and green space project near "ish Astirit". Cost estimate relates to capital cost of trees for next five years.	77,000	2,667,000	0	0	2,589,000
GSB1b	Tree nursery strategy for the Metrobosco forests	Policy / strategy / study	Investment and delivery by MoT	Cost estimate relates to establishing and maintaining nurseries for planting over five years. Excludes land costs	0	185,000	0	0	185,000
GSB2a	Provide pocket parks in residential blocks	Capital project / purchase	Investment and delivery by MoT; potential for third party funding and/or community support	Mid-term budget 2018-2021 proposes funding for reconstruction of the zoo and botanical garden. Cost estimate relates to capital cost of forming five pocket parks over next five years, plus NPV of lost car parking income	5,000	206,000	0	0	200,000
GSB2b	Commercial delivery model for pocket parks in residential blocks	Policy / strategy / study	Procurement by or on behalf of MoT; potential for donor or IFI funding	Cost estimate relates to staff and consultant costs to establish and implement a pocket park strategy	0	0	24,000	17,000	17,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

5. Green Spaces & Biodiversity

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (Lekë '000s)	Capex estimate (Lekë '000s)	Opex over 5 years (Lekë '000s)	Devt & advisor costs (Lekë '000s)	Funding need (Lekë '000s)*
GSB3	Construct green corridors	Capital project / purchase	Investment and delivery by MoT; potential for third party funding and/or community support	Based on planting 18,000 trees of different varieties	0	369,000	92,000	10,000	379,000
GSB4	Create a biodiversity database	Information and capacity building	Procurement by or on behalf of MoT; potential for donor or IFI funding	Cost estimate relates to consultant cost to set up and initially populate database. Does not include large scale field surveys	0	0	0	10,000	10,000
GSB5	Implement legislation for the protection of green spaces	Regulation / rule	National legislation	Cost estimate relates to staff and advisor costs for setting up new rules	0	0	0	3,000	3,000
GSB6	Prepare a Strategic Environmental Assessment of green spaces	Policy / strategy / study	Procurement by or on behalf of MoT; potential for donor or IFI funding	Cost estimate relates to consultant cost to carry out SEA	0	0	0	13,000	13,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

5. Green Spaces & Biodiversity

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (Lekë '000s)	Capex estimate (Lekë '000s)	Opex over 5 years (Lekë '000s)	Devt & advisor costs (Lekë '000s)	Funding need (Lekë '000s)*
GSB7	Implement obligations for minimum sizes of public green spaces	Regulation / rule	Introduced by MoT	Cost estimate relates to staff and advisor costs for setting up new policy	0	0	0	6,000	6,000
GSB8	Implement the requalification of public spaces	Regulation / rule	Introduced by MoT	Cost estimate relates to staff and advisor costs for setting up new policy	0	0	0	6,000	6,000
GSB9	Expand wastewater treatment service for municipal and industrial wastewater	Capital project / purchase	Investment and procurement by Government of Albania; ownership and operation by UKT	JICA wastewater project and UKT costs used as benchmark	0	19,537,000	880,000	0	19,537,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

5. Green Spaces & Biodiversity

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

The following assessment maps out the cost estimates and funding needs *in euro* for each of the actions within Green Spaces & Biodiversity, as identified from the MoT mid-term budget and from estimates developed for the GCAP.

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (€)	Capex estimate (€)	Opex over 5 years (€)	Devt & advisor costs (€)	Funding need (€)*
GSB1a	Planting of Metrobosco forests and restoration of lakes	Capital project / purchase	Investment and delivery by MoT; potential for third party funding and/or community support	Mid-term budget 2018-2021 proposes construction of a specific paving and green space project near "ish Astirit". Cost estimate relates to capital cost of trees for next five years.	577,000	19,900,000	0	0	19,323,000
GSB1b	Tree nursery strategy for the Metrobosco forests	Policy / strategy / study	Investment and delivery by MoT	Cost estimate relates to establishing and maintaining nurseries for planting over five years. Excludes land costs	0	1,384,000	0	0	1,384,000
GSB2a	Provide pocket parks in residential blocks	Capital project / purchase	Investment and delivery by MoT; potential for third party funding and/or community support	Mid-term budget 2018-2021 proposes funding for reconstruction of the zoo and botanical garden. Cost estimate relates to capital cost of forming five pocket parks over next five years, plus NPV of lost car parking income	41,000	1,534,000	0	0	1,493,000
GSB2b	Commercial delivery model for pocket parks in residential blocks	Policy / strategy / study	Procurement by or on behalf of MoT; potential for donor or IFI funding	Cost estimate relates to staff and consultant costs to establish and implement a pocket park strategy	0	0	179,000	127,000	127,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

5. Green Spaces & Biodiversity

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (€)	Capex estimate (€)	Opex over 5 years (€)	Devt & advisor costs (€)	Funding need (€)*
GSB3	Construct green corridors	Capital project / purchase	Investment and delivery by MoT; potential for third party funding and/or community support	Based on planting 18,000 trees of different varieties	0	2,751,000	688,000	78,000	2,829,000
GSB4	Create a biodiversity database	Information and capacity building	Procurement by or on behalf of MoT; potential for donor or IFI funding	Cost estimate relates to consultant cost to set up and initially populate database. Does not include large scale field surveys	0	0	0	78,000	78,000
GSB5	Implement legislation for the protection of green spaces	Regulation / rule	National legislation	Cost estimate relates to staff and advisor costs for setting up new rules	0	0	0	22,000	22,000
GSB6	Prepare a Strategic Environmental Assessment of green spaces	Policy / strategy / study	Procurement by or on behalf of MoT; potential for donor or IFI funding	Cost estimate relates to consultant cost to carry out SEA	0	0	0	100,000	100,000

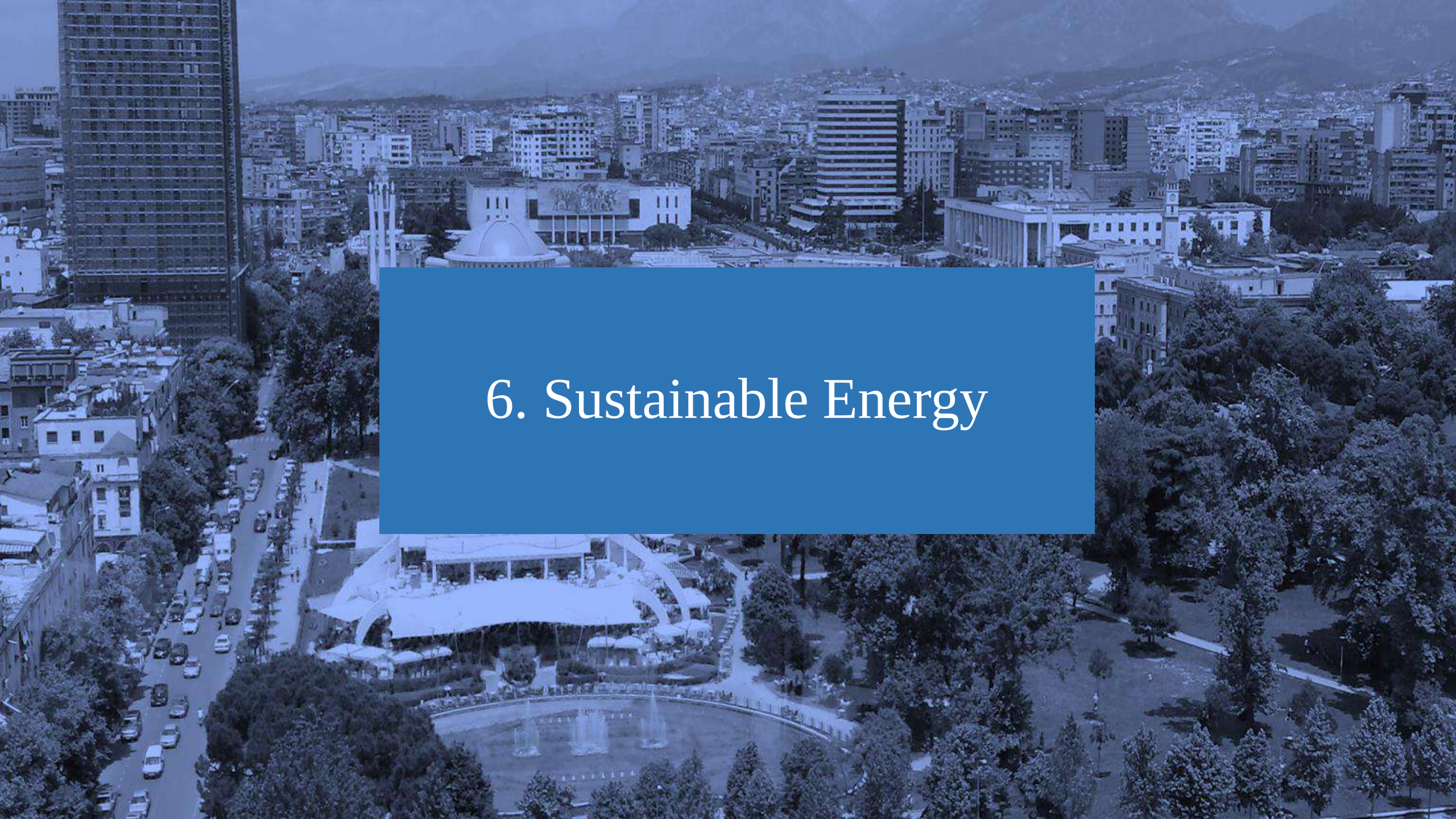
*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

5. Green Spaces & Biodiversity

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (€)	Capex estimate (€)	Opex over 5 years (€)	Devt & advisor costs (€)	Funding need (€)*
GSB7	Implement obligations for minimum sizes of public green spaces	Regulation / rule	Introduced by MoT	Cost estimate relates to staff and advisor costs for setting up new policy	0	0	0	44,640	44,640
GSB8	Implement the requalification of public spaces	Regulation / rule	Introduced by MoT	Cost estimate relates to staff and advisor costs for setting up new policy	0	0	0	44,640	44,640
GSB9	Expand wastewater treatment service for municipal and industrial wastewater	Capital project / purchase	Investment and procurement by Government of Albania; ownership and operation by UKT	JICA wastewater project and UKT costs used as benchmark	0	145,800,000	6,570,000	0	145,800,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.



6. Sustainable Energy

We plan to increase the **energy efficiency** of Tirana’s buildings and lighting infrastructure and secure delivery of infrastructure for the adoption of electric vehicles.

6. Sustainable Energy

6.1 Main Challenges in Tirana

1) Energy Security

Tirana has seen major improvements in reliability of electric power supply. There is still a high number of interruptions, for which further improvement of supply is ongoing. 100% of electricity supply is from renewable, hydropower plants.

Most non-transport energy for the city comes from electricity. The completion of the Trans Adriatic Pipeline (TAP) will introduce the opportunity for natural gas, a fossil fuel, to become an additional source of energy for Tirana. The implications of this are as yet uncertain. Energy is a matter regulated and delivered at national level, with the city having little control over generation. Tirana currently lacks fiscal incentives for renewable energy facilities in residences and non-domestic buildings. It is considered an important issue to improve overall energy supply in the city, but beyond the direct control of the MoT.

2) Energy Theft

A concern for future investment and maintenance of the energy network is the extensive practice of energy theft and poor revenue collection rates from registered energy customers. Recognising the concern about energy theft, the National Government launched an anti-theft campaign to crack down on energy theft in 2014

These measures have meant that there has been a reduction in people not paying energy from 52% in 2013 to approximately 29.8% during the first six months of 2015 across Albania. This change has removed one of the major obstacles to introducing renewable energy systems and energy efficiency measures across the Albanian energy system. Now that the energy consumption is better regulated there is an incentive for increasing renewables and energy efficiency.

3) Energy Consumption in Buildings

Energy consumption has significantly increased in Tirana in line with the country's population and economic growth. Albania adopted the National Action Plan on Energy Efficiency (2011-2018) and based on this, Tirana adopted the Sustainable Energy Action Plan (SEAP) (2013-2020). The SEAP indicates that in 2011 residential energy consumption accounted for 66% of total energy consumption, commercial and service buildings for 33%, and public buildings for 1%.

The main building systems which consume energy are the air conditioning and heat pumps. These tend to be both old and inefficient. Electricity consumption in buildings is high and thus the main area for saving energy is to improve energy efficiency of buildings and infrastructure. Building standards are regulated and delivered at national level, with the city having little control beyond the consumption of the municipality's own building stock. However, the municipality owns relatively little building stock. The SEAP recorded 181 municipal buildings, 123 680 residential buildings and 23 143 commercial buildings in 2011.

6.1 Main Challenges in Tirana

4) Energy Consumption in Transport

The transport sector is the highest oil consumer in Albania. In Tirana, the transport sector fuel consumption is made up of 54% of gasoline, 45% of diesel and 1% of LPG. Passenger and commercial vehicles consume 88% of the total transport fuel consumed, public transportation consumes 11%, and the municipal fleet consumes only 1%.

The subsector of personal and commercial vehicles is the most important in terms of energy consumption and potential energy savings.

5) Energy Consumption in Public Lighting

The public lighting system in Tirana consists of various types of lighting fixtures. About 70% of the installed lighting fixtures are metal halide lamps. While the most part are of the new generation with less than 15 years of age, environmentally friendly lamps such as LED lights are rare at about 4% of the total number of public street lights.

It is necessary to replace all lamps with the new generation of LEDs. Estimates from the SEAP indicate that this would enable electricity savings of up to 60%, better lighting effects, longer life of lamps and minimised maintenance costs.

6.2 What we are Already Doing

Electric Vehicle Charging Infrastructure

Energy consumption in transport could be improved with electric vehicles and electric charging infrastructure. This would provide local air quality benefits and reduce dependency on imported oil, but this would require substantial investment in EV charging infrastructure.

Technology development and incentives are stimulating rapid reduction in the lifecycle cost of EVs compared with traditional internal combustion engine (ICE) vehicles. There are currently a small number of charging points across the city, but these are expected to grow over the plan period.

Energy Efficiency in Buildings

Tirana's Sustainable Energy Action Plan indicates that the main area for saving energy is to reduce electrical energy consumption in the building sector. Several important policy instruments affecting action in this area are currently being drafted, or have recently been adopted, by the Directorate of Energy:

- Develop a new law on energy performance in buildings and a new code of construction.
- Undertake energy audits and issue energy performance certificates for properties which are to be sold (expected to be adopted in 2017);
- Undertake energy audits, performance certificates and plans for energy efficiency measures for refurbishment of public buildings. The Energy Efficiency Directorate is in the process of establishing a methodology for energy audits to comply with the requirements of the EU Energy Performance of Buildings Directive and the EU Energy Efficiency Directive. (Expected to be adopted in 2017);
- Roll out energy labelling of new electrical appliances and air conditioners to comply with the requirements of the EU Directive on the Labelling of Energy-Related Products. This reform has been prepared, but no adoption date has been confirmed.
- Establish the Albanian Energy Efficiency Financing Fund that would provide financial support for the refurbishment of residential and commercial buildings. There is no fixed timeline or plan for establishing this fund.
- Educate and promote energy efficiency measures for citizens of Tirana, and change the behaviour of employees and users of buildings owned by the MoT.
- Introduce new incentives (provide permit for additional floors) to encourage insulation of existing buildings.
- Introduce promotional instruments for the installation of solar collectors for water heating.
- Promote green buildings through some pilot projects or illustrations, e.g. green roof in MoT buildings, application of renewable energy installations and use of thermal insulation of new and existing education buildings.

Energy Efficient Street Lighting

The Sustainable Energy Action Plan included an action to upgrade street lighting in Tirana to improve efficiency and reduce energy theft via the street lighting power supplies.

The program to update street lighting is currently on hold by the Directorate of Energy pending completion of a detailed lighting design and analysis prior to replacement of energy sources. According to the National Energy Directorate, unregistered electric energy consumption is approximately 50% of total consumption. A new network must be built to ensure illegal connections are controlled.

6. Sustainable Energy

6.3 Green City Actions

GCAP Vision (2018-2033) By 2033, Tirana will achieve high energy efficiency of its buildings and lighting infrastructure and provide better infrastructure for the adoption of electric vehicles.				
Mid-term target (2018-2025)		**Short-term actions (2018-2021)**	**Owner/Responsibility**	**Priority**
SO.3A	Secure and diverse energy supplies	SE1: Deployment of electric vehicle charging infrastructure	Department of Transport	Medium
SO.3B	Higher energy efficiency of buildings and infrastructure	SE2: Municipal building energy efficiency programme	General Directorate of Public Works, General Directorate of Territorial Planning & Development, Dept. of Environmental Policies and Education, General Directorate No. 3 of City Workers	High
		SE3: Residential building energy efficiency programme	General Directorate of Public Works, General Directorate of Territorial Planning & Development, Dept. of Environmental Policies and Education, Dept. of Condominium Administration	High
		SE4: Replacement of street lamps with smart and energy efficient lamps	General Directorate No. 2 of City Workers, General Directorate of Public works and lighting contractor	High
		SE5: Implementation of legislation for enabling building energy efficiency measures	General Directorates of Urban Planning, General Directorate of Public Works	High
		SE6: Mechanisms to incentivise investment in energy efficient technologies	Department of Environmental Policies and Education, Department of Strategic Planning	Medium
		SE7: Effective implementation of provisions on ESCOs and EPCs	Department of Environmental Policies and Education, Department of Strategic Planning	High

6. Sustainable Energy

ACTION

Capital project:	**SE1: Deployment of electric vehicle charging infrastructure**
Description:	Deployment of electric vehicle charging points across Tirana, extending into peri-urban areas. The plan will contribute towards a coordinated parking strategy with EV charging infrastructure roll-out.
Current context:	• There are currently 3-4 charging points across the city in underground parking, at the start of the boulevard, and next to the police station. • The city currently lacks a coordinated charging infrastructure strategy. • Electric buses are currently being tested. • MoT is prioritising electric taxi licensing. One company is operating electric taxis since 2017.
Scale of project:	Establishing at least one EV charging infrastructure supplier for the city, with 500 charging points installed by 2023
Delivery mechanism & stakeholders:	MoT procures private sector to deploy EV charging stations and points on public highways and in public car parks. We will promote awareness and education on sustainable energy through information campaigns and educational initiatives in schools.
Revenue / savings opportunities:	• Sales of electricity to customers, although there is a risk from lower tax income from fuel sales • Electricity grid balancing services (load controlling and supply to grid from vehicle batteries).
Key metrics (see Appendix 1):	• State indicators: Air quality (1, 1.1, 1.2 1.3), GHG emissions (8, 8.1) • Pressure indicators: Transport energy (10.1, 10.3)

Inner Tirana

More and better green space	1
Smart mobility	2
Secure and diverse energy supplies	3
Higher energy efficiency of buildings and infrastructure	3
Economic returns for investor	Y
Public health	Y

Figure 26 Results of environmental and socio-economic evaluation

6. Sustainable Energy

ACTION

Capital project:	**SE2: Municipal building energy efficiency programme**
Description:	Elaboration of a refurbishment plan of buildings owned or occupied by the Municipality in line with the Energy Efficiency Law, with a rate of 3% of renewal of the total occupied area per year. For the funding of this plan, MoT could make recourse to the Energy Efficiency Fund, which is aimed at improving energy performance of buildings and whose eligible measures include "energy efficient renovation of buildings, including space heating, hot water, cooling and ventilation, measures for building envelope and heating installation and digital solutions aimed at improving the energy management of public buildings". The Municipality will: • Appoint an energy manager responsible for the management of energy performance of its buildings • Adopt a 5 years' refurbishment plan of its building stock to improve energy performance (3% of Municipal owned/occupied buildings per year) • Adopt energy saving approaches in its daily operations: i.e. obligation to purchase energy efficient buildings, products and services.
Current context:	• A total of 181 municipal buildings were identified in Tirana's Sustainable Energy Action Plan comprising a total of 260,000m^2. • Energy consumption from these buildings is around 23kWh/m^2 for electric power and 56kWh/m^2 for heating, which compares favourably with residential building energy consumption. • Measures identified in the SEAP included a target to provide insulation and high efficiency windows to 100 public buildings by 2020. The MoT is part way to meeting that goal. • The programme should continue as part of the GCAP.
Scale of project:	• Install energy efficiency measures in a further 15% of the municipal building stock over the next five years (around 30 buildings). • The project would follow best practice delivery principles, including a "data first" approach to ensure investment is directed where it can have the most impact, and actual "before and after" performance can be tracked to improve future investments and measures.

Inner Tirana

Secure and diverse energy supplies	2
Higher energy efficiency of buildings and infrastructure	3
Reduce water losses	1
Increase infrastructure resilience	1
Economic returns for investor	Y
Economic inclusion	Y

Figure 27 Results of environmental and socio-economic evaluation

6. Sustainable Energy

ACTION

Capital project:	**SE2: Municipal building energy efficiency programme (continued)**
Delivery mechanism & stakeholders:	The MoT would work with national and international organisations to identify a package of funding and technical assistance to support a municipal buildings retrofit programme, including the Energy Efficiency Fund. A private finance solution through energy performance contracting will also be considered as part of a scoping and feasibility assessment. We will promote awareness and education on sustainable energy through displays in public buildings, information campaigns and educational initiatives in schools.
Revenue / savings opportunities:	Fuel efficiency savings and improved comfort in municipal buildings. A programme at a larger scale could provide efficiency savings and provide a model for wider investment in building retrofit.
Key metrics (see Appendix 1):	• State indicators: Mitigation (8, 8.1) • Pressure indicators: Buildings (14, 14.1, 14.2, 15, 15.1, 15.2, 15.3, 15.4)

Inner Tirana

Secure and diverse energy supplies	2
Higher energy efficiency of buildings and infrastructure	3
Reduce water losses	1
Increase infrastructure resilience	1
Economic returns for investor	Y
Economic inclusion	Y

Figure 28 Results of environmental and socio-economic evaluation

6. Sustainable Energy

ACTION

Capital project:	**SE3: Residential building energy efficiency programme**
Description:	Implementation of energy efficiency retrofit measures in residential buildings. Specific goals to include • Energy efficiency measures of the existing building stock such as space heating, hot water, cooling, ventilation, thermal insulation, lighting. • A new energy code of construction for new buildings, to include central heating. • Introduction of energy performance certification and energy audits. The plan will contribute towards a strategy for the Building Energy Efficiency policy and the City's transition to LED lights, and will outline the details of building energy efficiency 'good performance'.
Current context:	• There are around 40,000 existing residential buildings in Tirana. Many of these are 20th century condominium structures with poor thermal performance for both cooling and heating mode conditions. • MoT plans to introduce energy efficiency standards for new buildings and insulation measures for buildings older than 20 years. • Building energy certificates are to be developed in the EU approximation process through support from the Regional Energy Efficiency Programme (REEP Plus) of the EBRD. • Currently MoT gives 50% grant funding to owners for building efficiency improvements. • The General Local Plan provides a bonus if new constructions have a good performance in Building Energy Efficiency. The policy is in place but MoT needs to create a document setting out the details.
Scale of project:	The scale of the project will depend on available funding to support retrofit measures. A target to support energy efficiency measures in the worst performing third of Tirana's residential buildings by 2035 would indicate a scale of around 1000 retrofits per year. With additional funding these retrofits could extend to include installation of solar collectors.
Delivery mechanism & stakeholders:	MoT secures funding source and deploys grants and low interest loans to building owners to invest in energy efficiency programmes. A programme which supported private financing through energy performance contracts could offer an alternative mechanism to stimulate private action on energy efficiency. We will promote awareness and education on sustainable energy through displays in retrofitted buildings, information campaigns and educational initiatives in schools.

Whole of Tirana

Secure and diverse energy supplies	2
Higher energy efficiency of buildings and infrastructure	3
Reduce water losses	1
Increase infrastructure resilience	1
Economic returns for investor	Y
Economic inclusion	Y

Figure 29 Results of environmental and socio-economic evaluation

6. Sustainable Energy

ACTION

Capital project:	**SE3: Residential building energy efficiency programme (continued)**
Revenue / savings opportunities:	Fuel efficiency savings, improved comfort in homes
Key metrics (see Appendix 1):	• State indicators: Mitigation (8, 8.1) • Pressure indicators: Buildings (14, 14.1, 14.2, 15, 15.1, 15.2, 15.3, 15.4)

Whole of Tirana

Secure and diverse energy supplies	2
Higher energy efficiency of buildings and infrastructure	3
Reduce water losses	1
Increase infrastructure resilience	1
Economic returns for investor	Y
Economic inclusion	Y

Figure 30 Results of environmental and socio-economic evaluation

6. Sustainable Energy

ACTION

Capital project:	**SE4: Replacement of street lamps with smart and energy efficient lamps**
Description:	Replacement of street lamps with multi-function low energy LED street lamps, reducing GHG emissions and providing: highly controllable LED lamps, environmental monitoring equipment, and advertisements and messages through fixed or variable message banners. See Appendix 2 for a mini-study on smart lighting.
Current context:	A previous SEAP action was to replace lamps with low energy luminaires. A higher value approach would be to incorporate smart features for data collection and active control as part of the renewal programme. MoT plans to introduce this measure through a private sector service contract. The contractor would receive payments based on the energy and operational savings from investing in new lamps and luminaires.
Scale of project:	50% of City's street lamps replaced by 2023
Delivery mechanism & stakeholders:	MoT procures lighting contractor to fund and install/renew street lighting infrastructure. Contract is incentivised to deliver cost savings for MoT.
Revenue / savings opportunities:	Energy savings and advertisements on street lamps. Additional data acquisition through smart devices installed concurrently with lamp replacement.
Key metrics (see Appendix 1):	• State indicators: GHG emissions (8, 8.1) • Pressure indicators: None

Whole of Tirana

Higher energy efficiency of buildings and infrastructure	3
Increase infrastructure resilience	3
Increase business, community and municipal resilience	1
Economic returns for investor	Y
Economic inclusion	Y
Public health	Y
Community involvement	Y

Figure 31 Results of environmental and socio-economic evaluation

6. Sustainable Energy

POLICY MEASURE

Policy measure:	**SE5: Implementation of legislation for enabling building energy efficiency measures**
Description:	Engage with the Ministry of Energy and Industry to assist in implementing national level policy measures on energy efficiency actions in buildings, including: • Adoption of the calculation methodology for energy performance of buildings prepared at national level under REEP Plus. • Adoption of minimum energy efficiency standards for new buildings and for major renovation of existing buildings prepared at national level under REEP Plus. • Insertion of obligation to comply with energy efficiency standards (such as use of LEDs for common parts lighting; recourse to thermo-insulation and other energy efficiency solutions, use of a minimum share of renewable sources for power supply and heating and cooling in buildings, etc.) in project designs of new buildings or major renovations as a condition for issuance of construction permits, including recourse to a fixed minimum rate of renewable sources. • Request of issuance of an Energy Certificate proving compliance of the building with proposed energy efficiency features proposed at national level, at the end of the construction phase as a condition for issuance of the use permit.
Scope and timing:	The legislation for enabling the energy efficiency actions in buildings could be adopted by 2019.
Impact or outcome:	A standard methodology and set of requirements will help to raise minimum practice and raise the capacity of the supply chain needed to delivery better energy performance in buildings.
Delivery mechanism & stakeholders:	<u>National stakeholders:</u> • Council of Ministers for adopting the policy documents and the implementing regulations for the recent approved legislation in the field of energy efficiency • Energy Regulatory Unit • Ministry of Energy and Industry (Directorate for Renewable Energy Sources and Energy Efficiency Secretariat of Energy Committee) • Agency for Energy Efficiency <u>Local stakeholders:</u> • Municipality of Tirana

Whole of Tirana

SE1	SE2	SE3	SE4
EV charging infrastructure	Municipal energy efficiency	Residential energy efficiency	Energy efficient street lamps

Figure 32 Actions supported by policy measure

POLICY MEASURE

Policy measure:	**SE6: Mechanisms to incentivise investment in energy efficient technologies**
Description:	The implementation of energy efficiency street lamps falls under the scope of Law 124/2015 on energy efficiency. Municipal applications for LED lighting include traffic lights and signals, street lights, public/municipal buildings (e.g. hospitals and schools), 24-hour emergency lighting, shopping malls and offices, parking lots and underground parking, exteriors and employee access ways, etc. The best lighting technologies, such as long-lasting light-emitting diodes (LEDs), are already available. Municipality of Tirana should replace high-pressure sodium bulbs with LEDs to reduce both consumption and operation/maintenance costs. Brighter LED light also increases visibility in adverse conditions. A key element in the implementation of this measure is to identify relevant sources of funding, e.g. by setting up mechanisms to incentivise private partners to invest in energy efficient technologies in the public sector. The Municipality should also consider the possibility to make recourse to the Energy Efficiency Fund – which is aimed at providing grants and loans or financial guarantees for the implementation of energy efficiency projects in Albania.
Delivery mechanism & stakeholders:	<u>Local stakeholders:</u> • Municipality of Tirana <u>National stakeholders:</u> • Ministry of Energy and Industry (Directorate for Renewable Energy Sources and Energy Efficiency Secretariat of Energy Committee • Ministry of Finance

Whole of Tirana

SE1	SE2	SE3	SE4
EV charging infrastructure	Municipal energy efficiency	Residential energy efficiency	Energy efficient street lamps

Figure 33 Actions supported by policy measure

6. Sustainable Energy

POLICY MEASURE

Policy measure:	**SE7: Effective implementation of provisions on ESCOs and EPCs**
Description:	It is crucial to ensure effective implementation of provisions on ESCOs under the Law on Energy Efficiency and the possibility for the Municipality to make recourse to Energy Performance Contracts (or "EPCs"). Issuance of secondary legislation removing all obstacles, if any, to the functioning of ESCOs and EPCs is very important. Training of Municipal staff on the elaboration of proposals for the request of funding to national and international institutions, and on the drafting and negotiating of Energy Performance Contracts and on the functioning of ESCOs is recommended.
Scale of policy measure:	Ensuring an effective implementation of the ESCOs and EPCs provisions, the adoption of the secondary legislation or any other change or amendment in order to remove the obstacles, can be recommended by 2019.
Delivery mechanism & stakeholders:	<u>Local stakeholders:</u> • Municipality of Tirana <u>National stakeholders:</u> • Ministry of Energy and Industry (Directorate for Renewable Energy Sources and Energy Efficiency) Secretariat of Energy Committee • Ministry of Finance

Whole of Tirana

SE1	SE2	SE3	SE4
EV charging infrastructure	Municipal energy efficiency	Residential energy efficiency	Energy efficient street lamps

Figure 34 Actions supported by policy measure

6. Sustainable Energy

SUPPORTING ACTIONS

In addition to the policy measures recommended above, we will consider the following Building Energy Efficiency policy measures:

New programmes:

- A grid-connected rooftop solar PV programme could be undertaken by PV developers/aggregators and end users for installation of rooftop solar systems on the rooftops of commercial, institutional and industrial buildings. This will make up a decentralized generation system with the ability to strengthen the grid.
- To promote recourse to renewable sources, also in relation to the refurbishment of existing buildings, the Ministry of Energy could set a regulated tariff for solar PV projects with a capacity of up to 50kW.
- We will promote awareness and education on sustainable energy through displays in buildings, information campaigns and educational initiatives in schools.

The following actions are proposed to support the implementation of the policy measures with regards to Energy Efficient Street lighting:

- We will consider the possibility to make recourse to the Energy Efficiency Fund, which is aimed at providing grants and loans or financial guarantees for the implementation of energy efficiency projects in Albania. Eligible energy efficiency measures and technologies to be funded through the Energy Efficiency Fund may be aimed at improving living comfort level and quality of public services and may include energy efficient lighting and appliances.

We will engage with the National Government on the following policy measures in order to support our long-term green city vision:

- Effective implementation of the EV charging infrastructure measure should be by the improvement of the legal framework on air quality at national level.
- Implementation of the recently adopted National Action Plan for Energy Efficiency. The progress towards the implementation of the national plan will be reported every 3 years by reporting also the current measures and instruments as well as the proposed measures.
- It is further recommended that all energy performance requirements, when set up at national level, are inserted in the Territorial planning instruments and Construction Code of Albania and become directly applicable for all.
- Pursuant to the relevant legislation implementing EU acquis, the adoption of secondary legislation and other implementing tools is still needed, for the Government to be able to comply with all obligations, including: the inventory of building stock in Albania, the adoption of a calculation methodology for each typology of building; the setting up of minimum energy performance requirements for all categories of buildings in relation to new constructions and major renovations.
- Following adoption of the Law No. 7/2017 on the Promotion of the Use of Energy from Renewable Sources, development of regulation and policy to support the development of grid-scale renewable energy (solar and wind). If provided at national level, the Municipality of Tirana could promote development of solar and wind farms in rural areas of Tirana.

6. Sustainable Energy

BENEFITS ASSESSMENT

Sustainable energy supply and consumption in Tirana may generate economic and environmental benefits.

1. Energy consumption savings

Actions SE2, SE3 and SE4 will generate electrical and thermal energy savings, the largest savings coming from the energy efficiency programme in residential buildings as indicated in Table 6.

Action	Electrical energy saving (2018 – 2022)	Thermal energy saving (2018 – 2022)
SE2. Municipal building retrofit	280,000 kWh_e	86,000 kWh_{th}
SE3. Residential building retrofit	5,300,000 kWh_e	1,600,000 kWh_{th}
SE4. Public lighting retrofit	3,200,000 kWh_e	-

Table 6. Energy saving from sustainable energy actions

These energy savings will lead to economic benefits from lower energy costs. Additionally, these savings may lead to reduced fuel poverty in socially disadvantaged households.

2. Climate change mitigation

The electric vehicle charging infrastructure, if supported by appropriate financial measures to incentivise the uptake of electric cars, may lead to carbon savings from the reduction in diesel and petrol fuelled vehicles.

Current data shows that the electric car ownership in 2011 was equal to nil. Modelling of action SE1, based on the assumption that a complete shift to electric cars will take place by 2050, indicates carbon savings of 10 million kg CO_2 from 2018 to 2022.

Modelling of the carbon reduction potential of actions SE2, SE3 and SE4 indicates that action SE3 may provide the largest carbon savings as indicated in Table 7.

The carbon saving potential from electrical energy savings is relatively lower than that from the reduction of diesel, LPG and fuel wood use for thermal or vehicle energy provision. This is due to the low carbon intensity factor of the Albanian electricity grid (0.009 kg CO_2/ kWh), which is largely supplied by hydroelectric power. Hence the largest carbon saving potential would come from the conversion of fossil fuel based heating to electricity.

Action	Carbon saving from electrical energy saving (2018 – 2022)	Carbon saving from thermal / vehicle energy saving (2018 – 2022)
SE1. EV charging infrastructure	-	10,000,000 kg CO_2
SE2. Municipal building retrofit	2,000 kg CO_2	21,000 kg CO_2
SE3. Residential building retrofit	47,000 kg CO_2	309,000 kg CO_2
SE4. Public lighting retrofit	29,000 kg CO_2	-

Table 7. Carbon saving from sustainable energy actions

The electricity grid's low carbon intensity factor also means that there is a revenue potential for Albania to export its electricity to neighboring countries reliant on coal and gas-fired power plants.

6. Sustainable Energy

FINANCIAL AND ECONOMIC ASSESSMENT

The following assessment maps out the cost estimates and funding needs *in lekë* for each of the actions within Sustainable Energy, as identified from the MoT mid-term budget and from estimates developed for the GCAP.

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (Lekë '000s)	Capex estimate (Lekë '000s)	Opex over 5 years (Lekë '000s)	Devt & advisor costs (Lekë '000s)	Funding need (Lekë '000s)*
SE1	Deploy electric vehicle charging infrastructure	Capital project / purchase	Investment and delivery by MoT, or public-private partnership	Based on 1,000 charging points	0	603,000	54,000	0	603,000
SE2	Municipal building energy efficiency programme	Capital project / purchase	Procurement by or on behalf of MoT; potential for donor or IFI funding	Mid-term budget provides funding for a school project including building fabric improvements. Cost estimate relates to retrofit works to existing municipal buildings based on 3% of stock per year over a five year period.	56,000	70,000	0	0	14,000
SE3	Residential building energy efficiency programme	Programme or incentive	Potential for municipal or national level implementation, and for private investment or delivery	Based on SEAP estimates for retrofit and solar collectors. 25% support to building owners.	0	4,389,000	0	20,000	4,409,000
SE4	Replace street lamps with energy efficient lamps	Capital project / purchase	Investment and delivery by MoT, or public-private partnership	Mid-term budget proposes funding for two street and park lighting projects. Cost estimate based on capital cost of lighting investments over 5 year period	9,000	393,000	36,000	10,000	394,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

6. Sustainable Energy

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (Lekë '000s)	Capex estimate (Lekë '000s)	Opex over 5 years (Lekë '000s)	Devt & advisor costs (Lekë '000s)	Funding need (Lekë '000s)*
SE5	Implement legislation for enabling building energy efficiency measures	Regulation / rule	Potential for municipal or national level implementation, and for private investment or delivery	Time for legal consultants and advisors	0	0	27,000	18,000	18,000
SE6	Mechanisms to incentivise investment in energy efficient technologies	Programme or incentive	Potential for municipal or national level implementation, and for private investment or delivery	Time for financial and technical consultants	0	0	0	9,000	9,000
SE7	Effective implementation of provisions on ESCOs and EPCs	Programme or incentive	Potential for municipal or national level implementation, and for private investment or delivery	Time for financial and technical consultants	0	0	0	13,000	13,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

6. Sustainable Energy

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

The following assessment maps out the cost estimates and funding needs *in euro* for each of the actions within Sustainable Energy, as identified from the MoT mid-term budget and from estimates developed for the GCAP.

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (€)	Capex estimate (€)	Opex over 5 years (€)	Devt & advisor costs (€)	Funding need (€)*
SE1	Deploy electric vehicle charging infrastructure	Capital project / purchase	Investment and delivery by MoT, or public-private partnership	Based on 1,000 charging points	0	4,500,000	405,000	0	4,500,000
SE2	Municipal building energy efficiency programme	Capital project / purchase	Procurement by or on behalf of MoT; potential for donor or IFI funding	Mid-term budget provides funding for a school project including building fabric improvements. Cost estimate relates to retrofit works to existing municipal buildings based on 3% of stock per year over a five year period.	420,000	523,000	0	0	103,000
SE3	Residential building energy efficiency programme	Programme or incentive	Potential for municipal or national level implementation, and for private investment or delivery	Based on SEAP estimates for retrofit and solar collectors. 25% support to building owners.	0	32,750,000	0	150,000	32,900,000
SE4	Replace street lamps with energy efficient lamps	Capital project / purchase	Investment and delivery by MoT, or public-private partnership	Mid-term budget proposes funding for two street and park lighting projects. Cost estimate based on capital cost of lighting investments over 5 year period	70,000	2,933,000	267,000	77,500	2,940,500

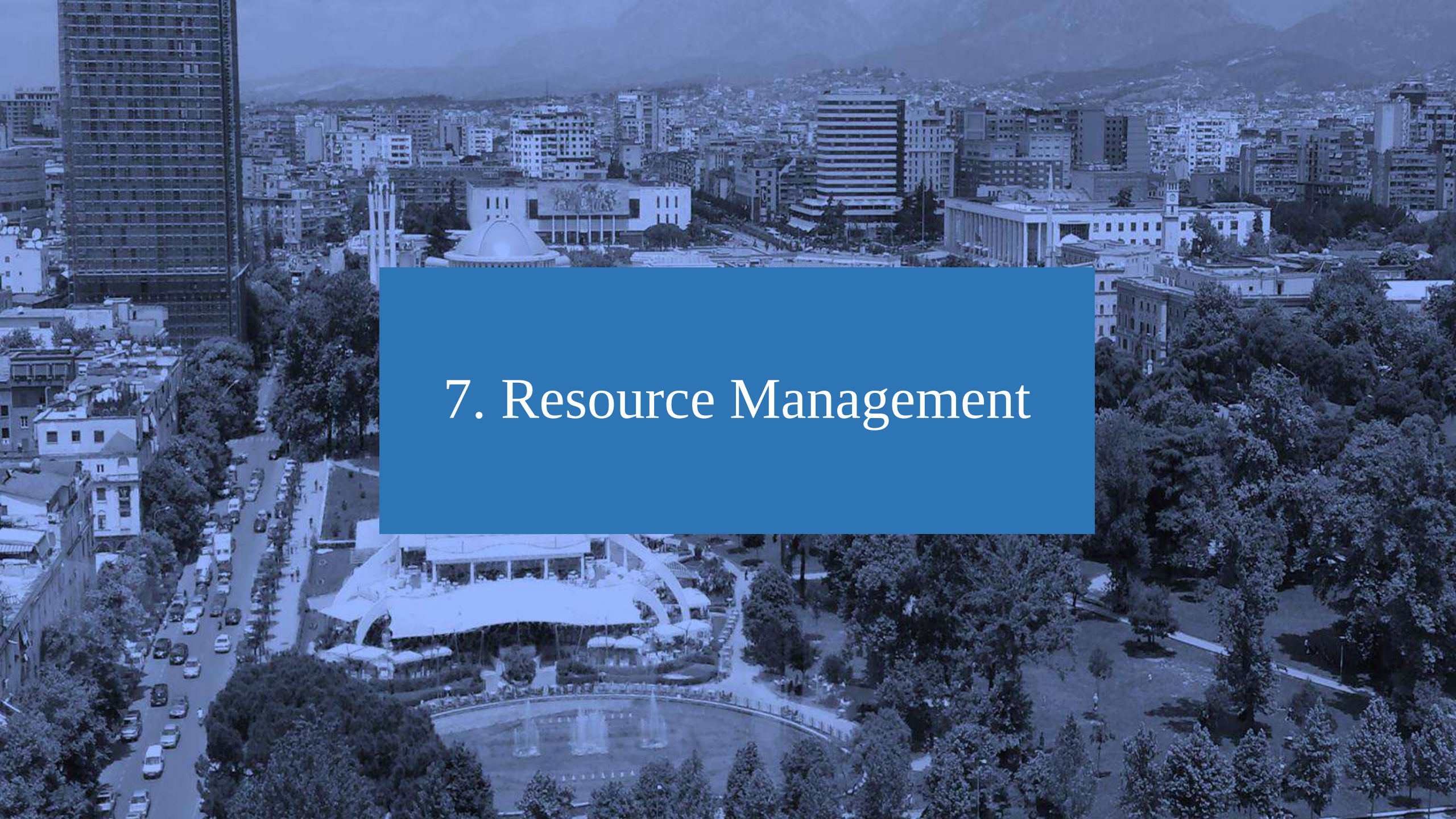
*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

6. Sustainable Energy

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (€)	Capex estimate (€)	Opex over 5 years (€)	Devt & advisor costs (€)	Funding need (€)*
SE5	Implement legislation for enabling building energy efficiency measures	Regulation / rule	Potential for municipal or national level implementation, and for private investment or delivery	Time for legal consultants and advisors	0	0	200,000	134,000	134,000
SE6	Mechanisms to incentivise investment in energy efficient technologies	Programme or incentive	Potential for municipal or national level implementation, and for private investment or delivery	Time for financial and technical consultants	0	0	0	67,000	67,000
SE7	Effective implementation of provisions on ESCOs and EPCs	Programme or incentive	Potential for municipal or national level implementation, and for private investment or delivery	Time for financial and technical consultants	0	0	0	100,000	100,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.



7. Resource Management

We plan to **manage resources** in a smarter, more sustainable way, improving recycling rates, minimising waste sent to landfill and reducing water losses.

7. Resource Management

7.1 Main Challenges in Tirana

1) Low Recycling Rates

Waste generation per capita and GDP per domestic material consumption in Tirana is relatively low. Municipal Solid Waste (MSW) is collected for the entire population, however recycling rates are very low. Littering and non-compliance to sorting systems is currently not dis-incentivised through fines and penalties. This is urgent to address in the outskirts of urban areas and in rural areas.

Most recycling is achieved by informal waste pickers that sell collected recyclables. A recent study estimated a total of 200 pickers. Based on a reported collection rate of 265 kg/day/person, total recycling by pickers is estimated at around 50 tonnes per day, which is around 6-7% of total waste disposed in the city (622 tonnes per day). It is a legal requirement for municipalities to achieve recycling objectives; this is therefore an urgent need for action.

2) Illegal Dumping of Waste

Illegal dumping occurs widely in the periphery of the city. A recent report identified 46 illegal dumping sites in areas including along the Lana and Tirana River, where waste and contamination lead to poor water quality and increased flood risk from blockages.

3) Landfill Capacity

The life of the existing waste landfill site, Sharra Disposal Site, was estimated in 2012 to reach capacity between 2013 and 2015, depending on the conditions of waste diversion activities. This is an urgent and salient issue; however, the government of Albania has appointed an operator to improve the environmental management of the landfill and to construct and operate an energy from waste plant which will treat the majority of municipal solid waste from Tirana and neighbouring areas.

4) Treatment of Solid Waste

The municipal waste collection charge is too low to provide the capital needed for improved management practices and new waste management facilities. Other funding will need to be found and/or waste charges will need to be increased.

5) Water Distribution Losses

Most fresh water supplied to Tirana is from the Bovilla reservoir and a centralized fresh water treatment plant. Only 65% of supplied water is metered with revenue from bills collected in 2015. Although regulations for metering and billing for water use are in place, they face implementation challenges. It is estimated that about 40% of residential consumption is not metered. 66% of the water consumed has no revenues (losses). According to UKT (Tirana Water supply and sewage) there are 30-35% of non-revenue water consumption (NRW) is from illegal connections and 20-25% of NRW are distribution system loses.

6) Water Supply Intermittency

There are frequent water supply interruptions and requirements for individual houses daily water storage tanks with secondary pumping system due to low supply pressure. The supply time is 11 hours per day. The intermittency of water supply has however led to a form of local resilience, as individual property owners install water storage tanks to ensure continuity of supply to their own properties. This represents a significant cumulative additional storage capacity across the city. The MoT has introduced water awareness campaigns and plans for improved coverage and efficiency of water supply networks, although these are reported to have implementation issues.

7.2 What we are Already Doing

Solid Waste Collection and Treatment

The actions being implemented to improve solid waste collection and treatment include:

- The Government of Albania has procured a long-term contract to take over the management and environmental control of the Sharra Landfill and to build and operate a waste incinerator which will treat the majority of residual waste in Tirana. The investment will secure a long-term economic waste management solution for the municipality (although the size of the facility may act to constrain the long-term potential for high recycling rates).
- The Municipality is procuring contracts to extend household waste collection to the entire area of the city.
- The Municipality has recently launched a separate collection system to separate at source dry recyclable materials and other residual mixed waste. Performance of the new system is currently being monitored; the Municipality plans to extend these facilities to more areas of Tirana in the coming years.
- The City is currently surveying and formulating an implementation plan to remove the illegal dumpsites.
- The Municipality has identified six areas located outside the urban areas of Tirana for the construction of inert waste landfills that will serve for the disposal and treatment for only inert waste.

Water Distribution Improvements

The main water supply actions identified in Tirana master plan related to GCAP are to:

- Infrastructure Rehabilitation and Technical Assistance to the Tirana Water Company for the water and wastewater systems – Italian Cooperation (Ongoing) – 3.6 billion Lekë (27 million euros).
- Expand the water supply and treatment facility at the Bovilla spring to satisfy future city expansion until 2027.
- Expand existing water storage tanks capacity around UKT network is required to compensate daily peak demand.
- Replace existing main distribution pipeline to water storage tanks and installation of new main water supply meters is required for reduction of system losses and illegal connections.
- Install new water meters and replacement of old water meters on the consumer side.
- Monitor water supply and demand in each UKT network area for identification of system losses, plans for reconstruction and identification of illegal connections.

Through these measures the water company forecasts that losses will fall from 52% in 2016 to 24% for 2017 and 23% for 2018.

7. Resource Management

7.3 Green City Actions

GCAP Vision (2018-2033) By 2033, Tirana will manage resources in a smarter, more sustainable way, improving recycling rates, minimising waste sent to landfill and preventing water losses.				
Mid-term target (2018-2025)		**Short-term actions (2018-2021)**	**Owner/Responsibility**	**Priority**
SO.4A	*Reduce waste to landfill and increase waste recycling: Achieve 40% recycling rate and minimise waste sent to landfill.*	RM1: Implementation of household waste collection and separation	MoT, EcoTirana	High
SO.4B	*Reduce water losses: Reduce leakages to under 10%.*	RM2: Upgrade to water distribution network & infrastructure	UKT	High
		RM3: Instalment of smart water meters in buildings	UKT	Medium
		RM4: Implementation of secondary legislation on integrated management of water resources	Tirana Water Utility	Medium

7. Resource Management

ACTION

Capital project:	**RM1a: Implementation of household waste collection and separation**
Description:	Extend separate dry recyclables and residual waste collection service to the whole of Tirana, and provide sites for collection of bulky waste from households and small businesses. The service extension should also consider improvements in the collection process, e.g. intermediate transfer stations to enable smaller collection vehicles in narrow streets. The plan will link actions to EU regulations and requirements.
Current context:	• The waste collection and separation system is managed by Eco Tirana, the joint venture waste management company created by the MoT and the Municipality of Verona. • Eco Tirana plans to implement an information/awareness campaign targeting families and schools. • Only 5-8% of waste is recycled, due to contamination of recyclates with organic waste. • The law has a target for Eco Tirana to reach 25% waste separation by 2020. • Tirana does not have city-wide waste collection coverage; containers are mainly in the central area. • Businesses discharge their waste in the same containers as residents, leading to overloading. • Ministry of Environment has signed a concession contract a month ago to build an incinerator. The concession contract has a minimum guarantee of 700 tons/day to come from MoT. • MoT has no say over this guarantee and has to pay the corresponding gate fees regardless. • Negotiations are underway to build a recycling plant next to the incinerator. MoT aims to have an answer before the second public consultation. • No EU law prevents all waste to be incinerated, there are only future targets.
Scale of project:	90% of resident buildings with weekly MSW collection by 2022. This action will also span across the rural areas, where collection and recycling services are not currently provided.
Delivery mechanism & stakeholders:	• MoT and Eco Tirana invest in improved waste collection. • The MoT is currently procuring contractors to provide a collection service which collectively will serve the entire municipality. The new three-year contracts will be monitored to determine what service standards are appropriate for a longer term set of collection contracts. • A new set of contracts will be procured in 2-3 years.
Revenue / savings opportunities:	• Increased cleaning charges. • Direct charging by the amount of waste produced • Reduced cost of disposal.
Key metrics:	• State indicators: Soil quality (4, 4.1a, 4.1b, 4.1c), GHG Emissions (8, 8.1) • Pressure indicators: Solid waste (29, 29.1, 30, 31, 31.1)

Outer Tirana

Better river water quality	2
Reduce waste to landfill and increase recycling	3
Increase business, community and municipal resilience	1
Economic returns for investor	Y
Economic inclusion	Y
Public health	Y
Community involvement	Y

Figure 35 Results of environmental and socio-economic evaluation

7. Resource Management

ACTION

Capital project:	**Implementation of household waste collection and separation (continued)** ***RM1b: Household waste recycling centres (HWRCs)***
Description:	The one key opportunity identified by the MoT was for the development of a network of household waste recycling centres across the city to enable bulky waste collection, reuse of usable items and a wider range of recyclable materials such as WEEE, textiles, construction waste and gardening waste. See Appendix 2 for additional information on a mini-study for waste recycling centres.
Current context:	• Within the central Tirana area, there are on-street 1100-litre wheeled containers for household collection, with separate containers for dry recyclables (green) and residual waste (blue). The waste is collected by Eco Tirana and transported to the disposal site at Sharra. • Business waste is collected privately, although it is known that many businesses use the household waste containers. • Bulky waste is collected by arrangement, or else households can leave bulky waste next to the containers on the street. There are no facilities for households to bring bulky waste or other reusable/recyclable materials to the waste operator. • There are no systems for separate collection of organic waste. • A contractor has been appointed to manage the disposal of waste at Sharra, with planned construction of a new waste incinerator and improved management of the existing landfill. The contractor has a guarantee minimum tonnage (GMT) from Tirana of 550,000 tonnes per annum. • Beyond Eco Tirana's service area, four collection contracts are being procured to cover the rest of Tirana municipality. The contracts will all be in place by early 2018. In these areas, the MoT plans to operate a similar separate green and blue container system, but with a three-year initial period during which the system will be monitored. At the end of this trial period, a longer term contract will be procured based on the findings of the trial period.
Scale of project:	Based on preliminary study, a network of four HWRCs would provide suitable coverage and accessibility for residents across the city, to be delivered by 2022.
Delivery mechanism & stakeholders:	MoT works with national and international partners to specify, design, fund and procure delivery of a network of HWRCs across Tirana.
Key metrics (see Appendix 1):	• State indicators: Soil quality (4, 4.1a, 4.1b, 4.1c), GHG Emissions (8, 8.1) • Pressure indicators: Solid waste (29, 29.1, 30, 31, 31.1)

Whole of Tirana

Better river water quality	2
Reduce waste to landfill and increase recycling	3
Increase business, community and municipal resilience	1
Economic returns for investor	Y
Economic inclusion	Y
Public health	Y
Community involvement	Y

Figure 36 Results of environmental and socio-economic evaluation

7. Resource Management

ACTION

Capital project:	**RM2: Upgrade to water distribution network & infrastructure**
Description:	Upgrade to water distribution network and infrastructure. Goals include separation of surface water and wastewater, integration of pocket parks with surface water drainage, and measures for smart leakage monitoring (smart valves, planes, etc..).
Current context:	• The existing wastewater management project, funded by JICA, is upgrading 1/3 of the city and will be completed next year; it will prevent the discharge of untreated water into the Lana River. • The part of Tirana located south of the Lana River entails 2/3 of the city. Sewer network collects wastewater but it is not treated. There is no wastewater treatment strategy for this part of the city. • Septic tanks are being connected to the network now and will be completed within 5 years. • Surface water drainage is currently the responsibility of the MoT, while wastewater treatment that of UKT. There are plans to separate rainwater and wastewater treatment channels. • Everyone in Tirana is connected to the water distribution network. The percentage of leaks has been reduced from 72% to 67%. This is mainly due to leakages in main transmission pipelines. • The masterplan for water network improvement is carried out with the water company UKT. The estimated cost is around 40 billion Lekë (300 million euros). EBRD has committed 2 billion Lekë (15 million euros) for two projects. • Water meters are currently installed in 80-85% of housing. The money collection rate is around 87%, planned to increase to 95%.
Scale of project:	50% reduction in non-revenue losses in water distribution network by 2023
Delivery mechanism & stakeholders:	UKT secures funds and delivers water infrastructure upgrades. MoT could also provide support to UKT to help finance the project.
Revenue / savings opportunities:	Opex savings and reduced non-revenue water losses. Increased cleaning tax for sewage treatment Avoided penalties for pollution events (post-EU accession)
Key metrics:	• State indicators: Drinking water quality (3), Water use (5) • Pressure indicators: Water consumption (25, 25.1), Water supply (26, 26.1)

Whole of Tirana

Better river water quality	1
Higher energy efficiency of buildings and infrastructure	1
Reduce water losses	3
Increase infrastructure resilience	3
Economic returns for investor	Y
Public health	Y

Figure 37 Results of environmental and socio-economic evaluation

7. Resource Management

ACTION

Capital project:	**RM3: Instalment of smart water meters in buildings**
Description:	Deployment of smart meters for measuring, monitoring and controlling water usage in residential and commercial buildings.
Current context:	• UKT plans to invest 700-1000 million Lekë (5-7 million euros) on a smart water metering scheme. • Feasibility study to identify locations to install smart meters could take between 12-18 months, while implementation could take 2-3 years. • Sludge treatment or AD could add revenue stream for energy generation – current project of the Government of Albania, to be handed over to UKT next year.
Scale of project:	50% of commercial properties and 25% of homes with smart water meter by 2023
Delivery mechanism & stakeholders:	UKT funds and delivers a smart water meter rollout.
Revenue / savings opportunities:	• Reduced non-revenue water losses and increased revenues. • For some customers, savings from more accurate billing of consumption.
Key metrics:	• State indicators: Drinking water quality (3), Water use (5) • Pressure indicators: Water consumption (25, 25.1), Water supply (26, 26.1)

Whole of Tirana

Higher energy efficiency of buildings and infrastructure	1
Reduce water losses	3
Economic returns for investor	Y
Economic inclusion	Y

Figure 38 Results of environmental and socio-economic evaluation

7. Resource Management

POLICY MEASURE

Policy measure:	**RM4: Implementation of secondary legislation on integrated management of water resources**
Description:	At policy level it is essential to complete alignment with the directives on urban wastewater treatment, drinking water and groundwater especially with the adoption of secondary legislation and regulations to strengthen their implementation.
Scale of policy measure:	The secondary legislation on integrated management of water resources and their alignment with EU Directives can be developed by 2019.
Delivery mechanism & stakeholders:	<u>Local stakeholders:</u> • Municipality of Tirana: Planning division; Economic development division; Environmental Protection division • Municipal Water Company UKT (Water Supply and Sewerage Directorate) <u>National stakeholders:</u> • Ministry of Infrastructure and Energy

Whole of Tirana

RM1	RM2	RM3
Household waste collection and separation	Upgrade to water distribution infrastructure	Smart water meters in buildings

Figure 39 Actions supported by policy measure

7. Resource Management

SUPPORTING ACTIONS

There were no policy gaps identified for Household Waste Collection and Separation; however, we will implement the following actions to facilitate enforcement of the current legislation:

Plans creation:

- We will develop the Local Integrated Waste Management Plans for the territory falling under its jurisdiction, in compliance with the National Integrated Waste Management Plan. This should include reference to the Introduction of new technologies and planning of investments for the construction of facilities for the recycling and treatment of waste. In this respect, it is recommended that the draft National Strategy on Integrated Management of Water Resources 2017-2020, still to be adopted, takes into account the new Circular economy approach and targets set at EU level for treatment of waste and that, accordingly, the municipal waste management plan of Tirana is updated for establishment of an Integrated Waste Management system at local level, in line with new targets.

- The organization of an efficient system of collection and separation of household waste is the preliminary essential step in the “waste hierarchy” to allow the achievement of recycling and re-using targets, thus limiting recourse to landfills and incineration in line with latest developments of EU policy towards a circular economy. In this perspective, the MoT should strengthen actions aimed at increasing percentage of household waste collection and separation, allowing division into non-recyclable and recyclable waste, mixed recyclables and organic waste, and the recycling and re-use of waste. Also plans for the reuse and recycling of electronic waste are needed.

- We will introduce provisions in compliance with the Circular Economy approach in its Local Integrated Waste Management Plan, by setting targets for high percentages of re-cycling and re-using of municipal and packaging waste by a fixed deadline.

- Although EU legislation does not prevent incineration of waste per se, compliance with high quality re-use and recycle targets shall necessary imply the reduction of the amount of waste to be disposed in landfills or used for incineration purposes. We will proceed with a careful planning for the implementation of the Municipal Waste Management Plan and related investments in infrastructure in the medium term.

Environmental Standards:

- We will work with the Ministry of Environment to ensure that the new incineration plant is built and operated to the highest standards of environmental protection for air quality and local amenity.

- As our waste collection and recycling practice improve, we will engage with the Ministry of Environment to pursue reductions in the guaranteed minimum tonnage of waste to be provided by the Municipality to avoid the city being penalized for increasing recycling.

Finance:

- Investments at local level should be focused on the setting up of waste infrastructure related to waste collection, separation at source, transportation and promotion of innovative solutions for re-use or recycling of waste. The implementation of a coherent waste management strategy requires investments which must be planned at National and Municipal level through the recourse to international donors’ funding and international financial Institutions facilities, to be used as a leverage for the involvement of the private sector in accordance with Public Private Partnership schemes, pursuant to Law 125/2013 on concessions and public, private partnership.

- We will consider the possibility to make recourse to the Energy Efficiency Fund, which is aimed at providing grants and loans or financial guarantees for In line with Law no. 10463 dated 22.09.2011 “On integrated waste management” as amended by law 32/2013 and law 156/2013.

7. Resource Management

SUPPORTING ACTIONS

In addition to the policy measures recommended above, we will implement the following actions to support the implementation of the policy measures with regards to Water Infrastructure:

- The implementation of all proposed GCAP actions is challenging due to financial and planning aspects linked to the upgrading and digitalization (smart water meters rollout) of waste water infrastructure.

- A masterplan for water network improvement is currently carried out by the Municipal water company UKT. The estimated cost for planned interventions amount to approximately 40 billion Lekë (300 million euros), i.e. 3 times higher than the yearly budget of MoT. However, investments in infrastructure lead, directly and indirectly, to economic growth and employment and especially have an important impact of life conditions of citizens.

We will engage with the National Government on the following policy measures in order to support our long-term green city vision:

- A system of penalty and sanctions able to play a deterrent role must be put in place at national level together with the introduction of the relevant criminal offences in line with EU Directive on Environmental Crimes.

- The legal framework at national level should be updated in order to introduce the concept of **circular economy** in relation to waste management. This should include: the introduction of relevant targets for: recycling of municipal waste and packaging waste by 2030; reducing landfill to a maximum percentage of municipal waste by 2030; banning landfilling of separately collected waste; banning the incineration and co-incineration of waste that can be recycled; promoting economic instruments to discourage landfilling; promoting re-use and stimulating industrial symbiosis - turning one industry's by-product into another industry's raw material; setting economic incentives for producers to put greener products on the market and support recovery and recycling schemes; organizing campaigns to change consumer behavior.

- In order to ensure conformity in the implementation of the legislation at national level and allow compliance with the ‘circular economy approach”, it is advisable that clear guidelines are provided in the secondary laws in relation to the meaning of the obligations of separate collection, recovery and high-quality recycling of waste.

- In the elaboration of business plans for the construction of new waste disposal or incineration plants potential restrictions must be taken into account, in relation to the flows of waste to be treated due to obligations arising from the ambitious re-use and recycling targets, which will eventually become mandatory for alignment with the EU Circular Economy approach.

7. Resource Management

FINANCIAL AND ECONOMIC ASSESSMENT

The following assessment maps out the cost estimates and funding needs *in lekë* for each of the actions within Resource Management, as identified from the MoT mid-term budget and from estimates developed for the GCAP.

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (Lekë '000s)	Capex estimate (Lekë '000s)	Opex over 5 years (Lekë '000s)	Devt & advisor costs (Lekë '000s)	Funding need (Lekë '000s)*
RM1a	Household waste collection and separation	New or improved service	Procurement by or on behalf of MoT; potential for donor or IFI funding	Based on 30 trucks, 10,000 bins of each type and a depot site at Sharra landfill	0	1,842,000	2,298,000	0	1,517,000
RM1b	Household Waste Recycling Centres	New or improved service	Procurement by or on behalf of MoT; potential for donor or IFI funding	Based on reference costs for UK HWRCs	0	1,517,000	509,000	0	36,180,000
RM2	Upgrade to water distribution network and infrastructure	Capital project / purchase	Procurement by or on behalf of UKT; potential for donor or IFI funding	Includes for Separation of waste and surface water, Pipe repair and new pipes, Smart leakage monitoring, Combined-sewer overflow correction, Recycled-water distribution over 5 years	0	36,180,000	1,085,000	0	36,180,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

7. Resource Management

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (Lekë '000s)	Capex estimate (Lekë '000s)	Opex over 5 years (Lekë '000s)	Devt & advisor costs (Lekë '000s)	Funding need (Lekë '000s)*
RM3	Smart water meters	New or improved service	Procurement by or on behalf of UKT; potential for donor or IFI funding	Based on 300,000 properties	0	134,000	141,000	21,000	156,000
RM4	Implementation of secondary legislation on integrated management of water resources	Policy / strategy / study	Delivery by Government of Albania	Based on advisor costs	0	0	0	18,000	18,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

7. Resource Management

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

The following assessment maps out the cost estimates and funding needs *in euro* for each of the actions within Resource Management, as identified from the MoT mid-term budget and from estimates developed for the GCAP.

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (€)	Capex estimate (€)	Opex over 5 years (€)	Devt & advisor costs (€)	Funding need (€)*
RM1a	Household waste collection and separation	New or improved service	Procurement by or on behalf of MoT; potential for donor or IFI funding	Based on 30 trucks, 10,000 bins of each type and a depot site at Sharra landfill	0	13,743,000	17,151,000	0	13,843,000
RM1b	Household Waste Recycling Centres	New or improved service	Procurement by or on behalf of MoT; potential for donor or IFI funding	Based on reference costs for UK HWRCs	0	11,320,000	3,801,000	0	11,320,000
RM2	Upgrade to water distribution network and infrastructure	Capital project / purchase	Procurement by or on behalf of UKT; potential for donor or IFI funding	Includes for Separation of waste and surface water, Pipe repair and new pipes, Smart leakage monitoring, Combined-sewer overflow correction, Recycled-water distribution over 5 years	0	270,000,000	8,100,000	0	270,000,000

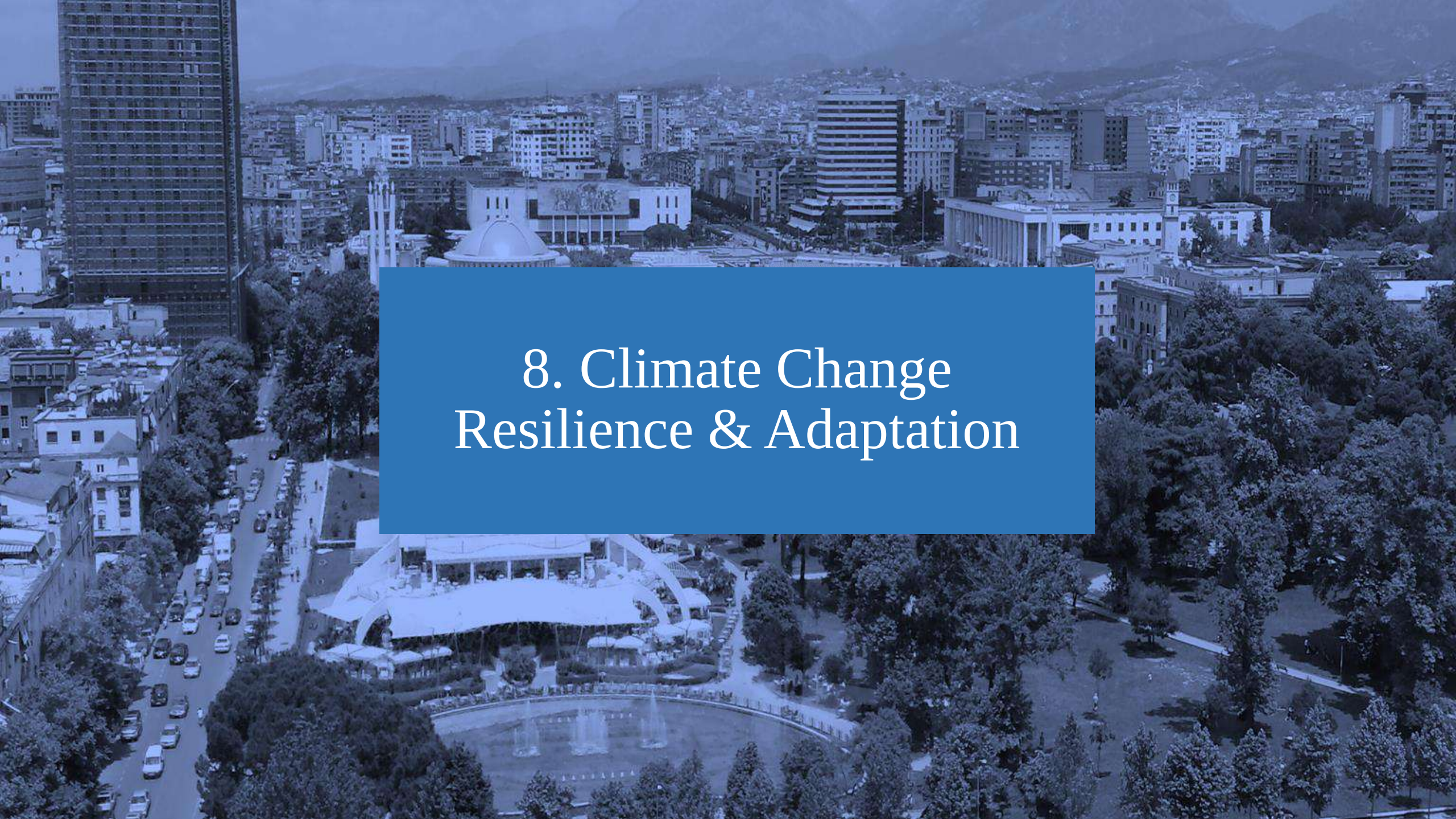
*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

7. Resource Management

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (€)	Capex estimate (€)	Opex over 5 years (€)	Devt & advisor costs (€)	Funding need (€)*
RM3	Smart water meters	New or improved service	Procurement by or on behalf of UKT; potential for donor or IFI funding	Based on 300,000 properties	0	1,003,000	1,052,000	160,000	1,163,000
RM4	Implementation of secondary legislation on integrated management of water resources	Policy / strategy / study	Delivery by Government of Albania	Based on advisor costs	0	0	0	134,000	134,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.



8. Climate Change Resilience & Adaptation

We plan to improve our **resilience** to chronic stresses and shock events and **adapt to climate change** through robust infrastructure and better preparedness of the municipality, citizens and businesses.

8. Climate Change Resilience & Adaptation

8.1 Main Challenges in Tirana

Tirana already has a Tirana Climate Change Adaptation Action Plan that sets out targets for the city to become more resilient against climate change impacts and avoid the negative impacts of extreme weather events in light of the city's rapid growth. However, there is still a need to implement organisational changes within the Municipality in order to increase preparedness of multiple city systems in the face of floods or other shock events.

The data on Climate Change Risks indicated a good performance of the indicators under the *States* of Mitigation and Adaptation. The additional analysis was enhanced by experts' observations of the city's ability to withstand climate change related shocks and stresses – notably surface water flooding and heat waves. These were flagged as priority challenges through discussions with the Municipality and local experts.

1) Climate Change Mitigation

Although the performance of the Mitigation indicators is good, the consulted experts advised that the benchmark emission values are too high if the aim is to bring the city's emissions down to be in line with a greenhouse gas emissions budget under a 1.5°C warming climate change scenario for 2100.

2) Climate Change Adaptation

Experts' comments also indicated that the Adaptation indicators capture catastrophic events, but not gradual decay of service and associated cost from chronic and worsening stresses associated with climate change; for example increased energy for cooling during heat waves, increased water stress during heat waves and droughts, reduced electricity network capacity during heat waves etc..

3) Surface Water Management

Surface water pollution (BOD and Ammonium) is a key issue. The pollution has the potential to cause health issues, harm the environment and it also reduces the availability of good quality water downstream for other uses.

Another key issue impacting surface water management is urban drainage. The annual number of storm water/sewerage overflows per 100km of network length has been marked as yellow during the data moderation process.

4) Urban Heat Island

In the "Vulnerability Assessment and Adaptation Action Plan for Tirana" (2015) by GIZ, urban heat island effect was identified as a very high risk for Tirana with regards to building stock and materials, and social infrastructure.

An example of urban heat island effect that is being experienced in densely used urban areas is the case study of the areas in the south-western city centre (Komuna e Parisit, Medar Shtylla street) which is a typical densely populated quarter of the city with very compact urban texture and very low portion of green areas.

5) Resilience of Transport and Electricity Systems

Tirana currently lacks policy on planning and testing of public transport emergency management in publicly and/or privately run networks, and it is important to address this to improve emergency preparedness.

The resilience of electricity networks in case of disaster is tested and enhanced through investment. This is considered as an urgent issue, but is not within the direct control of MoT.

8.2 What we are Already Doing

Albania has ratified both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol with the status of a Non-Annex 1 Party. It has also ratified the 2015 Paris Agreement. Albania has regularly associated itself with EU positions in the International Climate Change talks and, within the restrictions of being a Non Annex I party, committed to take action for climate change mitigation.

However, transposition in this area has not started yet and preparations in the area of climate change are at a very early stage. The EC Progress Report of 2014 emphasizes that “No progress can be reported as regards alignment with the climate Acquis. Priority should be given to the establishment of a monitoring, verification and reporting system for greenhouse gas emissions in line with the EU Monitoring Mechanism legislation”.

A National Adaptation Plan to climate change was issued on 25 April 2014. This Plan focuses on the Governmental preparedness for a long process on climate change adaptation, and addressing the need for mainstreaming the climate change adaptation concepts in all affected sectors. NAP is a process which involves various stakeholders to enhance Albania’s climate resilience over a longer time-frame. The EU financed the project for “Technical Assistance for Institution Building of the Ministry of Environment in Enforcing Environmental and Climate Acquis”, with the overall objective to support the sustainable development of the country via improved environmental and climate change requirements and to develop, implement and enforce environmental and climate change legislation to EU standards.

With the support of GIZ, we developed an Adaptation Action Plan for Tirana (2015) which aims to integrate climate adaptation measures across all sectors of the City. This document is to help equip key city decision makers to consider how the impacts of climate change may impact the city. The aim is to integrate the CCA actions into all planning and decision making to ensure that Tirana is a resilient city. The plan advises to promote information on climate change risk and adaptation, and resource efficient behaviour.

Through the General Local Plan, we plan to support the optimal use of energy and water resources to help the country better manage climate variability and build resilience to climate change.

8. Climate Change Resilience & Adaptation

8.3 Green City Actions

GCAP Vision (2018-2033)

By 2033, Tirana will be resilient to chronic stresses and shock events thanks to its resilient infrastructure and response preparedness of the Municipality, citizens and businesses.

Mid-term target (2018-2025)		Short-term actions (2018-2021)	Owner/Responsibility	Priority
SO.5A	Higher resilience of Tirana's infrastructure in the face of chronic stresses and shock events	CCRA1: Implementation of smart and resilient urban planning	Department of Territorial Planning, Department of Civil Emergencies	Medium
		CCRA2: Risk assessment of dam infrastructure in Tirana	General Directorate No.2 of City Workers, Department of Civil Emergencies	High
		CCRA3: Action plan for dam rehabilitation and maintenance	General Directorate No.2 of City Workers, Department of Civil Emergencies	High
		CCRA4: Financial incentives for implementing private and community adaptation measures	Department of Environmental Policies and Education, Department of Civil Emergencies	Medium
SO.5B	Higher resilience and preparedness of business, community and the Municipality	CCRA5: Update of the Early Warning system with a mapping of extreme weather events	Department of Civil Emergencies	Medium
		CCRA6: Preparation of an emergency action plan	Department of Civil Emergencies	High

8. Climate Change Resilience & Adaptation

ACTION

Capital project:	**CCRA1: Implementation of smart and resilient urban planning**
Description:	It emerged from the GCAP public consultation on 6 December 2017 that there is an urgent need of urban planning that takes into consideration climate change impacts. This should include: • Planning of green spaces and trees that absorb the most CO_2 and are able to adapt to Tirana's climate to ensure longevity through the year. • Planning of sustainable urban drainage solutions to manage surface water and prevent flooding. • Planning of buildings to include heat adapted design such as white facades, use of blinds, green roofs, and efficient cooling technologies. • Introduction of a reporting and monitoring system for building insulation to ensure heat resilient buildings. • Planning of the transport sector to consider climate change risks on transport infrastructure.
Scale of project:	City-wide, including the rural areas. Planning begins in 2019 and is subject to two-yearly reviews.
Delivery mechanism & stakeholders:	Department of Territorial Planning
Revenue / savings opportunities:	• Savings as a result of reducing the impact of climate changes on residents and businesses in Tirana
Key metrics:	• State indicators: GHG Emissions (8, 8.1), Adaptation (Resilience to Natural Disaster Risks) (9, 9.1, 9.2) • Pressure indicators: Resilience to floods (28, 28.1, 28.2) • Response indicators: Water (60, 61), Transport (40).

Whole of Tirana

Smart mobility	2
More and better green space	3
Better river water quality	2
Secure and diverse energy supplies	2
Higher energy efficiency of buildings and infrastructure	3
Reduce water losses	2
Increase infrastructure resilience	3
Increase business, community and municipal resilience	2
Economic returns for investor	Y
Public health	Y
Community involvement	Y

Figure 40 Results of environmental and socio-economic evaluation

8. Climate Change Resilience & Adaptation

ACTION

Capital project:	**CCRA2: Risk assessment of dam infrastructure in Tirana**
Description:	This action would involve implementing a Portfolio Risk Assessment (PRA) for the 48 dams. The objective is to provide for each of the dams an analysis of the risk of each reservoir to people's safety and evaluate whether this risk is acceptable or not. The PRA would enable a prioritisation of the upgrading works to be undertaken in the interest of safety. The scope of the action would include: • site visit of each site • collection of existing documentation (design, surveillance reports, dam break inundation maps, GIS database regarding population and buildings in the downstream areas) • identification and analysis of potential failure modes of the dams • dam break analysis and consequences evaluation • assessment of the tolerability of the risk of the reservoirs • identification of options to reduce risk.
Scale of project:	City-wide Territory of the Municipality of Tirana, including the municipalities of Vore and Kamez
Delivery mechanism & stakeholders:	General Directorate No. 2 of the City Workers, responsible for dams, river Basins and reservoirs; Department of Territorial Planning and Department of Public Works Planning
Revenue / savings opportunities:	• Savings as a result of reducing the impact of dam infrastructure failure due to natural disasters (flood, earthquake) or infrastructure ageing
Key metrics:	• State indicators: Adaptation (Resilience to Natural Disaster Risks) (9, 9.1, 9.2) • Pressure indicators: Resilience to floods (28, 28.1, 28.2) • Response indicators: Water (60, 61)

Outer Tirana

Better river water quality	2
Reduce water losses	3
Increase infrastructure resilience	2
Increase business, community and municipal resilience	2

Figure 41 Results of environmental and socio-economic evaluation

8. Climate Change Resilience & Adaptation

ACTION

Capital project:	**CCRA3: Action plan for dam rehabilitation and maintenance**
Description:	Based on the findings of the Portfolio Risk Assessment undertaken for the 48 dams, a prioritisation process must be implemented in order to identify the most urgent upgrading works to be undertaken for the interest of safety. Initial costing and planning should be prepared for budget purposes, including Terms of Reference for feasibility studies for upgrading works. In parallel, a complete audit of current maintenance and surveillance procedures must be undertaken. The audit would cover Operation and Maintenance Manual, including procedures for surveillance and monitoring, and Emergency Preparedness Plan. Current practice will be compared with international standards for dam safety in order to align with international practices. This action would also include preparation of programme for training of staff in the general field of dam safety, including operational staff and managerial staff.
Scale of project:	City-wide
Delivery mechanism & stakeholders:	General Directorate No. 2 of the City Workers, responsible for dams, river Basins and reservoirs; Department of Territorial Planning and Department of Public Works Planning
Revenue / savings opportunities:	• Savings as a result of reducing the impact of natural disasters on dam infrastructure
Key metrics:	• State indicators: Adaptation (Resilience to Natural Disaster Risks) (9, 9.1, 9.2) • Pressure indicators: Resilience to floods (28, 28.1, 28.2) • Response indicators: Water (60, 61)

Outer Tirana

Better river water quality	2
Reduce water losses	3
Increase infrastructure resilience	3
Increase business, community and municipal resilience	2

Figure 42 Results of environmental and socio-economic evaluation

8. Climate Change Resilience & Adaptation

POLICY MEASURE

Policy measure:	**CCRA4: Financial incentives for implementing community adaptation measures**
Description:	The Adaptation Plan envisages financial incentives for implementing private climate change adaptation measures. For example, houses close to flood prone areas should be covered by insurance and a tax reduction could be offered in case of implementation of climate change adaptation measures. The financial measures could be setup as part of a fund and will need to consider both residential buildings and those owned by businesses, e.g. for the rising cost for cooling.
Delivery mechanism & stakeholders:	<u>Local stakeholders:</u> • Municipality of Tirana, community groups, voluntary sector • Responsible departments include Dept. of Environmental Policies and Education and Dept. of Strategic Planning

Whole of Tirana

CCRA1	CCRA2	CCRA3	CCRA4	CCRA5
Smart urban planning	Dam risk assessment	Dam rehabilitation	Mapping of extreme events	Emergency action plan

Figure 43 Actions supported by policy measure

8. Climate Change Resilience & Adaptation

ACTION

Capital project:	**CCRA5: Update of the Early Warning system with a mapping of extreme weather events**
Description:	Tirana's Adaptation Plan recommends updating the mapping of weather events to consider climate change scenarios. The Early Warning system should be updated with the list of extreme weather events related to climate change and should be upgraded to provide data in real time. It was also confirmed through the GCAP public consultation on 6 December 2016 that a study of climate change hot spots and easily affected areas from extreme weather events in Tirana needs to be carried out.
Current context:	• An Early Warning system is in place and being upgraded into Integrated Rescue System 112.
Scale of project:	City-wide to identify the vulnerable hot spots easily affected from extreme weather events. This action can be completed by 2020.
Delivery mechanism & stakeholders:	Department of Civil Emergencies to use existing data, such as data on current flood events, and invest in a detailed study on the impact of climate change related weather events on the citizens of Tirana. We will communicate the information from the mapping exercise to the public through information campaigns, social media, public events and education in schools.
Revenue / savings opportunities:	• Reduced cost of damage due to extreme weather events. • Mapping the hot spots affected by extreme weather events will help smarter urban planning and to make smart investments in projects that precede disastrous events.
Key metrics (See Appendix 1):	• State indicators: GHG Emissions (8, 8.1), Adaptation (Resilience to Natural Disaster Risks) (9, 9.1, 9.2) • Pressure indicators: Resilience to floods (28, 28.1, 28.2) • Response indicators: Water (60, 61), Transport (40).

Whole of Tirana

Better river water quality	1
Secure and diverse energy supplies	2
Reduce water losses	1
Increase infrastructure resilience	3
Increase business, community and municipal resilience	2
Public health	Y

Figure 44 Results of environmental and socio-economic evaluation

8. Climate Change Resilience & Adaptation

ACTION

Capital project:	**CCRA6: Preparation of an emergency action plan**
Description:	Tirana's Adaptation Plan recommends identifying the economic activities that may be affected by a disaster and sharing MoT's responsibilities with the private sector on risk prevention and reduction, performance during emergencies, and reconstruction improvements. These can be fed into a comprehensive emergency action plan on behaviour during extreme weather events both in the city and rural areas. The emergency action plan will need to include interventions for buildings and social centres, emergency transport options such as smart street furniture for emergency messaging and rerouting/ bypasses, emergency energy supply, tools for inspection and analysis during emergency situations, and actions to be taken by the community prior or during extreme events. Due attention should be given to water bodies furnishing the city with potable water and to separate storm and waste water.
Current context:	The surface and underground waters as well as the Bovilla reservoir that supplies the city with potable water are prone to contamination when such extreme weather events happen.
Scale of project:	The emergency action plan will apply to the whole city, including the rural areas. This action plan can adopted for a mid term period by 2023.
Delivery mechanism & stakeholders:	Department of Civil Emergencies could invest in emergency action plan, with participation from the private sector. As part of the plan implementation we will communicate the need for preparedness to the public through information campaigns, social media, public events and education in schools.
Revenue / savings opportunities:	• Reduced cost of damage due to extreme weather events.
Key metrics:	• State indicators: GHG Emissions (8, 8.1), Adaptation (Resilience to Natural Disaster Risks) (9, 9.1, 9.2) • Pressure indicators: Resilience to floods (28, 28.1, 28.2) • Response indicators: Water (60, 61), Transport (40).

Whole of Tirana

Smart mobility	1
Better river water quality	2
Secure and diverse energy supplies	2
Reduce water losses	2
Increase infrastructure resilience	3
Increase business, community and municipal resilience	3
Public health	Y
Community involvement	Y

Figure 45 Results of environmental and socio-economic evaluation

8. Climate Change Resilience & Adaptation

SUPPORTING ACTIONS

There were no policy gaps identified for Climate Change Adaptation & Resilience actions; however, we will implement the following actions to support the current legislation:

- Clear institutional arrangements and a monitoring and reporting mechanism on the Greenhouse Gas Emissions should be set up to enable concrete institutional support/inputs issues.
- Land use planning to maintain and increase natural areas and leave natural soil undisturbed, and increase technologies to prevent heat waves, flood risks in the city, etc..
- We will prepare a set of Climate Change Adaptation Actions in line with Governmental targets and strategy in order to manage the posed risks, including investments planned for the intervention proposed related to emergency management.

We will engage with the National Government on the following policy measures in order to support our long-term green city vision:

- To enact a Standalone Climate Change Legislation to address the basis for climate change issues at national and local level, implement the Climate Change Strategy, establish a permanent coordinating body on climate change and a Technical Advisory Committee.
- To develop and adopt a National Action Plan on Mitigation.
- Transposition of the overall EU acquis on energy and climate to ensure effective impacts of actions proposed for Climate Change mitigation and adaptation.
- Introduction of regulatory obligations to assess existing spatial settlement structures or to re-examine existing spatial plans through climate change resilience audits aiming at the reduction of vulnerability to climate change

8. Climate Change Resilience & Adaptation

FINANCIAL AND ECONOMIC ASSESSMENT

The following assessment maps out the cost estimates and funding needs *in lekë* for each of the actions within Climate Change Resilience & Adaptation, as identified from the MoT mid-term budget and from estimates developed for the GCAP.

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (Lekë '000s)	Capex estimate (Lekë '000s)	Opex over 5 years (Lekë '000s)	Devt & advisor costs (Lekë '000s)	Funding need (Lekë '000s)*
CCRA1	Implement smart and resilient urban planning	Policy / strategy / study	Procurement by or on behalf of MoT; potential for donor or IFI funding	Cost estimate relates to staff to prepare plan, plus three years of a resilience officer	0	0	22,000	0	0
CCRA2	Risk assessment of dam infrastructure in Tirana	Policy / strategy / study	Procurement by or on behalf of MoT; potential for donor or IFI funding	Based on consultant costs	0	0	0	8,000	8,000
CCRA3	Action plan for dam rehabilitation and maintenance	Policy / strategy / study	Procurement by or on behalf of MoT; potential for donor or IFI funding	Includes advisor and capital costs of rehabilitation	0	209,000	150,000	0	209,000
CCRA4	Financial incentives for implementing private and community adaptation measures	Programme or incentive	Potential for municipal or national level implementation, and for private investment or delivery	Based on advisor costs	0	0	0	12,000	12,000

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

8. Climate Change Resilience & Adaptation

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (Lekë '000s)	Capex estimate (Lekë '000s)	Opex over 5 years (Lekë '000s)	Devt & advisor costs (Lekë '000s)	Funding need (Lekë '000s)*
CCRA5	Update the Early Warning system with a mapping of extreme weather events	Information and capacity building	Procurement by or on behalf of MoT; potential for donor or IFI funding	Cost estimate relates to consultant cost to set up system and initially populate event mapping.	0	12,000	31,000	0	12,000
CCRA6	Prepare an emergency action plan	Policy / strategy / study	Procurement by or on behalf of MoT; potential for donor or IFI funding	Cost estimate relates to staff to prepare plan, plus training and pamphlets for community	0	0	92,000	0	0

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

8. Climate Change Resilience & Adaptation

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

The following assessment maps out the cost estimates and funding needs *in euro* for each of the actions within Climate Change Resilience & Adaptation, as identified from the MoT mid-term budget and from estimates developed for the GCAP.

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (€)	Capex estimate (€)	Opex over 5 years (€)	Devt & advisor costs (€)	Funding need (€)*
CCRA1	Implement smart and resilient urban planning	Policy / strategy / study	Procurement by or on behalf of MoT; potential for donor or IFI funding	Cost estimate relates to staff to prepare plan, plus three years of a resilience officer	0	0	163,500	0	0
CCRA2	Risk assessment of dam infrastructure in Tirana	Policy / strategy / study	Procurement by or on behalf of MoT; potential for donor or IFI funding	Based on consultant costs	0	0	0	57,600	57,600
CCRA3	Action plan for dam rehabilitation and maintenance	Policy / strategy / study	Procurement by or on behalf of MoT; potential for donor or IFI funding	Includes advisor and capital costs of rehabilitation	0	1,560,000	1,120,000	0	1,560,000
CCRA4	Financial incentives for implementing private and community adaptation measures	Programme or incentive	Potential for municipal or national level implementation, and for private investment or delivery	Based on advisor costs	0	0	0	90,000	90,000

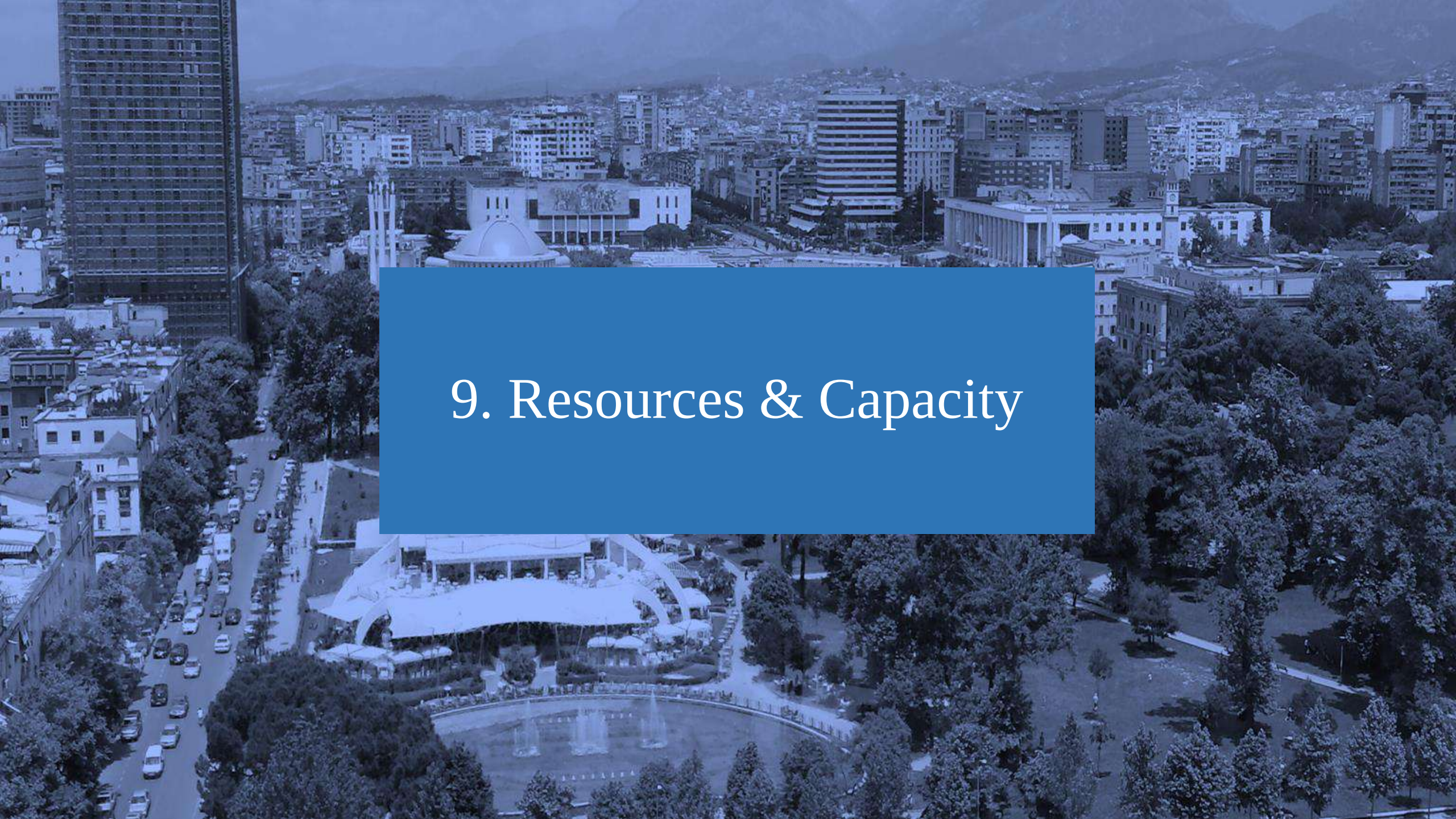
*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

8. Climate Change Resilience & Adaptation

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (€)	Capex estimate (€)	Opex over 5 years (€)	Devt & advisor costs (€)	Funding need (€)*
CCRA5	Update the Early Warning system with a mapping of extreme weather events	Information and capacity building	Procurement by or on behalf of MoT; potential for donor or IFI funding	Cost estimate relates to consultant cost to set up system and initially populate event mapping.	0	90,000	235,000	0	90,000
CCRA6	Prepare an emergency action plan	Policy / strategy / study	Procurement by or on behalf of MoT; potential for donor or IFI funding	Cost estimate relates to staff to prepare plan, plus training and pamphlets for community	0	0	688,000	0	0

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.



9. Resources & Capacity

9. Resources & Capacity

9.1 Introduction

To ensure the success of the GCAP, it is essential to invest in building capacity within both the Municipality and private sector on how to implement and monitor the proposed actions and policy measures. It is also crucial to build awareness amongst our citizens on the importance of each of these actions and the role they need to play in order to make the GCAP a success and contribute towards making Tirana an even greener, safer and more inclusive city.

This chapter therefore provides a cross-cutting review of the general resources and capacity building measures to support the implementation of the GCAP actions. These are broadly divided into:

- Human resources, including capacity building for the Municipality and the private sector
- Public promotion, education and awareness measures
- Data collection and monitoring

9. Resources & Capacity

ACTION

Capacity:	**RC1: Capacity building of the Municipality of Tirana**
Description:	The Municipality will require upgraded services related to the thematic areas of the GCAP to ensure the implementation of all actions. This will involve a study to map the departments to be upgraded and the skills required, which will include at least the following: • Landscape architects and ecologists will be required to support urban planning. • Energy experts at Municipal level will need to be trained and accredited on the issuance of energy certificates in buildings. • Municipal staff will need to be trained in relation to circular economy. • Administrative capacity to enforce legislation will be strengthened with reference to the management and inspection of legal activities. • Municipal staff will need to be trained on the organization of tenders and setting of private public partnership (PPP) projects. • Management and monitoring activities for all actions will require a standing working group. • Data analysts will be required to support the monitoring of actions. The collaboration and exchange of information between the Municipality of Tirana and the National Government will be a necessary step to the capacity building process. This action will include a review of the current state of knowledge transfer, and will include mechanisms to improve collaboration.
Scale of project:	The capacity building process should be done constantly and in any time where legal changes affecting this area occur.
Delivery mechanism & stakeholders:	Process needs to be approved and initiated by the Mayor.
Revenue / savings opportunities:	• Training Municipality staff on the implementing resilience and adaptation measures would reduce cost of damage due to extreme weather events.
Key metrics:	This will involve all indicators across the five themes.

Whole of Tirana

Increase shift to public and active transport	1
Smart mobility	1
Ending sprawl	1
More and better green space	2
Better river water quality	1
Secure and diverse energy supplies	1
Higher energy efficiency of buildings and infrastructure	2
Reduce waste to landfill and increase recycling	2
Reduce water losses	1
Increase infrastructure resilience	2
Increase business, community and municipal resilience	3
Economic returns for investor	Y
Economic inclusion	Y
Community involvement	Y

Figure 46 Results of environmental and socio-economic evaluation

9. Resources & Capacity

ACTION

Capacity:	**RC2: Capacity building measures for businesses**
Description:	Capacity building of the private sector will need to be conducted by the municipality to ensure alignment of the private sector with the green city actions. This will include at least the following sectors: • Heat adapted building design (e.g. white facades, use of blinds, green roofs) • Energy efficient cooling technologies • Sustainable urban landscaping and maintenance of open green spaces and forests • Information on mapping of flooding hotspots This action will involve formal training sessions, workshops and online resources.
Scale of project:	Municipality trains private sector businesses
Delivery mechanism & stakeholders:	The private sector stakeholders affected by the GCAP actions will be those falling under: • Albanian Construction Association • Albania Recycles Association
Revenue / savings opportunities:	• Reduction of cost of damage due to extreme weather events.
Key metrics:	This will involve all indicators across the five themes.

Whole of Tirana

Increase shift to public and active transport	1
Smart mobility	1
Ending sprawl	1
More and better green space	2
Better river water quality	1
Secure and diverse energy supplies	1
Higher energy efficiency of buildings and infrastructure	2
Reduce waste to landfill and increase recycling	2
Reduce water losses	1
Increase infrastructure resilience	2
Increase business, community and municipal resilience	3
Economic returns for investor	Y
Economic inclusion	Y

Figure 47 Results of environmental and socio-economic evaluation

9. Resources & Capacity

ACTION

Education:	**RC3: Public promotion, education and awareness campaigns**
Description:	It emerged from the GCAP public consultation on 6 December 2017 that there is a need to implement better campaigns and actions for public education regarding people's impact on climate change as well as how climate change impacts them. Most of the public is not well aware of these issues, and it is therefore difficult for them to change their behaviour. Continued campaigns with the public will be necessary to raise awareness of the public on: • Non-motorized transport (green transport), use of car-free areas, use of public transport, eco-schemes and taxation schemes. • Local natural resource management, adjudication of land, the rational use of the natural resources and protection of the biodiversity, and the development of tourism and environment protection as tools for development of local livelihoods. • Electric vehicles and building energy efficiency schemes. • Waste management and recycling. • The impacts of climate change and the emergency action plan, and raise public interest in insurance and tax reduction schemes.
Scale of project:	City-wide
Delivery mechanism & stakeholders:	• Department of Environmental Policies & Education • Community groups • Non-governmental organizations (such as Eco Tirana) • Public affected • Researchers and academics • Other related actors
Revenue / savings opportunities:	• Reduced costs from climate change impacts • Revenue from increased participation of the public in actions
Key metrics:	This will involve all indicators across the five themes.

Whole of Tirana

Increase shift to public and active transport	2
Smart mobility	2
Ending sprawl	1
More and better green space	2
Better river water quality	2
Secure and diverse energy supplies	2
Higher energy efficiency of buildings and infrastructure	2
Reduce waste to landfill and increase recycling	2
Reduce water losses	1
Increase infrastructure resilience	2
Increase business, community and municipal resilience	3
Economic inclusion	Y
Public health	Y
Gender equality	Y
Community involvement	Y

Figure 48 Results of environmental and socio-economic evaluation

9. Resources & Capacity

ACTION

Resources:	**RC4: Implementation of improved data collection & monitoring**
Description:	The technical assessment of indicators and prioritisation of challenges demonstrated gaps in the data available to the Municipality (see overleaf for discussion on data quality). Therefore, there is a need to design a methodology for improved data collection. The methodology will describe the data that needs to be collected, the frequency of collection, the process for analysing the data, and how to improve the data collection process. In addition, monitoring of the collected data will be explained in the methodology. The following page summarises the data gaps and the areas which data collection needs to focus on. Collecting more and better quality data will help Departments measure the impact of the actions defined in the GCAP and make decisions on how to modify the actions in order to improve their outcomes. Data collection is discussed further in Chapter 10, Monitoring, Verification and Reporting.
Scale of project:	Across the Municipality, both urban and rural areas.
Delivery mechanism & stakeholders:	Process needs to be approved and initiated by the Mayor. Municipality staff in the relevant departments will be responsible for delivering the work. All MoT departments should report to the Department of Statistics, which needs to collect all the data.
Revenue / savings opportunities:	By having access to richer city data, we will be able to make better informed decisions about areas or sectors in the urban and rural parts of Tirana that need further investment. This will create efficiencies in the way the Municipality operates.
Key metrics:	This will involve all indicators across the five themes.

Whole of Tirana

Increase shift to public and active transport	3
Smart mobility	3
Ending sprawl	1
More and better green space	1
Better river water quality	1
Secure and diverse energy supplies	1
Higher energy efficiency of buildings and infrastructure	3
Reduce waste to landfill and increase recycling	1
Reduce water losses	1
Increase infrastructure resilience	3
Increase business, community and municipal resilience	3
Economic returns for investor	Y
Economic inclusion	Y
Public health	Y
Gender equality	Y
Community involvement	Y

Figure 49 Results of environmental and socio-economic evaluation

9. Resources & Capacity

DATA COLLECTION AND MONITORING

The table below provides a summary of the results of the indicator data quality evaluation, showing where data quality was strong or weak. Future data collection should focus on the areas with currently adequate and weak data quality as well on the areas where no data is available.

	Rich data quality	Good data quality	Adequate data quality	Weak data quality	No data / data unacceptable
State Indicators					
Air			■		
Water Bodies		■			
Drinking Water	■				
Soil					■
Water Use				■	
Land Use				■	
Biodiversity and Ecosystems					■
Mitigation				■	
Adaptation				■	
Pressure Indicators					
Transport		■			
Buildings	■				
Industries	■				
Energy	■				
Water (Supply, Sanitation, Drainage)		■			
Solid Waste			■		
Land-Use				■	
Response Indicators					
Transport		■			
Buildings		■			
Industries			■		
Energy		■			
Water (Supply, Sanitation, Drainage)			■		
Solid Waste		■			
Land-Use			■		

Table 8. Summary of Indicator Data Quality for Tirana GCAP

Rich data quality: Highly credible sources and/or multiple corroborating sources. Lengthy time series (over several years) applying a consistent methodology. High spatial (multiple data collection points around the city) and/or temporal (at least monthly results) granularity. Data scope relates very well to Tirana municipality / county

Good data quality: Credible sources and/or more than one corroborating sources. Multiple data years (at least 5 years of data). Data scope relates well to Tirana municipality / county

Adequate data quality: Credible sources of data. At least three years of data points. Where data is only available on a national basis, there is evidence that Tirana is reasonably consistent with the national picture.

Weak data quality: Data source not credible or collection methodology is weak or poorly documented. Only one or two data points available. Data scope relates to national or regional area instead of Tirana specifically.

No data / data unacceptable.

Figure 50 Data quality categorisation

9. Resources & Capacity

FINANCIAL AND ECONOMIC ASSESSMENT

The following assessment maps out the cost estimates and funding needs *in lekë* for each of the actions within Resources and Capacity, as identified from the MoT mid-term budget and from estimates developed for the GCAP.

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (Lekë '000s)	Capex estimate (Lekë '000s)	Opex over 5 years (Lekë '000s)	Devt & advisor costs (Lekë '000s)	Funding need (Lekë '000s)*
RC1	Capacity building of the Municipality of Tirana	Capacity building	Procurement by or on behalf of MoT; potential for donor or IFI funding	Includes for 7 no. staff plus working group and training	0	0	361,000	20,000	20,000
RC2	Capacity building measures for businesses	Capacity building	Procurement by or on behalf of MoT; potential for donor or IFI funding	Includes costs for online materials and ongoing costs for training and working groups	0	0	40,000	62,000	62,000
RC3	Public promotion, education and awareness campaigns	Communication	Procurement by or on behalf of MoT; potential for donor or IFI funding	Includes print and broadcast media	0	0	57,000	0	0
RC4	Implementation of improved data collection & monitoring	Capacity building	Procurement by or on behalf of MoT; potential for donor or IFI funding	Includes improved methodology, software development, AQ and traffic monitoring	0	0	177,000	8,000	8,000
RC5	Resources to support energy efficiency measures	Capacity building	MoT	3 FTE for energy efficiency unit, 0.5 FTE for energy expert on technical panel	0	0	134,000	0	0

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.

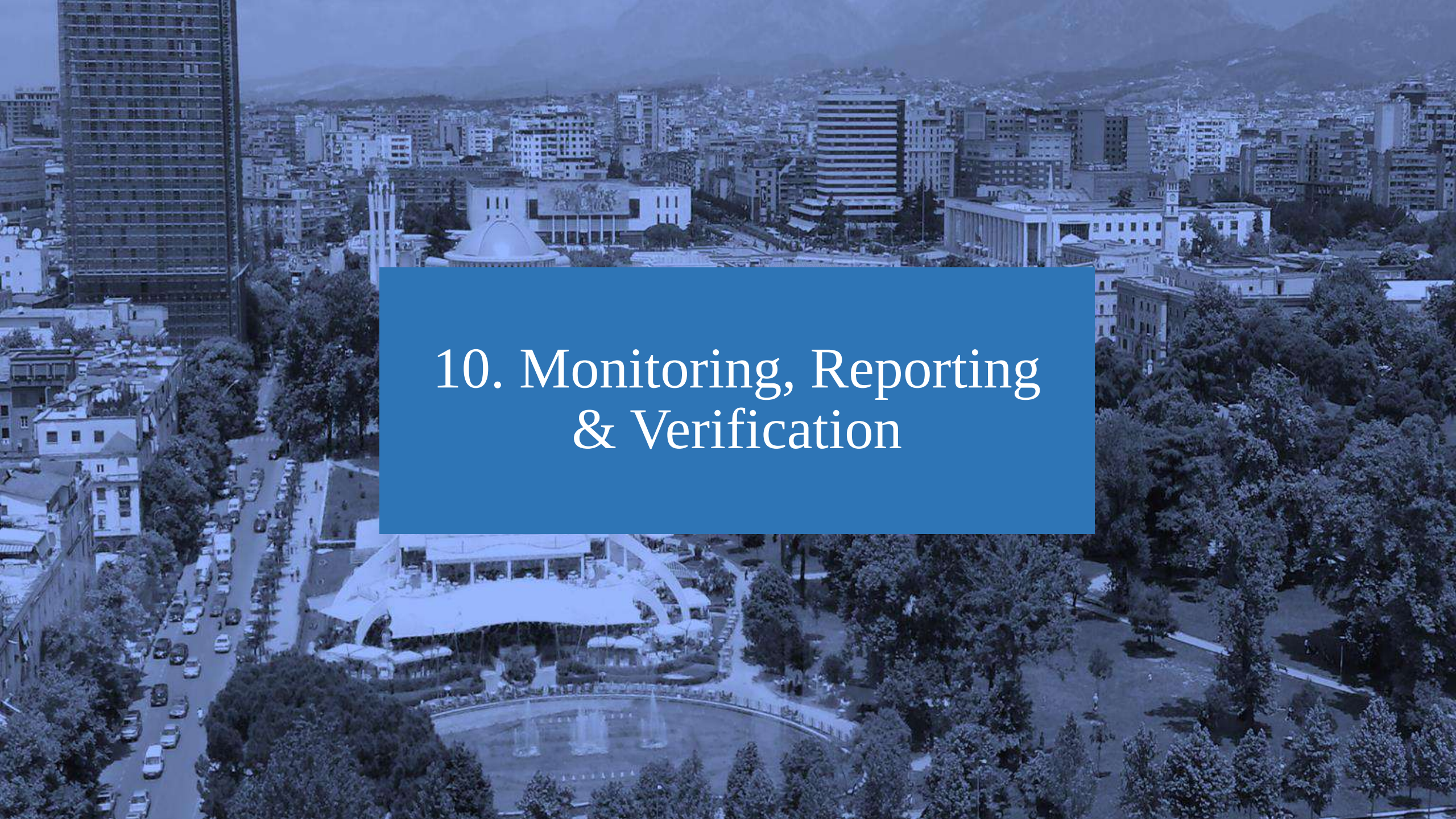
9. Resources & Capacity

FINANCIAL AND ECONOMIC ASSESSMENT (CONTINUED)

The following assessment maps out the cost estimates and funding needs *in euro* for each of the actions within Resources and Capacity, as identified from the MoT mid-term budget and from estimates developed for the GCAP.

No.	Proposed GCAP Actions	Type of action	Expected delivery route	Notes on budget & cost estimate	Mid-term budget (€)	Capex estimate (€)	Opex over 5 years (€)	Devt & advisor costs (€)	Funding need (€)*
RC1	Capacity building of the Municipality of Tirana	Capacity building	Procurement by or on behalf of MoT; potential for donor or IFI funding	Includes for 7 no. staff plus working group and training	0	0	2,692,000	150,000	150,000
RC2	Capacity building measures for businesses	Capacity building	Procurement by or on behalf of MoT; potential for donor or IFI funding	Includes costs for online materials and ongoing costs for training and working groups	0	0	300,000	460,000	460,000
RC3	Public promotion, education and awareness campaigns	Communication	Procurement by or on behalf of MoT; potential for donor or IFI funding	Includes print and broadcast media	0	0	422,500	0	0
RC4	Implementation of improved data collection & monitoring	Capacity building	Procurement by or on behalf of MoT; potential for donor or IFI funding	Includes improved methodology, software development, AQ and traffic monitoring	0	0	1,320,000	60,000	60,000
RC5	Resources to support energy efficiency measures	Capacity building	MoT	3 FTE for energy efficiency unit, 0.5 FTE for energy expert on technical panel	0	0	1,000,000	0	0

*Note: “Funding need” is the difference between the mid-term budget and the sum of capex and devt & advisor costs. Opex is not included in this figure.



10. Monitoring, Reporting & Verification

10. Monitoring, Reporting & Verification

10.1 Introduction

We have developed an outline MRV plan to:
1) monitor the implementation of the GCAP; and
2) measure the impact of the GCAP actions and evaluate their success against the actions' targets.

10.2 Implementation Monitoring

Monitoring the implementation of the GCAP actions will be embedded in our core organisation structure and processes within the MoT. We have developed a 5-step process to plan and monitor the implementation of the GCAP.

1) **Organisation**: We will set up a coordination body within the Department for Strategic Planning to monitor the implementation of the GCAP. See table overleaf.

2) **Scheduling and Resourcing**: The coordination body will assign each GCAP action to a responsible department. A Project Leader or Task Director within each department will define a champion for each action. The champions will be responsible for data collection on indicators and reporting on progress of each action.

3) **Budgeting and Work Authorisation**: Each department will set the budgets and timescales for delivering the actions assigned to them. The budget and scope of work will be authorised according to the standard MoT processes.

4) **Reporting & Monitoring**: The champions within each department will provide regular reports of the progress of each action (according to the set timescales and budget) to the coordination body.

5) **Change management**: The results of the monitoring will inform the planning of the subsequent stages of each action. Amendments will be made to the timescales, resources and budget, as necessary.

10. Monitoring, Reporting & Verification

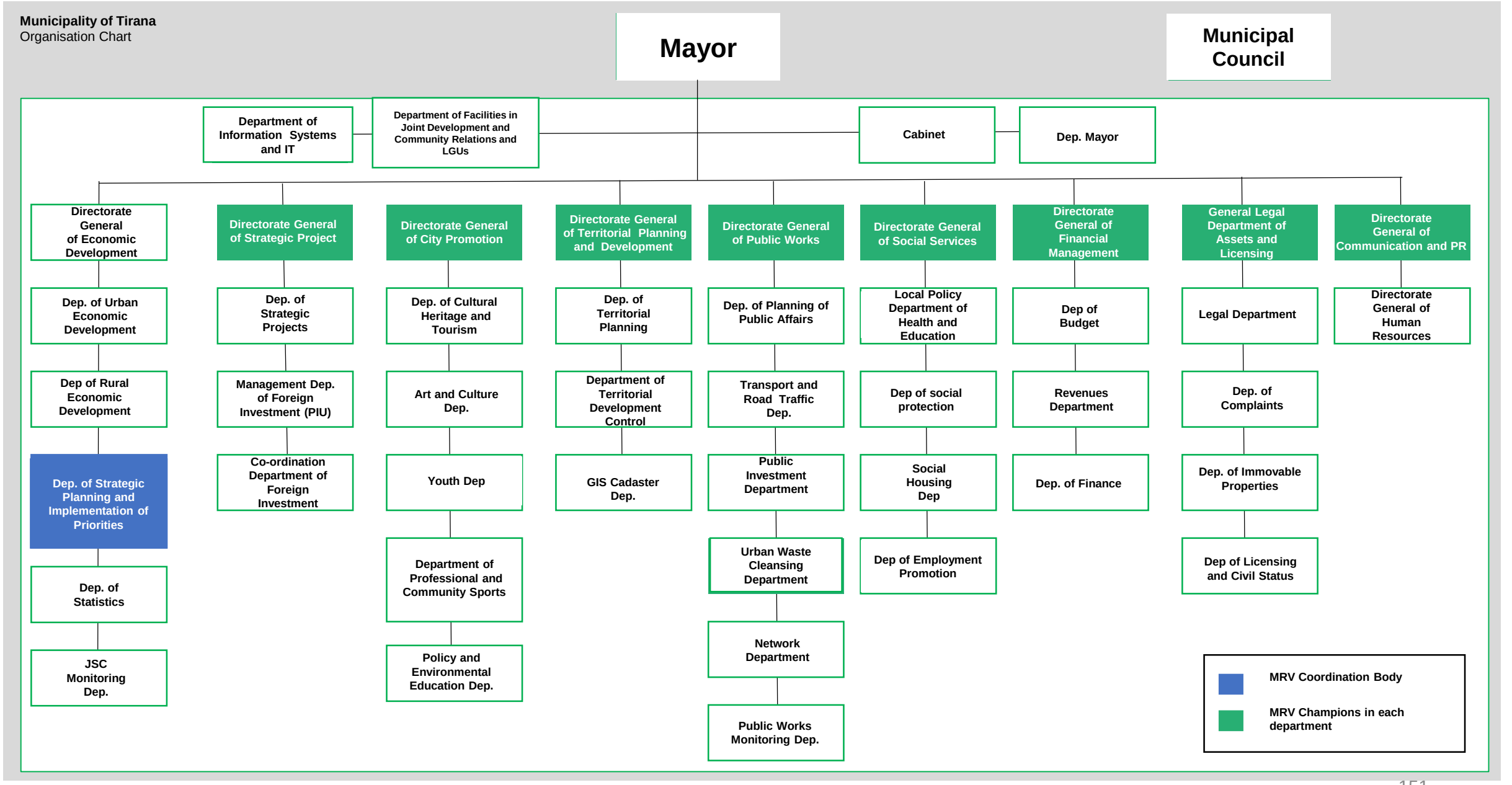


Figure 51 Municipality organisation showing how the GCAP coordination unit will be established

10.3 Impact Monitoring Methodology[1]

The purposes of monitoring and evaluating the results of the actions are multi-fold:

i. To understand whether the actions are achieving their intended outcome,
ii. To make changes during the course of the actions to ensure they meet their targets,
iii. To promote the successes of the actions and draw lessons from these.

The process of monitoring and reporting follows these seven steps:

1. MRV initiation
2. Understand the baseline
3. Agree objectives and targets
4. Set up monitoring scheme
5. Implementation monitoring
6. Evaluate process and achievements
7. Evaluation report

1. MRV initiation

Identify resources

The Department for Strategic Planning will nominate an MRV Coordinator who will be responsible for coordinating the implementation and monitoring of the GCAP actions. Each action falls within the realm of specific departments. Each department will identify an MRV Champion who will be responsible for monitoring the progress of the relevant actions within their department. The MRV Champion will determine appropriate stakeholders for data collection and review, approve responses, and complete the templates introduced in this plan. Each department's MRV Champion will feed back the collected data and results to the designated MRV Coordinator within the Department for Strategic Planning.

Establish collaborative approaches

The MRV Champion will also aim to align the MRV process with other city processes. The results of the GCAP actions monitoring can be complementary to other planning agendas and activities in the city like development planning, adaptation measures, risk mitigation, disaster risk resilience, and sustainability plans. Additionally, we aim to use the GCAP to stimulate cross-departmental collaboration to work on these complementary agendas.

Aligning GCAP monitoring with other planned activities in the city will help us align data collection with other stakeholder engagement initiatives to prevent duplication and improve efficiency.

Set data collection standards

To help MRV Champions record and store data consistently, the MRV Coordinator will set guidelines for data recording and storing. Since the GCAP indicators will be measured against global benchmarks, the data guidelines would also include definitions of terms and align them with the context in Tirana, as well as clarify data privacy principles.

2. Understand the baseline

We established the GCAP baseline in 2017 through the collection of indicators across the aspects of the environment (States), urban systems (Pressures) and actions by the Municipality, other stakeholders and citizens (Responses). These indicators were assembled in a database and reported in the GCAP Technical Assessment Report, which serves as a reference document for the monitoring and evaluation of the performance of all GCAP actions.

[1] This methodology draws upon the recommendations in the City Resilience Index (CRI) Training Toolkit, developed in 2017 by Arup and The Rockefeller Foundation.

We will use the database and continue to collect data across these indicators. As new indicators are identified, the database will be expanded to include them.

As part of the baseline assessment, the expert team identified a number of areas of poor quality or where additional indicators are needed to provide a more complete picture of Tirana's environment and the impact our urban systems are having on the environment. The data quality assessment was discussed in the previous chapter. In Section 9.3, we identify some of the main aspects where new indicators or additional measures for collection have been identified.

Throughout the GCAP, each action has been assigned several indicators which will help measure its success. A full list of all indicators can be found in Appendix 2 of the GCAP.

Example:

The key metrics for measuring the impact of the action ***Reallocate street space to buses and cyclists*** are:

- State indicators: Air quality (1, 1.1, 1.2, 1.3), GHG emissions (8, 8.1)
- Pressure indicators: Choice of transport mode (11, 11.1, 11.4, 11.5, 11.6, 11.7), Road congestion (12)

Actions:

- MV1: Update the database with more recent baseline data, across all indicators
- MV2: Work with agencies to fill gaps and improve quality of reporting in the weakest indicators.

3. Agree objectives and targets

For each action, we will specify the objectives and targets it aims to achieve and by what time. Within the GCAP each strategic objective has time-bound targets associated with it and short-term actions that will contribute to achieving each target. Each of the actions has metrics assigned to it and there is a global benchmark for the performance of each of these metrics. The benchmark values are available in the Technical Assessment Report.

Once the GCAP actions have been agreed and adopted, we will link each action to the measurable indicators in the database to show progress as a result of action.

Example:
One of the Sustainable Mobility mid-term targets is to *increase shift to public and active transport by achieving 70% mode split for public and active transport modes* by 2025. The GCAP also specifies the short-term actions (2018-2021) for achieving this target:

- Reallocate street space to buses and cyclists
- Implement an Integrated Public Transport System (IPTS)
- Replace buses with low emission buses
- Implement a dockless bikes rental system
- Upgrade taxi fleet with hybrid or electric models

The metrics for these actions are specified in the GCAP and the benchmark values for these indicators are available in the Technical Assessment Report.

Actions:

- MV3: Update the database with the committed actions and link each action to the agreed metrics for measuring impact

4. Set up monitoring scheme

Monitoring of progress will be continuous throughout the implementation phase, to ensure that the process and performance can be appropriately evaluated at the end of each project. Each indicator will be assigned to a responsible department or agency to collect and monitor data on that indicator.

Review process

When we set up the monitoring scheme, we will establish a process for reviewing the collected data. The review process will help us ensure that the data is complete, credible, and traceable. The ultimate responsibility of reviewing and approving responses under each action lies with each MRV Champion. However, besides ensuring that responses to questions are complete, the Review stage is an opportunity to ensure that a wide range of voices and opinions are considered in the process, and as a means of engaging with stakeholders not approached during data collection. For reviewing topics, we will select other city stakeholders or topic experts who can provide MRV Champions with alternative viewpoints or help address information gaps.

Example:
The indicators that will measure the success of the action ***Reallocate street space to buses and cyclists*** will be assigned a department that will be responsible for collecting and reviewing the data, how it will be collected and how often. Table 3 provides a template for how the data can be recorded.

Actions:

- MV4: Assign responsibility for monitoring data collection, against each indicator and action.

5. Implementation monitoring

Monitoring is an ongoing process that will include collecting and assessing data throughout each project. Data collection methods will be specific to each action and each indicator and could include:

- Air quality monitoring stations
- Traffic sensors
- GIS mapping of green spaces
- Soil sensors
- Surveys

We will begin the monitoring process with collection of published indicators consistent with the overall baseline which was collected at the start of the development of the GCAP. More detailed, frequent or sophisticated data collection methods will be evaluated during the first year of the monitoring period to determine the value of and potential funding routes (if relevant) for these monitoring approaches.

Actions:

- MV5: Evaluate alternative methods of data collection to determine their value and practicability for Tirana. Identify potential funding sources where new methods of collection are demonstrated to provide net benefits.

Perform Uncertainty and Sensitivity Analysis

The GCAP currently includes circa 130 indicators. The uncertainty and sensitivity analysis will test if the 130 indicators are equally important or if the results of each GCAP action is dominated by a few indicators. In addition, this approach will allow us to explore whether we can reduce the number of indicators we measure to monitor the success of the GCAP actions. The sensitivity and uncertainty analyses will therefore help to identify:

- the optimal set of indicators, and
- the ideal scale/measurement unit of the indicators.

The testing will include but is not limited to Monte Carlo simulation and regression-based methods.

10. Monitoring, Reporting & Verification

Action: Reallocate street space to buses and cyclists			
Indicator	**Responsible Department**	**Collection frequency**	**Collection method**
Air 1: Average annual concentration of PM2.5	Dept. of Environmental Policies & Education	Continuous monitoring	Automatic collection from fixed stations with spot monitoring in other locations.
Air 1.1: Average annual concentration of PM10	Dept. of Environmental Policies & Education	As above	As above
Air 1.2: Average daily concentration of SO2	Dept. of Environmental Policies & Education	As above	As above
Air 1.3: Average daily concentration of NOx	Dept. of Environmental Policies & Education	As above	As above
GHG 8: Annual CO2 equivalent emissions per capita	Dept. of Environmental Policies & Education	Annual	Utility reporting on energy and carbon intensity
GHG 8.1: Annual CO2 emissions per unit of GDP	Dept. of Environmental Policies & Education	Annual	Government reporting on carbon intensity and GDP
Transport 11: Transport modal share in commuting (cars, motorcycles, taxi, bus, metro, tram, bicycle, pedestrian)	Dept. of Transport	Annual	Survey
Transport 11.1: Transport modal share in total trips	Dept. of Transport	Annual	Survey
Transport 11.4: Kilometres of road dedicated exclusively to public transit per 100 000 population	Dept. of Transport	Annual	Department for Transport mapping and project records
Transport 11.5: Kilometres of bicycle path per 100000 population	Dept. of Transport	Annual	Department for Transport mapping and project records
Transport 11.6: Share of population having access to public transport within 15 min by foot	Dept. of Transport	Annual	Desktop mapping (GIS)
Transport 11.7: Frequency of bus service	Dept. of Transport	Annual	Bus company reporting
Transport 12: Average travel speed on primary thoroughfares during peak hour	Dept. of Transport	Continuous	Real time streaming positioning data

Table 9. Example of monitoring scheme plan per GCAP action

6. Evaluate process and achievements

Based on the data collected throughout the monitoring process, each action will be evaluated in relation to the agreed indicators upon completion of the action, or annually if a project is implemented over a longer timescale. The analysis will include reviewing the set targets for each action, analysing the data collected throughout the project and evaluating it against the set benchmarks for each indicator. The results will be summarised in a table similar to the one in Table 4 on the next page.

7. Evaluation report

A short report will be prepared based on Step 6 to document how each action met the objectives and targets set at the onset, determine the successes and recommend improvements for future similar projects.

Actions:

- MV6: Set up evaluation report template to allow for rapid, simple and clear reporting, and to enable evaluation reports to be collated into an annual monitoring report.

10. Monitoring, Reporting & Verification

Action: Reallocate street space to buses and cyclists										
Reporting period	Month	Indicator	Unit	Baseline value	Benchmark			Recorded value	Score (RAG)	Comments
					Green Benchmark	Yellow Benchmark	Red Benchmark			
2018	1	Air 1: Average annual concentration of PM2.5	µg/m3	13.74	10	10 - 20	20			
2018	1	Air 1.1: Average annual concentration of PM10	µg/m3	25.14	20	20 - 50	50			
2018	1	Air 1.2: Average daily concentration of SO2	µg/m3	6.25	20	20 - 50	50			
2018	1	Air 1.3: Average daily concentration of NOx	µg/m3	21.68	40	40 - 80	80			
2018	1	GHG 8: Annual CO2 equivalent emissions per capita	Tonne / year / capita	1.7	5	5 - 10	10			
2018	1	GHG 8.1: Annual CO2 emissions per unit of GDP	Tonne / m. USD of GDP	0.022	0.35	0.35 - 0.8	0.8			
2018	1	Transport 11: Transport modal share in commuting (cars, motorcycles, taxi, bus, metro, tram, bicycle, pedestrian)	Private transport %	28%	30%	30–50%	50%			
2018	1	Transport 11.1: Transport modal share in total trips	%	28%	30%	30–50%	50%			
2018	1	Transport 11.4: Kilometres of road dedicated exclusively to public transit per 100 000 population	km	0.63	40	10–40	10			
2018	1	Transport 11.5: Kilometres of bicycle path per 100000 population	km	1.66	25	15–25	15			
2018	1	Transport 11.6: Share of population having access to public transport within 15 min by foot	%	No Data	> 80%	60%–80%	< 60%			
2018	1	Transport 11.7: Frequency of bus service	Average number of passengers at station per hour, in total bus network	7	30	30–6	6			
2018	1	Transport 12: Average travel speed on primary thoroughfares during peak hour	km/h	15	30	15-30	15			

Table 10. Example of the evaluation process for one GCAP action

10.4 Data Collection and Monitoring

A successful Monitoring & Verification process is grounded in good quality data. Our baseline assessment identified several areas which necessitate improved data collection and monitoring. This chapter summarises the challenges and data gaps per thematic area.

Sustainable Mobility

Among the air quality indicators, ozone was not previously included in the indicator database. We plan to include collection of ozone concentrations in accordance with WHO guidelines. Air quality indicators will be reported against WHO guideline values and against EU air quality standards.

Air quality is highly spatially variable, so we plan to extend collection of data in the city across more sites and using continuous monitoring equipment with automatic data collection. Different collection equipment and technology options will be evaluated.

Instruments should be regularly checked and calibrated (i.e. once a fortnight), and data subsequently ratified. Data should be collected continuously for comparison with the relevant guideline values.

The indicator analysis for *Pressures* assessed the data quality for the transport sector as good. We plan to extend our data collection effort to include:

- Share of population having access to public transport within 15 min by foot
- Frequency of interruptions of public transport systems in case of disaster

The current data on car mode share alone does not give sufficient information to assess the effectiveness of schemes such as bike sharing or bus service upgrades. We plan to increase our frequency and sample size of travel patterns and mode. In addition, the action to prepare a sustainable urban mobility plan (SUMP) will include updated origin-destination data across the city.

Actions:

- MV7: Evaluate air pollution monitoring equipment and technology (part of Action RC4)
- MV8: Include new air quality and transport indicators in database and determine benchmark values..

Green Spaces and Biodiversity

The quantity of green space in Tirana (approx. 37m^2 per inhabitant) is above the World Health Organisation (WHO) recommendation of 9m^2 of green space per person. However this does not give a complete picture as the data does not give information about the green space in terms of its quality, public accessibility, and location near neighbourhoods.

The data also provides no information on how the green spaces function in terms of providing and measuring environmental, social and economic benefits. The quantity of green, blue and vacant land within urban limits is reasonably high at 70%, compared with other cities. However, there are questions on how the city defines ‘green space’.

The critical element of green space is to determine how functional and well it performs in terms of providing resilience against the effects of climate change and pollution in terms of providing protection for citizens. The second priority should be to assess the quality, location, accessibility etc.. of the green spaces.

The following additional data and survey on green spaces are recommended:

- Assess and establish more information on types of green space including location, size, accessibility, category, facilities/function, and any designations
- Assess and establish the quality of green space in terms of vegetation, biodiversity, safety, management, maintenance and aftercare

- Assess and establish further habitat survey data for green spaces including the types and condition of habitats within green spaces
- Assess and establish where and how people use green space, and any social, sports, play and educational programs or events that occur in green spaces
- Assess and establish the cultural, historic, aesthetic significance or value of green space
- Assess and establish information on the city's broad vegetation types in terms of their extent and quality including trees, urban woodlands, wetlands, grasslands, areas of deforestation and areas of urban food production
- Assess and establish baseline conditions of green space/ green infrastructure in terms of performance for stormwater storage, carbon sequestration, urban heat mitigation, improving air quality, reducing energy demand and habitat provision

Some computer programs for data collection and analysis include:

- i-Tree - tool for quantifying benefits of trees in urban areas
- InVest – tool for quantifying ecosystems services to inform policy decisions
- Green Infrastructure Valuation Toolkit (GIVT)
- eBird – global tool for recording diversity of bird species

Actions:

- MV9: Evaluate and select additional green spaces indicators based on a cost, practicability and value assessment.

Wastewater Treatment

Water quality monitoring in Tirana is currently inadequate, with little or no time series data available about many of the city's water courses and water bodies. We will therefore establish more monitoring stations and regular spot monitoring in water bodies at key locations to better understand sources of surface water pollution.

Key target indicators for water quality will be biological oxygen demand (BOD) and Ammonium (NH_4).

In addition, data collection efforts will focus on the following *State* conditions:

- Percentage of residential and commercial wastewater that is treated according to applicable national standards
- Percentage of buildings (non-industrial) equipped to reuse grey water
- Percentage of wastewater from energy generation activities that is treated according to applicable national standards
- Annual number of storm water/sewerage overflows per 100km of network length

Actions:

- MV10: Establish monitoring equipment for the city's main water bodies and develop a programme of periodic spot monitoring (part of Action RC4).

Electricity and Buildings

The data quality for energy indicators was assessed as rich to good (see Chapter 9). Our data collection efforts will focus on the following indicators:

- Average share of population undergoing prolonged power outage in case of climatic extremes over the past 5 years
- Frequency and duration of power outages and the number of generators in use across the city; together these data could provide an indication of the contribution of generators to overall pollution level

The data quality for buildings sector indicators was assessed as rich to good. Our data collection efforts will focus on the following indicators:

- Share of city enterprises with ISO50001/EMAS certification or similar
- Total value of projects with green building certification as a share of the total value of projects granted a building permit per year

Collected data on electricity consumption are based on statistical research. Energy audits should be carried out on a number of public and residential buildings to determine actual building consumption and resulting energy performance.

Actions SE2 and SE3 relate to investment in the efficiency of existing buildings. We recognise that collecting data on the energy performance of the buildings which have been improved is highly valuable for design and specification of future improvements on other, similar buildings. We will therefore aim to include pre- and post-completion monitoring in all building projects supported by the Municipality, and to make that performance data widely available (subject to confidentiality considerations for the building owners).

Actions:

- MV11: Include pre- and post-completion monitoring within building improvement programmes (part of Actions SE2 and SE3).

Resource Management

Available indicators on solid waste are several years out of date. As part of our waste collection contracts with EcoTirana and other waste operators in the city, we will put in place continuous monitoring to track waste arisings, and frequent sampling to determine trends in waste composition. The monitoring will be spatially varied to understand how neighbourhoods differ in waste generation rates.

Regarding water consumption, we will work with national agencies and UKT to monitor trends in water consumption. Our available data indicated high values for water exploitation, industrial water and non-revenue water. Further data collection will help us confirm where and how these conditions are occurring, which will enable us to take better action to reduce the figures.

The UKT's programme of metering water customers will help both to reduce non-revenue water but also to obtain more accurate consumption data from across the city.

Actions:

- MV12: Incorporate continuous solid waste tonnage monitoring and frequency waste composition.
- MV13: Work with agencies and partners to secure data on water consumption

Climate Change Resilience & Adaptation

The data quality of the Mitigation and Adaptation indicators was assessed as weak. Additional data is needed on:

- Percentage of public infrastructure at risk
- Percentage of households at risk
- Gradual decay of service and associated cost from climate change

10. Monitoring, Reporting & Verification

We know that Tirana's weather is expected to become more extreme, with heat waves becoming a more regular feature of our summers. Identifying areas prone to the exacerbating effects of urban "heat islands" will be an important part of developing targeted measures to reduce this effect.
We will establish a dense array of real time temperature monitoring across the city, so that we can observe hot spots and the effect of tree planting and open spaces.

Actions:

- MV14: Establish a network of temperature monitors in the city, and include urban heat island among the indicators to be monitored..

10. Monitoring, Reporting & Verification

SUMMARY OF MRV ACTIONS

The following assessment summarises the MRV actions and provides a cost estimate for each action.

No	Proposed GCAP Actions	Notes on budget and cost estimates	Potential Funding Sources	Capex estimate (Euros)	Opex estimate over 5 years (Euros)	Capex estimate (Lekë '000s)	Opex estimate over 5 years (Lekë '000s)
MV1	Update the database with more recent baseline data, across all indicators	Annual cost is assumed to be 33% of original data collection costs for GCAP (was ca. €30,000).	MoT; Donor/IFIs	0	50,000	0	7,000
MV2	Work with agencies to fill gaps and improve quality of reporting in the weakest indicators	1 FTE for 3 months, per annum	MoT; Donor/IFIs	0	135,000	0	18,000
MV3	Update the database with the committed actions and link each action to the agreed metrics for measuring impact	1 week FTE, per annum	MoT; Donor/IFIs	0	11,250	0	2,000
MV4	Assign responsibility for monitoring data collection, against each indicator and action	1 week FTE, per annum	MoT; Donor/IFIs	0	11,250	0	2,000
MV5	Evaluate alternative methods of data collection to determine their value and practicability for Tirana. Identify potential funding sources where new methods of collection are demonstrated to provide net benefits.	1 FTE for 2 months	MoT; Donor/IFIs	0	36,000	0	5,000

10. Monitoring, Reporting & Verification

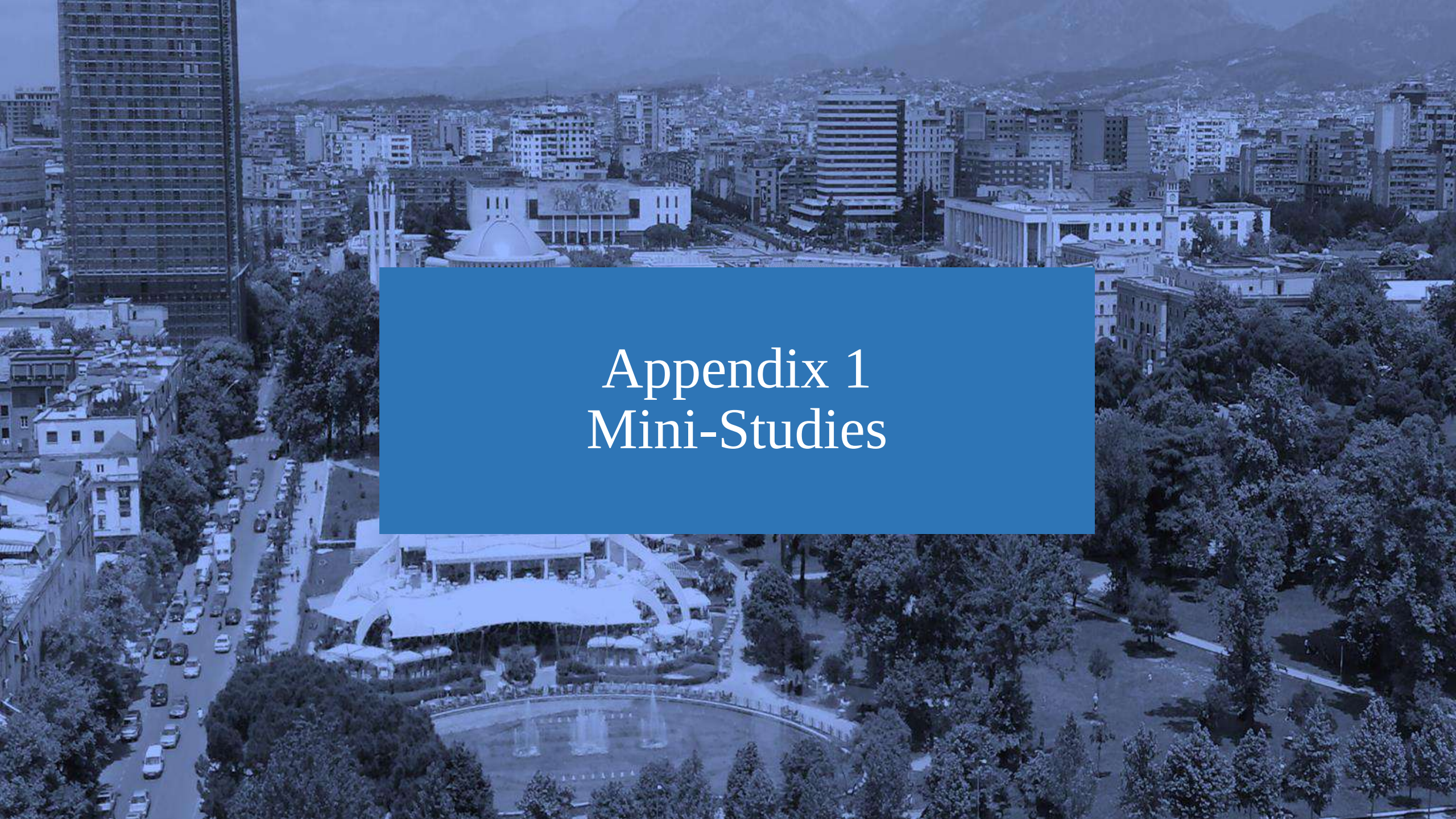
SUMMARY OF MRV ACTIONS (CONTINUED)

No	Proposed GCAP Actions	Notes on budget and cost estimates	Potential Funding Sources	Capex estimate (Euros)	Opex estimate over 5 years (Euros)	Capex estimate (Lekë '000s)	Opex estimate over 5 years (Lekë '000s)
MV6	Set up evaluation report template to allow for rapid, simple and clear reporting, and to enable evaluation reports to be collated into an annual monitoring report.	1 week FTE	MoT; Donor/IFIs	0	2,250	0	302
MV7	Evaluate air pollution monitoring equipment and technology (part of Action RC4)	2 weeks FTE	MoT; Donor/IFIs	0	9,000	0	1,000
MV8	Include new air quality and transport indicators in database and determine benchmark values..	1 week FTE	MoT; Donor/IFIs	0	2,250	0	302
MV9	Evaluate and select additional green spaces indicators based on a cost, practicability and value assessment.	1 week FTE	MoT; Donor/IFIs	0	2,250	0	302

10. Monitoring, Reporting & Verification

SUMMARY OF MRV ACTIONS (CONTINUED)

No	Proposed GCAP Actions	Notes on budget and cost estimates	Potential Funding Sources	Capex estimate (Euros)	Opex estimate over 5 years (Euros)	Cost estimate (Lekë '000s)	Opex estimate over 5 years (Lekë '000s)
MV10	Establish monitoring equipment for the city's main water bodies and develop a programme of periodic spot monitoring (part of Action RC4).	1 FTE for 1 month, then 2 weeks FTE per year, 5 x monitoring equipment	MoT; Donor/IFIs	50,000	36,000	7,000	5,000
MV11	Include pre- and post-completion monitoring within building improvement programmes (part of Actions SE2 and SE3).	1 FTE for 3 months, Then 1 month FTE per year, 100 x monitoring equipment	MoT; Donor/IFIs	100,000	90,000	13,000	12,000
MV12	Incorporate continuous solid waste tonnage monitoring and frequency waste composition.	0.5 FTE per annum	MoT; Donor/IFIs	0	270,000	0	36,000
MV13	Work with agencies and partners to secure data on water consumption	1 week FTE	MoT; Donor/IFIs	0	11,250	0	2,000
MV14	Establish a network of temperature monitors in the city, and include urban heat island among the indicators to be monitored..	1 FTE for 3 months, then 2 weeks FTE per annum, 500 monitors	MoT; Donor/IFIs	250,000	45,000	34,000	6,000



Appendix 1
Mini-Studies

Appendix 1 Mini-Studies

SUSTAINABLE TRANSPORT MINI-STUDIES

1. Future business model for the whole bus system

1.1 Institutional Arrangements

The current bus business model is considered unsustainable in the long term with expansion of car ownership and land development. A regional transport authority is essential to deliver a high quality and well used public transport system. The Municipality could act as the transport authority or a separate regional body could be set up, with sub authorities for neighbouring areas. This body should ensure the implementation of supportive land use policies and strong regulatory arrangement are in place to bring forward any major interventions within the bus system.

Public Service Contract

For urban public transport operated by more than one operator, a **Public Service Contract is recommended,** as it will enable a fully co-ordinated network to be achieved, and has the benefit that the Municipality has sufficient control to ensure good service coverage throughout the city with an ability to cross-subsidize from busy services to less used services.

A Public Service Contract would be set up between:

- The Transport Authority (or Municipality of Tirana)
- The Operator

The scope of work outlined in the contract would be:

- Transport services on a number of specific lines
- One contract per Operator

The contract duration would be 10 years, equal to the economic lifetime of a new bus.

Business Models for Urban Transport

Three business models for the bus operator contract were evaluated:

- Deficit coverage: The Operator keeps the fare revenues and may receive an additional subsidy to cover the deficit. Monthly variation
- Net Cost Contract: The Operator keeps the fare revenues and may receive a previously determined, fixed compensation
- **Gross Cost Contract:** The Municipality of Tirana keeps all fare revenues and pays the Operator a service fee for delivered services

Business model 3 is the most widely applied model e.g. buses in London as it allows The Transport Authority to optimise the transport network. Each risk is allocated to the party equipped to manage the risk, rather than a singular party. This model is recommended for Tirana where the Municipality pays the Operator a service fee per delivered vehicle kilometre.

SUSTAINABLE TRANSPORT MINI-STUDIES

A1.1.1 Future business model for the whole bus system (continued)

Outline Bus Business Model Arrangements

Contents of the Public Service Contract:

- Services to be delivered (lines, operating hours and frequencies).
- Service Fees to be paid by the Authority for transport services
- Service requirements, monitoring and associated penalties.
- Passenger information and customer service.
- Information on performance to be delivered by the Operator.
- Payment conditions.
- Rights and obligations of each party.
- Procedure for annual adjustment of fares, services and service fees

Provision of Fleet and Depot:

- **Fleet:** The Operator purchases the fleet and his capital costs are included in the Service fee. Fleet requirements are included in the contract of the Operator.

- **Depot:** On an assumption that the Municipality owns the current bus depots, the contracted Operator utilizes the depot at no cost; The Operator maintains the depot facilities; and Municipality remains the owner of the depot and has the right to inspect the depot.

Role of Municipality of Tirana:

The Municipality of Tirana (or Transport Authority) will:

- set the fares and defines the services to be delivered by the Operator.

- receive all fare revenues (through the Electronic Ticketing System). The operator does not receive any fare revenues.

- pay to the Operator a Service Fee based on delivered vehicle kilometres (as registered by means of GPS); Minus: penalties for non-compliance with quality and safety requirements.

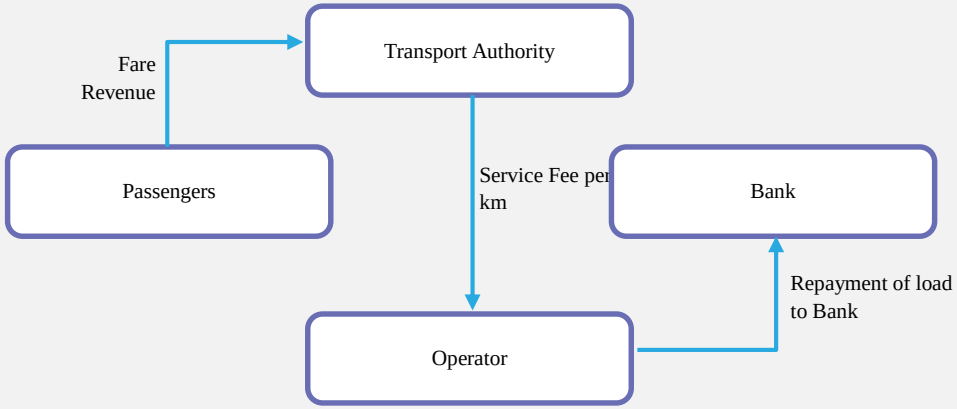
Monitoring and Penalties

Penalties need to be substantial in order to have effect and would typically be in the order of 5% of the service fee. Penalties should be based on reliable data in order to avoid arbitrary judgements and disputes. Sources include: data on delivered vehicle km and delays (data from a Fleet Management System, based on GPS and time registration); Monitoring of quality aspects, by means of mystery guests, customer satisfaction surveys and/or customers' complaints; technical inspections of the depot by professional inspectors.

Annual Adjustments

The contract shall allow for adjustments of fares, routes, timetables, vehicles used and service fees, typically the contract should include a procedure for this to be done annually. Thus, the adjustments can take place within the framework of the contract, rather than by amendments to the contract.

Service fees shall be subject to annual indexation, based on a published price index that covers the effects of changes of fuel prices and salaries on transport operating costs.



SUSTAINABLE TRANSPORT MINI-STUDIES

A1.1.2 Electric bus infrastructure technical note

Purpose of Note

To outline the issues associated with implemented with electric bus operation in Tirana, and associated changing infrastructure. Electric bus uptake in Europe is relatively small, however its deployment has risen noticeably over the past 5 to 10 years driven by national energy policy and environmental requirements.

Batteries

The life and performance of the battery is affected by the base chemistry selected, the temperature of the battery during operation and the recharging methods / frequency adopted. The cost of batteries is currently one of the highest component costs of an electric or hybrid bus. There are five prominent battery chemistries used for automotive applications:

- Lithium nickel cobalt aluminium
- Lithium nickel manganese cobalt
- Lithium manganese spinel
- Lithium titanate
- Lithium iron phosphate

Further research is developing second generation of batteries with these chemistries, and first generation of batteries with new chemistries including silicon, sulphur or air based cathodes. These battery types have different specifications related to their parameters of energy, specific power, life span, cost, performance and safety; and require a trade-off between these factors.

- *Safety of batteries* is aimed at preventing battery fires, these are caused by overheating due to overcharging, discharging too quick or short circuits.
- *Lifespan of batteries* is affected by the number of charge discharge cycles, the depth of the cycles and the age of the battery. Currently manufacturers are designing batteries to have min 80% of the original life remaining after five years covered by warranty.
- *Specific energy* (energy density), is the ratio of the energy capacity to the mass of the storage medium. For automotive batteries specific energy is currently only about 1% of the specific energy of diesel. This is a limiting factor on the range of electric vehicles compared to internal combustion engine (ICE) vehicles, but can be significantly improved by rapid charging and / or opportunity charging.

Effect of temperature

Optimising batteries to deliver maximum power over a wide temperature range is challenging. In winter conditions, batteries may need extra insulation and pre-heating, during warmer periods batteries may need additional cooling. For these reasons vehicles are usually engineered to work at moderate temperatures and are able to deliver less power and store less energy at extreme temperatures.

Some manufacturers offer cold weather packs that include battery heaters. Similarly cold weather increases the use of heaters and winter demisters which reduces vehicle range. Vehicles can be pre-heated whilst still on charge, reducing heater use wile driver. Academic studies on batteries show a roughly linear drop in range and a decrease of 10% from 20°C to 0°C. However, manufacturers have not released information on how much EVs are affected.

Rapid Charging

It is commonly stated that rapid charging lead to degradation in battery performance, but as yet there is a lack of reliable data. Vehicles have different limits to their charging speed dependent on battery chemistry and design. Most manufactures have adopted a conservation approach to rapid charging rates and battery management to maximise the life of the battery. These approached could be relaxed with greater application to real work transport applications.

SUSTAINABLE TRANSPORT MINI-STUDIES

A1.1.2 Electric bus infrastructure technical note (continued)

Battery Purchase Cost

The battery capacity of electric buses is a variable which depends on the operational duty cycle of the vehicle and the opportunities for charging during the daily cycle. A bus will typically be fitted with the smallest practicable battery to minimise cost, package size, charging time and weight. Presently, the battery cost could typically be around 20% of the vehicle cost, with it projected to fall in the future.

Second life options

Batteries no longer suitable for EV use, could have second life use in stationary applications within the energy generation and supply industries, and as a commercial/residential usage level. Examples include:

- Use of second life packs by utilising companies including transmission support, spinning reserve, load levelling, renewable energy firming etc.. However, a greater number of packs will be required for the larger power and energy storage needs
- Packs for commercial/residential levels would be to provide backup power, storage for small scale renewables or load following applications.

This secondary market is in its infancy and needs to be developed further.

Replacement and resale

Arup has in the recent past had outline discussions with EV bus manufacturers and operators to enable preliminary estimates to be made on expected battery life and their replacement costs. The actual battery life will be dependent on the duty cycle of the battery packs; indicative life spans of 5-7 years have been quoted for frequent urban bus services.
The price for a replacement battery pack will be less than the original purchase price, therefore a battery replacement is expected to have a net cost of significantly less than the original purchase price.

Charging technology

The most cost-effective method is usually overnight charging through a standard plug-in charger as the bus is typically not operational overnight, a standard charging rate is able to fully charge the vehicles before the start of the morning service, and electricity tariffs are cheaper. Other rapid charging technologies are explored below.

Rapid/opportunity charging

The energy consumption of an electric bus depends on a number of factors; bus size and weight, duty cycle and passenger load, but typical values range from 1.1 to 2.5 kWh/km. To enable a battery powered bus to operate an equivalent duty cycle to a diesel vehicle would require very large batteries, increasing the vehicle weight and cost, and potentially reducing the passenger carrying capacity.
Most bus routes however, have layover periods, typically at the beginning and end of the route. The use of a rapid charging facility at these layover periods can allow a significant reduction in the size of battery required. There are three types of rapid charging;

- Plug-in
- Overhead
- Inductive Power Transfer (IPT)

The costs of connecting the charge point to the electricity network can exceed the cost of the charging equipment. However, installation costs and disruption can be significantly reduced by planning for charging stations during the design stages of new bus stations/ stops.

Plug-in Charging

For plug-in charging the driver has to get out of the bus and plug a charger into the bus and then unplug before driving off. Plug-in fast charging stations are typically 50kW DC. They can recharge a typical battery in an electric bus in 2-3 hours, or can be used to top up the battery during layover periods. Information on costs of plug-in stations suggests a rapid-charging option, with DC fast charging, is around 6.7 million Lekë (50,000 euros).

SUSTAINABLE TRANSPORT MINI-STUDIES

A1.1.2 Electric bus infrastructure technical note (continued)

Overhead charging

Overhead charging is automatic, the driver approaches the charging station and overhead equipment connects to an overhead charging source to recharge the bus while it waits.
There are several different overhead charging systems, the systems require a suitable charging system to be installed on the vehicle and they can require careful positioning of the bus.

Inductive power transfer (IPT) charging

Inductive charging does not require a physical connection between the bus and the charging system. A primary charging coil is installed into the ground and another secondary coil is fitted to the underside of the bus. Power is then transferred wirelessly between the charger and the vehicle when the bus is parked in the correct location and a wireless communication link is established. Examples of systems in place are:

- IPT charging has been used on two routes in Italy for over a decade, charging is completed at the end of each route . while the bus stands for up to 10 minutes as part of the standard timetabled service.
- IPT charging equipment from Conductix-Wampfler was selected for the Route 7 Milton Keynes (UK) due to its proven record in Italy.

For the 120kW IPT equipment for Milton Keynes, the footprint of the equipment is roughly 10m^2 and was embedded into the existing road/bus stop surface. Although there was a temporary disruption to the immediate surroundings, once installed the equipment has no significant visual impact, which a key benefit for local residents, the local council and the general public, especially in visually sensitive areas.

The IPT equipment currently costs approximately £1000 per kWh for primary unit (ground module), and £200 per kWh for the secondary unit (bus module). We believe that these costs could reduce by up to 50% in future.

Purchase cost

The purchase price of the electric bus is dependent upon the capacity of the battery pack, manufacturers indicate it could cost 20-30% more than an equivalent diesel vehicle.

Maintenance costs

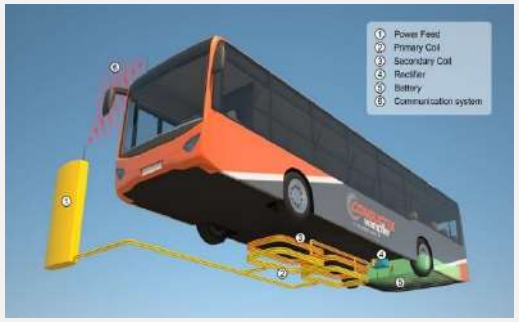
They are typically higher than those for diesel buses – especially during the initial operating period. They are expected to reduce to be in line with diesel vehicles as the electric bus maintenance routes become familiar, and emission requirements are stricter. They will be cheaper than hybrid buses as more systems needs to be maintained.

Residual value

A reasonable assumption can be made that an electric vehicle depreciates at the same rate as a diesel bus, but the battery packs are depreciated over a shorter time span, defined by either the expected useful life in an EV (typical expectations of operators and manufacturers is 5 years), or the warranty period provided by the battery manufacturer. Bus manufacturers design existing vehicles in a modular arrangement to simplify mid-lifecycle powertrain replacement.

Proterra –deCourcey Coventry (plug-in charger)

Proterra –FastFil system (Overhead)



Conductic-Wampfler (IPT system)

SUSTAINABLE TRANSPORT MINI-STUDIES

A1.1.2 Electric bus infrastructure technical note (continued)

Range

The range for an electric bus is dependent on a number of factors relating to electrical energy storage and consumption: battery size, bus weight, passenger weight, route specific duty cycle, temperature requirements for passenger comfort, environmental conditions.

Typical electrical energy consumption values are found in the range 1.1 to 2.5 kWh/km and battery sizes on existing electric buses range from 55 kWh to claims of over 250 kWh. Operators have quoted single charge ranges of around 100km based on duty cycles for 100kWh battery packs –depending vehicle specifications. Additional battery capacity could be used to extend the single-charge range, or alternatively, opportunity charging could extend the total operational range in between charges to full capacity. Recent battery technology advances has suggested ranges of 200km on a single charge.

Reliability

As with the topic of resale value, due to the relatively limited number of full fleets of electric buses in operation, there is a limited detailed information on vehicle reliability. However, informal information from manufacturers and operators has identified the following positive points:

- Routes in Turin and Genoa have had 30 electric buses running over a 10 year period using an inductive charging system.
- Optare have not had any operational reliability issues with the Coventry deCourcey fleet. They had early development issues, which have been overcome, and these lessons have been taken into account for future Optare electric buses.

Vehicle size

The majority of electric bus technology to date has been implemented in standard or midi sized vehicles. This is due to the additional size and weight which requires a bigger battery to achieve the same range. It is noted however that investment in larger electric vehicles has now begun in Europe. For example, for Osnabrück in Germany, 13 VDL Citeas SLFA Electric Buses will be delivered in late 2018; these are electric articulated vehicles which will be deployed on the first fully electric line, line 41 between Düstrup and Haste.

SUSTAINABLE TRANSPORT MINI-STUDIES

A1.1.3 Bicycle hire new business models

Context

Tirana has been investing in bike lanes but uptake of cycling remains very limited. Providing residents with an easy way of renting and using bicycles could help stimulate wider uptake. Bicycle rentals are provided today by EcoVolis, but the system of manual payments to staff and a requirement to return the bicycle to where it was taken means the system is rarely used. Many cities have adopted bike share systems with docking stations around the city, but the latest wave is for dockless bicycle hire systems employing wireless technology to enable users to check in and check out bicycles via mobile phone apps.

These types of systems have much lower infrastructure costs and higher uptake than a dock-based system. With greater uptake it translates to increased cycle safety as with greater cyclists on roads it make drivers sensitive to their vulnerability. However, these new businesses – many originating in China – have been criticised in some cities experiencing an oversupply of bikes and poor management, with bikes ending up dumped.

Business Model

The normal business model of this new Dockless Bike Share provides a low cost public transport scheme to the city and the operator generates income from three sources:

- Annual and Short-term subscriptions;
- Usage income – the longer the ride, the more expensive it gets
- Penalties - it is possible to penalise users for leaving bikes in inconvenient / undesirable locations (or incentivise users to leave bikes in convenient / desirable locations)
- Sales of usage data / statistics to third parties.

It is possible that the operator may be required to pay the city a small annual fee. This is being considered in a number of jurisdictions around the world at the moment. Operator costs remain on a par with the cost of operations of a normal Docked Bike Share Scheme as operators are still required to maintain and repair bikes, redistribute bikes and operate and manage the software monitoring and controlling the system.

The major financial differences between Dockless Bike Share and Docked Bike Share revolve around the ownership and sharing of user data. This is the primary revenue stream for the operator and with the current focus on Privacy and Personal Data protection does raise some issues. The possibility of advertising of sponsoring remains with a scheme of this type and frequently it is upon the operator to source such.

This type of scheme is still in its relative infancy and it is therefore unclear how sustainable the business model is, in regards to bikes being dumped. The quality of the bikes is also a concern, in a number of cities cheap bikes have been deployed, leading to lots of breakdowns, maintenance and loss of confidence in the system as well as additional cost on the operator.

Appendix 1 Mini-Studies

GREEN SPACES & BIODIVERSITY MINI-STUDIES

A1.2.1 Strategy for a tree nursery

Land area required for nursery
The land area required for a nursery, with the assumption of a projected peak planting rate of trees would be 200,000 trees per annum, then the minimum land area required would be approximately 100 - 150 hectares.

This area would also be dependent on whether the nursery aims to grow all or a proportion of their own tree stock from seed to ensure local provenance and better end product or buys in smaller size trees stock from elsewhere to grow on.

The size of land area required is also dependent on proportion and range of other plants that the nursery would be required to accommodate, such as shrubs, hedging stock, hardy perennials and flowering annuals/ biennials.

For example to accommodate 500,000 trees and other plants trees would require in the region of 200,000 - 250,000 hectares. This represents a very large commercial enterprise, comparable in size to the largest German, Dutch and UK growers.

The figure shows hotspots for the potential location of tree nursery sites.

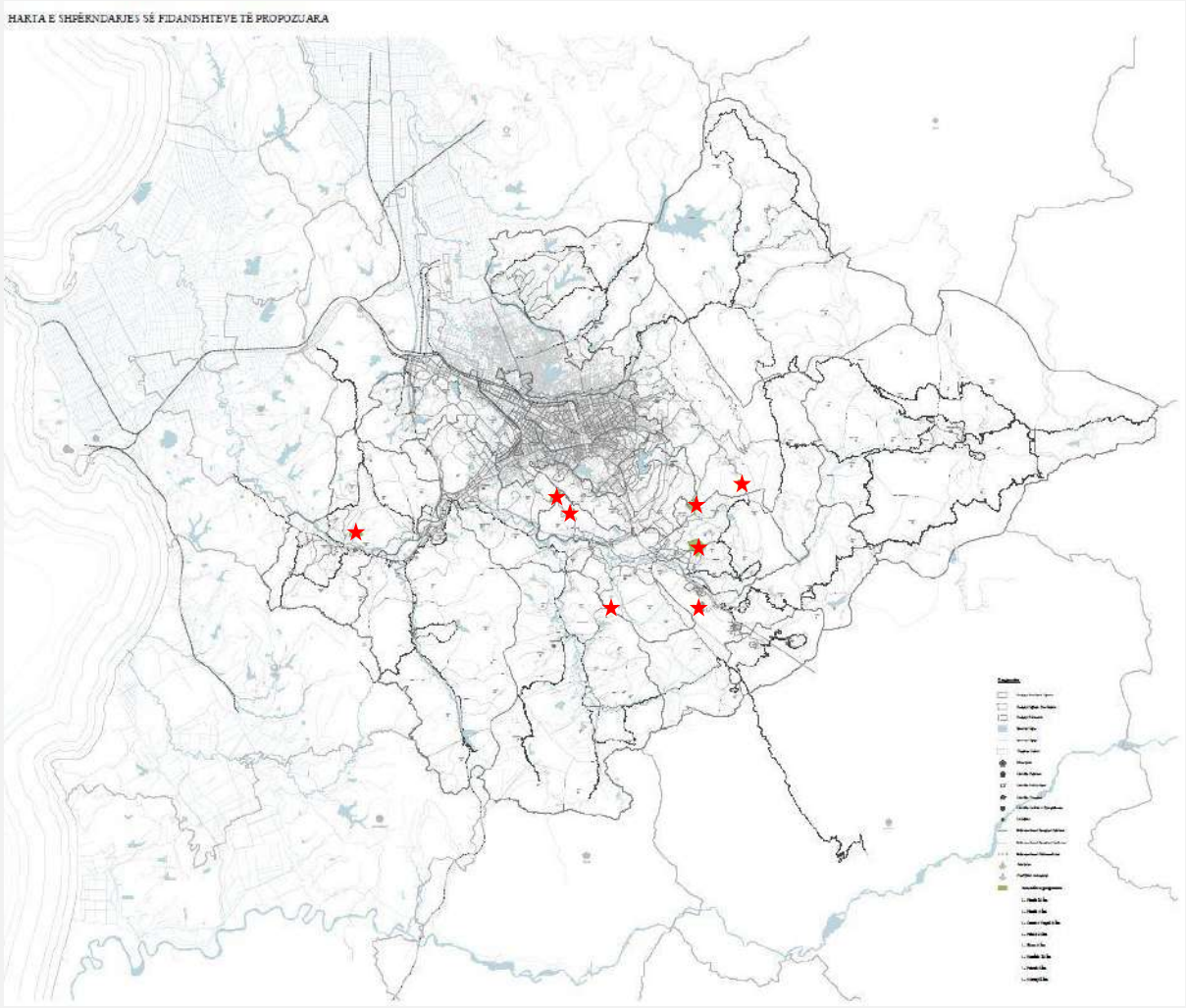


Figure 53 Potential sites for tree nursery

GREEN SPACES & BIODIVERSITY MINI-STUDIES

A1.2.1 Strategy for a tree nursery (continued)

Expected Losses

- Tree losses on planting – 10 % losses result in areas requiring 'beating up and replanting, if recommended planting practises are not followed can be as high as 25 – 30% for bare rooted stock
- For container grown or airport grown trees - can be as low as 1% providing trees are well planted and maintained.

Generally bare rooted stock is much cheaper initially and suitable for orbital forestry areas, but are prone to much higher losses.

Container grown stock is more suitable for urban core forest where instant impact is required, although more costly initially the failure rate can be minimal.

Growing time for tree seedlings to semi mature trees

- **Seedlings** grown in seed beds for 1- 2 seasons (can then be either field grown or continue to be transplanted in container or cell grown, known as a plug)
- **Transplants** (bare rooted) open field grown, roots undercut each season, for 1- 3 seasons
- **Feathered whips, half standards** (bare rooted) open field grown trees, require undercutting of roots each season, 3 - 4 seasons
- **Standard, feathered and multi-stemmed trees** - Container grown trees (that have been regularly transplanted/ undercut prior to containerising), 5 -10 years
- **Large specimen semi-mature trees**, 25/30 cm girth – spring ring or airpot containers (10-15 years to grow from seed)
- **Super semi- mature trees** 50cm+ - spring ring or airpot containers (15 years+ to grow from seed)

Appendix 1 Mini-Studies

GREEN SPACES & BIODIVERSITY MINI-STUDIES

A1.2.1 Strategy for a tree nursery (continued)

Timeline 2018-2030 and sequence of actions required to develop the nursery:

Select and establish specialist team: Year 1 (2018)
- MoT/ forest authority to select and appoint a specialist team including landscape architects, botanists, horticulturalists, ecologists, soil scientists, civil engineers and cost consultants.
- Review delivery mechanism and how similar scale forests both rural and urban have been implemented and their different procurement methods for tree nursery stock material and successful nursery establishment methods.

Establish extent of orbital forest area, undertake survey work: Year 1-2 (2018 -2019)
- In conjunction with the specialist team agree and establish the location and extent of orbital forest area within the defined rural areas and calculate its surface area.
- Agree relevant survey information and work to be undertaken by specialist team to:
    - Develop species lists that reflect the diverse native plants of Albania and divided into habitat types/ planting zones appropriate to location, soils and topography that occur within the orbital forest area.
    - Develop initial draft planting plans.

Establish potential street locations and extent for urban core tree planting: Year 1-2 (2018 -2019)
- Survey existing tree stock and establish planting requirements for urban parks, street trees, green space and proposed parklets
- Develop list identifying estimated plant numbers, size of tree required for planting and form and habitus of the trees for each location.

Selection and appointment of Nursery Manager: Year 2 (2019)
- Develop brief and job description, advertise, interview and appoint nursery manager. Agree projected nursery staff composition, phasing and timescale.

Planting procurement strategy and let procurement contract: Year 2 (2019)
- Landscape architect to produce planting procurement strategy in conjunction with specialist team for approval by MoT.
- Develop species list excel sheet, identifying species to be grown from seed and those species available from existing nursery suppliers in Albania and abroad, including nursery stock sizes, habitus type, and eventual sock size at time of planting, planting densities, estimated quantities, cost etc..

Construct nursery establishment: Year 3 - 4 (2020 to 2021)
- Select and appoint existing large nursery (possibly from abroad) to bring in expertise and specialist knowledge to establish nursery in Tirana.
- Develop layout plan for nursery, brief of requirements for facilities (e.g. ground sterilisation, drainage, seed bed areas, transplanting areas, container grown areas, irrigation, shade structures, wind belts, buildings etc..)
- Estimate cost budget and delivery time,
- Agree tender procedure for construction and award contract.

Phased establishment of plants: Year 4 – 8 (2021 to 2025)
- Botanists to collect local provenance seeds for nursery to gown on over 2-5 year period from seedling into forestry transplants 1+1, 1+2 for orbital forest.
- Nursery to import procured stock including feathered whips, half standards for growing on for orbital forest and some mass planting areas in for Urban core forest
- Nursery to import procured stock including other containerised larger tree stock and multi-stemmed trees for urban core forest – street trees parklets and parks.
- Monitor and report – Specialist team to review quality and quantity and produce progress reports to submit to MoT.

Production of ground preparation, planting plans and specifications: Year 7 (2024)
- Landscape architect to produce tender documentation for ground works, planting and maintenance contract for each planting area or zone.
- Establish and agree phased sequence and seasons for planting for each planting zone in agreement with MoT

Phased planting period: Year 8 – 13 (2025 to 2030)
- Award phased planting and maintenance contracts and/ or incorporate community collaboration to assist with planting through trusts, charities and other organisations etc..

GREEN SPACES & BIODIVERSITY MINI-STUDIES

A1.2.2 Commercial delivery model for pocket parks in residential blocks

Timeline and narrative for delivery of pocket parks
Assumed time line 2018 – 2030

Select and establish specialist design team:
- MoT/ park/planning authority to select and appoint a specialist team including landscape architects, arboriculturalists, civil engineers, soil scientist and cost consultants.
- Define scope of work, objectives and aims of Parklets
- Define budget and phased programme for Parklets

Establish extent of Parklet areas, undertake survey work:
- In conjunction with the specialist team agree and establish the location and extent of the Parklets.
- Agree relevant survey information and work to be undertaken by specialist team in order to develop Parklet designs and information to be provided by MoT
- Assess availability, land ownership, current usage, accessibility and condition of existing land

Funding and operation:
- Agree budgets and funding mechanisms
- Agree how the Parklets will be operated either as city led or by other such.as charities, community agencies or associations, volunteer groups, sponsors, in association with schools etc.

Undertake community consultation and develop initial design proposals:
- Submit initial design proposals to MoT (RIBA Stage 1 Preparation and Brief)
- Review proposals and develop design in consultation with stakeholders and community (RIBA Stage 2 Concept design)

Undertake detailed design:
- Undertake detailed design (RIBA Stage 3/4 Developed Design and Technical Design)
- Submit detailed design proposals to MoT for planning approval

Tender process and construction:
- Either develop design to be undertaken as a design and build contract (D&B) or prepare contract documentation for conventional tender (RIBA Stage 5 Construction)
- Select suitable contractors and award D&B contract
- Phased construction process of both the hard and soft landscape

Handover and maintenance:
- Once handover is complete the defects rectification period commences, usually 12 months for hard landscape and from 24 months to 36 months for soft landscape which include semi-mature trees, some contracts even extend up to 5 years after completion to ensure successful tree establishment.
- Monitoring and reporting






Appendix 1 Mini-Studies

SUSTAINABLE ENERGY MINI-STUDIES

A1.3.1 Smart street lighting technical and commercial strategy

This section outlines how recent developments in LED lighting technology have led many cities, including Tirana, to examine how they can roll out smart lighting and IoT applications.

Overview

Public lighting is an essential feature of urban environments, commonly thought of as having one purpose: the provision of light. However, advancements in LED lighting technology and networking along with a desire by cities for greater financial and environmental efficiency mean that this will no longer be the case. Technology is now helping cities address major city-wide issues in relation to; ageing lighting infrastructure, data management, funding and the modernisation of public services. The evolution of lighting technologies combined with its increased affordability is providing cities with greater options and opportunities when deciding on a course of action relating to street lighting.

Adopting a citywide LED based lighting solution represents a huge investment for Tirana. While LED costs have reduced significantly in the past few years, the cost of energy and operating traditional lighting schemes has risen. The expected continuation of these trends offers Tirana an opportunity to achieve considerable savings and benefits based on business as usual cost, however, this return depends on a number of parameters which include the condition of existing lighting infrastructure, extent of new lighting and design specification.

Smart Lighting Options

We have identified three lighting options which Tirana should consider (see also table overleaf):

- **LED Lighting Replacement**

This involves the replacement of existing lights with new LED lights. New LED lights could reduce Tirana's lighting energy costs by as much as 50%.

- **Smart Lighting (LED lights with CMS)**

Smart Lighting describes LED lighting, which has the ability to be controlled by a central management system (CMS) in order to provide better functionality and flexible lighting. Dimming, asset management and central management systems are some of the options available with 'Smart Lighting'. LEDs with a CMS can reduce a city's energy costs up to 70% as well as helping to reduce ongoing lighting operational costs.

- **Advanced Smart Lighting**

Advanced Smart Lighting is a term, Arup has defined to describe LED lighting which is combined with enhanced network capability to facilitate the deployment of IoT applications. This network could enable a multitude of different sensors relating to mobility, energy, environment, safety, security and technologies to be deployed on it.

Tirana potentially faces a number of challenges relating to lighting and other city services they provide and how to best manage environmental issues and the use of new technology:

- For Tirana, the operational lifetime of a lot of their lighting stock may be coming to an end and the decision to service and maintain the current lighting infrastructure or invest in newer, more efficient technology should be evaluated.

- Tirana realise they need to make better use of information and data they have relating to their services, but struggle to comprehend how they can manage this information in order to allow them to provide better services.

- Tirana would like to be able to use technology to provide smart services and improve the range and delivery of services they provide.

The application of Smart and Advanced Lighting is now seen as a means of tackling some of these challenges.

SUSTAINABLE ENERGY MINI-STUDIES

A1.3.1 Smart street lighting technical and commercial strategy (continued)

Technical

Tirana should examine their future lighting performance through the following aspects:

- Night-Time Brightness / Lighting Class;
- Equipment Scale;
- Equipment Performance;
- Equipment Aesthetics;
    - Heritage;
    - Contemporary;
    - Functional.
- Light Quality;
- Light Characteristics;
- Public / Private Interface.

Asset Analysis

It is important that the city understands the condition of its existing lighting infrastructure and the exact number of assets they control. Tirana should develop a complete inventory list for the following items as a starting point:

- Lantern type
- Power out to lanterns
- Light source composition
- Column type (heritage, contemporary, modern)
- Column heights
- Column control gear
- Maintenance cycle / lamp replacement

Future Lighting Options Benefits & Considerations		
LED Lighting Replacement Benefits Significant energy reductions from retrofitting luminaries with LED lights. Replacement can be justified on a 'spend to save' basis. Items to be considered • Developing City Lighting masterplan • Developing Digital/Smart City strategy • Lighting design – hierarchy, sustainability, heritage • Human experience design • H&S, Regulations • Procurement strategy • Allow for future proofing – Smart and Advanced Lighting	Smart Lighting Benefits Introduction of control technology to lighting networks to deliver further savings and functionality. Items to be considered • LED lighting network to be designed to have network capability • Open standards for software interfaces • Future proofing CMS • Technology integration • Measurable KPI's • Operations management • Maintenance & Staff resourcing	Advanced Smart Lighting Benefits Integrate additional technology such as transport sensors to maximise saving and optimise city resources. Items to be considered • Identify which IoT solutions to roll out • Smart City strategy • Technology integration • Network management • Technical /specification design • Data integration & analysis • Privacy & security integration Future installation protocols be to be considered as this will impact technology suppliers and the lighting operators

SUSTAINABLE ENERGY MINI-STUDIES

A1.3.1 Smart street lighting technical and commercial strategy (continued)

Commercial

Based on the three smart lighting options noted above, Arup has been able to review the lighting infrastructure and assess the costs and return on investment period for an EU capital city who were looking at replacing 45,000 lights.

	Lighting Options (EU Capital City, 45,000 lights) (figures in million Lekë)			
	1. Business as Usual	2. LED Replacement (No CMS)	3. Smart Lighting	4. Advanced Smart Lighting
Capex	-	3,958	4,378	4,729
Annual Energy Cost	~ 603	~ 201	~ 188	~ 188
Annual Maintenance Cost	~ 670	~ 456	~ 402	~ 415
Annual Total Opex	~ 1,273	~ 657	~ 590	~ 603
Return on Investment	-	8.7 years	8.6 years	9.1 years

The development of costs associated for future options which include the technical parameter noted above should be developed by Tirana to shortlist viable options.

Procuring Street lighting solutions

The table below identities several funding models which EU local authorities have used to deliver new lighting solutions.

Funding Options	Design	Installation	Finance	Operation	Risk
Local Authority in House Provision	Local Authority	Local Authority	Local Authority	Local Authority	Local Authority
Design & Install	Private sector partner	Private sector partner	Local Authority	Local Authority	Design & implementation risk with private sector but not operational risk
Outsourcing: Energy Performance Contract	Private sector partner	Private sector partner	Private sector partner	Private sector partner	Private sector partner guarantees a level of savings
Outsourcing: Joint Venture	Private sector partner	Joint Venture	Local Authority of JV partner	Joint Venture	Joint Venture
Public Private Partnership	Private sector partner	Private sector partner	Private sector partner	Private sector partner	Private sector partner

The availability of financing packages is crucial in an upgrade decision making process. The type of package will determine the cost of repayment, payback period and the resulting impact on Tirana's budget.

Appendix 1 Mini-Studies

RESOURCE MANAGEMENT MINI-STUDIES

A1.4.1 Household waste recycling centres

Context

HWRCs, are usually run by local authorities, and they provide facilities for the disposal of a range of household waste streams. Household waste can refer to that arising from:

- Domestic property
- A caravan which usually, and for the time being, is situated on a caravan site;
- A residential home;
- Premises forming part of an educational establishment or hospital/nursing home

HWRCs are available to all residents. The local authority running a HWRC specifies what can be accepted on site. This may vary between different HWRC sites, and between different local authorities.
Although construction, demolition, and excavation waste (CDEW) is not household waste, certain HWRCs in the UK, may accept small quantities of specific CDEW streams, as local authorities understand that these wastes can be generated by householders. Tirana may want to adopt a different policy, where CDEW is sorted separately, otherwise this may result in waste handling issues and other inefficiencies arising from the acceptance of large quantities of CDEW at HWRC sites.

Opportunities and Constraints

HWRCs can enhance significantly the recycling and waste management services that local authorities provide for the public, but at the same time they may face certain challenges.

Opportunities include:

- Potential to integrate informal pickers and allow them to dispose of unwanted recyclables to these centres. Given waste pickers are typically recycling 50 tonnes/day this would lead to reduced dumping across the city.
- Accept recyclables that may not be accepted within kerbside dry mixed recyclables waste streams; including waste electrical and electronic equipment (WEEE), batteries, garden waste, rubble and soil etc..
- Accept significant quantities of bulky waste (e.g. furniture, white goods, mattresses), providing an opportunity to reduce the cost of kerbside bulky waste collections
- Help residents to recycle waste that cannot be sent for incineration
- Help residents not living within areas serviced by kerbside recycling collection, to recycle
- Offer an alternative recycling opportunity for residents who have missed their kerbside waste collection round
- Offer an opportunity to gather materials that can be collected by a charity to generate income (e.g. CDs, DVDs, books, bric-à-brac)
- Offer an opportunity to develop reuse facilities on site, with the possibility of restoring and selling various items (e.g. furniture)
- Offer an opportunity for residents to take away items they desire that would otherwise be expensive for the HWRC to dispose
- Helping residents to dispose of excessive quantities of recyclables that cannot be disposed of kerbside

RESOURCE MANAGEMENT MINI-STUDIES

Constraints include:

- If no appropriate measures are taken (e.g. appropriate surveillance, fining, and public awareness campaign), the reduction of kerbside recycling and its replacement with HWRCs, may influence the increase of fly tipping incidents
- In many cities, the need for HWRCs has significantly reduced in recent years, and this may be associated with kerbside recycling becoming more advanced, and thus residents preferring this method
- If multiple HWRC sites are being operated by the same local authority, operation costs may be significantly high, leading to potential HWRC site closures, or the introduction of gate charges

Technical information

Site Layout

Site architecture affects large HWRC sites (>10,000 tonnes/annum). A split-level design should be employed, as this has benefits for both the HWRC personnel and the public. Split-level architecture can help sites with higher throughputs to manage materials more efficiently. This makes it easier for the public and site staff to focus on recycling, through easier access to recycling containers and more efficient container servicing. Within the site the following measures should be considered:

- Establishing a one-way system for public traffic
- Separating public and service traffic
- Ensuring that road markings, parking bays signage is clear
- Meeting the needs of disabled visitors
- Having perimeter fencing for site security
- Providing clear bin signage – shown to increase recycling rates
- Reviewing the order bins are positioned so that recycling containers are easier to access that residual waste containers
- The HWRC waste storage and handling items can be seen on the right

In the UK, HWRC have a median throughput of 5,700 tonnes/annum, with the largest 55,000 tonnes/annum. Those that are co-located can reach 100,000 tonnes/annum. Based on research done on ten HWRCs of different throughputs and surface areas, located throughout the UK, it is concluded that the average land take is **0.7 m^2/tonne** (ranging between 0.2-1.6 m^2/tonne). In general, higher throughputs are associated with lower recycling rates, mainly because busier HWRC sites are more challenging to manage. To overcome this issue, the site should be laid out efficiently and staff proactive in directing residents.

Figure 54 Overview of a split-level HWRC

RESOURCE MANAGEMENT MINI-STUDIES

Current distribution in Tirana

The UK National Assessment of Civic Amenity Sites (NACAS), following an empirical research, concluded that the maximum throughput of any HWRC site should be 17,250 tonnes/annum. Research undertaken by WRAP shows that HWRC provision and recycling yields are closely linked:

- Maximum catchment radii should be 3-5 miles
- Maximum driving time to site for residents 20 mins
- Maximum number of resident it serves: 120,000
- Maximum number of households: 50,000

Following these recommendations, at least 4 HWRC's shall operate in the city of Tirana.

Figure 55 Entrance road and parking at an HWRC

Appendix 1 Mini-Studies

RESOURCE MANAGEMENT MINI-STUDIES

Type of storage/handling	Description	Image
Bulk containers	Can be used for most dry recyclables (e.g. cardboard, metal), as well as wood and garden waste	
Isolation cages	Can be used to segregate hazardous or high-value materials (e.g. WEEE, tyres and gas bottles) that can also allow for the collection of a wider range of material streams in restricted spaces	
Compactors	Can be applied to reduce the volume of bulky residual waste, garden waste, timber, cardboard and plastics; making these waste streams easier to handle, while reducing waste haulage requirements	

RESOURCE MANAGEMENT MINI-STUDIES

A1.4.1 Household waste recycling centres

The MSW generation in Albania is 335kg/capita with collection coverage in Tirana 76%.

The table below shows the recycling waste types not likely to be collected as part of the dry mixed recyclable waste stream:

Waste stream	Average % in MSW	Quantity in Tirana (tonnes)
Batteries	0.02	25
Rubber	0.2	251
WEEE	0.31	389
Wood	1.43	1,795
Textiles	5.27	6,278
Inert waste	7.20	9,040
Total	14.43	17,778

Combining these waste streams with the uncollected MSW, HWRC infrastructure in Tirana should have a capacity of 47,912 tonnes/annum, therefore the average throughput for each HWRC is 11,978 tonnes/annum.

Distribution of HWRCs

HWRCs should be accessible by the main public transport line, in Tirana's case by bus.

Some of the main features to be taken into consideration when deciding on the location of the HWRCs in Tirana, are as follows (colour coded on the map to the right):

- The *Ruga Dritan Hoxha* road (orange line)
- The *Tiranë – Elbasan* motorway (yellow line);
- The *Rruga shtetërore SH56* motorway (pink line);
- The *Bulevardi Bajram Curri* road (red line);
- The *Rruga Muhamet Gjollesha* road (olive green line);
- The *Rruga e Elbasanit* road (deep orange line); and
- The *Lumi i Tiranës* tributary of the *Ishëm River* (blue line).

Taking into consideration the above features, which include roads and water bodies, will ensure that the connectivity of all HWRCs will be satisfactory; allowing residents to easily access their local HWRC site.

RESOURCE MANAGEMENT MINI-STUDIES

The provisional location of the four HWRCs given below, was chosen such that each HWRC is close to a road network, and at the same time covers for an area that is divided by major roads, rivers, and other landscape features (e.g. hills).

A more detailed appraisal of the location needs to be completed whereby a critical path analysis may also be undertaken.

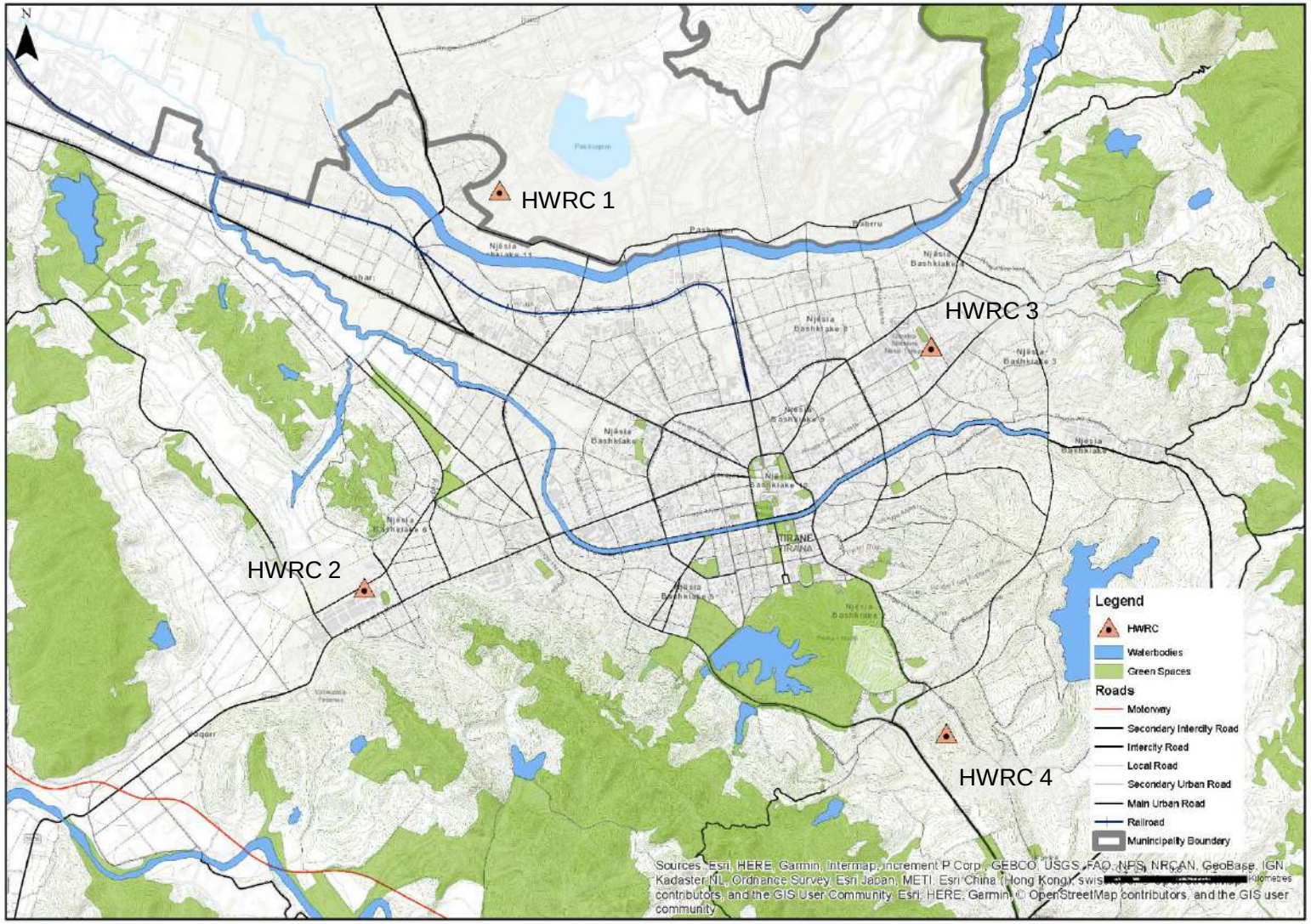
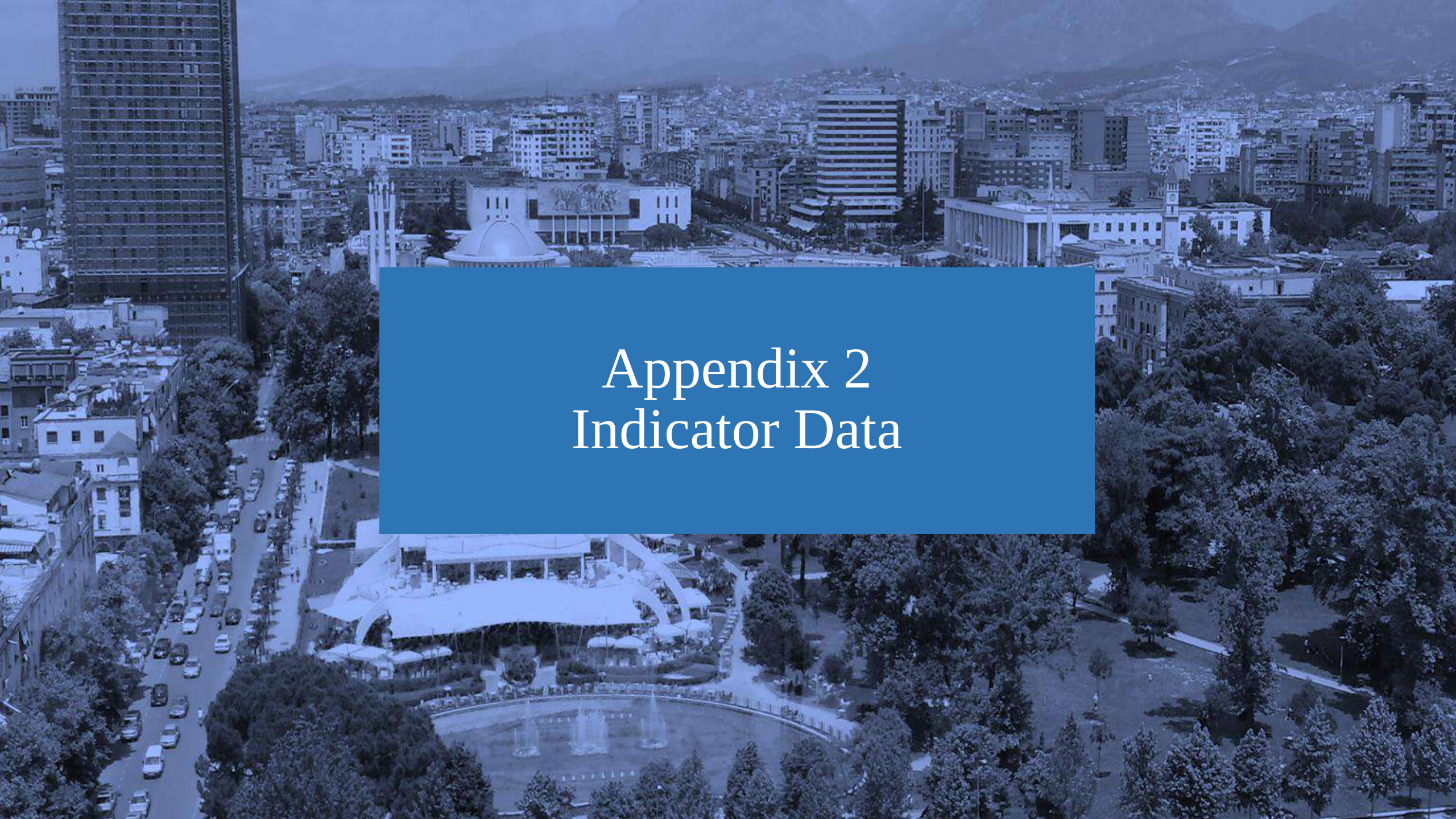


Figure 56 Potential sites for household waste recycling centres



Appendix 2
Indicator Data

A2. Indicator Data

A2.1 State Indicators

Topic	ID	State Indicator	Unit	Indicator Value	Indicator Flag	Indicator Trend
Air	1	Average annual concentration of PM2.5	µg/m3	13.74	YELLOW	Improving
Air	1.1	Average annual concentration of PM10	µg/m3	25.14	YELLOW	Improving
Air	1.2	Average daily concentration of SO2	µg/m3	6.25	GREEN	Improving
Air	1.3	Average daily concentration of NOx	µg/m3	21.68	GREEN	None
Water Bodies	2	Biochemical Oxygen Demand (BOD) in rivers and lakes	mg/L	32.5	RED	None
Water Bodies	2.1	Ammonium (NH4) concentration in rivers and lakes	µg/L	3736.2	RED	None
Drinking Water	3	Percentage of water samples in a year that comply with national potable water quality standards	%	98%	GREEN	Worsening
Soil	4	Number of contaminated sites	CSs / 1000 inh (or km2)	No Data	No Flag	None
Soil	4.1.a	Concentration of mercury in soil	mg/kg	No Data	No Flag	None
Soil	4.1.b	Concentration of cadmium in soil	mg/kg	No Data	No Flag	None
Soil	4.1.c	Concentration of zinc in soil	mg/kg	No Data	No Flag	None
Soil	4.2	Concentration of mineral oil in soil (using infrared spectroscopy)	mg/kg	No Data	No Flag	None
Water Use	5	Water Exploitation Index	%	90%	RED	Stable
Land Use	6	Open green space area ratio per 100 000 inhabitants	Hectares	4.6	RED	None
Land Use	6.1	Share of green space areas within urban limits	%	70%	GREEN	None
Biodiversity and Ecosystems	7	Abundance of bird species (all species)	Annual % of change	No Data	No Flag	None
Biodiversity and Ecosystems	7.1	Abundance of other species	Annual % of change	No Data	No Flag	None
Mitigation (GHG Emissions)	8	Annual CO2 equivalent emissions per capita	Tonne / year / capita	1.7	GREEN	None
Mitigation (GHG Emissions)	8.1	Annual CO2 emissions per unit of GDP	Tonne / m. USD of GDP	0.022	GREEN	Improving
Adaptation (Resilience to Natural Disaster Risks)	9	Estimated economic damage from natural disasters (floods, droughts, earthquakes etc..) as a share of GDP	%	0.15%	GREEN	Stable
Adaptation (Resilience to Natural Disaster Risks)	9.1	Percentage of public infrastructure at risk	%	No Data	No Flag	None
Adaptation (Resilience to Natural Disaster Risks)	9.2	Percentage of households at risk	%	No Data	No Flag	None

A2. Indicator Data

A2.2 Pressure Indicators

Sector	Source of Pressure	ID	Indicator	Unit	Indicator Value	Indicator Flag	Indicator Trend
Transport	Energy efficiency and type of energy used	10	Average age of car fleet (total and by type)	Years	13	RED	Stable
Transport	Energy efficiency and type of energy used	10.1	Percentage of diesel cars in total vehicle fleet	%	68%	RED	Stable
Transport	Energy efficiency and type of energy used	10.2	Fuel standards for light passenger and commercial vehicles	EURO	5	YELLOW	Improving
Transport	Energy efficiency and type of energy used	10.3	Share of total passenger car fleet run by electric, hybrid fuel cell, Liquefied Petroleum Gas (LPG) and Compressed Natural Gas(CNG) energy	%	1%	YELLOW	None
Transport	Energy efficiency and type of energy used	10.4	Percentage of low emission buses in bus fleet	%			
Transport	Choice of transport mode	11	Transport modal share in commuting (cars, motorcycles, taxi, bus, metro, tram, bicycle, pedestrian)	Private transport %	28%	GREEN	None
Transport	Choice of transport mode	11.1	Transport modal share in total trips	%	28%	GREEN	None
Transport	Choice of transport mode	11.2	Motorisation rate	Number of vehicles per capita	0.178	GREEN	None
Transport	Choice of transport mode	11.3	Average number of vehicles (cars and motorbikes) per household	Number of vehicles per household	0.61	GREEN	Improving
Transport	Choice of transport mode	11.4	Kilometres of road dedicated exclusively to public transit per 100 000 population	km	0.63	RED	Worsening
Transport	Choice of transport mode	11.5	Kilometres of bicycle path per 100000 population	km	1.66	RED	None
Transport	Choice of transport mode	11.6	Share of population having access to public transport within 15 min by foot	%	No Data	No Flag	None
Transport	Choice of transport mode	11.7	Frequency of bus service	Average number of passengers at station per hour, in bus network	7	YELLOW	Stable
Transport	Road congestion	12	Average travel speed on primary thoroughfares during peak hour	km/h	15	YELLOW	None
Transport	Road congestion	12.1	Travel speed of bus service on major thoroughfares (daily average)	km/h	30	GREEN	None
Transport	Resilience of transport systems	13	Interruption of public transport systems in case of disaster	n.a.	No Data	No Flag	None
Transport	Resilience of transport systems	13.1	Efficiency of transport emergency systems in case of disaster	n.a.	No Data	No Flag	None

A2. Indicator Data

A2.2 Pressure Indicators (continued)

Sector	Source of Pressure	ID	Indicator	Unit	Indicator Value	Indicator Flag	Indicator Trend
Buildings	Buildings electricity consumption	**14**	Electricity consumption in buildings	kWh / m2	**163.9712348**	RED	Stable
Buildings	Buildings electricity consumption	**14.1**	Electricity consumption in residential building	kWh / m2	**175.9189556**	RED	Stable
Buildings	Buildings electricity consumption	**14.2**	Electricity consumption in non-residential buildings	kWh / m2	**148.7448429**	YELLOW	Stable
Buildings	Heat / fossil fuel consumption	**15**	Heating / cooling consumption in buildings, fossil fuels residential buildings, fossil fuels	kWh / m2	**3.1021E+13**	RED	Stable
Buildings	Heat / fossil fuel consumption	**15.1**	Heating / cooling consumption in residential buildings, fossil fuels	kWh / m2	**37.71199563**	GREEN	Stable
Buildings	Heat / fossil fuel consumption	**15.2**	Heating / cooling consumption in non-residential buildings, fossil fuels	kWh / m2	**21.31367201**	GREEN	Stable
Buildings	Building standards	**15.3**	Share of city enterprises with ISO50001/EMAS certification or similar	%	No Data	No Flag	None
Buildings	Building standards	**15.4**	Total value of projects with green building certification as a share of the total value of projects granted a building permit per year	%	No Data	No Flag	None
Industries	Industry electricity consumption	**16**	Electricity consumption in industries, per unit of industrial GDP	kWh / 2010 USD	0.745	RED	Worsening
Industries	Heat consumption	**17**	Heat consumption in industries, per unit of industrial GDP	MJ / 2010 USD	5.406	RED	Stable
Industries	Consumption of fossil fuels in industrial processes	**18**	Heavy metals (Pb) emission intensity of manufacturing industries	kg heavy metals equivalent released per million USD GVA	No Data	No Flag	None
Industries	Consumption of fossil fuels in industrial processes	**18.1**	Fossil fuel combustion in industrial processes, per unit of industrial GDP	MJ / USD	2.227	RED	Stable
Industries	Consumption of fossil fuels in industrial processes	**18.2**	Share of industrial energy consumption from renewable energy	%	33%	GREEN	Worsening
Industries	Industrial waste treatment	**19**	Share of industrial waste recycled as a share of total industrial waste produced	%	No Data	No Flag	None
Industries	Industrial wastewater	**20**	Percentage of industrial wastewater that is treated according to applicable national standards	%	No Data	No Flag	None

A2. Indicator Data

A2.2 Pressure Indicators (continued)

Sector	Source of Pressure	ID	Indicator	Unit	Indicator Value	Indicator Flag	Indicator Trend
Energy	Electricity provision	**21**	Share of population with an authorised connection to electricity	%	100%	GREEN	Stable
Energy	Electricity provision	**21.1**	Annual average number of electrical interruptions per year, per customer	# / year / customer	22	RED	Stable
Energy	Thermal comfort provision	**22**	Share of population with access to heating / cooling	%	100%	GREEN	Stable
Energy	Renewable energy provision	**23**	Proportion of total energy derived from RES as a share of total city energy consumption (in TJ; compared to benchmark of 20% (links to EU target)	%	30%	GREEN	Worsening
Energy	Resilience of the electricity network to climatic extremes	**24**	Average share of population undergoing prolonged power outage in case of climatic extremes over the past 5 years	%	No Data	No Flag	None
Water	Water consumption	**25**	Water consumption per capita	L / day / capita	304	RED	Worsening
Water	Water consumption	**25.1**	Water consumption per unit of city GDP	L / day / USD	0.0427	YELLOW	Worsening
Water	Water consumption	**25.2**	Unit of water consumed in power plants, per unit of primary energy generated	l / MW / h	72000000	RED	None
Water	Water consumption	**25.3**	Industrial water consumption as percent of total urban water consumption	%	30%	YELLOW	Stable
Water	Efficiency of water supply networks	**26**	Non-revenue water	%	65%	RED	Improving
Water	Efficiency of water supply networks	**26.1**	Annual average of daily number of hours of continuous water supply per household	h/day	14.2	YELLOW	Improving
Water	Wastewater treatment	**27**	Percentage of residential and commercial wastewater that is treated according to applicable national standards	%	No Data	No Flag	None
Water	Wastewater treatment	**27.1**	Percentage of buildings (non-industrial) equipped to reuse grey water	%	No Data	No Flag	None
Water	Wastewater treatment	**27.2**	Percentage of wastewater from energy generation activities that is treated according to applicable national standards	%	No Data	No Flag	None
Water	Resilience to floods	**28**	Percentage of dwellings damaged by the most intense flooding in the last 10 years	%	0.15%	GREEN	None
Water	Resilience to floods	**28.1**	Annual number of storm water/sewerage overflows per 100km of network length	Number of events per year	No Data	No Flag	None
Water	Resilience to floods	**28.2**	Awareness and preparedness to natural disasters	n.a.	Citizens are aware of natural disaster risk but do not have resilient attitudes	GREEN	None

A2. Indicator Data

A2.2 Pressure Indicators (continued)

Sector	Source of Pressure	ID	Indicator	Unit	Indicator Value	Indicator Flag	Indicator Trend
Solid Waste	Solid waste generation	**29**	Total solid waste generation per capita	kg / year / capita	243	GREEN	Improving
Solid Waste	Solid waste generation	**29.1**	GDP per domestic material consumption	USD / kg	0.075221595	GREEN	None
Solid Waste	Collection of solid waste	**30**	Share of the population with weekly municipal solid waste (MSW) collection	%	100%	GREEN	Stable
Solid Waste	Treatment of solid waste	**31**	Proportion of MSW that is sorted and recycled (total and by type of waste)	%	10%	RED	None
Solid Waste	Treatment of solid waste	**31.1**	Percentage of MSW which is disposed of in open dumps, controlled dumps, or bodies of water or is burnt	%	0.013221617	GREEN	None
Solid Waste	Treatment of solid waste	**31.2**	Percentage of MSW landfilled disposed of in EU-compliant sanitary landfills	%	85%	YELLOW	None
Solid Waste	Treatment of solid waste	**31.3**	Percentage of collected MSW composted	%	0%	RED	None
Solid Waste	Landfill efficiency / capacity	**32**	Remaining life of current landfill(s)	Years	1.5	RED	None
Land-Use	Density / Integrated land-use	**33**	Population density on urban land	Residents/ km2	10462.7	GREEN	None
Land-Use	Density / Integrated land-use	**33.1**	Average commuting distance	km	11.3	RED	None
Land-Use	Density / Integrated land-use	**33.2**	Average commuting time	min	No Data	No Flag	None
Land-Use	Density / Integrated land-use	**33.3**	Proportion of the population living within 20 minutes to everyday services (grocery stores, clinics, etc..)	%	No Data	No Flag	None
Land-Use	Urban sprawl	**34**	Average annual growth rate of built-up areas	%	3%	GREEN	None
Land-Use	Urban sprawl	**34.1**	Percentage of urban development that occurs on existing urban land rather than on greenfield land	%	No Data	No Flag	None
Land-Use	Use of existing built-up areas	**35**	Vacancy rates of offices	%	10%	YELLOW	None
Land-Use	Use of existing built-up areas	**35.1**	Share of multi-family houses in total housing units	%	63%	No Flag	None

A2. Indicator Data

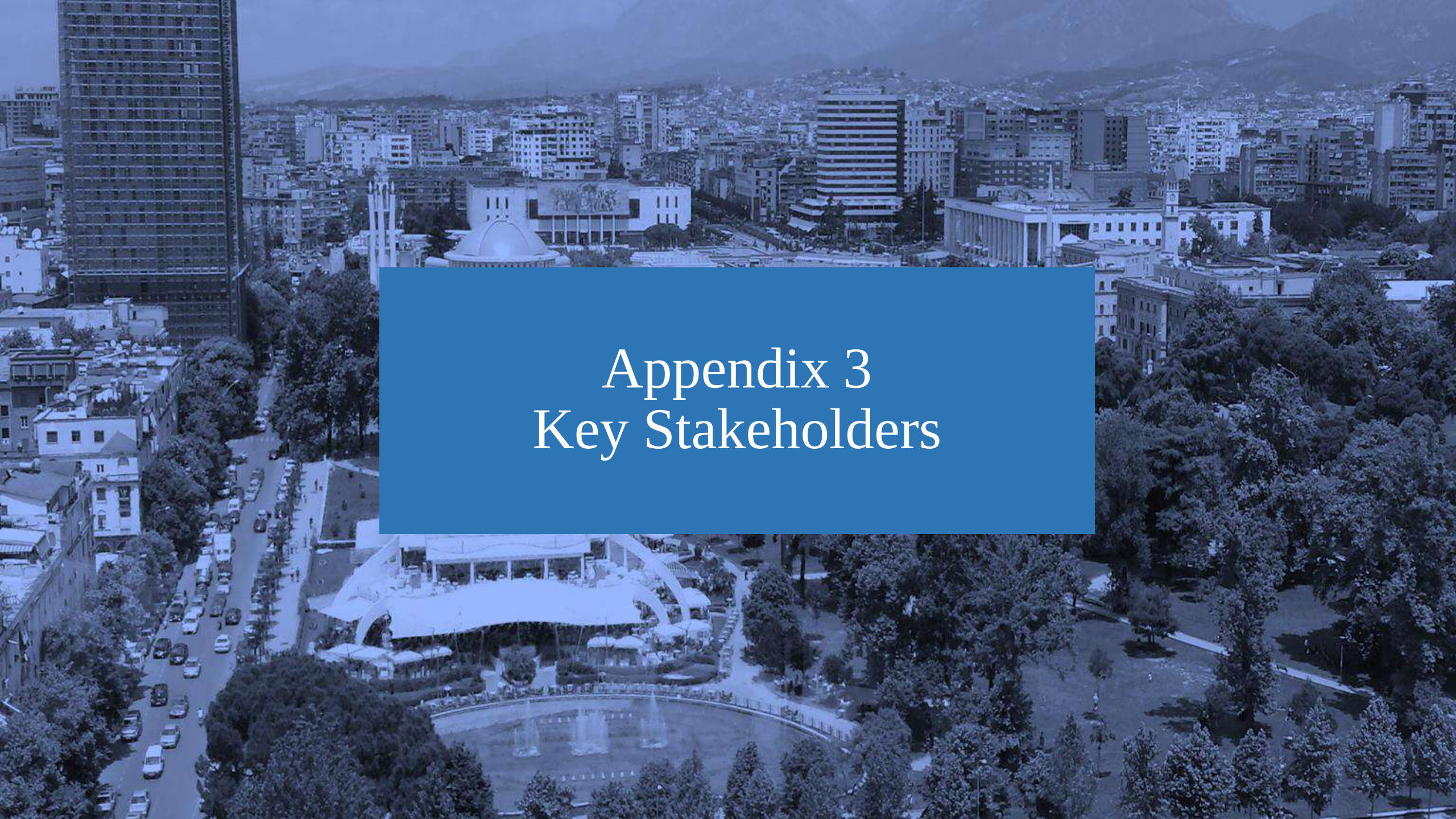
A2.3 Response Indicators

Sector	Item	ID	Indicator	Indicator Value	Indicator Flag
Transport	Energy efficiency and type of energy used in transport	36	High-polluting vehicles are regulated / Energy-efficient vehicles are incentivised through fiscal instruments	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Transport	Choice transport mode	37	Extension and improvement of public and non-motorised transport is planned and supported through investment in place	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Transport	Choice transport mode	38	Public and non-motorised transport is promoted through Information and awareness campaigns	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Transport	Congestion	39	Traffic demand is managed (congestion charges, smart technologies)	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Transport	Resilience of transport systems	40	Public transport emergency management (in publicly and/or privately run networks) is planned and tested	Not existing	RED
Buildings	Electricity and heat consumption	41	Green building is promoted through standards and fiscal Incentives	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Buildings	Electricity and heat consumption	42	Public and private investment in energy efficiency in buildings	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Buildings	Electricity and heat consumption	43	Metering and billing for personal energy use is regulated	Not existing	RED
Industries	Electricity and heat consumption/ energy efficient industrial processes	44	Energy efficient industrial machinery is regulated and incentivised through fiscal instruments	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Industries	Electricity and heat consumption/ energy efficient industrial processes	45	Energy efficient industrial technologies are supported through private investment	Not existing	RED
Industries	Industrial waste /material consumption	46	Material efficiency of new built industrial facilities and waste recycling is regulated and incentivised through fiscal instruments	Not existing	RED
Industries	Industrial wastewater	47	Industrial wastewater treatment / reuse / recycle is promoted through regulations and fiscal incentives	Not existing	RED
Energy	Electricity and heat provision	48	Coverage and quality of electricity and heat supply is improved through investment	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Energy	Renewable energy development	49	Renewable energy facilities in private buildings are incentivised through fiscal instruments	Not existing	RED
Energy	Renewable energy development	50	Renewable energy technologies are developed and supported through public and private investment	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Energy	Renewable energy development	51	Renewable energy facilities are incentivised through awareness campaigns	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Energy	Resilience of the electricity network	52	The resilience of electricity networks in case of disaster is tested and enhanced through investment	Not existing	RED

A2. Indicator Data

A2.3 Response Indicators (continued)

Sector	Item	ID	Indicator	Indicator Value	Indicator Flag
Water	Water consumption	53	Metering and billing for water use is regulated	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Water	Water consumption	54	Water saving / reuse is encouraged through awareness campaigns	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Water	Efficiency of water supply networks	55	Coverage and efficiency of water supply networks is improved through plans and investment	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Water	Wastewater treatment	56	Buildings' access to wastewater collection and treatment systems is improved through plans and investment	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Water	Wastewater treatment	57	Wastewater treatment is promoted through regulations and fiscal incentives	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Water	Wastewater treatment	58	Wastewater billing is regulated	Not existing	RED
Water	Drinking water pre-treatment	59	Drinking water pre-treatment is enhanced through plans and investment	Not existing	RED
Water	Resilience floods	60	Drainage facilities are developed through plans and investment	Not existing	RED
Water	Resilience floods	61	Business and community resilience is encouraged through awareness campaigns	Not existing	RED
Solid Waste	Solid waste generation	62	Reduction of material consumption / solid waste generation is promoted through awareness campaigns	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Solid Waste	Collection of solid waste	63	Coverage of solid waste collection system is improved through plans and investment	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Solid Waste	Collection of solid waste	64	Littering and non-compliance to sorting systems is dis-incentivised through fines and penalties	Not existing	RED
Solid Waste	Treatment of solid waste	65	Composting, recycling and waste-to-energy facilities are developed through plans and investment	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Solid Waste	Treatment of solid waste	66	Solid waste reuse, sorting and recycling is promoted through information and awareness campaigns	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Solid Waste	Landfill efficiency and overcapacity	67	Overcapacity issues in landfills are tackled through plans and investment	Existing, but with implementation challenges and/or insufficient policies	YELLOW
Land-Use	Density / Integrated land-use / urban sprawl	68	Density is regulated	Not existing	RED
Land-Use	Density / Integrated land-use / urban sprawl	69	Transit-Oriented Development is promoted	Not existing	RED
Land-Use	Use of existing built-up areas	70	Mixed-use development is promoted through zoning regulations / incentives	Not existing	RED



Appendix 3
Key Stakeholders

A3. Key Stakeholders

A3.1 Stakeholders relevant per State

Indicator Type	National Government	Municipal Government	Utility Companies	Private Sector	NGOs / Donors / IFIs/ Other
State					
Air	• Ministry of Environment - Director of Environmental Policies and Priorities • Directory of Environmental Education (DoEE) • NEA (National Environmental Agency)	• Directory of Statistics • Department of Environmental Education & Policies	N/A	N/A	See stakeholders listed against land-use • Public Health Institute
Water	• Ministry of Agricultural, Rural Development, and Water Administration - Director of Integrated Water Management • Technical Secretariat of the National Water Council.	• Directory of Statistics • Department of Environmental Education & Policies • General Directory No.2 of City Workers	UKT – Tirana Water Utility	N/A	See stakeholders listed against land-use
Green Spaces	• Ministry of Environment	• Directory of Statistics • Parks and Recreation Agency • Worker's Division nr.1 (Responsible for Maintenance of Green Spaces & Cleaning of Urban Tirana	N/A	N/A	See stakeholders listed against land-use
Biodiversity	• Ministry of Environment	• Directory of Statistics • Education Department and Environmental Policy	N/A	N/A	See stakeholders listed against land-use
Soil	• Ministry of Environment	• Directory of Statistics • Education Department and Environmental Policy	N/A	N/A	See stakeholders listed against land-use
Climate Change	• Ministry of Environment	• Directory of Statistics • Education Department and Environmental Policy	N/A	N/A	See stakeholders listed against land-use

A3. Key Stakeholders

A3.1 Stakeholders relevant per Pressure Sector

Indicator Type	National Government	Municipal Government	Utility Companies	Private Sector	NGOs / Donors / IFIs/ Other
Pressure					
Land use	N/A	• Department for Economic Development Director General of Economic Development • Planning and Territorial Development Directory of Strategic Projects Directory of Strategic Planning	N/A	• Albanian Construction Association	• EU Delegation • KfW • GIZ • USAID • World Bank • SECO (Swiss Embassy) • ADA (Austrian Development Agency) • Italian Cooperation • JICA • Albania-EU Energy Efficiency Centre (EEC) • Institute of Environmental Studies • EIB • UNDP • The Regional Environmental Center
Transport	Ministry of Transport	• Directory of Statistics Department of Transport and Road Traffic	N/A	• Albanian Construction Association	See stakeholders listed against land-use
Water & wastewater	• Ministry of Agricultural, Rural Development, and Water Administration - Director of Integrated Water Management • Technical Secretariat of the National Water Council.	• Directory of Statistics Public Works Department • General Directory No.2 of City Workers	• UKT Tirana Water Utility - Vice General Director	• Albanian Construction Association	See stakeholders listed against land-use
Solid waste	• Ministry of Environment	• Directory of Statistics • Directory of Cleaning and Waste Management	• ECO-Tirana	• Albanian Construction Association • Albania Recycles Association	See stakeholders listed against land-use

A3. Key Stakeholders

A3.1 Stakeholders relevant per Pressure Sector (continued)

Indicator Type	National Government	Municipal Government	Utility Companies	Private Sector	NGOs / Donors / IFIs/ Other
Pressure					
Energy	• Ministry of Energy - Director of Energy Efficiency & Renewables	• Directory of Statistics	• KESH (TSO) • OSHEE (DNO)	• Albanian Construction Association	See stakeholders listed against land-use
Buildings	• Ministry of Energy - Director of Energy Efficiency & Renewables	• Directory of Statistics	N/A	• Albanian Construction Association	See stakeholders listed against land-use
Industry	• Ministry of Energy & Industry - Director of Energy Efficiency & Renewables	• Directory of Statistics	N/A	• Konfindustria (Industry confederation) • Albanian Construction Association	See stakeholders listed against land-use