BĂLȚI

The green treasure
city of Moldova

Green City Action Plan for the City of Bălți

EBRD's Green Cities Framework

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ECONTACT

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List of acronyms

ANRE	National Agency for Energy Regulation
CET	District heating plant
CLIMA	Climate Change Office
CNG	Compressed Natural Gas
C&D	Construction and Demolition
DH	District Heating
DR	Demand Response
ELV	End-of-Life Vehicles
ENI SEIS	European Neighbourhood Instrument for the Shared Environmental Information System
EBRD	European Bank for Reconstruction and Development
GCAP	Green City Action Plan
GDP	Gross Domestic Product
GHG	Greenhouse gases
GIES	General Inspectorate for Emergency Situations
IEA	International Energy Agency
LPG	Liquefied Petroleum Gas
MSW	Municipal Solid Waste
NDR	North Development Region
nZEB	nearly Zero Energy Buildings
PSR	Pressure – State – Response
PVs	Photovoltaics
RES	Renewable Energy Sources

SACET	Central district heating system
TSP	Total Suspended Particles in air
UNEA	United Nations Environment Assembly
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Program
WEEE	Waste Electric and Electronic Equipment

Message of the Mayor

Dear citizens of Bălți,

Our municipality is continuously developing and transforming. As the development centre of the northern part of the country, it will inevitably become an attractive landmark for the region both from an economic and social perspective as well as for tourism. The need for development of the municipality is essential given the fact that urbanization in the northern region is continuously increasing. In addition, Bălți has the second largest population compared to other administrative and territorial units in the Republic of Moldova, and the social and economic needs are constantly increasing.

The Green City Action Plan for Bălți represents a tool which would assist the municipality in structuring more comprehensively its strategic development areas, this allowing for a harmonious development in all sectors, and for creating opportunities for an economic, social and green progress for all of its citizens, including socially vulnerable people, i.e. women, elderly etc. The core of the GCAP is the idea of a green city, an urban area where human activities are organized in synergy with the environment, this allowing for a healthy livelihood for the citizens, and continuous regeneration for the latter.

Economic development is a necessity for the city, which has to be met exhaustively, taking into account the needs of the citizens and the possibilities it has to offer. Nevertheless, when we speak of progress, we also have to ensure its sustainability. Therefore our objectives will have in view sustainable development, and will be achieved through environmental conscious actions.

This GCAP includes concrete actions for the following 15 years integrated in a vision of strategic development. These will contribute to the balanced progress of the municipality in economic, social and environmental terms. The implementation of this plan requires cooperation with national and international financing institutions, development partners and private investors, for which the sustainable development potential represents the European path in an era when we all have to increase our efforts in safeguarding the future for next generations.

The transformation process into a green city implies the openness and responsiveness of authorities towards transformative initiatives and ideas, and the active implication of the citizens in formulating and implementing ideas and projects which ensure both wellbeing and a sustainable lifestyle. Through our perseverance, with investments and a great amount of work, Bălți municipality will indeed become the green treasure of Moldova.

Therefore we encourage you, dear citizens, to join our efforts and step together on this ambitious, though difficult path towards the Green Transformation of Bălți municipality.

The Mayor of Bălți municipality

Executive Summary

The Municipality of Bălți joined the Green Cities programme in 2019 and immediately after decided to develop its own Green City Action Plan (GCAP). The aim of EBRD Green Cities programme is to build a better and more sustainable future for cities and their residents. For this purpose, it addresses challenges related to insufficient infrastructure investment, demographic changes, poor air quality, climate vulnerabilities etc. in a systematic and integrated way.

The GCAP pursues a comprehensive assessment of the environmental and urban development challenges the city is confronted with, having a focus on seven urban sectors: land use, transport, water and wastewater, waste management, energy, buildings and industry. This process was carried out in a systematic way following EBRD methodology.

GCAP is a comprehensive strategic document, providing a thorough assessment of the environmental conditions in the city, and defining paths to address the challenges and overcome pressures exerted by various human activities on the environment. The document gives an overview of all necessary investments in the upcoming 15 years, which would guide us to achieve transformation and to become the green treasure city of Moldova.

Whilst developing the GCAP, we have followed a process including data collection, verification, analysis and consultation with all stakeholders involved. This process allowed us to define the most important measures to engage in. Given the available data and time series trends for the state indicators, coupled with expert knowledge of the local context, it can be concluded that the priority environmental challenges of Bălți are related to air quality, drinking water quality, water bodies, green spaces, and climate change resilience.

The environmental challenges are determined by the pressures coming from different sectors. Thus, GCAP analysed seven key sectors and determined which are the main aspects that need to be addressed to improve their performance and reduce the pressure on the city's environment. The transport sector needs substantial improvements in public transportation (renewal of public transport fleet, dedicated lanes for public transport, higher frequency of buses) as well as diversification of modal transport (introducing bicycle lines, pedestrian walking paths, etc.). Buildings (both public and residential) require major investments in terms of energy efficiency and connection of new and existing buildings to the central heating system. Key challenges in the industry sector refer to high consumption of thermal energy and the extensive use of fossil fuels, non-compliance regarding wastewater treatment and hazardous waste management. The energy sector calls for investments in the efficiency of district energy networks and in public and private financial schemes promoting RES. Actions targeting the water sector would tackle the issues of

high losses in the water supply and sewerage networks, the insufficiencies of the rainwater drainage system, controlled use of water resources, and the high sewerage infiltration rate. Waste management requires the extension of waste collection coverage and major reforms regarding waste disposal and treatment. Finally, the assessment of the land use sector pointed to issues regarding improving the green areas in the city and their maintenance system, as well as future-proofing and greening the General Urban Plan in order to enhance the overall living standards of citizens.

In order to address the key environmental and sectoral challenges GCAP sets four strategic objectives to guide us during GCAP implementation, and defines 30 short-term actions to be realized in the first 5 years. In most cases these actions, though grouped under GCAP sectors, are interlinked, will serve more than one objective, and result in improvements in multiple sectors. For each short-term action we have defined the targets, implementation steps, the stakeholders involved, and compiled budget estimations. A special emphasis is given to environmental, gender and social benefits of the actions. Whenever possible, smart solutions are recommended.

By implementing all these actions, the total GHG emissions reduction is estimated at nearly 60 thousand t CO2 eq annually. To this further emission reductions would be added, which instead of being quantified, are estimated as percentage reductions of GHG emissions from specific areas (i.e. Action 9 Connecting green infrastructure with sustainability mobility: biking/walking city network has the potential to reduce by 5% air pollution from cars). However, it is to note that an integrated approach and simultaneous implementation of actions is preferred for a substantial reduction of GHG emissions.

We estimated that the total CAPEX of implementing these actions is at 180 million euro on a timeframe spread over the 5 to 10 years. Some of the actions are policy-oriented (8 in total, i.e. Action 4 Developing and approving the Sustainable Urban Mobility Plan), some both policy and investment oriented (3 in total, i.e. Action 5 Traffic Management Plan development and implementation pilot), while others are investments in green infrastructure (19 in total, i.e. Action 25 Collection and composting of green waste).

We consider that the core priority actions included in this GCAP target the energy efficiency in buildings, aim to improving the waste management system, and provide incentive to rediscover and co-create the green heart of our city. The GCAP will help our city to steer the development process by understanding the interlinks between different sectors and how our investments should be corelated to achieve best results as efficiently as possible. We will constantly monitor and evaluate the GCAP implementation process and will consider all the lessons that we will learn together during the period.

Introduction

World-wide, the rapid growth of urban populations generates serious environmental challenges to which local solutions need to be conceived. According to the United Nations, around half the world's population now lives in urban areas, with this figure likely to exceed 68 per cent by 2050. To meet the rising demand for services, cities require vast amounts of resources, which, in turn, has a significant impact on the urban environment. For example, cities currently account for up to 75 per cent of energy use and 70 per cent of greenhouse gas emissions worldwide.

To address these challenges, the EBRD developed the EBRD Green Cities programme, with the aim of building a better and more sustainable future for cities and their residents. The programme does this by identifying and prioritising environmental challenges, which are then connected with sustainable infrastructure investments and policy measures.

The Municipality of Bălți joined the Green Cities programme in 2019 and immediately after decided to develop its own Green City Action Plan (GCAP). The GCAP pursues a comprehensive assessment of the environmental and urban development challenges the city is confronted with, having a focus on seven urban sectors: land use, transport, water and wastewater, waste management, energy, buildings and industry. This process was carried out in a systematic way, while considering social concerns and including gender aspects as well. A special emphasis was given to digital/smart solutions that can be applied while guiding the city through the transformative process of becoming a green city.

Thus, the GCAP intends to be a dynamic document, a step-by-step guide to implementers and urban specialists, through which environmental challenges can be tackled, and sustainable, green infrastructure can be developed. We strongly believe that this strategic plan will allow the city to fulfil its vision of becoming a green urban zone where citizens will find economic opportunities, access to improved services and employment as well as equal participation and representation. It will also empower its decision-makers, officials and the community as a whole to transform Bălți into the green treasure city of Moldova.

Structure of the document

When developing this document, our endeavour was to produce a coherent, well-structured action plan, to make it comprehensive, yet easy to read, understand and use.

The document is structured in three main sections:

Section I. City overview and environmental baseline provides a comprehensive background in terms of the methodology used and adapted to specifics of Bălți, a city overview and baseline. The section consist of several chapters, as follows:

> ***Chapter 1.*** City overview – presenting the main demographic, social and economic features of the city, and providing highlights on the policy framework
>
> ***Chapter 2.*** Methodology – detailing how the EBRD's GCAP methodology was adapted to the specifics of Bălți
>
> ***Chapter 3.*** Baseline – providing a thorough review of the city, the findings of the data collection and analysis; the environmental and sectorial challenges faced by the city

Section II is the core part of the document; it presents the Green City Actions developed on the basis of the findings in Section I. The section consist of several chapters, as follows:

> ***Chapter 4.*** The Green City vision and strategic objectives, detailing the 4 strategic objectives for addressing the issues and turning Bălți into the green treasure of Moldova
>
> ***Chapter 5.*** GCAP Actions – detailing the 30 defined actions which are trans-sectorial and multi-purposed, meaning that most of them of them refers to more than one sector and contributes to more than one strategic objective. The chapter also lists long-term actions completing the detailed short-term actions.
>
> ***Chapter 6.*** Summary of GCAP actions with financial details

Section III presents the plan for the monitoring of the implementation of the actions. The section includes:

> ***Chapter 7.*** Description of the Monitoring Framework

Section 1

City overview, methodology and environmental baseline

BĂLȚI

The green treasure city of Moldova

1 City overview

Social and economic context

Bălți is the second urban centre in the Republic of Moldova by area and number of inhabitants. It is an important economic, educational, and cultural centre in the Northern Development Region, located at 138 km distance from the capital Chisinau, 65 km from neighbouring Romania and 120 km from Ukraine.

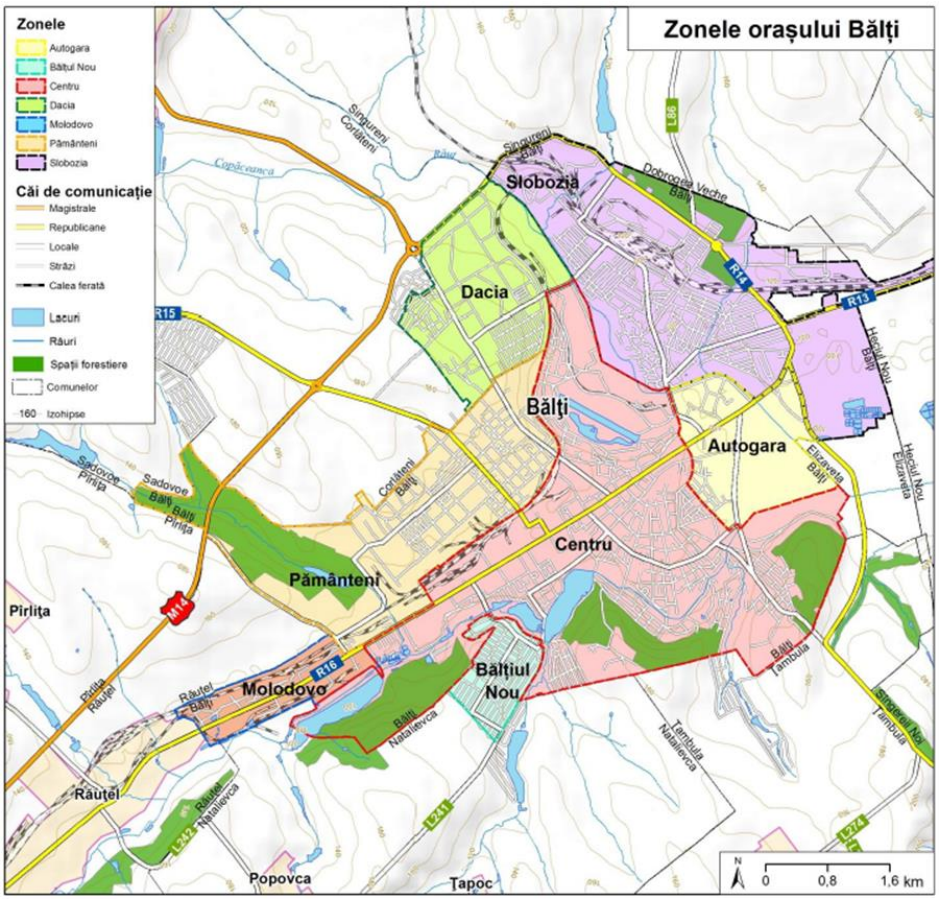


Figure 1 Sectors of Bălți Municipality

The Strategy for the Social and Economic Development of Bălți Municipality, 2021-2025 defined 3 zones of the city: *Center* – which includes 4 neighbourhoods: Center, Țigănia, Teioasa and Berestecico; *Pământeni*, which includes the neighbourhoods Jubiliar and Dacia; and the 3rd zone

named *Slobozia*. Beside these 3 zones, the city administration also includes 2 adjacent zones, Molodovo and Bălții Noi, and two nearby villages, Elizaveta and Sadovoe.

The territory of Bălți municipality (including Elizaveta and Sadovoe villages) is 7,800.6 ha, out of which the city of Bălți occupies 4,143 ha, Elizaveta village 2,677 ha and Sadovoe village 980 ha.

The population of Bălți is 151,791 inhabitants[1], representing about 15% of the population of the region and 4% of the population of the country. Of the total population, 52% (79,563) are women and 48% (67,287) are men.

The terrain in the northern part of the country is a quite uniform plateau, with the elevation ranging between 240-320 m. The area around Bălți is known as the Bălți Plain. The climate of Moldova is temperate-continental with long warm summers with temperatures above 20°C and dry winters with temperatures averaging -4°C. Precipitation varies greatly, with frequent drought episodes. Most rainfall occurs in March and October, which is when most flooding episodes occur. According to projections, the climate will become more extreme, with shorter but more intense rainfall episodes expected and longer drought intervals. Intense rainfall episodes are likely to cause more frequent overflows of the insufficiently expanded and seldom maintained rainwater drainage system in the city. Droughts are already an important climate issue in Moldova. Having droughts manifesting for extended periods of times in the area of Bălți, it is likely to cause a decrease in the groundwater levels which could potentially lead to temporary disruptions in the water connections supplied from private wells.

Bălți municipality is an outstanding hub of economic growth at regional level. Business activities are intense, and the economic environment is diverse. According to the National Bureau of Statistics, a total number of 6,806 businesses are registered in the municipality, of which 98.5% are SMEs and 1.5% are large enterprises. Around 66.7% of the total turnover registered between 2017 and 2019 is generated by large enterprises, and only 33.6% by SMEs.

1 Institute of statistics of Moldova, data from 1st of January 2019, including population of the two adjacent villages Elizaveta and Sadovoe, available at http://statbank.statistica.md/PxWeb/pxweb/ro/20%20Populatia%20si%20procesele%20demografice/20%20Populatia%20si%20procesele%20demografice__POP__POP010/POP010400reg.px/table/tableViewLayout1/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774

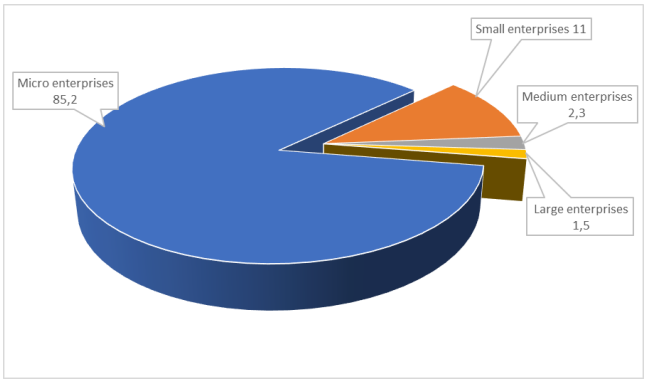


Figure 2 Share of enterprises by size (%)

It is to note that the businesses based in Bălți represent 38.6% of the enterprises registered in the region and 4.7% of the total number of businesses registered in Moldova.

The economic sectors with the highest turnover are: commerce, manufacturing, and the production and distribution of electric and heat energy, gas, hot water and air conditioning.

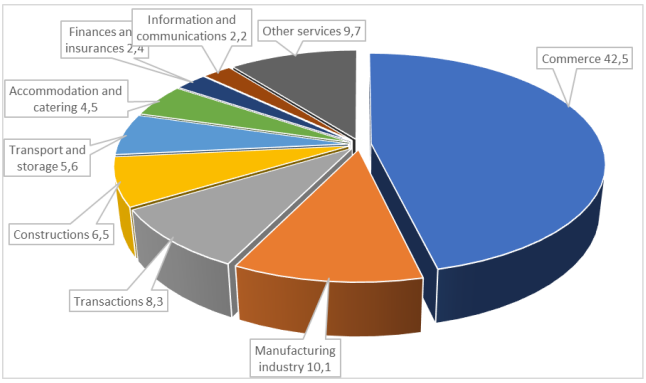


Figure 3 Share of enterprises by activity (%)

Bălți municipality is a connection point between regions, as well as between neighbouring countries. The presence of the railway on the territory of the municipality located near the industrial areas ensures access to the Commonwealth of Independent States (CIS) and European Union (EU) countries. The city passenger transport services are carried out by public electric transport, buses and car transport. The public electric transport is a service of the Department of Trolleybuses Municipal Enterprise, with a total number of 53 trolleybuses, including 11 fitted with

traction batteries and a length of electric operating networks of 38.6 km². The bus lines are operated by private companies.

Another important sector for the socio-economic sphere is education. Bălți is the most important educational centre in the northern region and the second in the Republic of Moldova, entailing a high human and intellectual potential. Public education is structured on multiple levels: pre-school education, primary, secondary and high school education. Professional and postgraduate education is organized and carried out in: 4 vocational schools, 1 center of excellence in services and food production, 6 colleges and 1 university, attended by 13,302 students. In addition to this, access of children and students from the municipality to education is achieved in Bălți municipality through the activity of 78 educational institutions, out of which: 35 institutions of pre-school education, 2 primary schools, 10 gymnasiums, 13 theoretical high schools, 1 Moldavian-Turkish high school (called Orizont), 3 extracurricular art education centres, 14 extracurricular education institutions (5 sports schools, 7 Municipal Centres for Minors and Youth, 1 resource centre for teenagers and youth, 1 creation centre for children).

The public health system of the municipality is intended to ensure the health of the entire society and each inhabitants, and to increase the life expectancy of citizens. Health care and services are specified in the General Program which represents a package of general services satisfying the needs of the population, and provided to all individuals, both with or without health insurance. Health care in the city is provided to a great extent by national, municipal and private health care institutions. Health care and services in Bălți municipality are available at: Bălți Municipal Hospital, SAMU National Emergency Health Care Centre, Bălți Psychiatric Hospital, Bălți Blood Centre, Bălți Public Health Centre, Bălți Dialysis Centre, Municipal Centre of General Practitioners of Bălți.

The Magnific Nord Health Care Centre and the Incomed Laser Therapy Centre are private diagnosis and treatment centres providing a wide range of health services.

The Invitro, Analitic Med, Synevo, Sante, Alfa Diagnostic, MedExpert clinics are available for laboratory diagnostics.

In order to enhance and protect the health of the population, and to ensure workforce capable of generating high levels of productivity, in Bălți municipality are implemented 10 programs in the

2 Chamber of Commerce and Industry, Bălți branch, https://Bălți.chamber.md/despre-regiune/municipiul-Bălți/

field of health care, of which: combating B, C and D viral hepatitis, preventing and controlling cardiovascular diseases, combating substance and alcohol abuse, combating tuberculosis etc.

In Bălți municipality 17 cultural institutions are located as follows:

- 8 cultural centres (6 in urban and 2 in rural areas)
- 3 libraries (1 in urban and 2 in rural areas)
- 3 extracurricular art education centres
- Museum of History and Ethnography
- Antioh Cantemir Art Gallery
- Vasile Alecsandri National Theatre

In the cultural centres 102 art groups consisting of 2037 amateurs carry out their activities. It is to mention that 30 art groups including 573 persons were granted the honorific title of "models."

The Municipal Library manages 4,555,000 items, and the number of active users is 10,547 individuals. The collection of the Museum of History and Ethnography consists of 35,923 items. The 3 institutions hosting extracurricular arts education delivered by 99 teachers are attended by 997 children.

The built heritage consists of 67 monument buildings of which 43 are of national and 24 of local significance.

Being "the capital" of the North, Bălți municipality comprises all services and places needed for other communities and districts in the north.

Even though the municipality has economic potential, still many investments are needed in all spheres for the consolidation and revitalization of the city. Currently, there are intentions to increase the size of the municipality by adding some other neighbour communities, in order for Bălți to become more developed. Still, these remain initiatives and are not implemented projects.

Institutional setup

The institutional setup of Bălți Municipality is complex and consists of two main entities: the Local Council as the decision-making entity and the Mayor's Office as the executive entity. The Mayor's Office is directly subordinated to the Local Council.

The Local Council includes 35 councillors and is led by a general secretary. There are 5 specialised commissions under the Local Council. Of these, the Commission for municipal

infrastructure and environmental protection is highly relevant in the context of GCAP development. The Local Council has 17 female members and 18 male members.

The Mayor's Office includes several departments coordinated by the Mayor and 3 vice-mayors. The below scheme presents the organisations setup of the Mayor's Office. The Communal Services Department, the Architecture and Urban Planning Department and the External Relationships and Investments Department are the most relevant for the GCAP.

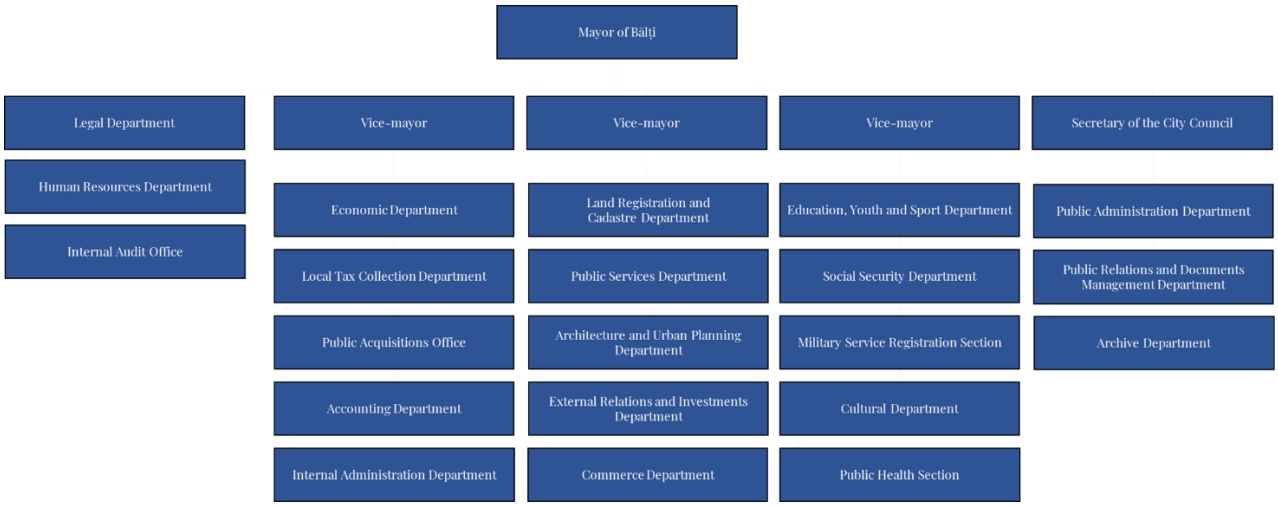


Figure 4 Organizational chart of Bălți Municipality

The municipal services are provided to the citizens of Bălți by municipal owned enterprises. These are under the direct coordination of the Mayor's Office. Currently, there are 12 such enterprises out of which 7 are highly relevant in the GCAP development context, these are specialized in Waste Management, Road Management, Land use and green area management, Trolleybuses, Energy generation and distribution (Termogaz), Landscape and Architecture, Water and Wastewater. The district heating service is provided by a state-owned company that is organised as a shareholding company named CET Nord.

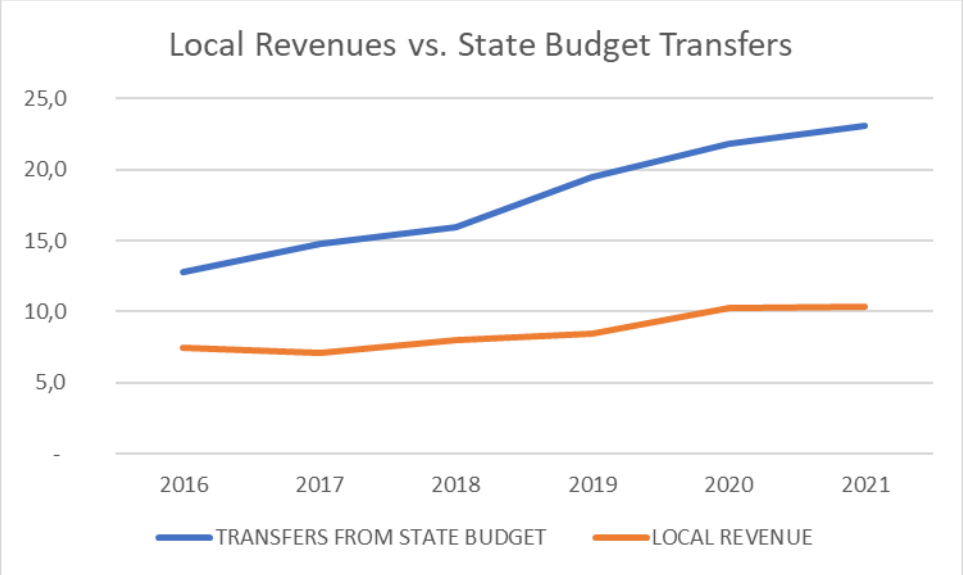
The GCAP development process is coordinated by the newly appointed working group led by the representative of the External Relations and Investments Department. The GCAP working group includes 9 members, one from each relevant municipal enterprise, including one representative of CET Nord. The working group closely cooperates with the representatives of EBRD and the consultant team in order to develop a well-structured and comprehensive GCAP. Furthermore, the working group ensures the visibility of the development process and cooperates in

implementing the Stakeholder Engagement Plan[3] which was disclosed together with the Inception Report prepared in November 2020.

Financial overview

Revenue

The municipal revenues have been on an ascending trend since 2016, culminating in a planned budget containing total revenues of 33.4 mil. EUR in 2021. The main sources of revenue in the municipal budget are transfers from the state budget and taxes raised on the local level. Both revenue sources have seen an increase since 2016. Despite these ascending trends of absolute values, the shares of these sources in the overall revenues of the municipality stayed somewhat consistent. As a generalization, we can state that one third of the revenue of the budget is local revenue, which is an acceptable standing when it comes to creditworthiness.



Expenses

Municipal expenses have also been increasing since 2016, but this trend has not prevented the Municipality from being able to balance the yearly planned budgets. As of 2021, the planned total expenses in the approved budget are 32.8 mil. EUR. Overall, personnel expenses comprise around

3 The Stakeholder Engagement Plan – SEP - was developed in the inception phase of the GCAP development process. It includes a detailed analysis of the relevant stakeholders, and the activities to be performed in the upcoming period of time in order to ensure that the GCAP is developed in line with international best practices related to stakeholder engagement. For further information, please consult the SEP.

half of the total expenses of the municipal budget. Expenses regarding environmental protection were relatively consistent in 2018-2020 (around 2,4% of the total expenses), and cover only the expenses related to the collection, containment and destruction of persistent organic pollutants, solid waste and chemical waste, and no specialized methods of collection and no investment plans.

The Municipality does not have large previous expenses with loan repayments, indicating that there is a window of opportunity to access more financing if the surplus necessary to cover repayments can be gathered, to balance the budget.

Capital investments and projects

Investment projects only start from 2017 onwards and they mostly target the expansion and rehabilitation of sewer and water systems, the expansion of the public lighting system, the provision of public services and facilities, and the retrofitting of buildings. The percentage of capital investments in the total municipal expenses should be boosted to reach the international consensus on sustainability of investments (15-20%).

On the other hand, since 2011, development projects have been frequent and regular in the Municipality of Bălți, rarely necessitating own contributions. It is noteworthy that the partners and donors of these projects are diverse, including domestic development funds, international institutions, diplomatic missions of foreign countries in Moldova, Romanian authorities etc. Moreover, long-term partnerships and collaborations have been established, providing many opportunities.

Most projects are centered on the renovation and improvement of energy efficiency of educational institutions. Health care, industry, and research are the next three fields that had priority. International projects for development of three strategic documents are also present. The last noteworthy project is financed with EBRD assistance and is related to the upgrade of the public transport fleet of busses (phase I: 2012-2014, phase II: starting in 2019).

In 2020, the Municipality invested its own contribution to the EBRD-assisted project, covered through loans from domestic financial institutions, which is within the legal boundaries of debt servicing.

Policy landscape of GACP Bălți

In order to be able to embed the GCAP into the political landscape of Moldova and specifically of Bălți, a policy framework analysis with connection to GCAP areas and sectors at international, national and local (municipal) levels was performed. Mapping the relevant policies and regulations have enhanced the relevance of the GCAP also in terms of filling eventual gaps in this area, tackling environmental challenges through local policy interventions, and ensuring substantial arguments for the further improvement of green governance.

International and national level

At the international level, the EU has a strong tradition of formulating and promoting directives in the field of environmental protection and climate change. Regarding Moldova, even if such EU regulations and directives are not fully implemented yet, they are aspirational and provide guidance for development.

Through the **Association Agreement between the European Union and the European Atomic Energy Community and their Member States and the Republic of Moldova**, a comprehensive framework for dialogue and cooperation was created in multiple fields, including environment and climate action. By signing the Agreement on June 27, 2014 (ratified by the Parliament of the Republic of Moldova on July 2, 2014, and by the European Parliament on November 13, 2014), Moldova took the path of progressive convergence of policies and regulation.

At a broader international level, the **UN 2030 Agenda for Sustainable Development** is recognised as the overarching framework for cooperation. It links social, environmental and economic development commitments, addressing poverty and sustainability in combination and requiring a multi-stakeholder approach (the UN, governments at all levels, private enterprises and civil society) to secure implementation.

In July 2017 the Government of Moldova, through the State Chancellery, adapted the **2030 Sustainable Development Agenda**, and nationalised the Sustainable Development Goals, thus guaranteeing political commitment to working towards these goals. The Moldova Sustainable Green Cities program, through its pilot actions and sector specific planning exercises raises awareness and thereby complements the GCAP.

The **National Strategy on Adaptation to climate change by 2020 and the Action Plan** to implement it, approved by Governmental Decision 1009/2014 is the main document guiding the national level efforts to develop resilience in different regions across the key sectors.

National, regional and local environmental and cross-sector policies

In the following sections, we summarise the most important findings of the External Framework Report regarding the local situation at the time of elaborating the political framework analysis.

Table 1 Environmental and cross-sector policies

Field	Policy
Sustainable development	**National Development Strategy "Moldova 2030"**, under approval: aims to identify the fundamental factors determining the country's development trajectory in the period up to 2030 **Social and Economic Development Strategy for the Municipality of Bălți, 2021-2025**, approved in 2021: succeeds the Sustainable Development Strategy for Bălți, 2016-2019, with the aim to determine the strategic development directions, the dynamics and depth of development, to enhance local authorities' efficiency in city management, to use financial resources efficiently, and to promote the city while attracting external financing for investments and social projects.
Environment	Government Decision no. 160 of 21.02.2018 regarding the approval of the **Green Economy Promotion Program in the Republic of Moldova 2018-2020** – setting several objectives to reduce the impact on air quality **Environmental Strategy 2014-2023**: the most relevant document, it includes the main goals and objectives for environmental protection in Moldova
Climate change	In March 2020 Moldova submitted to the UNFCCC an **updated Nationally Determined Contribution (NDC)**, being the fourth country in the world to do so. Through this NDC2, Moldova has increased their ambition to unconditionally reduce greenhouse gas emissions by 70% below its 1990 level in 2030, instead of 64-67% as committed in NDC1. This ambition could be increased up to 88% reduction compared to reference year levels with international technical, financial and technological support **Sustainable Development Strategy for Bălți 2016-2019:** it includes several specific objectives regarding energy efficiency, disaster risk reduction, water and wastewater management and green spaces

	Local Action Plan for Energy Efficiency for 2019–2021: identified specific measures for improving energy efficiency for six public buildings in Bălți **Sustainable Energy and Climate Action Plan (SECAP) 2016–2030** under the Covenant of Mayors for Climate and Energy
Biodiversity	**National Strategy and the Action Plan for Biodiversity Conservation:** includes provisions related to the biodiversity and local ecosystems

Most relevant national, regional and local GCAP sector policies

As the second largest city in the Republic of Moldova, and a major industrial, cultural and commercial centre and transportation hub in the northern part of the country, Bălți faces the challenges of uneven development, environmental pressure from the part of industry and transport, uncontrolled urbanization, and outdated infrastructure. Further challenges include social inequality, inefficient use of energy, lack of efficient land use, and outdated urban transportation. In order to overcome these challenges, the municipality adopted various polices, and is implementing different programs and action plans aiming at the modernization and revitalization of the city in various fields, i.e.:

- **Social and Economic Development Strategy for the Municipality of Bălți, 2021-2015**
- **Sustainable Energy and Climate Action Plan** (SECAP) for Bălți municipality, 2016-2030
- **Urban Revitalization Programme** for the Municipality of Bălți for 2019-2021, Phase 1 (PUR)
- **Local Action Plan for Energy Efficiency** for 2019-2021 (LAPEE)

The table below presents a selection of the most relevant policy documents in GCAP sectors. An extensive review of these and additional policies, ongoing initiatives and strategies is available in the External Framework Report.

Table 2 Sectoral specific policies – other than the generic policies presented above

Field	Policy
Urban planning and land use	**Urban Development Plan**: the main coordinating document in the context of establishing a harmonious and integrated development of the structural elements of the urban environment, administrative and cultural centres, housing areas, industrial and leisure areas, the urban services and adequate technical infrastructure. **Zonal Urban Plan (PUZ)** of the central area of Bălți municipality: tends to organize the central zone of the Bălți municipality by improving access to the central zone,

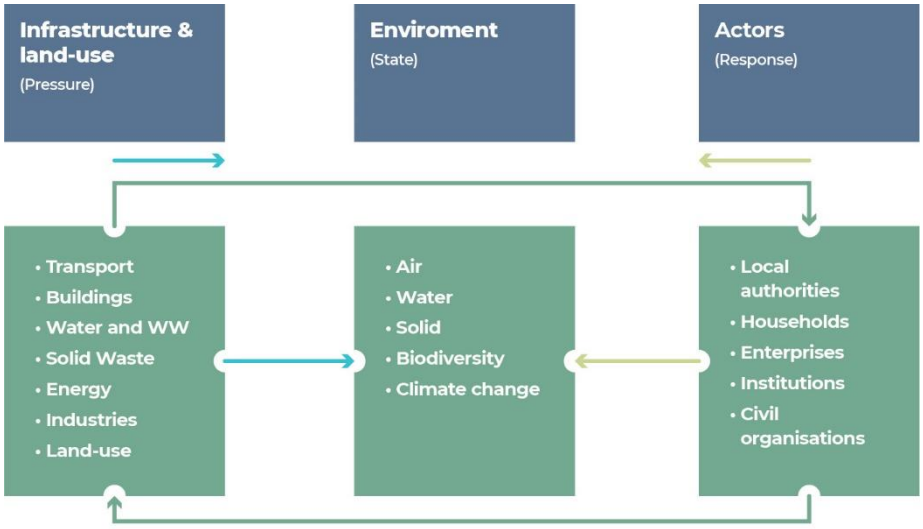
	developing leisure and recreation areas, renovating and developing public infrastructure, creating infrastructure to support businesses and establishments of social importance, expanding green areas, as well as promoting the conservation of cultural heritage in Bălți. **Program of Urban Revitalization for 2019-2021**: the main objective relevant for GCAP is the rehabilitation of public spaces and the improvement of the environmental conditions in the selected area.
Buildings	**Regional Sector Program on Energy Efficiency in Public Buildings: North Development Region**, 2013-2020: defines energy savings targets, as for refurbishment rate and annual energy savings, for 2016 and 2020, also separately for Bălți **Local Energy Efficiency Action Plan, 2019-2021**: has been prepared specifically with the aim to increase energy efficiency of public buildings in Bălți municipality. Up to date, only one school (three buildings) has been intensely renovated, major components being applied, with the aim to increase energy efficiency and decrease the dependence on fossil fuel-based energy. Due to limited available budget, the Municipality has been implementing small energy efficiency measures in buildings – changing windows and doors and repairs. **Sustainable Energy and Climate Action Plan for Bălți, 2016-2030**: increase energy efficiency to reduce operating costs and CO2 emissions for the public and private sector.
Solid waste	**Regional Programme for Solid Waste Management for the North Region**, 2013-2020: the overall objective of the programme is to improve local public services for waste management in the Development Region North (DRN), through gradual transition to the new standards according to EU Directives.
Water and wastewater	**Water Supply and Sanitation Strategy**, 2014-2028) **National Regional Development Strategy**, 2013-2015, 2016-2020 **Regional Sector Programme on Water Supply and Sanitation: Development Region North,** 2015-2020: strengthening the water sector planning and programming at regional and local level in order to optimize investments needs and develop sustainable projects in the specific sector

GCAP will build on the existing policies and will not duplicate the efforts made so far in development and implementation of a coherent policy framework in all the GCAP sectors as well as for the cross-sectoral ones.

2 Methodology

The methodology applied

Throughout the development of the Green City Action Plan, the methodology developed by EBRD has been applied, based on the Pressure-State-Response (PSR) assessment framework.



The **PSR framework** identifies human activities that exert **pressures** on the urban environment in the transport, energy, building, industry, water, solid waste, and land-use and change its **state** in terms of environmental performance. It also identifies how society **responds** to these changes through general environmental, economic, social and sectoral policies, investments, and through changes in behaviour, thus affecting the pressures caused by human activities. The PSR framework therefore builds causal linkages between the environmental performance of a green city; the key associated economic activities of different social groups; and investment, services and policy instruments to respond to these challenges.

Allocating the city's financial and human resources to addressing the identified challenges will optimize environmental benefits, as well as social and gender co-benefits, therefore resulting to a safe, affordable, accessible and sustainable city.

In order to have a clear and objective view on the state of the environment and challenges faced by the city, an environmental and sectoral **baseline assessment** is conducted. The **indicators** collected reveal the extent of the pressures on the urban environment, the resulted state of the environment and the efficiency or shortcomings of actions addressing these pressures.

The baseline assessment is followed by the process of **benchmarking** and **prioritisation** of green city indicators: first, these indicators are adjusted to the specificities of Bălți, then an analysis is performed to compare these indicators with international benchmarks. As a result, indicators are ranked, corresponding to **traffic light thresholds** ("green", "amber", "red"). This method also allows for identifying priority challenges. The linkages between priority state, pressure and response indicators are depicted in **problem trees**. Problem trees are used to assess and select/discard priority challenges in stakeholder consultation.

Concrete measures, including policy, investment and behaviour change actions are identified only for priority challenges building on the already existing and ongoing efforts in the city for improvements. First, a **long list** of ideas or actions is drawn for each priority challenge and discussed with the technical staff of the municipality. The **short list** of ideas emerges from this technical assessment that are further developed and prioritized through stakeholder consultation. The selected and prioritized ideas are then detailed and included in the action plan.

Both the prioritisation of green city challenges and green city actions/ follow a three-step **participatory assessment**: (1) technical assessment, (2) stakeholder-based prioritization and a (3) political assessment that can be done working flexibly with a set of tools available in the methodology.

Throughout the baseline assessment **smart solutions** were considered whenever possible in order to adjust the city infrastructure to 21st century needs and make use of technologies designed to reduce energy consumption, environmental impacts from traffic, etc.

The action plan also embeds the findings of a **social and gender assessment**. Each action included in the GCAP includes, where relevant, additional measures and specific activities related to reduction of gender inequalities, social inclusion, maximizing the socio-economic benefits and ensuring equal opportunities for all categories of persons, including the most vulnerable ones.

Given the **COVID-19 pandemic** unfolding during the GCAP development process, several lessons are being learned at a rapid pace by all nations and in particular by municipalities throughout the world. On one hand the COVID-19 pandemic has emphasized inequalities and the disproportionate impact and access to resources and information in terms of gender, education and income level of citizens. All these lessons learned are internalised to ensure that engagement methods reach a broad and inclusive audience.

On the other hand, resilience has emerged as a key feature which urban areas need to possess and develop to face future times. The recovery process of cities after the pandemic provides a

unique opportunity to 'rebuild' in a more resilient and green way. The development of the GCAP therefore integrates in an optimum way the recovery process, uses the momentum and harnesses the newly achieved awareness to streamline the green and 'resilient by design' development of future Bălți.

Stakeholder consultations

The GCAP development process had to overcome the unprecedented challenge related to the COVID-19 pandemic and to limitations/restrictions regarding in-person meetings and travelling. Thus, travel restrictions, locally set limitations on the number of attendees to face-to-face meetings, social distancing measures, etc. impacted the format and the timing of project events and stakeholder consultation process. However, the team of local and international experts and city officials, respectively a wide range of stakeholders involved in the development of the GCAP succeeded in keeping an adaptive spirit and adjust our approach as needed to ensure that a thorough GCAP development process is followed, while taking the needed precautions to keep all the parties involved safe and healthy. On-line tools as well as mass-media coverage of project developments were used in order to ensure that citizens have access to timely and effective information.

The following alternative methods were applied in engaging stakeholders:

- Regular online team meetings to update and brief each other about the project progress and upcoming tasks.
- Zoom or other on-line stream meeting allowing international team members to participate in meetings held by local team.
- Online workshops (technical assessment etc.).
- Online surveys
- Constant communication and information via Municipality website

Four groups of relevant stakeholders for the project purposes have been identified:

- Group 1. Specialized Committee of the City Council and members of the City Council: having a decisional role and being involved in the approval process.
- Group 2. Project Working Group and the Steering Committee: having a coordinating role, providing support in the development of activities, and having a technical role in the process.

- Group 3. Other key stakeholders: relevant regulators/agencies within the City, IFI and donors, relevant NGOs, research institutes and businesses in the sector, having a consultative role in all project phases.
- Group 4. Public at large: having a consultative role in the process and engaged in all project phases in order to provide feedback on identified challenges, strategic objectives and proposed actions.

Table 3 List of key stakeholder engagement activities

Event / Activity	Date	Main outcomes
Official Kick-off Meeting (internal meeting)	Sept. 2020	Mobilization Political support Institutional setup for the project implementation
Official Launch Event and First Stakeholder Consultation Workshop	Oct. 2020	Informing public at large on the GCAP methodology Perceived environmental and sectoral challenges of the city
Consultation meetings (internal meetings)	During the entire GCAP development process	Constant communication and online meetings between the project team and the working group established at Municipality level and other key stakeholders
Data validation workshops	Dec. 2020	Data collected for the GCAP development has been validated and additional information has been provided by representatives of Municipality and other key stakeholders
Online survey – key environmental and sectoral challenges	March 2021	An online survey has been launched and rolled out for understanding citizens perception over the key environmental and social challenges the city is confronting with.
Second Stakeholder Consultation Workshop: Prioritization of challenges	March 2021	During the meeting, the environmental challenges were presented both at city level and sectoral level. Discussions were gravitating around which are the main challenges the city should address in the coming 5 years. The main outcome of the meeting

		was a list of priority environmental and sectoral challenges.
Gender and Social Inclusion Workshop	April 2021	A dedicated workshop was organized in order to discuss with representatives of NGO sector and other key stakeholders about the way gender equality and social inclusion principles will reflect I the GCAP and especially at the level of each GCAP action, via concrete measures.
Third Stakeholder Consultation Workshop	June 2021	The workshop was organized for two days covering all the GCAP sectors. All actions have been introduced to participants and they had the opportunity to give direct feedback related to the implementation process of each action. The goal was to prioritize the actions and to select the one to be implemented in the coming 5 years. The event offered the possibility to contextualize more the actions and to collect valuable information which was used in further detailing the actions.
Key stakeholder meetings and site visits (internal meetings)	August 2021	A mission to Bălți was organized and international consultants participated in a series of meetings with key stakeholders to better understand the local circumstance and to collect additional data for developing the GCAP actions.
Disclosure of draft GCAP	October 2021	The draft GCAP has been publicly disclosed on the website of the municipality. An official announcement about the public consultation meeting has been also made available.
Fourth Stakeholder Consultation Workshop	November 2021	Consultation workshop on the draft GCAP. Each action included in the GCAP has been presented and feedback was collected in order to prepare the final GCAP.

The consultation process was done based on the stakeholder engagement plan prepared in the beginning of the process. Throughout the entire period, there were more than 100 participants consulted. Out of these 55% were women and 45% men. NGOs and public at large were represented by 13 persons who were consulted throughout the entire process. We have also organized 1 dedicated workshop in order to discuss with civil society representatives aspects related to gender equality and social inclusion, and to find together ways of mainstreaming these considerations into the GCAP actions.

A dedicated online survey aimed at consulting citizens of Balti about the environmental challenges of the city was conducted. 159 persons responded to the survey, out of which 40% were women and 60% were men. The main outcomes of the survey materialized into a list of prioritized challenges presented in chapter 3.

3 Green City environmental and sectoral baseline

This sub-chapter summarises the key findings of the baseline assessment of the city against a set of indicators. For further details not included in this document, please consult the full Technical Assessment report.

The first part refers to the environmental condition of the city, followed by the presentation of key challenges on GCAP sectors.

3.1 Environmental quality

The collected data show that the environmental conditions of the city are not optimal, signalling that the pressures on the environment are increasing due to anthropic activities. The graph below is an illustration of environmental conditions in the city followed by a brief explanation of the main environmental challenges. The colour code used in the below graph is in line with EBRD methodology for comparing the environmental indicators against international benchmarks, where red and amber colour means that the indicator is below the international threshold, thus being in urgent need for intervention, while green colour means that the indicator' score is above the international benchmark.

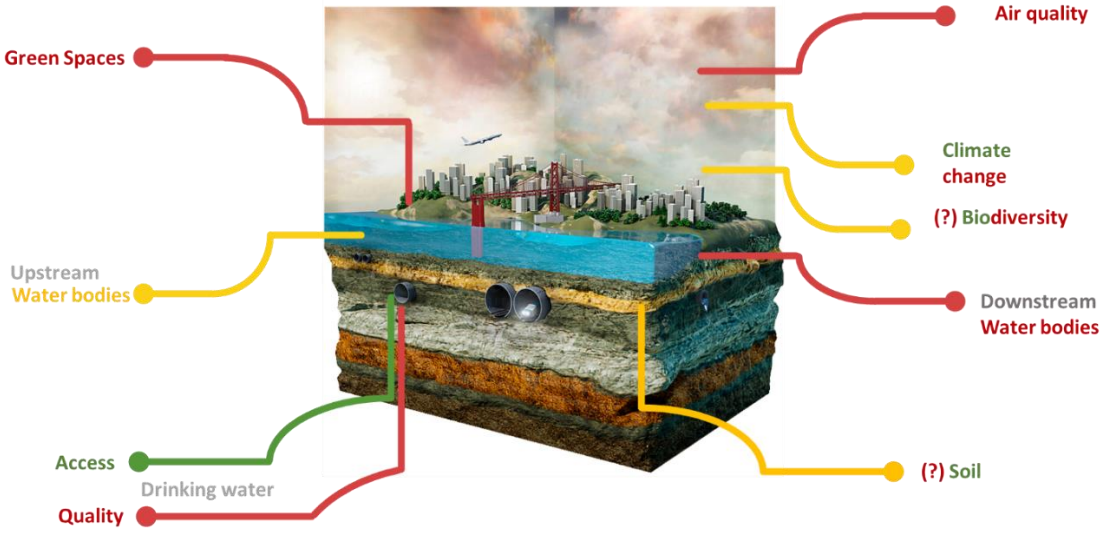


Figure 5 Snapshot of the environmental performance of Bălți

Given the available data and time series trends for the state indicators as analysed above and presented in the Indicators' database (Annex 1), coupled with expert knowledge of the local context, it can be concluded that the priority environmental challenges for Bălți are related to:

- ***Air quality***:
  - High levels of particulate matter and of specific industrial pollutants were detected. Annual concentrations of NO_2 show increasing trends in the most recent years, but their values do not exceed the yellow benchmark, while values for SO_2 are well below the green benchmark.
  - Additional indicators have been added especially for the air quality analysis in Bălți, as they showed negative aspects regarding pollution with phenols and even more worrying negative trends on formaldehyde, which are measured in two monitoring stations close to the centre of the city. Phenol levels (measured starting with 2016) show annual averages below the national standards, with several days per year exceeding standard values, but with decreasing trends. In turn, formaldehyde pollution (high levels of exposure causing some types of cancers) is exceeding national standards during 163-218 days annually since 2007.
- ***Drinking water and wastewater***:
  - low percentage of samples compliant with national standards for drinking water quality, even more so when water supply is ensured through wells. This could lead to public health issues.
  - It can be assumed that the deep well infrastructure for water extraction is obsolete and needs modernization.
  - There are several business entities using water from unauthorized deep well drilling, therefore the volume of wastewater is approximately 2 times the volume of invoiced water.
- ***Water Bodies***: poor surface water quality downstream of Bălți, high ammonium levels
  - The water exploitation index for river Raut, the main water course in Bălți is situated well below the green benchmark. In terms of surface water quality, available data shows values exceeding red benchmarks for both upstream and downstream levels of Biological Oxygen Demand for Raut.
  - In case of ammonium (NH_4) samples, values upstream are in the uppermost level for the yellow benchmark, but for downstream samples the values in 2015 exceed the green benchmark more than 100-fold. This indicates that the quality of surface water is profoundly affected in a negative way by anthropic activities within Bălți and that wastewater is either not captured entirely or insufficiently/inefficiently treated before discharge in the river. The particular high levels of ammonium

could indicate insufficient coverage or poor performance of the sanitation system and wastewater treatment plant.

- *Green Spaces*:
  - low share of green spaces in the urban area compared to benchmarks due possibly to land plot status label in official sources; officially labelled green space is distributed on the outskirts of the urban area
  - There are several other areas in the city which are parks, urban gardens or generally areas with plants and greenery, especially along the rivers, lakes and ponds in the city, not included in official statistics as green spaces in public areas (thus the actual value for this indicator might be above 30%, within the 'yellow' benchmark).
- *Climate change resilience*:
  - urban drainage network overflows in case of heavy rains and snow melt.
  - According to data provided by the General Inspectorate for Emergency Situations (GIES) there are no significant economic damages from the natural disasters as Bălți municipality is not situated near rivers that could cause big damages due to floods. In discussions with municipality representatives and other stakeholders, it emerged though that flooding does occur in Bălți during heavy rain episodes, but this is due to overflowing of the rainwater collection system and is not recorded as an emergency situation by GIES.
  - According to existing climate projections for Moldova, extreme weather events will have an increased occurrence and severity in the coming years.

3.2 Sector based key challenges

In this sub-chapter we discuss key challenges in the main areas of human activities that place pressure on the environment, grouped into Green City sectors including transport, buildings, energy, industry, water, solid waste, and land use, indicating which environmental elements these pressures are most likely to severely impact.

The overview of the collected indicators and their assessment against benchmarks is schematically presented in a table for each sector, based on the most recent values for each specific indicator. The assessment is based on the **traffic lighting method**, indicators being ranked corresponding to traffic light thresholds:

- green indicates good performance, in line with international standards;
- amber refers to insufficient performance, cause for concern, and
- red signals low performance, in need of critical attention.

This method also allows for identifying priority environmental challenges presented next to the assessment.

TRANSPORT

Pressure indicators against benchmarks	Value
Motorisation rate – number of vehicles per capita	0.21
Fuel standards for vehicles	EURO 5
Share of passenger car fleet run by alternative fuel (hybrid, electric, CNG, LPG, etc.)	3%
Transport modal share in commuting	40%
Average number of vehicles, cars and motorbikes per household	0.6
Share of population having access to public transport within 15 min by foot	80%
Frequency of bus service – average number of passage at station per hour, in total bus network	8
Average travel speed on primary thoroughfares during peak hour	18 km/h
Daily average travel speed of bus fares on major thoroughfares	20 km/h
Interruption of public transport systems in case of disaster	Reduced efficiency
Efficiency of transport emergency systems in case of disaster	Limited efficiency
Average age of car fleet	15 years
Percentage of diesel cars in total vehicle fleet	97%
Transport modal share in total trips	70%
Road dedicated exclusively to public transit	0 km
Bicycle path per 100,000 inhabitants	0 km
Frequency of bus service – rural area, average number of passage at station per hour, in total bus network	2

Sector challenges

- The public transport fleet is old, running mostly on diesel and thus polluting the air in the city.
- There is a complete lack of bicycle lanes and dedicated lanes for public transport; there is only one recent plan to start building a 15km lane exclusively for public transport.

- Access to public transport towards the city centre is difficult for people from rural areas where the frequency of buses is low. It is coordinated to some extent with commuting times but well below international benchmarks.
- Sector gaps in terms of green / smart solutions: smart traffic control, peak load management of traffic level, fleet renewal with energy efficient green vehicles, promotion of electric vehicles and enhancement of charging station network, smart ticketing system for public transport, etc.; network of continuous monitoring sensors for air pollutants throughout the city – showing levels against green/yellow/red benchmarks set according to national standards.

BUILDINGS

Pressure indicators against benchmarks	Value
Electricity consumption in buildings (general)	61.16 kWh/m^2
Electricity consumption in buildings (non-residential)	192 kWh/m^2
Heating/cooling consumption in residential buildings, fossil fuels	100.89 kWh/m^2
Heating/cooling consumption in non-residential buildings, fossil fuels	198 kWh/m^2
Electricity consumption in buildings (residential)	27.97 kWh/m^2
Heating/cooling consumption in buildings, fossil fuels	200 kWh/m^2
Share of city enterprises with ISO 150001/EMAS/similar certification	0%

Sector challenges

- Insufficient investment in energy efficiency in buildings, as well as a gap in terms of public and private financial schemes aimed at improving the poor quality and performance of existing buildings.
- Large number of buildings using individual heating systems (e.g. gas-based small boilers), including public buildings, which are polluting and a missed opportunity for increasing the efficiency of the DH system.
- Pressure on the management effort, the efficiency and ultimately the cost-effectiveness of the district heating system due to ownership challenges, DH company owning the network only until the external limit of the property, while the communal areas have a different owner than the networks inside each flat / household.
- Regularization of metering and billing of individual / household energy consumption is not widespread.
- Renewable energy facilities in residential and non-residential buildings are not incentivised
- There are no Building Standards / Codes for Green Buildings or nearly Zero Energy Buildings (nZEB), nor are there certified buildings according to International Green Buildings Certification Systems (BREEAM, LEED etc.).
- At the moment there is no official document to report buildings and city infrastructures at risk in case of a major earthquake or other natural disasters.
- Sector gaps in terms of green / smart solutions: individual metering and control of heating at household level; smart control applications for lighting systems in public buildings; BMS in public buildings; support for water consumption reduction (tap aerators, etc.) and water reuse.

ENERGY

Pressure indicators against benchmarks	Value
Share of population with authorized connection to electricity	>90%
Share of population with access to heating/cooling (any kind of source)	97%
Annual average number of electrical interruptions / year / customer	1.28
Proportion of total energy derived from RES (includes biomass)	20%
Share of population with access to heating/cooling (namely DH)	68%
Proportion of total energy derived from RES (excludes biomass)	6%

Sector challenges

- The district energy networks are, in some cases, old and non-insulated, lacking investments to improve their efficiency, including individual heating metering and control systems, as thermal energy consumption is measured in some cases for an entire block of flats and in some other cases for the individual user.
- Non-modernised district heating control does not allow individual control by each consumer.
- Energy in the Republic of Moldova relies mostly on imports, making the country highly dependent on external resources and resulting in accentuated insecurity with regards to energy prices. Nationally, only 6% of the energy results from renewable sources. There is a gap in terms of public and private financial schemes promoting investment in RES.
- Renewable energy facilities are not incentivised through fiscal instruments and awareness campaigns.
- The resilience of electricity networks in case of disaster lacks testing and incentives for upgrades.
- There is a lack of investment in the quality and coverage of electricity and heat supply services, rendering them often inefficient non-resilient.
- Sector gaps in terms of green / smart solutions: digitalisation of the DH systems; smart grids powered by Demand Response (DR) models, which enable a real-time analysis of customer demand trends; microgrids / locally produced energy systems.

INDUSTRY

Pressure indicators against benchmarks	Value
Electricity consumption in industry, per industrial GDP	0.16 kWh/USD (2010)
Fossil fuel combustion in industrial processes per unit of industrial GDP	1.23 MJ/USD (2010)

Heat consumption in industry, per unit of industrial GDP	0.41 MJ/USD (2010)
Share of industrial energy consumption from renewable energy	0%
Share of industrial waste recycled out of industrial waste generated	23%
Percentage of industrial wastewater treated according to national standards	36%

Sector challenges

- High consumption of thermal energy in industry per unit of industrial GDP – insufficient implementation of energy efficiency measures
- Most (almost all) of the energy used in industry is generated by fossil fuels
- Low level of environmental compliance of industry when it comes to wastewater treatment and possibly also air pollution standards (formaldehyde levels often exceed national standards)
- Low level of waste recycling and generation of high quantities of hazardous waste, possibly unsoundly managed.
- Sector gaps in terms of green / smart solutions: Online registration and reporting system for industrial facilities connected to the environmental management authorities, to report on emissions to air and water, generated and managed waste quantities by type and operation. Online platform for industrial symbiosis, facilitating industrial waste exchange for reprocessing/recycling purposes. Smart sensors for monitoring energy performance and equipment wear and tear.

WATER

Pressure indicators against benchmarks	Value
Percentage of dwellings damaged by the most intense flooding in the last 10 years	0%
Industrial water consumption as percent of total urban water consumption	21%
Water consumption per capita	74.59 l/day
Non-revenue water	60%
Annual average of daily number of hours of continuous water supply per household	10 hours/day
Percentage of residential and commercial wastewater that is treated according to national standards (both apartment and ger areas)	36%
Annual number of storm water or sewerage overflows per 100 km network length	High prevalence
Citizen awareness and preparedness (resilient attitudes) to natural disasters	No

Sector challenges

- State of insolvency of the Regia Apa-Canal Municipal Enterprise
- Relatively high losses in the water supply and sewerage networks
- The rainwater drainage system is deteriorated and missing on many streets, which leads to overflows and urban floods in case of heavy rain
- There are households and business entities using water from unauthorized deep wells, which puts pressure on the water resources and lacks control on the quality of water used by population.
- Illegal connections to the municipal water supply and sewerage systems, hindering cost recovery in the system.
- High sewerage infiltration rate due to unauthorized connections to the sewerage network damaging the infrastructure.
- Enterprises that do not have pre-treatment plants leading to illegal wastewater discharges into the municipal sewerage system or rivers.
- Bulky structure of the water related operations containing three main stakeholders – regional water provider and municipal water and wastewater service operators
- Low tariff, not covering system operation and maintenance costs
- Limited financial capacities of local public administration for the elaboration of technical designs and investments in the sector
- Consumption data collected is available mostly for residential buildings and households that are connected to a centralized system, or metering system. In case of villages data is not collected.
- Lack of citizens' information and awareness campaigns related to preparedness to natural disasters
- Sector gaps in terms of green / smart solutions: digitalisation of the water supply and sanitation systems; smart metering and remote data readings along the network and for every customer. Continuous water quality monitoring sensors for both drinking water supply and wastewater treatment.

SOLID WASTE

Pressure indicators against benchmarks	Value
Total solid waste generation per capita (may include industrial, C&D waste etc., data unclear) - rural	340.2 kg/year
Share of population with weekly MSW collection (urban)	85%
Total solid waste generation per capita (may include industrial, C&D waste etc., data unclear) - urban	72 – 1344 kg/year/capita
Share of population with weekly MSW collection (rural)	18%
Proportion of MSW that is sorted and recycled	0%
Percentage of MSW which is disposed of in open dumps, controlled dumps or bodies of water or is burnt	100%
Percentage of MSW disposed of in sanitary landfills	0%
Percentage of MSW composted	0%
Remaining life of current landfills	2 years

Sector challenges

- Insufficient collection coverage in the suburbs and in parts of the city as well
- Lack of special arranged spaces for waste collection, except for those placed near residential multi-story buildings)
- Very low recycling and composting rates.
- Lack of cooperation between companies with authorization in collecting recycled waste and local authorities. No data is reported to and kept at municipality level on the type, quantity, and the way the waste is recycled.
- Lack of a sanitary landfill in the region; annual negotiations/issues with the villages where two functional, albeit non-compliant landfills are located. No data kept on the quantity and type of waste disposed of, in lack of a weighbridge.
- The remaining life and capacity of the current landfill is low (estimated at 2 years unless disposal practices are changed, and the disposal site undergoes upgrade works) and infrastructure investments are not developed enough.
- There is a lack of information and awareness campaigns for reduction of material consumption, solid waste reuse and recycling.
- There is no solution for treatment of special waste streams such as hazardous waste, bulky waste, Waste electrical and electronic equipment (WEEE), used oil, batteries, and accumulators, end-of-life vehicles (ELV) and construction and demolition waste.
- Sector gaps in terms of green / smart solutions: Smart data collection on collected, recycled, and disposed of waste; Online reporting system for industrial and commercial waste generators to report on type, quantities of waste, contracted operators and waste management/disposal methods employed.

LAND USE

Pressure indicators against benchmarks	Value
Percentage of population living within 20 minutes of everyday services (grocery stores, clinics, etc.) – both urban and rural (uncertain for clinics)	>75%
Average annual growth rate of built-up areas	2%
Percentage of urban development that occurs on existing urban land rather than on greenfield land	100%
Average commuting time – urban	30 min
Population density on land	1945.9 residents/km^2
Share of multifamily houses in total housing units	6%
Average commuting time – rural	>=60 min

Sector challenges

- Low density development puts pressure on municipal infrastructure networks
- Long commuting times for residents of the two villages which are part of the municipality
- Revised General Urban Plan not yet approved
- Lacking sound and enforceable urban planning regulation leading to difficulties in improving urban drainage. Flooding due to heavy rainfall and snow melt as well as high water table in the river is one of the main climate hazards, exacerbated by the flat terrain with low drainage capacity.
- Sector gaps in terms of green / smart solutions: Smart sensors, smart metering, and remote data readings along the urban drainage network, to highlight bottlenecks in drainage capacity case of heavy rain and allowing for prioritising of investment needs. Digital monitoring of people movement pathways to collect data on mobility dynamics and justify need for improvement of city layout and transport routes.

Section II.

Green City Action Plan

BĂLȚI

The green treasure city of Moldova

4 Green City vision and strategic objectives

4.1 Green City vision

Bălți is a city located in the North region of Moldova. Its geographic position provides it a significant role in the region as a hub and an urban centre for municipal and health services. The city attracts citizens from all the region due to its development and opportunities for employment.

The vision of the city is to become a green urban zone where citizens will find opportunities for fulfilling their development needs in a comfortable and pleasant environment. Bălți aims to **become a green treasure city of Moldova**. The vision is to have an organic development of the city and to invite people to discover its secrets and the green development opportunities.

This vision has been developed through a participatory approach. During the Second Stakeholder Consultation Workshop in March 2021 (see Table 3 for details regarding stakeholder engagement), we managed to identify the priority environmental and sectoral challenges, and to formulate the strategic objectives and the vision pursued by this action plan.

BĂLȚI
The green treasure city of Moldova

4.2 Green City strategic objectives

The figure above represents the 4 strategic objectives to pursue during GCAP implementation through a series of actions.

In this sub-chapter, we detail these objectives. Each explanation is followed by a graphic illustration of how specific actions from multiple sectors would serve the objective. The figures also show how the actions might be linked to other objectives as well (indicated as secondary objectives), and the sectors these belong to.

At the moment, public utilities and urban services do not completely cover the entire city of Bălți to a satisfactory level and the city is thus subjected to pollution. There is no doubt that the basic services such as wastewater collection and treatment, public transport, or paved roads for example, are of utmost importance for the city and its citizens and need to be implemented city-wide.

However, future pressures on these services should be acknowledge as well and planned for as well. These pressures may include climate, environmental, social and economic factors which are expected to exacerbate in the future. This creates the need to **have a strategic plan for extending or implementing such basic services and urban infrastructure at municipal level.**

When a strategic planning is being implemented, aiming to reach the optimum 'feel' and functionality of the city which is resilient to future pressures, the first actions which need to be put in place might not be the most obvious ones. For example, although there are unpaved roads in the city, if we aim at having a transit-oriented approach for city traffic in the future, combined with green mobility options, the first steps might not be to pave all the unpaved roads. Mapping out future pedestrian, green, cycling, parking and road-traffic areas would a necessary first step, highlighting the areas that make sense to be paved with asphalt, as future car-traffic designated areas.

SO1

Reducing pollution and improving public health by implementing future-proof urban services

Strategic Objectives

SO1 SO2 SO3 SO4

Sectors

T Transport | E Energy | B Buildings | I Industry | W Water | SW Solid Waste | LU Land Use

dominant SO | secondary SO | sector

Action 6
Green Public Parking System and implementation pilot

Action 7
Developing an Investment Programme for road maintenance and rehabilitation

Action 8
Renewing the public (trolley) bus fleet

Action 14
Modernize and upgrade the district heating services

Action 16
Energy efficient street lighting programme

Action 19
Investment program for the rehabilitation, modernization and expansion of the drinking water distribution network

Action 20
Rehabilitation, modernization and expansion of the rain water and sewerage collection and treatment

Action 21
Urban drainage and sewerage infrastructure maintenance program

Action 22
Permeable infrastructure and sustainable urban drainage systems

Action 23
Improving waste disposal site and operation

Fighting climate change by accelerating the transition to an affordable, reliable, and decarbonised energy and ensuring universal access to quality energy services, improving energy efficiency and increasing the share of renewable energy is needed in Bălți.

The community of Bălți can do this, building on what the city has, improving the performance of the district heating system, boosting energy efficiency of **buildings and the energy systems, increasing the adoption of innovative technologies and modern infrastructure and empowering customers to meter and regulate their own consumption**. By doing this Bălți will protect the environment, improve the living conditions and health and promote new local and green jobs.

SO 2

Mitigating climate change and contributing to energy security by scaling up clean and affordable energy

SO 2

Mitigating climate change and contributing to energy security by scaling up clean and affordable energy

Action 10

Developing and approving the Energy Efficiency Programme for public buildings

Action 11

Energy efficiency investments for public buildings and institutions

Action 12

Promoting small-scale RES

Action 13

Gradual improvement of the energy efficiency of residential blocks and promotion of self-consumption of RES

Action 15

Promoting large-scale RES through investments

The success of a strategic plan depends on the actual implementation of the actions. Transforming Bălți into a green and future-proof city therefore requires defining the right actions, but above all ensuring that these actions are implemented and can be carried out.

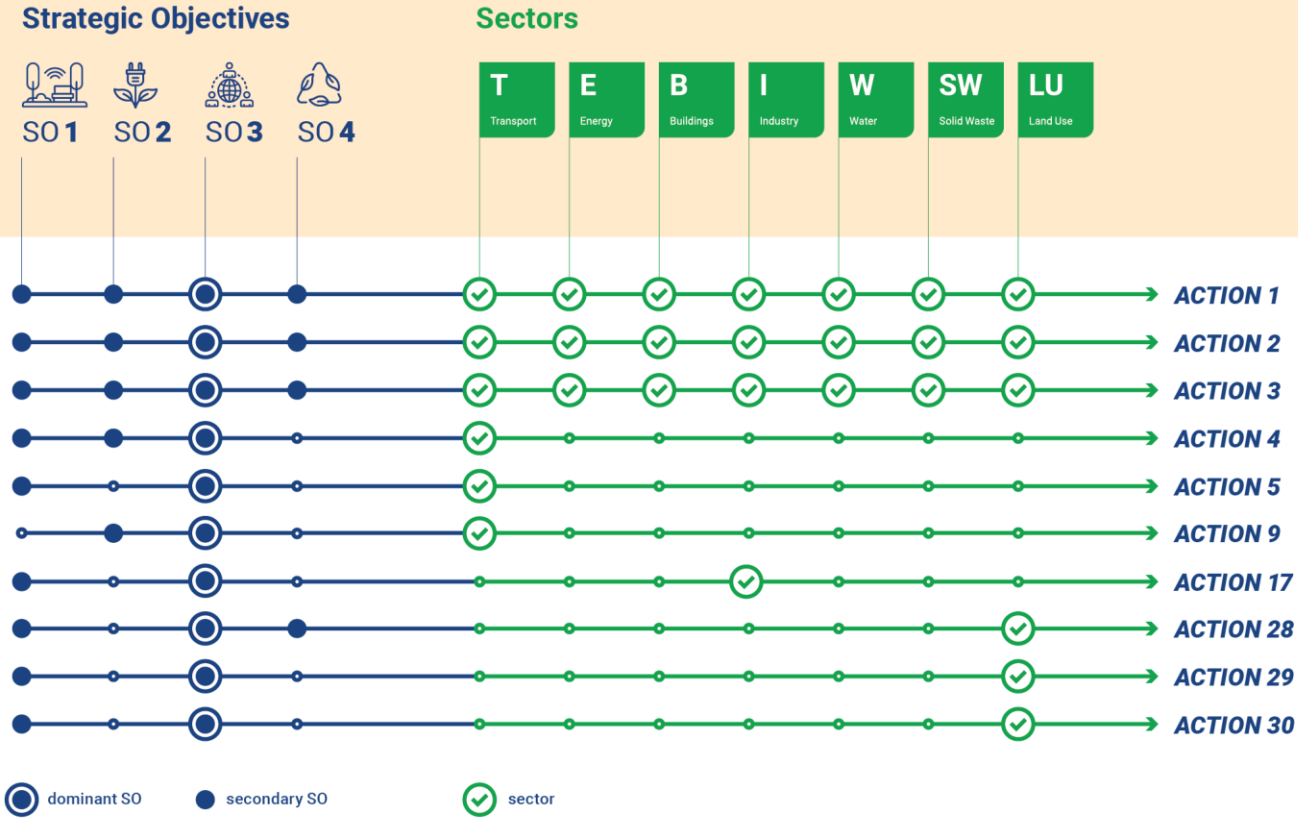
A number of things are needed to guarantee the implementation of the actions. Among these, the following are crucial: **citizen involvement, performance management, knowledge, and capacities**.

The implementation of (spatial) plans has little chance of success if citizens have limited awareness of the decision process or feel that they have little impact on what is happening. Citizen engagement can be increased through enhanced open governance and sustaining two-way communication channels.

Strengthening the city's managerial competencies for a successful implementation requires a thorough follow-up of the results of the actions. Performance management is indispensable for this. All actors must have the necessary knowledge and information to be able to carry out the implementation. Targeted capacity building of the stakeholders as well as smart city applications can contribute to this.

SO 3

Improving the quality of life and optimizing land use by mainstreaming community- and knowledge-based development



Action 1
Strengthening the capacities of Bălți Municipality to implement GCAP

Action 2
Supporting the digitalization of City Management

Action 3
Strengthening the capacities of municipal enterprises to implement GCAP actions

Action 4
Developing and approving the Sustainable Urban Mobility Plan

Action 5
Traffic Management Plan development and implementation pilot

Action 9
Connecting green infrastructure with sustainable mobility

Action 17
Implementation of an environmental monitoring system at city level

Action 28
Building the green heart of the city

Action 29
Management Plan of the City's blue-green network

Action 30
Future-proofing the General Urban Plan

A step further from the basic need of waste management services is to look at resources efficiency and improve it across the city. This includes not only material but also water and energy efficiency.

Solutions such as **sharing facilities, industrial symbiosis, co-treatment in a single facility of various waste streams**, reducing food waste and other specific waste streams have the potential to **save resources and create new local opportunities for small businesses, community-based services and economic resilience**. Such initiatives with embedded social equity values, include growing high-quality local produce in urban gardens, access to free meals for the socially vulnerable and other measures aimed at creating job opportunities and steady livelihoods for citizens.

SO 4

Enhancing resilience through investments in resource efficiency and circular economy

Action 18
Cooperation platform at local level for green industrial development

Action 24
Upgrading and expansion of the waste collection system

Action 25
Collection and composting of green waste

Action 26
Collection and recycling of construction and demolition waste

Action 27
Bulky WEEE and other specific waste collection center

5 GCAP Actions

The Green City Action Plan for the City of Bălți includes **30 detailed actions** to be implemented on the short term, in the first 5 years of GCAP implementation. In addition, we have defined long-term actions as well for the following 10 to 15 years which, if implemented, will contribute to the sustainable, green development of the city, and will boost the achievements of GCAP implementation.

For ease of understanding we present the actions as follows:

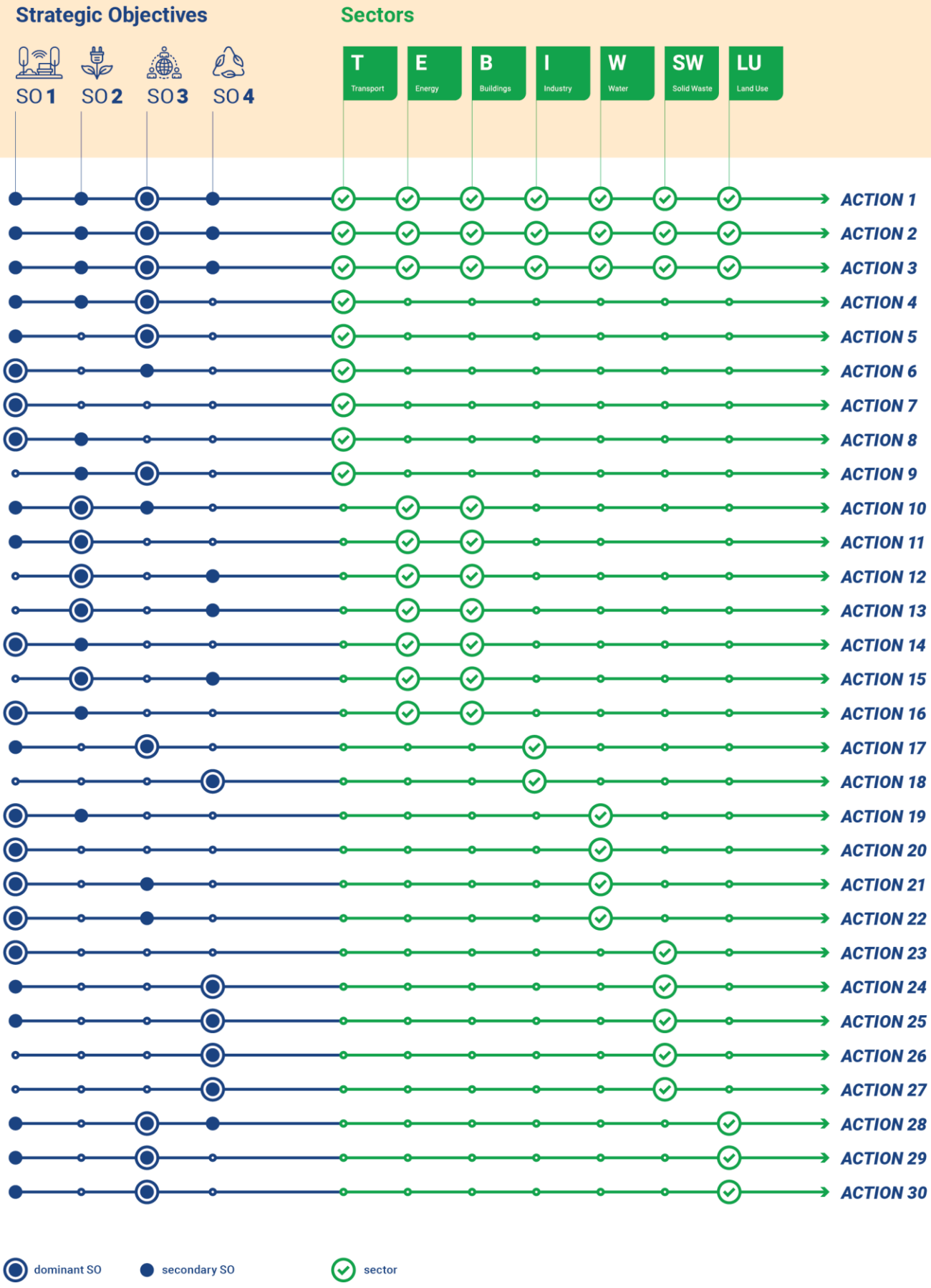
- First, an **overview of the 30 actions and their interconnections with strategic objectives and sectors** is provided in a comprehensive table.

- This is followed by the **detailed presentation of the actions grouped on sectors**: the first set represents overarching institutional measures, then the 7 Green City sectors with respective detailed actions are included. The detailed presentation of each action includes: a brief description on the context and how the action fits in the overall development programme of the city, its implementation steps, the costs estimates both for CAPEX and OPEX, the environmental, social and gender benefits and other advantages as well as considerations related to inclusion of smart components in the action.

- Each set of sector-based actions starts with **an overview of both the short-term (implemented in the first 5 years) and long-term actions (implemented after 5 years up to year 15)**.

The implementation of all these actions will lead towards implementing our vision of Bălți becoming the **green treasure** of Moldova.

Actions – Sectors – Strategic Objectives



Overarching actions

Short-term actions

Action 1

Strengthening the capacities of Bălți Municipality implement GCAP

Action 2

Supporting the digitalization of City Management

Action 3

Strengthening the capacities of municipal enterprises to implement GCAP actions

Long-term actions

- Performance-based contracting for all public services
- Green Public Procurement implemented for all public tenders and own activities
- Full digitalization of public services
- Digital Urban Planning tool implemented

Action 1

Strengthening the capacities of Bălți Municipality to implement GCAP

Contributing to

SO3 SO1 SO2 SO4

Total CAPEX
80,000 EUR

Estimated timeframe
2022-2023

T Transport | E Energy | B Buildings | I | W Water | SW Solid Waste | LU Land Use

Targets
- Institutional structures for GCAP coordination and implementation established
- Funds annually attracted
- Projects implemented
- Tools available for improving overall performance and green development

Scale and location
- The current action is to be implemented at the level of Municipality of Bălți.

Estimated annual savings
- N/A

CONTEXT AND DESCRIPTION

The GCAP is a strategic policy document developed by the Municipality together with a wide range of stakeholders, including both internal departments, agencies and municipal service providers as well as external ones such as academia, NGOs and other interested persons.

During the GCAP development, we focused on defining the most suitable institutional setup that will ensure an effective implementation of the identified actions. We have in focus three elements:

- the **coordination of the overall GCAP implementation** – this is foreseen as an overarching, well structured, result oriented process;

- the **development and implementation of GCAP actions** (projects) – each envisaged action included in the GCAP should be upgraded to a level of maturity which will be transformed into a feasible project ready to be implemented; and

- the tools required to ensure a **higher environmental performance of services and investments** in the city.

In order to achieve the proposed goal and strategic objectives, we are committed to make all the efforts towards establishing the most efficient and effective institutional setup within our Municipality. First, we will conduct a full analysis of the current institutional framework and will formulate recommendations regarding for both the GCAP coordination and implementation level. For the coordination level, we foresee a newly established structure at top level which will enable us to take fast and coherent decisions to smooth the development process of the city. A City Manager (CM) position will be proposed for approval to the City Council. The City Manager should be directly subordinated to the Mayor and have under his/her coordinator the Department for Sustainable Development (DSD). This is the second institutional structure that we foresee to be established for GCAP implementation. Currently, the municipality executive body has a unit for attracting investments. This unit is operational but with very limited resources (both human and equipment). Still, this unit might be the base of the future DSD. The CM and DSD will work as a synergetic team and will be the main driving force of the sustainable development process in Bălți.

The main tasks to be performed by the City Manager and the DSD will focus on: ensuring that sectoral policies and plans developed hereto will include GCAP actions; supervise the GCAP implementation in terms of effectiveness and efficiency (time, allocated resources, progress and impact); lobby and advocacy for GCAP at all levels; fund raising and coordination of efforts for ensuring that sufficient resources are allocated for GCAP implementation; communication, transparency and accountability; monitoring and coordination of data collection and management of information (digitalization) related to all GCAP projects; monitoring and results, dissemination of information, reporting to internal and external stakeholders and initiating and overseeing the periodical update of the plan.

The implementation of development projects (e.g. in the waste sector) will be done via dedicated Project Implementation Units established at the level of each sectoral municipal enterprise that will be considered the project beneficiary. The specific tasks and more details about this can be found in Action 3 below.

We intend to seize the opportunities relying in green procurement and contracting practices in selected areas of ongoing activities of the municipality, as these would ensure a higher environmental performance of services and investments in the city.

Due to the limited financial capacity of the municipality for sustaining operational costs and investments, priority will be given to those sectors and practices that may attract financing for capital investment projects or may increase financial sustainability in operation of public services.

These criteria will enable us to adopt measures such as:

- Introducing environmental requirements in the public procurement system
    - Adopting EU voluntary Green Public Procurement criteria partially or completely in a selected area, by introducing such criteria for the management of construction and demolition waste;
- Purchasing Power Agreements (PPAs)
    - The municipality will seek out opportunities to buy energy at fixed price or cheaper price by entering PPA type contracts with private sector for longer term procurement contracts. Renewable energy investors will be favoured. Such types of agreements are further detailed in Action 12 – Promoting small-scale RES.

Legal and policy framework

- According to the existing legal framework in Moldova, setting up a new entity responsible for Project Management is a common practice and is possible. **Law no. 436 / 2006** stipulates that the local administration may decide to establish a new entity either for public service enterprises or commercial entities that are for the benefits of the community.
- **Law on Public Procurement No 131 of 2015** sets the general and specific conditions for public procurements. Green Public Procurements are voluntary, and each authority can decide whether to adopt such type of procurement or not.

IMPLEMENTATION STEPS

1. Analyse the current institutional framework and formulate recommendations for improving it based on functional and operational performance and considering the future needs for development.
2. Include in the Organisational Chart of the Executive Body of Bălți Municipality a City Manager and the DSD unit:
    a. Prepare a job description for the City Manager, drafting and approving the local council decision related to this new position, allocate resources and select the person for this position.
    b. Establish the Department for Sustainable Development (DSD) responsible for the implementation of local development plans, attracting investors and funds for projects, coordination of project implementation, monitoring and evaluation of all projects implemented by municipal enterprises.
    c. Draft and approve the local council decision related to the establishment of DSD.
    d. Allocate resources for setting up the institutional structure.
    e. Select the employees.

   f. Develop and implement an annual trainings and capacity building program for employees of Bălți Municipality.
3. Develop a system for monitoring the environmental performance of public services.
4. Establish a task force in the Municipality for re-thinking procurement and contracting based on green performance.
   a. Ensure training of task force members in the new type of procurement, contracts and business models available.
   b. Organize a platform for discussion with the relevant private stakeholders to collect feedbacks on the initiatives, including ESCOs, renewable energy producers and developers, etc.
   c. Develop and approve the green procurement strategy and guideline at the level of Municipality.

STAKEHOLDERS

- Municipality of Bălți
- Municipal Enterprises
- State University Alecu Russo
- Environmental Protection Inspectorate
- Electricity Transmission and Distribution Companies
- Energy Regulatory Agency
- Private sector companies targeted, such as RES producers, developers, and the construction companies

COST ESTIMATE

Estimated CAPEX: 80,000 EUR

Institutional assessment, including preparing the job description for City Manager and employees from DSD	10,000 EUR
Establish the DSD, including investments in equipment	20,000 EUR
System for environmental monitoring	15,000 EUR
Trainings for DSD employees	15,000 EUR
Trainings on green procurement, contracting and PPA	20,000 EUR

Source of financing: Municipality / Municipal Enterprises / IFIs

Estimated yearly OPEX: 20,000 EUR

Environmental and economic benefits

- Efficient use of available resources
- Enhanced management practices for city development
- Reduced GHG emissions
- Improved competitiveness of eco-industry
- Promoting the uptake of green products
- Cost savings

Gender and social inclusion opportunities

- New job opportunities will be created
- Gender responsive analysis to be performed as part of the institutional assessment
- Gender equality principles will be applied throughout the selection process for new employees
- Training on gender equality and economic inclusion to be provided to all employees engaged in GCAP implementation

Smart and digital opportunities

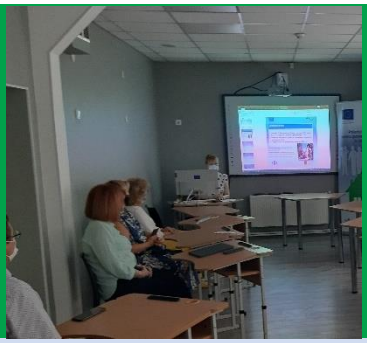
- New high-tech equipment and up-to-date software will be procured for daily operation of the newly created units and for environmental monitoring system
- Training of employees on usage of new equipment and software

Action 2

Supporting the digitalization of City Management

Contributing to

SO 3 SO 1 SO 2 SO 4



Total CAPEX
245,000 EUR

Estimated timeframe
2022–2023

T Transport | E Energy | B Buildings | I | W Water | SW Solid Waste | LU Land Use

Targets

- Increased efficiency of public services
- Increased transparency and community participation in decision making
- Reduced costs

Scale and location

- The current action will be implemented at the city level

Estimated annual savings

- N/A

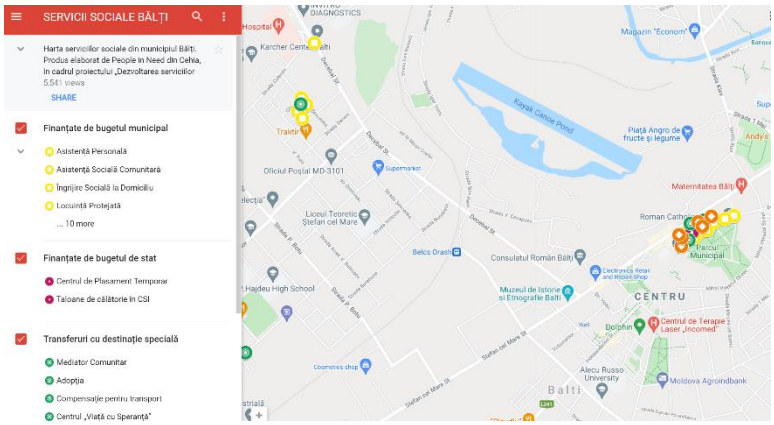
Context and description

Public authorities around the world are working towards digitalizing their services provided to the population in order to meet public expectations and become more efficient and resilient in front of current environmental and public health challenges. Bălți municipality has also made considerable steps towards ensuring that citizens have access to certain services via online and electronic means of communication.

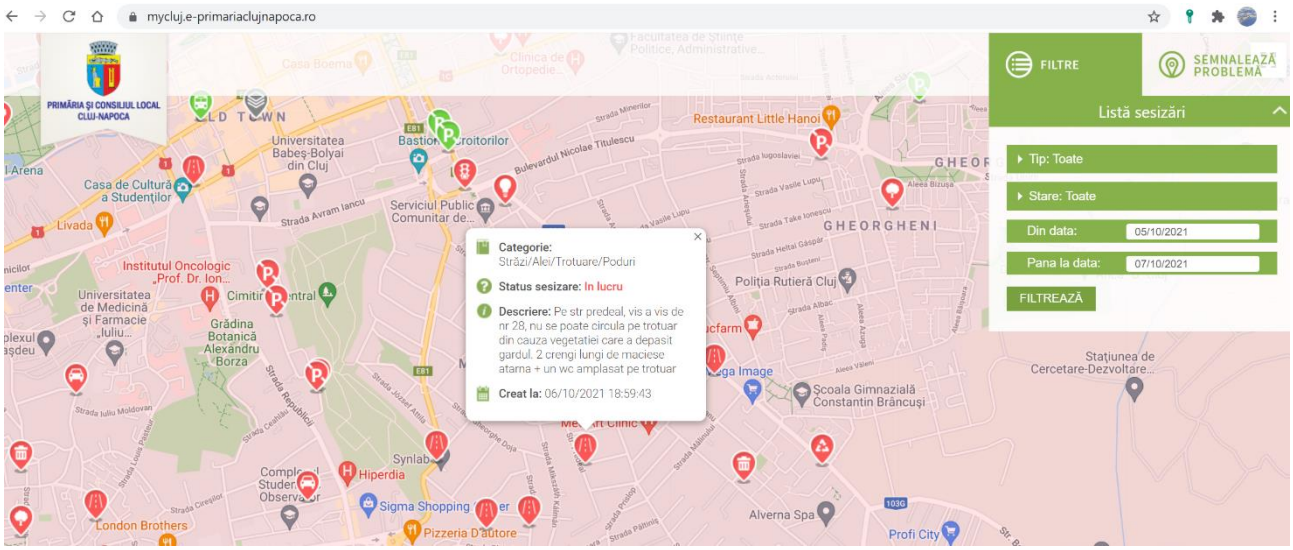
Our ambition is to move to a next level, where all our services are fully digitalized, and citizens have easy access to decision making processes. For the last years, we have been declared as the most transparent public authority in Moldova and we would like to consolidate and uptake this role. Thus, we have initiated a long-run cooperation with the local University for the establishment of an Information Technology Centre (ITC). The cooperation with the University is done with the Faculty of Science, Economics and Environment.

This Centre will help us in working with the latest technology and software related to urban services. We aim at creating a dedicated unit within this centre that will focus on **digitalizing the public services** provided to the population, development of a solid database with functional and operational parameters of all municipal enterprises as well as environmental and social indicators that will allow us to observe the improvements made via GCAP implementation. The centre together with the representatives of the Municipality will also **update the existing database on GCAP indicators**.

As of today, the municipality has developed an **interactive map**[4] where social services are easy to spot by any interested party. In the coming years, we aim at improving this map and adding up other public services. This will be done gradually, by adding up yearly data that have been collected and processed from different municipal enterprises.



The interactive map will be also developed and open for public at large in order to be able to receive and visualise the grievances population might have. Thus, the map will become more interactive and will allow insertions from any interested person reporting any inconvenience he/she might consider relevant at municipality level. One such example of interactive map is presented in the below box. This is a snapshot from the map[5] available in Cluj-Napoca, Romania where citizens can report any type of grievance and can monitor its solving process.



This action is a complex one including multiple phases. The first one refers to the development of the interactive map and grievance reporting. The second phase refers to the digitalisation of public services, which in itself includes several steps dedicated to each sector. These phases are complementary and support each other.

Our aim is to start with including on our digital map the following elements:

- Public institutions and the services that are provided

[4] Source: https://www.google.com/maps/d/viewer?ll=47.76232233090646%2C27.9161254402473&z=15&mid=12fpSKeDIRtMBbjVMHLzzREbcZjSuoB-J

[5] Source: https://mycluj.e-primariaclujnapoca.ro/

- Parking areas
- Green and leisure areas
- Reporting of illegal waste dumping, water leaks, malfunctions of sewer network, etc.
- Cultural events that will take place in the city
- Grievances,
- Street lighting, etc.

Community based monitoring and reporting of illegal dumping is prioritized by the municipality as a short-term measure that will help improve cleanliness of the city, abandoned buildings, public space, green space, and immediate surroundings of the city. This will improve public health and improve the recreational value of certain areas as well. Community based reporting will also be available for other incidents, such as water leaks or malfunctions of the sewer network as well as for street lighting.

On the long run, the interactive map will develop towards a decision making tool: it will include the digital image of the city and will be used as an urban planning tool. This will happen gradually but constantly. The Municipality will organise at least twice per year general meetings with interested public for consulting them on the operational efficiency of the interactive map and how this could be used for the development of additional measures or concrete actions. For example, at neighbourhood level, the citizens and the Municipality might observe that there are certain areas where illegal dumping of waste is constantly occurring. Thus, the map will give good evidence for developing additional measures for reducing such situations. Further on, the map could bring other elements that will be used in the public consultation meetings, technical meeting or any other type of meetings and will help with anchoring the decisions into the local reality.

All these efforts for digitalization and improvements related to mapping of public services aim at increasing the transparency and efficiency in public participation in decision making processes. One concrete area where we would like to concentrate our efforts is **the engagement of the population in decisions related to spatial planning**. Spatial plans stand or fall with a successful implementation. The plans must initiate actions that contribute to a high-quality spatial, social, ecological and economic development of the city. The lasting success of these plans is determined by the effects they can have on the urban fabric, the quality of life of citizens, and the sustainability of the economic growth, and so on.

Legal and policy framework

- **Governmental Decision no. 911 from 2016** refers to the approval of the National Strategy for Modernization of Public Administration. This document makes direct references to digitalization of public services.

Implementation steps

1. Develop a comprehensive and complete database with performance indicators for all public services.
2. Develop and maintain the urban interactive map.
    a. Develop a GIS database with different layers to make it interactive: public institutions and the services that are provided, parking areas, green and leisure areas, cultural events that will take place in the city, grievances (reporting of illegal waste dumping, water leaks, malfunctions of sewer network, other type of grievances).
    b. Digitise available data and collect new data: map all existing leisure/green places in the green city, bike paths, pedestrian areas.
    c. Train relevant services in the use of the interactive map for the facilitation of their planning and maintenance tasks and for evaluating (un)equal distribution of leisure places, gaps and needs.
    d. Set up a communication campaign to raise awareness of citizens on the existence of the map.
    e. Set up a schedule for regular updates to guarantee the representation of the real time situation (and future developments).
3. Carry out a public participation process for an urban zonal plan.
    a. Select a pilot project, for example the establishment of the Green Heart of the City or any other project included in this GCAP, to which the participation process will be applied;
    b. Train city officials (city planners) to monitor and guide the participation process.
    c. Tendering of the design of the project, linked to a participation process, in which designers work together with the stakeholders (see above), whereby the participation process itself is also facilitated by experts (setting up workshops, participation sessions, web-based platforms, etc.).
    d. Simultaneous tendering – in the same or in a separate contract – of a web-based platform to enable interaction between the government, the designers and the stakeholders. This can range from purely consultative (surveys) to co-design.

Stakeholders

- Municipality of Bălți, Department for Public Relations and IT Support
- University Alecu Russo
- Municipal Enterprises
- Private companies

COST ESTIMATE

Estimated CAPEX: 245,000 EUR

Development of the dataset on public services and monitoring the GCAP indicators	15,000 EUR
Design and development of dynamic map	150,000 EUR
Capacity building	50,000 EUR
Field survey/inventory	30,000 EUR

Source of financing: Municipality, IFIs, private sector financing, local budget

Estimated yearly OPEX: 75,000 EUR (including awareness raising campaigns and public participation processes for implementing GCAP projects)

Environmental and economic benefits

- Resource efficiency through usage of high performance, interactive and user-friendly tools
- Reduced cost in maintenance and management of the green/leisure places
- Reduced illegal waste dumping
- Reduced pressure on the soil, water and biodiversity
- Better usage of public spaces

Gender and social inclusion opportunities

- Better opportunities for public participation
- Ensure smoother access to grievance mechanism
- Reduced discrimination and increased opportunities for women to participate in decision making processes
- Access to employment
- Increased transparency and credibility of the city
- Raised environmental awareness of the population

Smart and digital opportunities

- Digitalization of public services will be undertaken under other actions as well (i.e. Action 4 Development and approval of the Sustainable Urban Mobility Plan) and continuously feed the development of the database and interactive map for further improvement and data driven decision making
- There is the potential to develop an app linked to the map to report damage, illegal dumping of litter, etc.
- By (re)designing public communication and information services via digital technology, these services can become more efficient and effective

Action 3

Strengthening the capacities of municipal enterprises to implement GCAP actions

Contributing to

SO 3 SO 1 SO 2 SO 4

Total CAPEX
125,000 EUR

Estimated timeframe
2022-2025

T Transport | E Energy | B Buildings | I | W Water | SW Solid Waste | LU Land Use

Targets

- Institutional structure for Project Implementation established. Minimum 5 PIUs fully functional.
- Projects implemented.

Scale and location

- The current action is to be implemented at the level of Municipal Enterprises coordinated by Bălți Municipality.

Estimated annual savings

- N/A

Context and description

Bălți Municipality coordinates several municipal enterprises specialised in different services, such as waste collection, maintenance of green areas and parks, road maintenance, etc. Each municipal enterprise receives an annual budget for operation and investments. Currently, the investments are done mainly based on needs with few based on strategic plans developed by the municipal enterprises. The coordination responsibilities for these investments are falling under different departments from Bălți Municipality.

From now on, the coordination of the development plans and investment programmes for all municipal enterprises will be done by the Bălți City Manager together with the Department for Sustainable Development that will be established at Municipal level.

Via the current GCAP we are envisaging to develop the targeted sectors (transport, waste, water, land use, building, energy efficiency, industry) in order to increase the overall environmental performance of the city and thus to enhance the quality of life of our citizens. In order to do this, we are committed to strengthen the capacities of our municipality by establishing Project Implementation Units (PIU) in each municipal enterprise when a well-defined investment project is to be implemented. This unit will be a mirror type of the DSD from Municipality level.

The PIU will be responsible for supporting the DSD in preparing the feasibility studies for the proposed investments, preparing the tender documents, organising the selection processes for contractors, coordination of specific project implementation, monitoring and evaluation of overall project performance, including environmental, social, gender and smart performance, reporting to DSD, preparing investment

plans at municipal enterprise level, lobby and advocacy for investments in the sector, development and implementation of awareness raising campaigns related to their sector.

Our aim is to start gradually with the implementation of this action, by establishing 1 or 2 PIUs per year, depending on the number of projects we will implement. The good practice examples we have so far - the investments in the trolleybus system, investments in building renovation, etc. – gives us confidence that the PIU structures are efficient and effective.

Legal and policy framework

- The current legal framework both at national and local level supports the development and strengthens the institutional setup at local authorities' level and subordinated units (municipal enterprises). The only limitation is related to the availability of funds for implementing such initiatives.
- Bălți Municipality will work towards including in all the projects that are about to be implemented a component aiming at capacity building and strengthening their monitoring and control capabilities.

Implementation steps

1. Analyse the current institutional framework of Municipal Enterprises and formulate recommendations for improvement based on functional and operational performance and considering the future needs for development.
2. Establish the Project Implementation Unit (PIU) – prepare the job descriptions, selection process for employees to be part of the PIU, investment in equipment and software. We foresee the establishment of 5 PIU in the coming 5 years.
3. Develop and implement an annual training and capacity building program for employees of Municipal Enterprises.

Stakeholders

- Municipality of Bălți
- Municipal Enterprises

Cost estimate

Estimated CAPEX: 125,000 EUR

Institutional assessment / municipal enterprise, 5000 EUR for each	25,000 EUR
Establish the PIU, including investment in equipment and software / Municipal enterprise, 20,000 EUR for each PIU	100,000 EUR

Source of financing: Municipality / Municipal Enterprises / Internal Budget / IFIs

Estimated yearly OPEX: 15,000 EUR / Municipal Enterprise

Environmental and economic benefits

- Efficient use of available resources
- Strengthened local capacities for improving project management competencies
- Reduced costs / expenditures from municipal budget

Gender and social inclusion opportunities

- Access to employment
- Gender responsive analysis to be performed as part of the institutional assessment
- Gender equality principles will be applied throughout the selection process for new employees
- Training on gender equality and social inclusion to be provided to all employees engaged in GCAP implementation
- Raised environmental awareness of the employees
- Increased transparency and credibility of the municipal enterprises

Smart and digital opportunities

- New high-tech equipment and up-to-date software will be procured
- Training of employees on usage of new equipment and software

T

Transport

Short-term actions

Action 4

Developing and approving the Sustainable Urban Mobility Plan

Action 5

Traffic Management Plan development and implementation pilot

Action 6

Green Public Parking System and implementation pilot

Action 7

Developing an Investment Programme for road maintenance and rehabilitation

Action 8

Renewing the public (trolley) bus fleet

Action 9

Connecting green infrastructure with sustainable mobility

Long-term actions

- Promotion of electric vehicles and development of charging stations network
- Implementation of the Sustainable Urban Mobility Plan
- Full implementation of Traffic Management Plan
- Automated Traffic Management System
- Extending pedestrian areas and bicycle lanes – implementation of the Blue Line
- Realisation of mobility hubs, park and ride facilities

Action 4

Developing and approving the Sustainable Urban Mobility Plan

Contributing to

SO 3 SO 1 SO 2

Total CAPEX
500,000 EUR

Estimated timeframe
2022–2023

T Transport

Targets

- Reduced car use by 10% in 5 years, by modal shift from cars to public transport, by optimizing the public transport system
- Increased average travel speeds for buses on the major thoroughfares by 10%
- Increased number of public transport users with 20,000 daily passengers in 5 years within 3 years after GCAP approval

Scale and location

- Municipality of Bălți
- City-wide and beyond - the Sustainable Urban Mobility Plan concept considers the functional urban area

Estimated annual savings

- N/A

Context and description

The complexity of urban mobility makes it necessary to deal with mobility planning in a more integrative way. A Sustainable Urban Mobility Plan (SUMP) aims at the creation of an effective and inclusive transport system ensuring equal accessibility and sustainable mobility to and within the city by following a long-term vision and clear implementation plan. A SUMP includes short-, medium, and long-term strategies to improve the efficiency of mobility in Bălți.

The SUMP is therefore a necessary instrument to serve as a guideline for future-proofing and greening mobility in the city of Bălți. To create a SUMP, a process has to be followed. This starts with setting goals and objectives, based on the ambition framework to provide high-quality and sustainable mobility and transport, increase quality of living, increase traffic safety, and improve accessibility. The drafting of a long-term vision will be backed up by a clear implementation plan, which includes a delivery plan for short-term implementation of the strategy, specifying the timing for implementation, responsibilities and funding.

In order to implement a vision for the future, it is necessary to have a good view of the current performance of transport and transport networks, to establish a robust baseline against which future progress can be measured. The SUMP will develop a balanced and integrated development of all modes: this will include public transport, walking and cycling, inter-modality, urban road safety, road transport, urban logistics, mobility management and intelligent transport systems. Enhancing overall inter-modal connectivity will also be an essential element in the strategy.

From planning to implementation, a participatory approach will be followed where all actors - citizens, as well as representatives of civil society and economic actors - will have their say. An approach to the monitoring and evaluation of implemented actions will be included in the SUMP, with regular monitoring of performance against agreed targets and objectives.

The SUMP will form the basis for multiple actions. Some of these are elaborated as standalone actions in this GCAP:

- Traffic management with prioritization of public transport. This will help to improve travel time reliability, which is a positive incentive for users to switch from car to public transport (see Action 5)
- The development of a parking strategy in the SUMP, that leads to an efficient public parking system and the realisation of mobility hubs and park & ride facilities (see Action 6)
- Developing an investment programme for road maintenance and rehabilitation, based on the multimodal network analysis in the SUMP (see Action 7)
- Renewing the public transport network, including the (trolley) bus fleet (see Action 8)
- Development of a safe and comfortable network for cyclists and pedestrians, linked to the blue-green network (see Action 9).

Legal and policy framework

- **National Strategy of Road Safety** and its Action Plan approved by the Government Decision 972/2011 of 21 December 2011
- **Sustainable Development Strategy for the Municipality of Bălți**
- **Sustainable Energy and Climate Action Plan for Bălți**

The SUMP foresees that plans are developed in cooperation across different policy areas and sectors, across different levels of government and administration and in cooperation with citizens and other stakeholders.

Implementation steps

1. Prepare a tender for the development of the SUMP. Parallel to this: setting up a working group with the city administration to manage the design and progress of the SUMP.
2. Public tendering and selection of a consultant
3. Drafting the SUMP
4. Implementing actions based on SUMP (see also standalone actions)
5. Monitoring and evaluation

Stakeholders

- Municipality of Bălți
- Architecture and Urban Planning Department
- Department of Traffic and Roads
- Urban planning department
- National authorities

- NGO's

COST ESTIMATE

Estimated CAPEX: 500,000 EUR

Development of a Sustainable Urban Mobility Plan (SUMP)	500,000 EUR

Source of financing: Municipality, IFIs

Estimated yearly OPEX: 10,000 EUR (awareness raising campaign)

Environmental and economic benefits

- The implementation of the SUMP will significantly decrease GHG emissions, the volume of dust and other air pollutant emissions. Furthermore, annual financial savings are to be expected on maintenance of public domain (by implementing an investment programme built on priorities), on law enforcement, on operation costs for public transport, and so on.
- The creation of an integrated transport system with a well-defined hierarchy between the modes will reduce the usage of personal transport and implicitly the CO_2 emissions.
- Increasing the share of public transport in the Bălți modal split will improve air quality.
- Increased life expectancy and quality of life, and decreased morbidity rate due to traffic pollution related diseases
- Increased property value for areas that are currently lacking access to public transport and transport infrastructure
- Decrease in travel time due to the reduction of personal vehicles in traffic
- Decrease in number of traffic accidents
- Decrease in operating costs for public transport

Gender and social inclusion opportunities

- Opportunities for women and community-based organisations to be engaged in the strategic decision-making process related to transport system in the city, safety and security aspects related to child protection, vulnerable groups and persons with disabilities
- Encouraging public participation of women and other local organisations via consultations at neighbourhood level for identifying the local needs and specific measures required for enhancing the quality of life in the city

Smart and digital opportunities

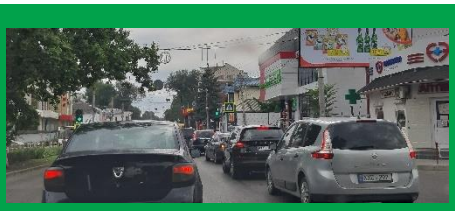
- Smart and digital solutions are essential means to implement the actions from the SUMP in a high-quality manner. This can include ITS systems that benefits road users by providing the information on parking or road works, or information systems that can help travellers choose the fastest and most sustainable mode of transportation. Smart information systems can also encourage travellers to choose cleaner modes of transport.

Action 5

Traffic management plan development and implementation pilot

Contributing to

SO 3 SO 1



Total CAPEX
300,000 EUR

Estimated timeframe
2022–2025

T Transport

Targets

- Increased average travel speed for buses on the major thoroughfares by 10%
- Improved road safety and a better functioning of the road network
- Decrease in number of accidents by 30% in 5 years' time, especially with pedestrians and cyclists

Scale and location

- Municipality of Bălți
- Pilot project to be selected based on SUMP

Estimated annual savings

- 5% reduction of air pollution from heavy traffic as compared to current levels
- 2,000 tonnes of CO_2 if Actions 5 to 9 inclusive are implemented

Context and description

Traffic management can be seen as a combination of measures meant to preserve traffic capacity and improve the security, safety and reliability of the overall road transport system. An efficient and effective traffic management system will improve traffic flows and lead to reduced air and noise emissions and to improved air quality.

The implementation of a traffic management system takes place at different scale levels: the city as a whole, neighbourhood level, intersection level and road segment level. At these different levels of scale, different traffic modes interact, and traffic networks overlap and intersect. For example, the following measures can be implemented in a traffic management system:

- traffic light optimization
- route restrictions, one way traffic, etc.;
- right of way restrictions (e.g. priority regulations or signals) including intersection redesign;
- speed limits.

The aim is therefore to implement a traffic management system that balances the increased efficiency and safety of some modes against the delay experienced by other traffic modes. The traffic management plan for Bălți should be based on the strategy as elaborated in the SUMP (see Action 4). Smart and digital techniques can help in the monitoring of the traffic (in real time) and can provide data for the development of the management plan in an early stage.

This action focuses on the development of a traffic management action plan at the various scale levels as described above, and on the implementation of a pilot with license plate recognition.

The pilot project will be set up to improve liveability in a certain neighbourhood. Automatic Number Plate Recognition (ANPR) will be used to ensure that these rules are followed. The cameras are placed at different locations to act against unauthorized through traffic – this can be freight traffic (>3.5 tons) for example. To distinguish through traffic from local traffic, the cameras measure the time in which a certain route was covered. The time allowed is determined based on the route, taking into account the speed limits. Prosecuting offenders is necessary to bring about change.

This action refers to the entire road network of Bălți. Priority should be given to public transport axes, major access roads, school areas and suburbs. A pilot project on smart systems for Traffic Management and Surveillance could provide valuable data. The location for the pilot project can be determined by mutual agreement – in the case of license plate recognition, a pilot at neighbourhood level will be developed.

Legal and policy framework

- **Sustainable Development Strategy for the Municipality of Bălți**
- **Law No. 133 of 8 July 2011 on Personal Data Protection** - The role of the National Center for Personal Data Protection ('NCPDP'), i.e. the national data protection authority, consists of issuing various subject-limited decisions and instructions whereby it provides the public with official opinions on particular personal data protection issues.

Implementation steps

1. Create an inventory of the best practices of conventional traffic management in Bălți.
2. Design a set of measures to be implemented in selected intersections and on selected routes, including traffic light optimization, one-way streets, junction redesign, banned turns, based on recommendations formulated in SUMP (Action 4).
3. Implement pilot project with ANPR cameras.
4. Implement and enforce the proposed measures.
5. Monitor traffic in the pilot areas, assess existing situation according to best practices and develop optimization planning and guidelines in traffic management.
6. Feed lessons learnt into the SUMP process and define a longer-term programme for more integrated traffic management.

Stakeholders

- Municipality of Bălți
- Architecture and Urban Planning Department
- Department of Traffic and Roads
- Urban planning department
- National authorities
- Bălți General Police Inspectorate
- Traffic Supervision Inspectorate, North Region
- Emergency Situations Department
- National Agency for Road Transport (regional office)
- Research organisations
- IT consultants

COST ESTIMATE

Estimated CAPEX: 300,000 EUR

Develop traffic management action plan (based on SUMP)	100,000 EUR
Pilot project with ANPR	200,000 EUR

Source of financing: Municipality, IFIs

Estimated yearly OPEX: 20,000 EUR (including awareness raising campaign)

Environmental and economic benefits

- The implementation of the traffic management plan will improve traffic flows, and thus decrease GHG emissions, the volume of dust and other air pollutant emissions. Furthermore, annual financial savings are to be expected on maintenance of public domain (by implementing an investment programme built on priorities), on law enforcement, on operation costs for public transport, and so on.
- Reduction of travel time, air and noise pollution and accidents
- Reduction in traffic congestion
- Income from traffic fines
- Decrease in operating costs for public transport
- Congestion mitigation programs will directly reduce GHG emissions. Smoothing the stop-and-go pattern of traffic so that cars move at a relatively constant speed will reduce GHG emissions as well.

Gender and social inclusion opportunities

- Opportunities for women and community-based organisations to be engaged in the decision-making process related to traffic management plan
- Introduction of specific measures related to ensuring accessibility of people with disabilities and making the roads safer for their travel
- Introduction of safety measures targeting reduction of car incidents at city level and especially around schools, kindergartens, markets, elderly centres, etc.

Smart and digital opportunities

- The use of technology, such as ANPR cameras is an essential part of traffic management. In the future, it is also possible to look at ITS applications that build on this pilot and extend the traffic management plan. The installed ANPR cameras can be used for other applications as well, for example the monitoring of a low emission zone. This can be integrated on the platform foreseen in Action 2.

Action 6

Green Public Parking System and implementation pilot

Contributing to

SO 1 SO 3

Total CAPEX
2,880,000 EUR

Estimated timeframe
2022–2026

T Transport

Targets

- Reduced number of on-street parking spaces on public domain in the city centre with 50%
- All new urban development and redevelopment projects will be built in accordance with regulations on parking and accessibility

Scale and location

- Municipality of Bălți
- Pilot project – parking nearby Municipal Hospital

Estimated annual savings

- 2,000 tonnes of CO_2 if Actions 5 to 9 inclusive are implemented

Context and description

The parking system in Bălți is currently insufficiently robust to regulate the parking demand and to match it to the available supply, both in public and private parking spaces. A new parking system will help to optimise the supply to meet demand. Organized parking, managed by a municipal parking agency, can generate income and serves many other goals (accessibility, liveability, attractiveness of the city). When a parking lot becomes a place to charge the battery of electric vehicles, the economic value can increase further. Also, each parking lot will include environmentally friendly elements such as bike parking space, green facades and rainwater harvesting systems as well as smart components, such as intelligent monitoring and ticketing system, vehicle plate number recognizing system, etc.

In the update of the public parking system, sufficient attention should be given to accessibility for the disabled, the ability to charge electric vehicles, security, and the ticketing system. Cyclists and motorcyclists should also be given a convenient location to safely park their bikes/motorcycles and possibly charge their batteries.

A good starting point and piloting area is the Municipal Hospital in Decebal Street. In this hospital, daily 400 workers arrive, using on average 100 cars, 100 patients are being discharged, more than 100 patients come directly to the hospital and around 150 patients are being transported by the emergency department. Currently, there is only a small parking on the hospital premises, mostly for the personnel. The small parking nearby pertains to the Municipal Enterprise for Road Construction and Maintenance, and the price is 10 MDL per hour. There are permanently 60 cars on the hospital grounds and 80 cars parked along the nearby street. But actually around 200-300 parking places are needed for patients and employees. There is a stringent necessity for building a hospital parking. A new multi-storey parking would be very useful for the Hospital and for the city, reducing the traffic congestion on the streets around the hospital. The design

of the new parking lot will include green elements such as: charging station for electric vehicles, small scale renewables (see Action 12), bike parking space, green facades and rainwater harvesting and reuse system (see Actions 9, 22 and 29) etc.

There are two alternatives that will be analysed: (1) a new building dedicated for the parking and (2) rehabilitation and modernization of the existing building block which is currently not functioning situated nearby the hospital and which requires major renovation works. This building could be partially converted into multi-level parking. Sustainable techniques and materials will be used, and the parking balance must be entered in a sustainable manner (sufficient parking spaces for bicycles, charging points, subsystems). The ultimate use and occupancy of the parking spaces for the different modes can provide interesting conclusions for the implementation of the parking policy.

Legal and policy framework

- **Sustainable Development Strategy for the Municipality of Bălți**
- **Sustainable Energy and Climate Action Plan for Bălți**

IMPLEMENTATION STEPS

1. Assess the enforcement measures (regulations, capacity, practice) for parking in the city of Bălți.
2. Make an inventory of all actual parking situation in selected zones (occupation, duration, vehicle type, origin of vehicle).
3. Develop a detailed and feasible parking plan based on SUMP, including a gradual roll-out action plan.
4. Update the parking regulations for urban developments, based on best practices; align these regulations with the parking strategy in the city centre; adapt tariffing and licensing for public parking spaces (roadside parking and parking lots), with differentiation of tariffs based on location.
5. Prepare the feasibility study for the pilot project and start the implementation.
6. Raise awareness and gain acceptance of the parking policy.

STAKEHOLDERS

- Municipality of Bălți
- Department of Traffic and Roads
- Urban Planning Department
- National authorities, Police
- Municipal Hospital (pilot)
- Public transport operators, private transport operators, local businesses
- NGOs

COST ESTIMATE

Estimated CAPEX: 2,880,000 EUR

Inventory of actual parking situation	30,000 EUR
Public Parking System update	100,000 EUR

Outsourcing the design and building of a multilevel parking lot by renovating existing building next to the hospital	2,000,000 EUR
Setup capital cost including equipment and training for the staff, ticket and permitting process, equipment for maintenance	750,000 EUR

Source of financing: Municipality, PPP, IFIs

Estimated yearly OPEX: 80,000 EUR

Environmental and economic benefits

- Improved enforcement and increased parking charges can encourage more use of public transport and less use of cars. Reductions in car traffic will contribute positively towards liveable streets, an attractive local economy, and will help to reduce road accidents.
- Parking policy which prevents obstructions for pedestrians can bring benefits of accessibility and improved safety, especially for people with limited mobility and for children.
- The measure is a net revenue generating action because of the revenues from parking and fines.
- Increased parking charges can encourage more use of public transport. Increased revenue generation from existing parking facilities can be ringfenced and explicitly used for the development of alternative modes, i.e. infrastructure improvements, incentives, subsidies.
- The environmental consequences of implementing a sustainable parking policy manifest themselves in reduced losses of open spaces and biodiversity, and in the reduction of GHG emissions and air pollutants occurring while cars are cruising for parking. Furthermore, limiting the supply of parking and raising the costs of car travel will stimulate individuals to use other transport modes to reach their destinations.

Gender and social inclusion opportunities

- Ensure that all categories of persons including vulnerable groups such as persons with disabilities will have access to the newly developed infrastructure
- Access to employment
- Gender aspects – level of accessibility, lighting, colour coding, safety, cleaning and maintenance level, activity and customer assistance amenities, etc. - will be considered when designing and operating the new parking facility

Smart and digital opportunities

- Implementing a parking system can make perfect use of digital solutions, such as parking apps, license plate recognition, ITS and GIS-based databases. This can be built upon the experience from the smart parking for Bălți Municipality pilot, as described in the Sustainable Energy and Climate Action Plan.

Action 7

Developing an Investment Programme for road maintenance and rehabilitation

Contributing to

SO 1

Total CAPEX
25,250,000 EUR

Estimated timeframe
2022–2026

T
transport

Targets

- Rehabilitate 10% of the roads per year, over a course of 5 years.
- All roads to benefit from pavement management system

Scale and location

- Municipality of Bălți

Estimated annual savings

- 2% contribution to the reduction of total emissions resulting from road traffic; further pollution reduction as program is upscaled
- 2,000 tonnes of CO_2 if Actions 5 to 9 inclusive are implemented

Context and description

Roads in Bălți are in moderate to poor condition. Besides a national road rehabilitation program, there is a high need for road maintenance at municipal level. Maintenance and rehabilitation of roads should be based on a strategic plan in line with the SUMP (see Action 4), leading to an investment and maintenance programme that includes urgent repairs as well as structural improvements.

Prioritizing investments and maintenance work goes hand in hand with drawing up a multi-year budget. The setting of priorities depends on a multitude of factors, which are determined by means of a multi-criteria analysis and a risk assessment. The SUMP will help determine which axes are priorities for structural reconstruction, for example in view of improving the public transport network and/or the bicycle network. Proper planning and coordination of the road works is essential - for example, the works must be coordinated with the necessary works on the drainage system and the implementation of the blue-green network. The use of sustainable techniques and materials will be an essential part of the programme. The programme will also consider the full rehabilitation of the local roads, meaning that beside improvement to the pavements, the rehabilitation will also consider organising parking, organising street furniture, trees etc. making the streets more pleasant for walking and cycling. This will include both primary and secondary roads. Via this programme, we aim at improving the safety of all participants in traffic - pedestrians, cyclists, drivers, etc.

The programme must take into account budgetary constraints, which means that strict phasing is required. In addition to the tendering of contracts, the institutional strengthening of municipal services will be instrumental in ensuring success for the programme – this can be in relation to project and programme management, procurement, engineering, design, site inspections, quantity surveying and cost consultancy, and so on.

Road maintenance and rehabilitation is needed city wide, but priority should be given to certain axes that play an essential part in the transport system.

Legal and policy framework

- **National Transport and Logistics Strategy 2013-2022**
- **Sustainable Development Strategy for the Municipality of Bălți**
- **Program of Urban Revitalization**

Implementation steps

1. Prioritize the entire road network, based on their network function into primary, secondary and local roads.
2. Design a feasible and realistic investment program for road maintenance.
3. Continue investments into road rehabilitation based on the updated prioritization.
4. Introduce a pavement management system.

Stakeholders

- Municipality of Bălți
- Department of Traffic and Roads
- Municipal enterprise for Road Construction and Maintenance
- Municipal enterprise for large constructions
- Urban planning department
- National authorities

Cost estimate

Estimated CAPEX: 25,250,000 EUR

Developing an investment plan for road rehabilitation and maintenance, including procurement documentation	100,000 EUR
Road rehabilitation – investment foreseen for 5 years, 5,000,000 EUR/year	25,000,000 EUR/ year
Introduction of the pavement management system	150,000 EUR

Source of financing: Municipality, IFIs

Estimated yearly OPEX: 125,000 EUR

Environmental and economic benefits

- Improved road conditions will reduce journey time and allow delayed departure time.
- Improved road conditions will reduce congestion, speed, emissions and noise pollution, and fuel consumption.
- Maintenance could reduce diversions which would otherwise be chosen due to poor road condition. This could limit overall distance travelled.
- Structural investments in the road network will lead to limited repair costs in the long term. It will also reduce overall costs of maintenance.
- Use of new technology to build more sustainable roads with economical use of cement reduces GHG emissions (cement contributes to GHG: every tonne emits up to 622 kg CO_2).

Gender and social inclusion opportunities

- Equal and fair opportunities for participation of women and community-based organisation in the decision-making process and selection of roads to be rehabilitated
- Introduction of safety measures targeting reduction of car incidents at city level and especially around schools, kindergartens, markets, elderly centres etc.
- Encouraging public participation of women and other local organisations via consultations at neighbourhood level for identifying the local needs and specific measures required for enhancing the quality of life in the city

Smart and digital opportunities

- Digital solutions can make an important contribution to optimizing roads and the public domain in general. For example, a system can be set up whereby citizens can report defects, so that this can be included in the maintenance planning. This platform can also be used to communicate about planning, and to propose options to reduce nuisance during road works (see also Action 3).

Action 8

Renewing the public (trolley) bus fleet

Contributing to

SO 1 SO 2

Total CAPEX
28,000,000 EUR

Estimated timeframe
2022–2026

T Transport

Targets

- The age of public transport vehicles should be maximum 15 years/vehicle and the average age of the fleet should not exceed 10 years by 2026;
- 50% of vehicles to be compatible with Euro 4 or higher;
- Less than 85% of the public transport buses runs on diesel by 2026;
- Increase number of public transport users with 20,000 daily passengers in 5 years

Scale and location

- Municipality of Bălți – city wide

Estimated annual savings

- At least 5% reduction of air pollution and GHG emissions from public transport due to renewal of fleet and introduction of low emission vehicles on routes that are currently operated by the private sector
- 2,000 tonnes of CO_2 if Actions 5 to 9 inclusive are implemented

Context and description

The electrified public transport in Bălți is a service of the Municipal Enterprise "Department of Trolleybuses", with a total number of 53 trolleybuses and a length of electric operating networks of 38.6 km. The upgrade of the public transport fleet of busses saw two phases, both financed with EBRD assistance. The first project was carried out in 2012-2014, and the second project is ongoing and started in 2019. Within this second project, the municipality will benefit from the acquisition of trolleybuses with autonomous course and technical maintenance vehicles, as well as the rehabilitation of the old power supply infrastructure. The trolleys are equipped with GPS monitoring.

However, a large part of the public transport fleet is still outdated. The average age of the public buses and trolleybuses in Bălți is 15 years - some of the trolleybuses are older than 30 years. Renewing the bus fleet is a high priority towards a greener, more comfortable, and reliable bus service – there is a need to up to 50 new (trolley)buses. Here lies the opportunity to go for economic and environmental-friendly buses with large double doors and low floor boarding for better accessibility. Next to the bus fleet itself, the contact lines for the trolleys also needs renovation.

In order to ensure that public transport becomes an even more attractive alternative to the car, the infrastructure must also be adapted. The technical workshop will be modernized further, to improve the maintenance strategy of the buses. The bus stop infrastructure throughout the city will also be upgraded,

linking it to the road rehabilitation investment programme (see Action 7). In addition, the tariff structure can also be revised in line with the parking policy (see Action 6) and the public transport strategy from the SUMP (see Action 4).

Legal and policy framework

- There is no policy set at local level specifically dedicated to the transport sector. Still, some references are available in the **Sustainable Development Strategy for the Municipality of Bălți.** The local authority focuses on improving the existing infrastructure and quality of public transport service.
- Currently, the Municipality is developing the **Sustainable Public Transport Strategy**. This will include specific measures for improving the current public transport system in the city.

Implementation steps

1. Evaluate the process of acquiring low-emission public transport vehicles (procurement, available financial resources, timing).
2. Invest in capacity building throughout the entire life cycle of the bus (personnel for procurement, planning, exploitation and bus drivers, maintenance staff, the technical workshop).
3. Further modernize the technical workshop/repair shop.
4. Monitor the state of the contact lines of the trolleybuses and set up a renovation plan.
5. Adapt bus stop infrastructure in line with the road investment programme (Action 7).

Stakeholders

- Municipality of Bălți
- Department of Transport and Communication,
- Municipal Enterprise "Department of Trolleybuses"
- Operators of bus companies

Cost estimate

Estimated CAPEX: 28,000,000 EUR

Replacing rolling stock of fleet: 50 (trolley)buses	15,000,000 EUR
Replacing and extending the trolleybus networks – 200,000 EUR/km	10,000,000 EUR
Modernizing the technical workshop	1,000,000 EUR
Bus stop infrastructure – 100,000 EUR/bus stop	2,000,000 EUR

Source of financing: Municipality, National Government, IFIs

Estimated yearly OPEX: 1,600,000 EUR

Environmental and economic benefits

- Lower exploitation cost (fuel savings)
- Revenue from gradual increase of tickets
- The use of lower emission technologies reduces carbon emissions and improves air quality
- Modern buses increase comfort of public transport users
- More reliable public transport

Gender and social inclusion opportunities

- Accessible buses and well planned, designed and maintained bus stops promote inclusive bus services, so expanding services to previously underserved groups, increasing their economic opportunities and increasing the number of people using these services.
- Transportation routes will consider the special needs of women, children and elderly people for commuting within the city
- Bus-stops will be designed considering the special needs of women, children and elderly people and as close as possible from their locations of interest (public institutions, health care centres, markets, etc.)

Smart and digital opportunities

- Data from GPS monitoring of all trolleybuses can be used in a public transport app. Real time passenger information is an automated system for supplying users of public transport with information about the nature and state of a public transport service. This can be presented to passengers in different ways, including mobile phone applications, platform and bus stops electronic signage and automated public address systems.
- Automated Traffic Management System is also another possible solution for optimizing the public transport system in Bălți.

Action 9

Connecting green infrastructure with sustainable mobility: biking/walking city network

Contributing to

SO 3 SO 2

Total CAPEX
1,800,000 EUR

Estimated timeframe
2022–2025

T Transport

Targets

- 20 km of cycle and pedestrian lanes developed by 2025
- Increased use of active transport (cycle and walking) by 20% by 2025

Scale and location

- City of Bălți - connecting the water bodies and the green areas with the green heart, the neighbourhoods and the city centre

Estimated annual savings

- 5% reduction of pollution from cars in the city

Context and description

Cycling and walking are a healthy, environmentally friendly and flexible transport mode. When the cycling infrastructure and pedestrian lanes are well developed, it encourages citizens to cycle and walk more. Combined with sightseeing and connecting green and blue elements in the city, this can also contribute to bicycle tourism. In line with international good practice, cycle and walking facilities should be planned, designed and installed based on the principles of visibility, accessibility, safety and security, maintenance and monitoring, availability and capacity, connectivity and attractiveness. New areas for cycle parking need to be located strategically throughout the city, preferably close to areas where there are significant concentrations of tourists, commuters and students (see Action 6 on parking policy).

Involving the public in an early stage is a crucial element. The bike friendly climate and relief in Bălți will quickly convince citizens to buy a bike and use it for functional trips. Soft lining the route with blue-green infrastructure and turning it into a green corridor will add to the utility and attractiveness of the project.

There are two potential routes to connect the green and blue areas of the city with a network of bicycle and pedestrian lanes (Figure 1): an inner circle connecting parks and neighbourhoods, referred to as the green line; and an outer circle connecting water bodies around the city, referred to as the blue line. Both routes (green and blue) will be developed on public land only.

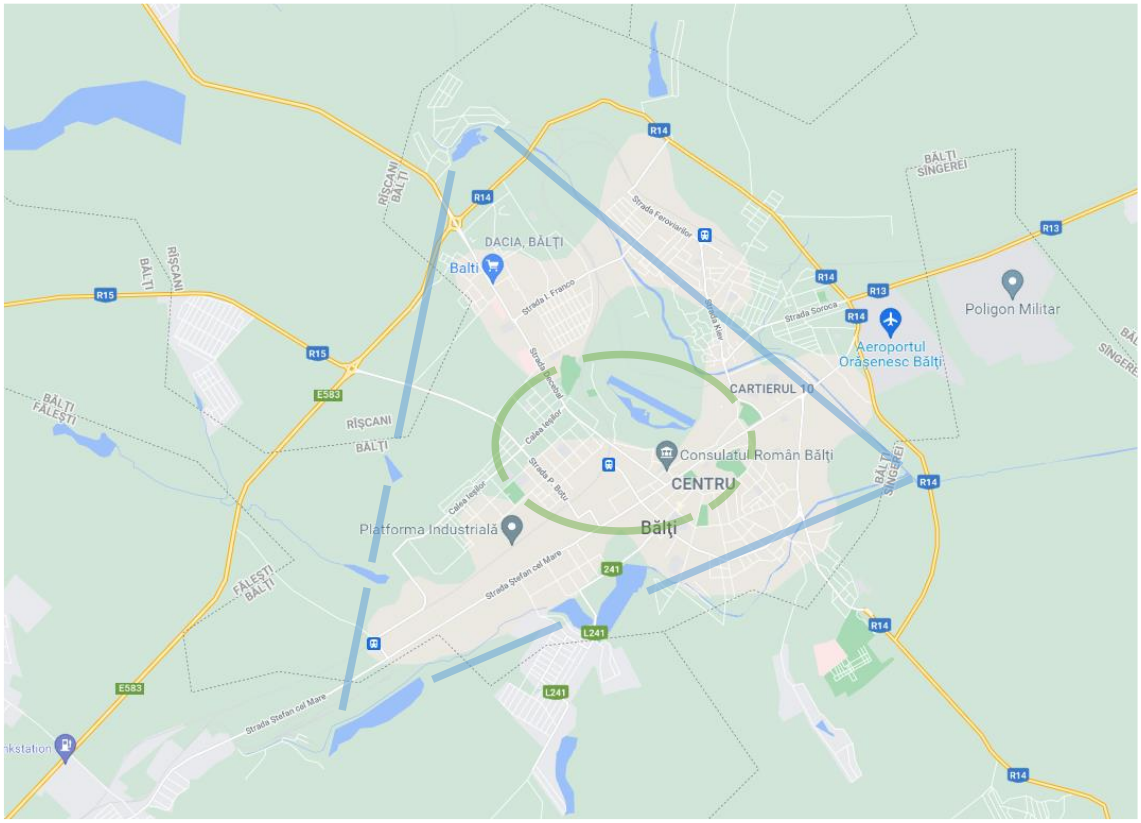


Figure 6 A blue line connecting water bodies around the city (outer circle) and a green line connecting parks and the neighborhoods (inner circle)

In the first 5 years, the development of the green line can take place. Later the development of the blue line can follow, taking into account all lessons learned from the development of the green line.

Legal and policy framework

- The municipality has the authority to design and implement the cycle routes. Moreover, citizen involvement is needed to decide on the specific route and the soft lining that can be done in the different sections of the route to optimize attractiveness and utility.

Implementation steps

1. Develop a concept that includes as much as possible multi-purpose blue-green infrastructure and blue-green corridor along the bicycle and pedestrian path.
2. Involve citizens in selecting the exact route to connect the public spaces and parks
3. Ensure a good connection of the network of public transport and to the Green Heart of the city (Action 30).

Stakeholders

- Municipality of Bălți

- Department of Transport and Communication
- Architecture and Urban Planning Department
- National government
- NGOs
- Citizens

COST ESTIMATE

Estimated CAPEX: 1,800,000 EUR

Green line cycle and pedestrian route	1,800,000 EUR

Source of financing: Municipality, National Government, IFIs

Estimated yearly OPEX: 18,000 EUR (including awareness raising)

Environmental and economic benefits

- The realisation of a network for pedestrians and cyclists will stimulate a modal shift to these modes of transport. This will significantly decrease GHG emissions, the volume of dust and other air pollutant emissions.
- The project has a high potential to positively impact tourism. Improving the safety of cyclists encourages others to start cycling.
- Increased active transport provides opportunities for social interaction and can host benefits for communities.
- Some groups of people with lower incomes may benefit from the cheap form of mobility cycling provides. It increases the mobility for those groups with relatively low levels of car ownership.
- Where cycling becomes more common, this has the potential to increase use of local shops and services, helping to support the local economy.

Gender and social inclusion opportunities

- Make walking and cycling paths accessible to wheelchairs, strollers, and provide regular benches for older people and children to rest.
- Consult with women and youth organisations in order to understand their expectations and needs and consider health and safety aspects when designing the new cycling routes in order to encourage women and youth to use them.

Smart and digital opportunities

- The new cycling and pedestrian routes can be equipped with smart street lighting.

E Energy

B Buildings

Short-term actions

Action 10

Developing and approving the Energy Efficiency Programme for public buildings

Action 11

Energy efficiency investments for public buildings and institutions

Action 12

Promoting small-scale RES

Action 13

Gradual improvement of the energy efficiency of residential blocks and promotion of self-consumption of RES

Action 14

Modernize and upgrade the district heating services

Action 15

Promoting large-scale RES through investments

Action 16

Energy efficient street lighting programme

Long-term actions

- Upgrading the electric distribution network
- Development of a strategy for energy production from biomass
- Promotion of energy efficient appliances
- Usage of solar panels for heating in areas where district heating is not accessible
- Promotion of nZEB and green building standards for building design
- Promotion of components for green buildings
- Continued investments in RES at all scales

Action 10

Developing and approving the Energy Efficiency Programme for public buildings

Contributing to

SO2 SO1 SO3

Total CAPEX
255,000 EUR

Estimated timeframe
2022–2025

E Energy B Buildings

Targets

- Develop and approve a public buildings energy efficiency programme.
- Execute twenty energy audits.

Scale and location

- All public buildings which are owned by the City

Estimated annual savings

- Up to 10% CO_2 emissions (associated with energy consumption in buildings) reduction after implementation of awareness raising campaign in public buildings

Context and description

There are over 400 buildings owned and administered by the Municipality of Bălți, including schools, kindergartens, sport centres, administrative, cultural, social and health care institutions. Many were built several decades ago, when no energy standards existed, with no insulation and a high dependence on fossil fuels. High energy consumption is strengthening the fact that buildings in Bălți are old, energy intensive and the limited implementation of renovation interventions is a major concern, both for the environment and the building users. Increasing the energy efficiency and promoting minimum environmental and comfort standards in public buildings is a first step to protect the environment and secure increased quality of life for citizens of Bălți.

This action involves a holistic approach to decrease the energy consumption in Bălți and renovate public buildings in the city through a combination of data collection, action planning and awareness raising measures, including the development of a dynamic data collection and building inventory portal for energy consumption and components of the entire public building stock. This will allow the city to have a "buildings energy map" identifying the most energy intensive buildings and possible energy efficiency and renewable energy opportunities. The portal can continuously be updated with information collected during the energy audits or directly provided by energy and utilities invoicing and energy meters.

An action plan will be developed in accordance with the requirement of the Energy Efficiency Law. This plan will define minimum energy efficiency targets and the measures to improve the energy efficiency

such as insulating the building envelope, replacing windows, heating / cooling improvements, mechanical ventilation, lighting, appliances, green roofs, building automation system or small-scale renewable energy sources (photovoltaic, solar water heaters, biomass, and heat pumps). The action plan will include guidance on enforcement of legal requirements regarding connection of public buildings to centralised district heating system. Also, an energy efficiency and comfort design guide will be developed as the basis of future training and awareness raising programmes.

Delivering an awareness and education programme in collaborating with NGOs and community-based associations towards energy efficient behaviour based on information campaigns in schools and public buildings will allow the promotion of individual practices to decrease energy consumption and educate the population towards energy efficiency.

This action will support future projects and investments by providing a sound baseline based on relevant and accurate data. It is complying with national regulations and requirements according to the energy efficiency law and monitoring the energy performance indicators, at local level. Energy audits will be developed for the first 20 most intensive energy buildings.

The programme will be overseen by a working group including representatives from different departments of the Municipality (legal, economic, urban planning, technical, energy). This working group will be responsible for approving minimum performance indicators, outsourcing contractors and supervising the implementation of the Energy Efficiency programme for public buildings.

Legal and policy framework

- The **Sustainable Energy and Climate Action Plan for Bălți**
- The **Energy Efficiency Law**
- The **Energy Performance of Buildings Law**
- The **ANRE/national regulation on renewable energy projects and FIT**

Implementation steps

1. Launch a working group to oversee the energy efficiency in public buildings programme and investments [2022].
2. Set up an energy monitoring in municipal buildings via the development of a dynamic building inventory data collection portal [2022-2023].
3. Develop the Terms of Reference for public buildings energy audits [2022].
4. Develop the first twenty energy audits for the most energy intensive buildings (batch 1) [2023].
5. Develop the action plan and the energy efficiency and comfort design guide [2023].
6. Deliver an energy efficient behaviour programme based on information and awareness campaigns in schools and public buildings [2023 - 2025].

STAKEHOLDERS

- Mayor's Office
- Local authority departments and municipal enterprises
- Utilities Companies
- National Environmental Agency
- Energy efficiency and technical providers
- CET-Nord

COST ESTIMATE

Estimated CAPEX: 255,000 EUR

Development of the Energy Efficiency Plan and Behaviour Change Guide	20,000 EUR
Energy audits for 20 buildings	160,000
Develop the Dynamic Building Inventory portal	75,000 EUR

Source of financing: Municipality, donors

Estimated yearly OPEX: 20,000 EUR/year (educational behaviours change programs and awareness raising campaigns and updating the inventory portal)

Environmental and economic benefits

- Increased energy efficiency of the public buildings will reduce the operational costs of the buildings
- Better user comfort with positive health impacts
- Demonstration of the benefits of energy conservation measures and promoting the use of energy service companies (ESCOs)
- Local access to employment and business opportunities in the construction and energy sectors specialty in SMEs

Gender and social inclusion opportunities

- Offer equal opportunities to all citizens to actively be engaged in consultations related to the development of the Energy Efficiency Programme for public buildings
- Include gender mainstreaming and social inclusion criteria – level of impact of the proposed investment on women and socially vulnerable groups - in the evaluation of the public buildings to be included in the programme
- Include in the programme specific elements which are supporting gender equality and social inclusion

Smart and digital opportunities

- Dynamic building inventory: dynamic portal collection continues information on Energy Performance Certificates, energy consumption from invoicing and smart metering, etc.
- Building Management Systems: The plan will promote the adoption of smart control and monitor solutions.

Action 11

Energy Efficiency investments for public buildings and institutions

Contributing to

SO 2 SO 1

Total CAPEX
12,120,000 EUR

Estimated timeframe
2023–2026

E Energy B Buildings

Targets

- Reduce the energy consumption of the intervened buildings in at least 35%.
- Promote the use of small-scale renewable energy (15%).
- Increased level of awareness among Bălți citizens regarding energy efficiency.

Scale and location

- All public buildings which are owned by the City

Estimated annual savings

- GHG emissions savings: 575 tonnes of CO_2/year
- Primary energy savings
- Energy intensity reductions

Context and description

Buildings in Moldova account for about 45% of energy consumption and on average 75% of this energy is used for heating. On average, in 2018, heating consumption in public buildings was higher than 200 kWh / m^2 / year indicating high energy loses. This is mostly because the building stock is old, energy intensive and lacks investments in maintenance or energy rehabilitation measures. The Municipality owns and administers over 400 buildings, among which schools, kindergartens, sport centres, administrative, cultural, social and health care institutions. Considering the energy efficiency level of public buildings, there is a huge opportunity for reducing GHG emissions and increase the quality of life of Bălți citizens.

This action involves a holistic approach to reduce the energy consumption in Bălți and renovate public buildings in the city through a combination of analysis (based on previous action) followed by investments in measures including the renovation of municipal buildings and institutions, to increase their energy and water efficiency namely by insulating the building envelope, replacing windows and doors, efficient installation components, heating / cooling and mechanical ventilation improvements, efficient lighting and appliances, green roofs or water harvesting.

The action will also promote the use of smart technologies such as building automation and monitoring systems together with capacity building activities for administrators, building management and technical personnel.

On the other hand, small-scale renewable energy sources such as photovoltaic, solar water heaters, biomass, and heat pumps will be promoted to reduce the building carbon footprint and ensure the RES share in total energy consumption of buildings of at least 15%.

This action will be implemented after the previous action, namely based on the results from the energy audit for the first batch of buildings. The selected twenty buildings / institutions will undergo deep renovation works as a starting point for an extensive programme. For each of the buildings, a feasibility study will be developed, including technical documentation, a financial assessment (cost benefit analysis as well) and environmental and social impact assessment.

Additionally, a new batch of twenty-five energy audits for municipal buildings will be launched. This new batch must take into consideration the energy consumption but also the diversity of the buildings to provide a sound overview of the building stock and opportunities to be adopted.

To renovate the public buildings approaches based on new business models promoting the development and implementation of on-bill or other third-party financing schemes, based on the cooperation between utilities, financial institutions and Municipality can be considered. Given the novelty of the approach and the required expertise of this contracting model, this action will include a capacity building programme.

Information and awareness raising campaigns will be organized to promote energy efficiency in buildings and the importance to reduce GHG emissions associated to the building sector. Site visits could also be organised, to promote achieved results and inspire citizens to adopt similar measures.

Legal and policy framework

- **The Sustainable Energy and Climate Action Plan for Bălți**
- **The Energy Efficiency Law**
- **The Law on the Energy Performance of Buildings**
- **The ANRE/national regulation on for renewable energy projects and FIT**

Implementation steps

1. Develop the Terms of Reference (ToR) for public buildings energy rehabilitation based on the results of the energy audits and aligned with the energy efficiency programme from Action 1. The ToR should define the business model (e.g. on-bill or other third party finance) and consider capacity building for the municipal staff [2023].
2. Perform renovation and modernization works of the first twenty buildings (batch 1) according to the previously developed energy efficiency programme and implementation plan [2023-2026].
3. Outsource the energy audit for a second batch of twenty-five municipal buildings (batch 2).
4. Monitor implementation and evaluate performances via the dynamic building inventory portal [2026].
5. Conduct information and awareness campaigns to promote energy efficiency in buildings and the project results, organising site visits, press releases, etc. [2025-2026].

STAKEHOLDERS

- Mayor's Office
- Local authority departments and municipal enterprises
- Utilities Companies
- NGOs (e.g., National Environmental Centre)
- Energy efficiency and technical providers
- CET-Nord

COST ESTIMATE

Estimated CAPEX: 12,120,000 EUR

Development of the ToR for the Renovation and modernization works (including business model definition and capacity building activities)	20,000 EUR
Renovation and modernization works of the first twenty buildings: 120,000 m^2 at 100 EUR / m^2	12,000,000 EUR
Development of the twenty-five energy audits	100,000 EUR

Source of financing: Municipality, Donors, Energy Services Companies

Estimated yearly OPEX: 848,000 EUR/year (including 25,000 EUR/year for awareness raising campaigns)

Environmental and economic benefits

- Improved public health due to avoided air pollution
- Increased energy efficiency of the public buildings will reduce the operational costs of the buildings
- Increased life expectation of the rehabilitated buildings
- Better user comfort with positive health impacts
- Demonstration of the benefits of energy conservation measures and promoting the use of energy service companies (ESCOs)
- Leverage from the results in the public sector to the private sector setting the rehabilitated buildings as "good practice"
- Achieving local policy goals

Gender and social inclusion opportunities

- Access to employment
- Social inclusion and gender aspects such as: ensuring access for persons with disabilities to public buildings, equal and gender distribution of restroom at each level of the building, etc., will be embedded in the design of the rehabilitation process.
- Awareness raising campaigns will be tailored to specific groups of citizens and will also emphasise the social and gender equality dimension of the investments

Smart and digital opportunities

- Dynamic building inventory: dynamic portal continues information collection on Energy Performance Certificates, energy consumption from invoicing and smart metering, etc.
- Automated Building Management Systems using data from smart meters or indoor quality sensors

Action 12

Promoting small-scale RES

Contributing to

SO2 SO4

Total CAPEX
2,190,000 EUR

Estimated timeframe
2022–2025

E Energy B Buildings

Targets

- Increase the total volume of investment in RES
- Reduce energy costs
- Increase the building market value
- 1 PPA signed by the Municipality for green energy

Scale and location

- Energy consumers in Bălți

Estimated annual savings

- GHG emissions savings – 210 tonnes of CO_2 / year
- Renewable Energy Production

Context and description

The Republic of Moldova is highly dependent on external resources for energy, resulting in accentuated instability of the energy prices. In Bălți electricity in mainly generated on a natural gas CHP plant operated by CET-Nord SA. The number of small-scale renewable energy projects being implemented or already implemented is very low both in the country and in the city.

The National Agency for Energy Regulation of the Republic of Moldova (ANRE) approved a 15-year feed-in tariffs (FIT) for solar energy projects with a generation capacity of no more than 1 MW. With this scheme the government wants to invest in 15 MW of solar facilities ranging in size from 10 kW to 1 MW. Developers who secure a FIT contract will have two years to get projects grid connected.

This measure aims to promote, via an awareness raising campaign and four pilot projects, the adoption of small-scale renewable energy projects. In the first two pilot projects all energy will be used in self-consumption and in the second two pilot projects following the FIT approach (i.e., selling all energy to the grid).

The Municipality can promote a green Power Purchase Agreement (PPA) to reduce the emission associated to the energy consumption of the city, as a financing mechanism for one of the pilot projects. A PPA is a long-term contract between two parties, one which generates green electricity and one which is looking to purchase green electricity. Usually, the PPA is signed with an established power plant (wind, solar) at a price that is fixed for a period of 10, 15 or 20 years. Contrary to other sustainability initiatives a PPA does not require any capital investments from the Municipality and works as an effective hedge against price fluctuations on the power market. Given the novelty of the approach and the required technical expertise

of this contracting model, this action will be implemented after Action 1, which is designed to build capacity among municipal staff. The selection of the pilot projects depends on their level of maturity, however CET-Nord are planning to start a pre-feasibility study for the implementation of a 1 MW solar power plant in their administrative buildings and the surrounding area. Besides, there are studies for solar implementation on top of municipal buildings (e.g., markets). For better awareness reasons the pilot project should cover projects ranging from 10 kW to 1 MW.

The promotion of small renewable energy sources will allow the adoption of smart metering and digitalisation tools and platforms. These automated processes support informed decision making, improve transparency and avoid isolated 'energy islands'. Among others, the digitalization reduces plants downtime and allows for a more accurate forecast of the weather and market conditions, maximising renewable production.

Following the installation of the pilot projects a set of awareness raising activities will be developed.

Legal and policy framework

- **The Sustainable Energy and Climate Action Plan for Bălți**
- **The Energy Efficiency Law**
- **The Law on the Energy Performance of Buildings**
- **The ANRE/national regulation on for renewable energy projects and FIT**

Implementation steps

1. Develop feasibility studies and four Terms of Reference (ToR) for the implementation of the pilot projects. Assess ambition indicators and eligibility criteria for the pilot projects and include these in the Terms of Reference [2022].
2. Outsource the development of the four small-scale renewable power plants [2023].
3. Promote the results of the project through awareness raising activities such as site visits and information campaigns [2024].

Stakeholders

- Mayor's Office
- Local authority departments and municipal enterprises
- CET Nord
- ANRE
- NGOs

Cost estimate

Estimated CAPEX: 2,190,000 EUR

Development feasibility studies and the ToR regarding the pilot projects	30,000 EUR
4 Pilot projects – average 600 kW/project at 900 EUR/ kWp	2,160,000 EUR

Source of financing: Municipality, Donors, Energy Services Companies, IFIs, government FITs

Estimated yearly OPEX: 66,000 EUR/year (including information and awareness campaigns)

Environmental and economic benefits

- Increased small-scale renewable energy used in Bălți reducing dependence on imported fuels
- Air quality improvement due to green technologies which produce no global warming emissions
- Improved public health due to avoided air and water pollution
- Diversifying energy supply and reducing dependence on imported fuels
- Achieving local policy goals

Gender and social inclusion opportunities

- Inducing economic development and creating skilled jobs in manufacturing, installation and maintenance of RES
- Considering the needs of women, youth, elderly and people with disabilities when deciding on the potential investments and encourage these groups to participate in the consultation process
- Awareness raising campaigns will be tailored to specific groups of citizens and will also emphasize the social and gender equality dimension of the investments.

Smart and digital opportunities

- New renewable power plants rely on the digitalization of the energy services.

Action 13

Gradual improvement of the energy efficiency of residential blocks and promotion of self-consumption of RES

Contributing to

SO 2 SO 4

Total CAPEX
6,600,000 EUR

Estimated timeframe
2022–2027

E Energy B Buildings

Targets

- Reduce the energy consumption of the intervened buildings in at least 35%
- Promote the use of small-scale renewable energy, to cover 10% of energy consumption
- Implement a consumption-based billing
- Increased level of awareness among Bălți citizens regarding energy efficiency

Scale and location

- Private and public residential buildings within the city

Estimated annual savings

- GHG emissions savings –251 tonnes of CO_2 / year
- Primary energy savings
- Energy intensity reductions

Context and description

Over 60% of the housing stock in the Republic of Moldova was built between 1976 and 1993. In Bălți, the main typology of the housing stock is represented by apartments in multi-family housing units / blocks of flats, followed by individual housing. Even though the housing stock is not very old, it was not designed and built according to energy efficiency standards, having no insulation and being highly dependent on fossil fuels. Currently residential blocks are insufficiently maintained, and no investments in rehabilitation are being undertaken. This results in a highly deteriorated housing stock with a low energy efficiency performance.

In majority of cases, there is no heat consumption-based metering equipment and households are not paying their bills based on consumption. By switching all residential buildings to the consumption-based billing, many residents would pay higher bills than now, because their buildings are not energy efficient. To switch to consumption-based billing, buildings need to undergo energy efficiency works and a tariff reform must be considered.

This action aims to improve the energy efficiency of existing residential buildings and promote self-consumption renewable energy through a combination of analysis (i.e. investment-grade energy audits) followed by investments including:

- Renovation of residential buildings to increase their energy efficiency namely insulating the building envelope, replacing windows and doors, heating improvements, efficient lighting and green solutions such as green roofs.
- Encouraging users to connect to the district heating system.
- Introduction of individual consumption metering for district heating and consumption-based billing.
- Small-scale renewable energy sources such as photovoltaics, solar water heaters or heat pumps, to cover at least 10% of the energy consumption.
- Encouraging the use of efficient appliances and equipment in residential buildings.
- The action also aims to promote non-energy measures such as connection to sewage network, drainage, asbestos roofs replacement, ventilation systems improvements, etc.

It is aimed that the rehabilitated buildings improve their indoor air quality and energy certification, according to EU EPBD framework, in a minimum of two levels and reduce their energy consumption in more than 35%.

The action consists of the development and implementation of a deep retrofit plan using own capital, credit lines or via alternative financing schemes such as on-bill finance in partnership with the utilities company for financing eligible residential energy efficiency improvements.

The dedicated working group for the energy efficiency in public buildings programme will coordinate this action. The group, as previously defined, includes representatives from different departments of the Municipality (legal, economic, urban planning, technical, energy).

The selection of the buildings for refurbishment will be based on interest expressed by tenants in a survey conducted by the Municipality and housing associations with priority given to buildings with higher consumption and larger heating areas.

The Municipality will stimulate the rehabilitation works by providing support to homeowners and homeowners associations via a one-stop-shop. The one-stop-shop will showcase technologies, materials and evidences of successful rehabilitations and promote existing local and national incentives and the adoption of financing schemes such as on-bill finance.

Legal and policy framework

- **The Sustainable Energy and Climate Action Plan for Bălți**
- **The Energy Efficiency Law**
- **The Law on the Energy Performance of Buildings**
- **The ANRE/national regulation on for renewable energy projects and FIT**

Implementation steps

1. Develop a regulation specific for housing units with regards to the process of transition from public to private property, where needed [2022-2023].
2. Promote the survey for the selection of the buildings to be refurbished.
3. Outsource the development of a feasibility study and Terms or Reference (ToR) for rehabilitation and modernization of the residential buildings and set up an implementation plan. Identify and assess financing opportunities based on ownership (buildings owned by the Municipality or privately owned). The ToR will include, among others the definition of the business model, minimum performance indicators and eligibility criteria. [2023]
4. Develop a municipal one-stop-shop supporting homeowners and homeowner associations with technical information, available funding and providing incentives.
5. Outsource the renovation works according to the implementation plan and business model adopted. Renovation of residential apartment blocks could be done in batches and with the involvement of different entities such as the district heating company [2023-2027].
6. Monitor implementation and evaluate performances. Conduct information and awareness campaigns to promote energy efficiency in buildings [2025-2027].

Stakeholders

- Municipality of Bălți
- Communal Household Department
- Municipal Enterprise for Bălți residential and communal household
- Building Owners and associations
- Building users
- CET Nord
- Energy efficiency and technical providers

Cost estimate

Estimated CAPEX: 6,600,000 EUR

Feasibility study and Terms of Reference	85,000 EUR
Develop the One-Stop-Shop	15,000 EUR
Residential rehabilitation investments: 100,000 m^2 at 65 EUR/m^2	6,500,000 EUR

Source of financing: Private financing, municipal budget incentives

Estimated yearly OPEX: 462,000 EUR/year (including information and awareness campaign)

Environmental and economic benefits

- Increased energy efficiency of the residential buildings
- Improved public health due to avoided air pollution
- Increased life expectation of the rehabilitated buildings
- Better user comfort with positive health impacts
- Building owners, developers and investors are encouraged to invest in energy efficient renovations.
- Improved user controllability and awareness of the energy consumption due to individual consumption meters

Gender and social inclusion opportunities

- Local access to employment and business opportunities in the construction and energy sectors specialty in SMEs
- Include specific social inclusion and gender mainstreaming criteria for selection of potential buildings to be included in the programme
- Encourage women and local community-based organisations to participate in the consultation and the decision-making process related to the investments
- Analyse the needs of women and local community-based organisations and conduct an awareness campaign on promotion of energy efficiency measures

Smart and digital opportunities

- For the consumption-based billing a large-scale programme deploying smart metering will be required.

Action 14

Modernize and upgrade the district heating services

Contributing to

SO 1 SO 2

Total CAPEX
11,793,000 EUR

Estimated timeframe
2022–2026

E Energy B Buildings

Targets

- Modernisation of the DH network system
- 296 residential buildings will be targeted for DH modernisation

Scale and location

- The entire area of the City which has a DH network system and neighbouring areas as well.

Estimated annual savings

- GHG emissions savings: 4,736 tonnes of CO_2 / year
- Primary energy savings

Context and description

Buildings in Moldova account for about 45% of energy consumption and on average 75% of this energy is used for heating. The District Heating (DH) network covers 68% of the City of Bălți and provides mostly heating since only few consumers have access to both heating and hot water. Most of the heat energy from the district heating system in Bălți is obtained from natural gas, a fossil fuel that can be considered more environmentally acceptable in comparison with coal or other fossil fuels. In addition, a small-scale biomass boiler has been installed recently as part of an EBRD project. Nevertheless, a cost-effective centralised heat generation system brings efficiency benefits when compared to decentralised boilers, creating additional opportunities for emissions reduction and in general diverting emissions from the household level. This is the rationale driving CET Nord, the DH company in Bălți, in the engagement of consumers and in encouraging citizens to connect to the centralised DH system.

This comprehensive action contains two components with several measures aiming to increase the energy efficiency of the DH system and decreasing the overall GHG emissions associated with heating consumption in Bălți, namely:

Component a)

- Supply and installation of individual heating sub-stations for the tallest 161 blocks of flats which are currently connected to the DH system. This will target the most energy intensive buildings, to achieve highest results for energy consumption reduction.
- Construction of horizontal networks in 296 residential buildings equipped with individual heating sub-stations for heating and hot water. This network system will allow consumers to adjust their

consumption, using thermal control dampers and individual heat meters. The individual heat meter will allow remote metering.

- Construction of heat storage tank (700 m^3) to maximize the number of customers who will receive domestic hot water during the summer.
- Modernization of water treatment plants to produce steam and additive water for the DH network. Improving water quality with improved demineralization units will reduce the steam treatment rate from 8% to 4%. 13% of the volume of additional water will be saved after the implementation of the PIP (11,300 m^3 / year: 9.5% based on the modernized water treatment system and 3.5% due to the renovation of secondary networks in buildings).
- Implementation of digital tools for network operation and planning: SCADA for the DH network and supply of the hydraulic model. A first step of a new DH smart grid will be implemented to generate and process information in the field to improve the data collection record keeping within the system. The physical parameters (pressure, temperature, flow etc.) measured in the key points of the DH system (pumping station, critical points of the network) will be monitored in real time by means of an alarm system. Data collected at individual heating points will monitor service quality (temperature) and commercial information (heat meter index, allocation between space heating and domestic hot water). A hydraulic model will also be developed to perform technical analyses to extend the central DH system to the neighbouring areas, to better understand the weaknesses of the system, and to be able to fix these in real time.

Component b)

- Developing the Local Strategy for District Heating. This strategy will be developed and approved by the Municipality, in partnership with CET-Nord.
- Given the fact that the network is old, most of the pipes are not insulated and there is a huge opportunity for decarbonization, we plan to initiate the rehabilitation, modernization, and expansion of the network including the replacing of existing old transmission and distribution pipes with pre-insulated pipes, replacing the existing compensators and bellows; mounting ball valves; and installing monitoring systems. To evaluate the impact, a feasibility study must be conducted.
- The mentioned feasibility study will also analyse the ability to utilise or integrate lower temperature sources of renewable or waste heat in the near future.

CET Nord will lead the implementation of this action. From the Municipality the action will be overseen by the dedicated working group for the energy efficiency in public buildings programme. A cooperation protocol will be signed between the two entities in order to maximise the outcomes of the Local Strategy for District Heating.

Legal and policy framework

- **The Sustainable Energy and Climate Action Plan for Bălți**

- The Energy Efficiency Law
- The Law on the Energy Performance of Buildings Law

Implementation steps

Component a)

1. Finalise financing scheme and contracts based on the existing feasibility study for the measures included in the component a) [2022].
2. Outsource the modernisation works according to the feasibility study. This includes preparation of the ToR / acquisition documentation, based on the previously performed feasibility study [2022].
3. Perform modernization works according to the implementation plan [2022 - 2026].
4. Train operating personnel to operate the new SCADA system and digital components included in the works [2024-2026].
5. Conduct an information campaign for building users [2022 - 2026].
6. Monitor implementation and evaluate performances. Conduct information and awareness campaigns to promote project results [2026].

Component b)

1. Develop a feasibility study for the network rehabilitation, modernisation and expansion. This study will analyse the ability to utilise or integrate lower temperature sources of renewable or waste heat [2022 – 2023].

Stakeholders

- CET Nord
- Building Owners and associations
- Communal Household Department
- Architecture and Urban Planning Department
- Municipal Enterprise for District Heating
- Building Users

Cost estimate

Estimated CAPEX: 11,793,000 EUR

Measures a)	
Installation of individual heating sub-stations for the tallest 161 blocks of flats	2,900,352 EUR
Construction of horizontal networks in buildings for 296 residential buildings equipped with individual heating sub-stations for heating and hot water	7,254,585 EUR

Heat storage tank	588,000 EUR
Modernization of water treatment plants to produce steam and additive water for the SACET network	420,000 EUR
SCADA system	250,000 EUR
Thermo-Hydraulic model	80,063 EUR
Measures b)	
Local Strategy for District Heating	100,000
Feasibility study	200,000 EUR

Source of financing: CET Nord, EBRD Loan, GCF, Investment Grants

Estimated yearly OPEX: 590,000 EUR/year (including information and awareness campaign)

Environmental and economic benefits

- Increased energy efficiency of the network will reduce the operational costs of the DH system
- Increased resilience of the DH network
- Better user comfort with positive health impacts

Gender and social inclusion opportunities

- Access to employment
- Promote women and local community-based organisations to actively participate in the consultation process related to modernisation of district heating
- Conduct awareness raising campaigns for explaining the advantages and benefits offered to citizens by the central district heating system

Smart and digital opportunities

- SCADA management system
- Individual heat smart meters at substation level
- Automation for water sampling and analysis, especially for steam production

Action 15

Promoting large-scale RES through investments

Contributing to

SO2 SO4

Total CAPEX
530,000 EUR

Estimated timeframe
2024–2026

E Energy B Buildings

Targets
- Increase the total volume of investment in RES

Scale and location
- Bălți and surroundings

Estimated annual savings
- N/A

Context and description

The Republic of Moldova is highly dependent on external resources for energy, resulting in accentuated instability of the energy prices. Accordingly, to IRENA in 2020 Moldova had installed capacity of 5 MW in Solar and 35 MW in Wind (with a total capacity of 2,944 MW of which 96% are non-renewable). In Bălți electricity relies on limited production sources. The major producer is the CHP plant operated by CET-Nord SA.

The renewable energy market is regulated by the National Agency for Energy Regulation of the Republic of Moldova (ANRE), an independent authority established to introduce market mechanisms in the energy field while protecting consumer and investor interests. It issues licences, regulates fuel and power prices, and establishes energy pricing principles and methodologies for calculating tariffs, including for renewables' support mechanisms through secondary legislation. Under this role, ANRE approved a 15-year feed-in tariffs (FITs) for renewable energy projects with a generation capacity of no more than 1 MW, however larger projects must be authorized and, in some cases, compete in auctions.

This action refers to the elaboration of five feasibility studies on the potential for implementing large-scale renewable energy projects in Bălți and surroundings, for both electricity and heat production. Its results will lead to investments through public funds provided by the Energy Efficiency Agency and/or private funds and investors' involvement. This action will encourage the Municipality to invest and access funding for green technologies to generate energy, both electricity and heat, which produces no greenhouse gas emissions from fossil fuels and reduces air pollution, via the lunch of a pilot ranging from 1 to 6 MW of renewable energy power.

Large-scale renewable energy sources are designed and backed by digital tools and platforms to increase renewable production. This action is also linked with actions 12 and 1 that aim the promotion of Power Purchase Agreements.

Legal and policy framework

- The Sustainable Energy and Climate Action Plan for Bălți
- The ANRE/national regulation on for renewable energy projects and FIT

Implementation steps

1. Develop five Terms of Reference (ToR) which will include all activities mentioned above. Assess ambition indicators and eligibility criteria for the contractor and include these in the Terms of Reference [2022].
2. Develop five feasibility studies for increasing the share of energy from renewable sources in the City and surroundings [2022].
3. Identify and assess financing opportunities, actions and other developing models and prepare public tenders [2023].
4. Launch a tender for the pilot project - 1 to 6 MW RES project - [2024].

Stakeholders

- Mayor's Office
- Local authority departments and municipal enterprises
- CET Nord
- DSOs and utilities companies

Cost estimate

Estimated CAPEX: 530,000 EUR

Development of 5 ToR for the feasibility studies	30,000 EUR
Develop 5 feasibility studies	500,000 EUR

Source of financing: Municipality, Donors, IFIs, government FITs

Estimated yearly OPEX: N/A

Environmental and economic benefits

- Increased renewable energy used in Bălți reducing dependence on imported fuels
- Air quality improvement due to green technologies which produce no global warming emissions
- Improved public health due to avoided air and water pollution
- Diversifying energy supply and reducing dependence on imported fuels
- Creating economic development and skilled jobs in manufacturing, installation and maintenance of RES
- Achieving local policy goals

Gender and social inclusion opportunities

- The consultation process related to the development of the feasibility studies will be gender and socially inclusive. The municipality will strive for understanding the needs of different groups of potential beneficiaries and will actively consult with the representatives of local community-based organisations
- The feasibility studies will also assess and address the social co-benefits and gender mainstreaming aspects.

Smart and digital opportunities

- New renewable power plants rely on the digitalization of the energy services

Action 16

Energy efficient street lighting programme

Contributing to

SO 1 SO 2

Total CAPEX
1,665,000 EUR

Estimated timeframe
2022–2026

E Energy B Buildings

Targets

- Improved light quality during the night
- Increased pedestrian/cycling traffic
- Increased coverage of public lighting in the city
- Reduced energy consumption of the old street lighting systems
- Increased level of safety perceived by citizens

Scale and location

- Street lighting system within the city boundaries, mainly where street lighting is not available or it is insufficient, or where such systems are inefficient, in public areas, including pedestrian zones and parks

Estimated annual savings

- N/A

Context and description

Public lighting in Bălți is in some cases old, inefficient and in many cases insufficient. Currently there are 7290 lamps. A high share of these have been changed to LED lights recently, through three investment programmes developed between 2019-2020 for the extension and upgrade of the public lighting network. Even so, there are many public areas with insufficient lighting levels or green areas which have no public lighting. Thus, further investments are necessary in order to secure a sufficient lighting level and a safe environment for all citizens in Bălți.

This action envisages the implementation of a large-scale programme aiming for the replacement and improvement of the public lighting network including, amongst others, high efficiency street lighting and traffic lights, dedicated lighting for pedestrian crosses, public lighting in green areas and parks. The project will consider the national legislation and norms and the use of best available technology, namely light-emitting diodes ("LED") supported by smart control solutions such as smart lighting control systems (dimming) and possibility to integrate different sensors and systems (e.g. mobility, air quality, etc.).

Implementation will be based on a feasibility study and plan replicating best practices in procuring performance-based design, financing, installation, operation and maintenance of energy efficient solutions. Where possible, new ways of finance with a focus on third party finance and performance contracts will be considered.

The rehabilitation works will include the following components:

- Centralised remote-control centre for the street lighting network (to control, among others, energy consumption or dimming schedules).
- Smart monitoring solutions (allowing the dimming and centralized monitor and control).
- Retrofit of the existing outdated streetlights with best available energy efficient technology, namely LED fixtures.
- Additionally, the action will include the replacement of the deteriorated poles, anchorage and cables (replacing for underground, where feasible).

Where street lighting is not available or it is insufficient, new/upgraded street lighting network will be installed following norms (e.g. CEN TR/EN 13201 'Road Lighting' standard) and state-of-the art requirements.

This action will be overseen by a working group that includes representatives from different departments of the Municipality (legal, economic, urban planning, technical, energy, road maintenance) and from local Distribution System Operators (DSOs). They will be responsible for developing tenders (which could range from public private partnerships to innovative financial schemes), setting minimum performance indicators for outsourced contractors and supervising the implementation of the programme.

Where feasible, as mentioned, an integrated smart cities approach must be considered. For instance, the ToR for the acquisition and installation must allow, where feasible, the use of LED fixtures and poles for other services such as air quality monitoring, electrical vehicle charging, or 5G. Also, the ToR must define standards and communications protocols in order to allow the integration and connectivity of different elements and systems.

As the main objective of this action is to secure sufficient lighting levels in public areas across the city, according to national and best practice standards, the result will not be directly linked to energy savings or emissions reductions, but to public safety and security.

Legal and policy framework

- **The Sustainable Energy and Climate Action Plan for Bălți**
- **The Energy Efficiency Law**

Implementation steps

1. Launch a working group to oversee energy investments [2022].
2. Develop a feasibility study and implementation programme for the rehabilitation of the public street lighting system. The plan should identify target areas and assess financing opportunities [2023].
3. Outsource the modernization and rehabilitation works for the public lighting system. This includes preparation of the Terms of Reference (ToR) / acquisition documentation. The ToR should include minimum performance indicators, eligibility criteria and business models [2023].

4. Perform renovation and modernization works according to the implementation plan [2024-2026].
5. Train administrative personnel how to operate and manage the public lighting system and smart control centre [2026].
6. Monitor implementation and evaluate performances. Promote results through information campaigns [2026].

STAKEHOLDERS

- Mayor's Office
- NGOs
- Local authority departments and municipal enterprises
- Lighting and technical providers

COST ESTIMATE

Estimated CAPEX: 1,665,000 EUR

Feasibility Study and Implementation Plan	20,000 EUR
Construction and implementation of new lighting fixtures (1,500 fixtures)	1,125,000 EUR
Improving and retrofitting existing lighting fixtures (2,000 fixtures)	360,000 EUR
Control centre and smart infrastructure (covering 30% of the retrofitted/ new network)	150,000 EUR

Source of financing: Municipality, Donors, IFIs, National funding from the Energy Efficiency Agency, Energy Companies

Estimated yearly OPEX: 50,000 EUR/year (including information and awareness campaigns)

Environmental and economic benefits

- Increased energy efficiency of the public lighting systems
- Reduced maintenance costs
- Increased road and public safety
- Improved street lighting controllability through control centre and system monitoring solutions.

Gender and social inclusion opportunities

- Consult with women and community-based organisation on the current level of performance of the public lighting system and understand their expectations for future improvements
- Consider safety and security aspect when designing and implementing new public lighting facilities. The protection of women, children, elderly, people with disabilities would be an important criteria used when working on improving the street lighting and lighting of parks, pedestrian areas and other leisure areas.

Smart and digital opportunities

- Use of smart monitoring and control systems
- Initial step for an integrated smart cities approach, by installing lamp poles with smart monitoring sensors

I Industry

Short-term actions

Action 17

Implementation of an environmental monitoring system at city level

Action 18

Cooperation platform at local level for green industrial development

Long-term actions

- Promotion and support for green and smart economic activities via fiscal incentives
- Specific tariffs for wastewater based on the pollutants charging level
- Support for attracting investors for circular economy activities / production from secondary materials

Action 17

Implementation of an environmental monitoring system at city level

Contributing to

SO 3 SO 1

Total CAPEX
200,000 EUR

Estimated timeframe
2022–2025

Industry

Targets

- Working group established at municipal level and regular meetings
- At least 10 air quality monitoring stations installed in the first two years of GCAP approval
- At least 20 air quality monitoring station and 3 water quality monitoring stations installed in the first 5 years of GCAP approval

Scale and location

- Municipality of Bălți
- City-wide

Estimated annual savings

- N/A

Context and description

In the municipality of Bălți, the monitoring capacity of the environmental factors is significantly reduced.

Data regarding air quality is regularly monitored in only two locations in the city, while water and soil quality data is for the most part inexistent. Reliable data is needed to determine what are the shortcomings and what can be done to mitigate them, as well as to inform decision makers, urban planners and the general population on the environmental aspects of the city.

The action aims to enhance the monitoring of the environmental factors in the city through a strong collaboration between the Municipality and the Alecu Russo University, Faculty of Science, Economics and Environment. The action proposes the establishment of environmental monitoring points throughout the city and have them managed and cared for by the University. In turn, the University would have the chance to provide practical training and research possibilities for students and teaching body. The existence of an

environmental department within the University enables continuous stewardship for the environmental monitoring network, providing the necessary influx of students that could oversee the monitoring capabilities and gradually improve network performance.

This action will be implemented city wide, with air quality monitoring stations being first located in the vicinity of industrial sites, along main transport routes, as well as in residential areas to assess baseline exposure for population.

The action includes the establishment of environmental monitoring research programmes at the Faculty of Science, Economics and Environment that would benefit the entire city. The development of the action should be sectioned in 3 phases, one for each environmental factor (air, water and soil).

Air quality monitoring should be implemented in the first phase of the action, within 5 years of GCAP approval. Air quality sensors could be first installed in areas where the street lighting network is being rehabilitated, as they would need connection to electricity. Parameters monitored should include routine pollutants in the city, such as PM2.5, PM10, NOx, SO2, O3, CO as well as industrial pollutants such as formaldehyde and VOCs. In addition, the air quality monitoring sensors/stations should also measure ambiental parameters such as temperature, pressure, humidity, but also noise levels to detect problematic noise pollution areas within the city.

Legal and policy framework

- **Government Decision no. 160 of 21.02.2018** regarding the approval of the Green Economy Promotion Program in the Republic of Moldova 2018-2020 and its Action Plan sets several objectives to reduce the impact on air quality.

Implementation steps

1. Municipality to organize a working group for environmental monitoring within the city, comprising members form the environmental department of the Alecu Russo University, the environmental protection inspectorate, the ITC, representatives of the industrial sector.
2. Establish together with the working group the locations and technical requirements for setting up the air quality sensors and online database for data collection.
3. Assign roles and responsibilities for network monitoring, data acquisition and analysis through an Air Quality Monitoring Plan and memorandum, to which all parties commit to.
4. Identify financing lines and roll out procurement services for sensor purchasing and setting up database with automatic data collection.
5. Install sensor network in selected locations and connect to remote data acquisition system.

6. Monthly analysis of collected data and reporting to municipality and environmental protection inspectorate, as well as the general public, on municipality website and apps, as well as on platform developed in Action 18.
7. Working group to meet annually to assess the performance of the sensor network and analyze opportunities for expansion to other areas and other media (e.g. surface and groundwater).

STAKEHOLDERS

- Municipality of Bălți
- Alecu Russo University, Faculty of Science, Economics and Environment
- Environmental Protection Inspectorate
- Bălți Information Technology Center (ITC)
- NGOs
- Industrial companies

COST ESTIMATE

Estimated CAPEX: 200,000 EUR

Air quality monitoring stations – 10 stations / 500 EUR – 6,000 EUR per station, depending on sensors included	60,000 EUR
Setting up remote data collection system and database, plus software	140,000 EUR

Source of financing: Municipality, National Government, IFIs

Estimated yearly OPEX: 20,000 EUR

Environmental and economic benefits

- Informed based decision making on where to address stringent needs to develop green infrastructure to mitigate air pollution
- Identification of main pollution sources within the city
- Public health benefits when taking targeted measures to reduce pollution
- Evidence of functioning of measures implemented throughout the city to improve air quality.

Gender and social inclusion opportunities

- The actions developed through the action should provide equal applied research (i.e. air monitoring sensors) opportunity to the students regardless of gender.
- Scholarships programs for students that want to further develop their research projects.
- Encouraging students to participate at technical/applied research projects
- Equal rights to live in good air quality ensured for all citizens.

Smart and digital opportunities

- Smart and digital solutions to be employed for data acquisitions (electronic sensors for all parameters measured), remote data acquisition and online database for data storage and analysis.

Action 18

Cooperation platform at local level for green industrial development

Contributing to

SO 4

Total CAPEX
300,000 EUR

Estimated timeframe
2022–2026

Industry

Targets

- Annual forum held (100 participants), two job fairs/year held (200 participants each)
- 300 unique visits on platform in first month after deploying, 5% monthly increase in first year, 10% annual improvement

Scale and location

- Municipality of Bălți
- City-wide

Estimated annual savings

- N/A

Context and description

This is a local initiative action for easing cooperation, share of good environmental practices and identify synergies among local industry, the municipality and other local or regional stakeholders.

The action aims at promoting green and well performing industries already present in Bălți, but also increasing investment in non-polluting industries which can drive the local economy, prevent "brain drain" from the city and actively support the green development of Bălți and job market integration of Bălți University alumni.

As part of this action, an online platform is developed to include industry, local authorities, financing institutions, environmental authorities at all relevant levels, the University, technology providers and other relevant stakeholders. The platform should showcase top performers in terms of sustainability regularly and offer resources and guidance to ease green business development at local level, including facilitating job posting/candidate search for selected industries.

The action is to be implemented city-wide, with outreach also to regional, national or international companies, as well as financing institutions with an agenda focused on green development, circular economy and green jobs. The platform is to be implemented online, with regular live events such as an annual forum of green industry, regular job fairs, regular media coverage, as well as targeted training sessions.

Legal and policy framework

- This action is in line with **North Regional Development Strategy (SDR) 2016-2020**, as well as the **Green Economy Promotion Programme of Moldova 2018 – 2020** and its Action Plan. The most relevant policy for this action is perhaps the Innovation Strategy of the Republic of Moldova for the 2013–2020 period.
- A local policy document at the city level promoting green or sustainable industrial practices or incentivizing circular economy is yet to be adopted but would be beneficial in guiding future investments.

Implementation steps

1. Develop online platform concept according to local context and needs.
2. Set up platform and prompt all stakeholders not yet involved to join.
3. Organize monthly online meetings among participants to catch up on new developments and set short- and medium-term goals, plan events.
4. Set period for annual forum and job fairs, advertise on platform.
5. Organize forum and job fairs at set dates, ensuring adequate promotion and media coverage before and during events.
6. Regular monitoring and annual evaluation of progress set goals and targets for next planning period.

Stakeholders

- Municipality of Bălți
- Alecu Russo University, Faculty of Science, Economics and Environment
- Environmental Protection Inspectorate
- Bălți Information Technology Center
- NGOs
- Industrial companies
- Technology providers

COST ESTIMATE

Estimated CAPEX: 300,000 EUR

Develop online platform	100,000 EUR
Organize forum and job fairs (2 forums and 4 job fairs in the first 2 years)	200,000 EUR

Source of financing: Municipality, National Government, IFIs, private sector

Estimated yearly OPEX: 10,000 EUR (for platform maintenance, promotion and media coverage before and during events)

Environmental and economic benefits

- Environmental benefits: local industry well performing in terms of environmental criteria to see increased productivity and visibility as a result of participating in the developed platform, better-qualified personnel as a result of job fairs and training sessions
- Economic benefits: increased economic activity in the city, reduced costs with public health as a result of less polluting industry, better qualified working force as a result of training, internships and local workforce harnessed from the University

Gender and social inclusion opportunities

- Platform to highlight fiscal incentives for industry employing less advantaged social groups
- Forum, job fairs and other events to be mindful of and possibly have dedicated sections for gender and social inclusion promotion in industry

Smart and digital opportunities

- Online job fairs and exhibitions/marketplace could be hosted on the platform
- Online one-stop-shop for information on what is needed to set up a green business in Bălți

W
Water

Short-term actions

Action 19
Investment program for the rehabilitation, modernization and expansion of the drinking water distribution network

Action 20
Rehabilitation, modernization and expansion of the rain water and sewerage collection and treatment

Action 21
Urban drainage and sewerage infrastructure maintenance program

Action 22
Permeable infrastructure and sustainable urban drainage systems

Long-term actions

- Upgrading and usage of GIS data system for monitoring the drinking and wastewater distribution networks
- Development and implementation of a social tariff for ensuring an equitable access to water resources for all categories of vulnerable persons
- Smart solutions for flood prevention
- Natural solutions for pre-treatment and/or treatment of industrial wastewater
- Upgrading of blue-green infrastructure and future development of all these components at neighbourhood level

Action 19

Investment Program for the rehabilitation, modernization and expansion of the drinking water distribution network

Contributing to

SO 1 SO 2

Total CAPEX
19,150,000 EUR

Estimated timeframe
2022–2026

Targets

- Within 12 months after GCAP approval: development of an investment plan, including a timeline, budget, and prioritization and involving all the responsible parties
- Within 2 years after GCAP approval: approval of investment plan and timeline by responsible parties
- Within 3 years after GCAP approval: start implementation of investment program
- Review of investment plan every 2 years

Scale and location

- Municipality of Bălți
- City-wide

Estimated annual savings

- 50% reduction of non-revenue water on average after rehabilitating the entire network

Context and description

The water supply service is provided by the Municipal Enterprise Regia „Apă-Canal" Bălți. Water in Bălți city is supplied through the centralized system from surface water, the Dniester River, by means of the Soroca-Bălți aqueduct managed by state company Acva-Nord. During 2011-2012, the Bălți Free Economic Zone was connected to municipal utilities such as water, sewerage, electricity. During this project, 1.45 km of aqueduct was constructed. In the same period, 1.84 km of aqueduct was constructed in the Bălțiul Nou neighbourhood as well.

In addition, the Municipal Enterprise Regia „Apă-Canal" Bălți manages approximately 60 deep wells in the city area, which serve as reserve for water abstraction in case of breakdowns at the water treatment plant located in the town of Soroca. Also, the deep wells of Moldova railways are on the balance of the water utility company. Currently, all the deep wells are in reserve, except for the Bălțiul Nou neighborhood,

where there are no technical possibilities to deliver water from the Soroca-Bălți aqueduct. It can be assumed that the deep well infrastructure is obsolete and needs modernization. There are several business entities using water from unauthorized deep well drilling (in Bălți the volume of wastewater is approximately 2 times the volume of invoiced water). Enterprises are fined, but the situation remains generally unchanged.

The wear degree of existing water supply pipelines is very high (55-60%), causing quality issues and relatively large leaks in water supply networks. Only half of the supplied water is billed, the rest accounts as losses. Due to a lack of investments, in the last two years the utilities company performed only urgent repairs to the water supply systems. A recently developed feasibility study, though being focused on selected districts of the municipality, could be of use when implementing this action, as it gives a general description about the status of the water supply services and infrastructure.

The quality of drinking water is an area of concern in Bălți, with the percentage of drinking water samples which are compliant with national quality standards being well below 40% in the last five years for which data was available, showing a need for urgent action in the water sector. Monitoring of drinking water quality is provided by the water supplier (Apa-Canal Bălți has its own certified laboratory), the National Agency for Public Health, and the National Agency for Food Safety (the quality of drinking water used by food businesses). According to the Apa-Canal Bălți, the quality of the drinking water when exiting the treatment plant in Soroca complies with the standards of the Republic of Moldova. The water from the Soroca-Bălți aqueduct flows gravitationally to the clean water tanks with the volume of 12,000 m^3 and, further, through 2 water pipes it is delivered to the city. No further treatment/chlorination is applied. It seems any contamination and poor quality at the point of consumers is due to old infrastructure further down the line from the water treatment plant.

Water consumption is a complex indicator to calculate, taking into consideration that in Bălți municipality, like in many areas in the country, water is not only supplied through the centralised system but also through neighbourhood wells and individual wells, for which consumption is not metered and quality is not routinely checked. Thus, although the indicator values for water consumption/capita are in the red benchmark, the confidence level in this indicator is rather low. This is also reflected in the losses of water and other core and optional water related indicators in the database.

To respond to these challenges, an investment program for the rehabilitation, modernization and expansion of the drinking water distribution network will be designed and implemented. The Investment Plan will include, but not limit to, the following elements:

- **Inspection plan for the water supply network** (wear degree, leaks, corrosion etc.)
- **Making up an inventory of the types, diameters and condition of the existing pipelines** (wear degree, leaks, congestion, corrosion) and risk mapping

- **Investment plan for the expansion of the drinking water distribution network** to provide the population access to clean drinking water, with prioritization schedule:
    - Evaluate the need for a Soroca-Bălți aqueduct expansion
    - City-wide expansion of the pipe connection system to the Soroca-Bălți aqueduct and modernization of its network
    - Resolve missing links in distribution network
    - Prioritize investments in areas which are more critical based on risk map
    - Investments to detect and reduce water losses in pipes
    - Rehabilitation of old pipe infrastructure causing contamination of drinking water and/or use of disinfection processes
    - Modernization of deep well infrastructure

Legal and policy framework

- **Law on water supply and wastewater public services no. 303 of 2013** defines the conditions for the establishment, organisation, management, regulation and monitoring of raw and drinking water supply, as well as for industrial and domestic wastewater treatment. This is a key document assigning responsibility of public water and sewerage systems to local public administration.
- **Water Supply and Sanitation Strategy (2014-2028)** - This strategy focuses on the development of water supply and sanitation plans (master plans), as well as feasibility studies to attract investments in the water sector. The actions specified in the Strategy require major financial resources.
- **Regional Sector Programme on Water Supply and Sanitation:** Development Region North (2015-2020), aiming at developing sustainable projects and investments in the water sector at regional and local level. One of the main goals is to provide access of the population to improved water supply sources.
- **Local Environmental Action Plan (2017-2020)** which includes specific objectives for improving water supply, such as: development of the information system for collecting, systematizing, improving and disseminating information on drinking water and treated wastewater quality, in accordance with European reporting; increasing access to drinking water; extension of the connection system to the Soroca-Bălți aqueduct and modernization of its network at the municipal level (target is not quantified: % of the population connected to the aqueduct).
- **Sustainable Energy and Climate Action Plan for Bălți (2016-2030),** including the long-term investment: Replacement of water distribution network for Bălți Municipality (estimated investment 35,834,126 EUR).

IMPLEMENTATION STEPS

1. Make an inventory of the existing water supply system and the current condition based on the inspections of the pipe network and drafting of a water balance using company-owned water meters and district metering areas.
2. Perform a study to identify the needs and potential for the expansion, modernization and rehabilitation of the water supply system in the municipality of Bălți, including a risk mapping based on the inspections of the pipe network and water balance.
3. Perform an affordability analysis and tariff reform strategy.
4. Elaborate the detailed technical designs of the proposed investments.
5. Develop an investment plan for the expansion, modernization and rehabilitation of the water supply system of the municipality, including a timeline, procurement documentation, budget, and prioritization and involving all the responsible parties.
6. Start implementation of the investment program within 3 years after GCAP approval.

STAKEHOLDERS

- Municipality of Bălți
- Regia Apa-Canal Bălți Municipal Enterprise

COST ESTIMATE

Estimated CAPEX: 19,150,000 EUR

Inventory of the existing water supply network	50,000 EUR
Study to identify the needs and potential of the expansion, modernization and rehabilitation of the water supply	50,000 EUR
Affordability analysis and tariff reform strategy	50,000 EUR
Detailed engineering design for identified expansion, modernization and rehabilitation needs	900,000 EUR
Development of investment plan and procurement documentation	100,000 EUR
Replacement and expansion of water supply network for Bălți Municipality	18,000,000 EUR

Source of financing: Municipality, National Government, IFIs

Estimated yearly OPEX: 60,000 EUR

Environmental and economic benefits

- Improved access to drinking water
- Improved drinking water quality
- Risk for human health related to water quality is eliminated
- Reduced (unauthorized) water uses from deep wells reduces pressure on water resources

Gender and social inclusion opportunities

- Ensure access to safe drinking water to all citizens
- Access to employment
- Awareness raising campaign on water savings, water usage and water pollution aspects – the design of the awareness campaign will consider gender aspects.

Smart and digital opportunities

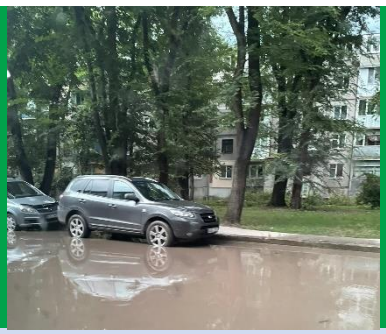
- SCADA system to be implemented
- Smart metering

Action 20

Rehabilitation, modernization and expansion of the rainwater and sewerage collection and treatment

Contributing to

SO 1



Total CAPEX
38,100,000 EUR

Estimated timeframe
2022–2026

W
Water

Targets

- Within 12 months after GCAP approval: development of an investment plan, including a timeline, budget, and prioritization and involving all the responsible parties
- Within 2 years after GCAP approval: approval of investment plan and timeline by responsible parties
- Within 3 years after GCAP approval: start implementation of investment program
- Review of investment plan every 2 years

Scale and location

- Municipality of Bălți
- Particularly areas without wastewater collection

Estimated annual savings

- 50% reduction in infiltrations in the wastewater network after rehabilitating the entire wastewater collection system

Context and description

The wastewater collection network is very old. It was built between 1973–1976 and 80% of it is obsolete. It was made with reinforced concrete (bigger diameter) and ceramics (smaller diameters), but it is so deteriorated and fragile now that it is effectively crumbled in some places (e.g. Kiev and Sorocii streets). Only the asphalt layer prevents those streets from crumbling and traffic in the area has been restricted. The wear degree of existing pipelines is very high (55-60%), causing quality issues and large leaks in sewerage systems. Due to the lack of investments, in the last two years only urgent repairs to the water supply and sanitation systems were performed. Both wastewater collection and wastewater treatment services in Bălți city have been commissioned to the "Glorin Inginering" Ltd. for a period of 49 years. The concession was due to the advanced depreciation of the wastewater system, wastewater treatment plant and the lack of available funds in Bălți municipality.

City districts Dacia and Bălții Noi have limited or no access to wastewater services. Illegal wastewater discharge into the Răut and Răuțel rivers is often frequented by laundries in the area, but also by the inhabitants of these regions. The latter, not being connected to the sewer system, are forced to evacuate it into the river.

Rainwater collection network

The rainwater drainage system also needs improvement and is not covered by policies and actions. There is no widespread rainwater collection system. Only some areas have such system in place, which directs the collected rainwater towards the river without any treatment. The existing rainwater collection system is poorly designed and/or unmaintained, leading to flooding in the city in case of heavy rains. Therefore, the capacity of the collection systems may need to be increased, in addition the implementation of sustainable drainage systems (SUDS) will help to reduce the flooding of the existing collection systems and of the city. The focus of this action - regarding rainwater management - will therefore be on the development of bluegreen networks and implementation of nature-based solutions (SUDS), instead of (traditional) grey infrastructure. The city of Bălți will therefore start up with a pilot project on SUDS. More information on SUDS is included in action 22.

Wastewater treatment

The existing wastewater treatment plant in Bălți performs both mechanical and biological treatment and has an installed capacity of 60k m^3 per day. On dry days it receives approximately 18k m^3, while on rainy days the amount of influent reaches 32k m^3. Although there are separate networks for stormwater and sewerage, the wastewater collection network is deteriorated and the high infiltrations of rainwater in the network are causing the rise of influent quantities on rainy days.

The city is planning to refurbish the existing obsolete wastewater collection network and expand it to areas which are not currently covered. This will lead to increased influent quantities, which might pose challenges for the capacity and performance capabilities of the current wastewater treatment plant.

Significant industrial activities are still present in the city, out of which many are discharging wastewaters towards the wastewater treatment plant. It is only the meat processing company that has a small waste-water pre-treatment plant. It is necessary to investigate whether other industrial activities pose a risk for the performance of the wastewater treatment plant and if its treatment capacity and efficiency would still be satisfactory with the expansion of the sewerage collection network.

Impact on water quality

Bălți is crossed by river Răut and its tributary Răuțel. The lack of a city-wide wastewater collection network has a negative impact on the surface water quality. Data available from a few annual reports issued by the State Hydrometeorological Service shows values exceeding red benchmarks for both upstream and even more so for downstream levels of Biological Oxygen Demand for Răut, the main water

course in Bălți. In case of ammonium (NH_4) samples, values upstream are in the uppermost level for the yellow benchmark, but for downstream samples the values in 2015 exceed the green benchmark more than 100-fold. This indicates that the quality of surface water is profoundly affected in a negative way by anthropic activities within Bălți and that wastewater is either not captured entirely or insufficiently/inefficiently treated before discharge in the river. The particular high levels of ammonium could indicate insufficient coverage or poor performance of the sanitation system and wastewater treatment plant.

To respond to these challenges, the following short-term measures have been identified:

- **Expansion, modernization and rehabilitation of the rainwater drainage system**
    - Investment in Sustainable Urban Drainages Systems (SUDS); it is most sustainable to maximally infiltrate rainwater, i.e. take measures at the source, rather than investing only in drainage**. See dedicated Action 22 – Permeable infrastructure and sustainable urban drainage systems**
    - Investment in the establishment of the main collectors, then connect the other areas to the main rainwater collectors, but consider that investment in SUDS will decrease needs for grey infrastructure
    - Prioritization of investments in areas with potential to reduce flood risks significantly
    - Multifunctional design of urban rainwater system (see Action 22)
    - Focus investments on natural water retention, infiltration, harvesting and storage with slow release (see Action 22) instead of drainage
- **Expansion, modernization and rehabilitation of the sewerage collection network**
    - City-wide expansion of the wastewater sewerage network and direction towards the municipal wastewater treatment plant. Investment in the establishment of the main collectors, followed by connecting the other areas to the main sewerage collectors.
    - Investments in connection of municipal wastewater and industrial wastewater to the sewerage collection network
    - Investments to reduce wastewater losses (leaks) in sewerage pipes
    - Prioritize investments in areas which are more urgent (e.g. negative environmental impact of wastewater discharges)
    - Investments to reduce harmful wastewater discharges into the rivers
- **Options analysis study for municipal and industrial wastewater treatment solutions**

- Investigate most suitable solution for treatment of wastewater from industrial and domestic sources. This could include micro-scale pre-treatment plants for industrial platforms, nature-based wastewater treatment stages for plant effluent not reaching compliance (aerated / reed lagoons, etc.)
- Investigate if with expansion of the sewerage collection system the capacity and efficiency of the existing wastewater treatment plant will be sufficient.

Legal and policy framework

- **Water Law no. 272 of 2011 creates the legal framework for water management,** water protection and water use partially harmonizing Moldova's legislation with the EU acquis. Specific regulations have been adopted to align water and wastewater treatment with international best practice:
  - Regulations on requirements for wastewater collection, treatment, and discharge into the sewage system and/or in water receiving bodies for urban and rural areas, approved by Government Decision no. 950/2013. It partially transposes the provisions of Council Directive No 91/271/EEC dated 21 May 1991 on urban wastewater treatment.
  - Regulations on conditions for wastewater discharge into water receiving bodies, approved by Government Decision no. 802/2013
- **Law on water supply and wastewater public services no. 303 of 2013** defines the conditions for the establishment, organisation, management, regulation and monitoring of raw and drinking water supply, as well as for industrial and domestic wastewater treatment. This is a key document assigning responsibility of public water and sewerage systems to local public administration.
- **Water Supply and Sanitation Strategy (2014-2028)** - This strategy focuses on the development of water supply and sanitation plans (master plans), as well as feasibility studies to attract investments in the water sector.
- **Regional Sector Programme on Water Supply and Sanitation:** Development Region North (2015-2020), aiming at developing sustainable projects and investments in the water sector at regional and local level. One of the main goals is to provide access of the population to wastewater collection services.
- **Local Environmental Action Plan (2017-2020)**
- **Sustainable Energy and Climate Action Plan for Bălți (2016-2030),** including the long-term investment: Replacement of water distribution network for Bălți Municipality (estimated investment 35,834,126 EUR).

Implementation steps

1. Make an inventory of the existing rainwater and wastewater collection system, and the current condition of the WWTP.
2. Perform a study to identify the needs and potential for the expansion, modernization and rehabilitation of rainwater and wastewater collection system in the municipality of Bălți, identify the needed investments in the wastewater treatment and identify opportunities for the implementation of SUDS (see also Action 22).

3. Perform an affordability analysis and tariff reform strategy.
4. Elaborate the detailed technical designs of the proposed investments.
5. Develop an investment plan for the expansion, modernization and rehabilitation of the rainwater and wastewater collection system and wastewater treatment of the municipality, including a timeline, procurement documentation and all the responsible parties.
6. Prioritize investments in rainwater and wastewater network (flood reduction, hazardous waste discharges reduction, etc.) - e.g. first establish the main sewerage collectors, then connect the side streets to the main collectors.
7. Start implementation of the investment program within 3 years after GCAP approval.

STAKEHOLDERS

- Municipality of Bălți
- Regia Apa-Canal Bălți Municipal Enterprise
- Communal Services department, Glorin Inginering SRL

COST ESTIMATE

Estimated CAPEX: 38,100,000 EUR

Inventory of the existing rainwater and sewerage collection network	50,000 EUR
Options analysis study for municipal and industrial wastewater treatment solutions	50,000 EUR
Affordability analysis and tariff reform strategy	50,000 EUR
Detailed engineering design for identified expansion, modernization and rehabilitation needs	1,800,000 EUR
Development of investment plan and procurement documentation	150,000 EUR
Expansion, modernization and rehabilitation of sewerage and rainwater collection networks	36,000,000 EUR

Source of financing: Municipality, National Government, IFIs

Estimated yearly OPEX: 120,000 EUR

Environmental and economic benefits

- Reduced flooding of the sewerage system (reduced flooding will result in lower repair costs)
- Climate resilience benefits
- Improved surface water quality (reduced wastewater discharges) will result in reduced human health costs
- SUDS is more cost-effective than grey infrastructure (lower investment and maintenance costs)
- Improved operational efficiency of the wastewater treatment plant will result in lower operational costs (when rainwater is separated from wastewater)

Gender and social inclusion opportunities

- Access to sewerage system for all citizens
- Access to employment
- Raised environmental awareness of the population

Smart and digital opportunities

- SCADA system
- Smart metering.

Action 21

Urban Drainage and Sewerage Infrastructure Maintenance Program

Contributing to

SO 1 SO 3

Total CAPEX
200,000 EUR

Estimated timeframe
2021–2025

W Water

Targets

- Within 1 year of GCAP approval: making up an inspection plan
- Within 2 years of GCAP approval: inspection
- Within 3 years of GCAP approval: inventory, risk mapping and action plan
- Within 4 years of GCAP approval: implementation of inspection and action plan
- Periodic update of inventory, risk mapping, inspection and action plan (e.g. update cycles of 7 years)

Scale and location

- Municipality of Bălți

Estimated annual savings

- N/A

Context and description

The existing rainwater drainage and sewerage collection system is antiquated and includes several portions of damaged infrastructure. Due to the lack of investments, in the last two years, the utility companies performed only urgent repairs to the sanitation systems.

Maintenance is an issue, as higher force pressure washing equipment has been acquired, but it is damaging the infrastructure. Another issue is the substances people use to unclog the sink drains, as well as wet wipes being thrown into the toilet. Both wastewater collection and wastewater treatment services in Bălți have been commissioned to the "Glorin Inginering" Ltd. for a period of 49 years. The concession was due to the advanced depreciation of the wastewater system, wastewater treatment plant and the lack of available funds in Bălți municipality.

The existing rainwater collection system is poorly designed and/or unmaintained, leading to flooding in case of heavy rains. An investment program for the expansion, modernization and rehabilitation of the

rainwater drainage system is included in the GCAP (see Action 20). The city of Bălți wants to implement Sustainable Urban Drainage Systems (SUDS) for urban rainwater management (see Action 20, 22). Therefore, there will be lower maintenance costs for grey infrastructure.

Maintenance program

To respond to these challenges, the following short-term measure has been identified: **Urban drainage and sewerage system maintenance program.** This action is complementary to the investment program for the urban drainage and wastewater collection network (see Action 20). The expansion, modernization and rehabilitation of the rainwater and wastewater collection network will be implemented gradually. The new pipelines will need a regular maintenance to prolong the lifetime and capacity of the infrastructure and prevent clogging or damage. Regular inspections and maintenance will also allow for timely interventions in areas with possible failure of the infrastructure.

The **maintenance program** will include:

- Making up an **inventory** of the types, diameter, and condition of the existing pipelines (wear degree, leaks, congestion, corrosion) (under Action 20)
- **Risk mapping** of the existing sewerage network, with periodic updates of the risk map
- **Pipe inspection plan:** pipe inspection methods may include camera-inspections, hydrostatic leak test, infiltration/exfiltration tests, etc.
    - Regular pipe inspections as part of a routine maintenance cycle to early identify areas of concern in the urban drainage and sewerage collectors (high wear degree, leaks, clogging, corrosion).
    - Targeted pipe inspections in areas of concern to identify problems
- **Pro-active maintenance plan** (predictive and preventive): routine maintenance cycles for urban drainage and sewerage systems to maintain a good condition of the infrastructure (longer lifetime)
- In addition to routine maintenance, a **customer education campaign** will be drafted and implemented, to promote good practices related to the management of FOG (fats oils and greases), cleaning solutions and un-flushable materials.
- **Corrective maintenance plan** (reactive, incl. emergency maintenance): conduct targeted maintenance in areas of concern (e.g. flood reduction, negative environmental impact of wastewater leaks)

Legal and policy framework

- **Water Law no. 272 of 2011 creates the legal framework for water management,** water protection and water use partially harmonizing Moldova's legislation with the EU acquis. Specific regulations have been adopted to align water and wastewater treatment with international best practice:
  - Regulations on requirements for wastewater collection, treatment, and discharge into the sewage system and/or in water receiving bodies for urban and rural areas, approved by Government Decision no. 950/2013. It partially transposes the provisions of Council Directive No 91/271/EEC dated 21 May 1991 on urban wastewater treatment.
  - Regulations on conditions for wastewater discharge into water receiving bodies, approved by Government Decision no. 802/2013
- **Law on water supply and wastewater public services no. 303 of 2013** defines the conditions for the establishment, organisation, management, regulation and monitoring of raw and drinking water supply, as well as for industrial and domestic wastewater treatment. This is a key document assigning responsibility of public water and sewerage systems to local public administration.
- **Water Supply and Sanitation Strategy (2014-2028)** - This strategy focuses on the development of water supply and sanitation plans (master plans), as well as feasibility studies to attract investments in the water sector.
- **Regional Sector Programme on Water Supply and Sanitation:** Development Region North (2015-2020), aiming at developing sustainable projects and investments in the water sector at regional and local level. One of the main goals is to provide access of the population to wastewater collection services.
- **Local Environmental Action Plan (2017-2020)** - includes the extension of the drainage network

Implementation steps

1. Making up an **inspection plan** and **perform the Inspection** (structural and hydraulic)
2. **Inventory:** making up an inventory of the types, diameters and condition of the existing pipelines (wear degree, leaks, congestion, corrosion) (under Action 20)
3. **Evaluation and risk mapping**: assessment of the condition, ecological impact and identification of the causes
4. **Development and implementation of the Action plan:**
   a. Prioritization of replacement / repair / cleaning or maintenance needs
   b. Establishing a budget and schedule
5. **Implementation of inspection, action plan and customer education campaign**
6. **Update of inspection and action plan, as well as inventory and risk mapping**

Stakeholders

- Municipality of Bălți, Communal Services Department
- Regia Apă-Canal Bălți Municipal Enterprise
- Glorin Inginering
- Road Construction and Repair Municipal Enterprise
- CET Nord

- Moldova Gaz
- Capital Construction Municipal Enterprise

COST ESTIMATE

Estimated CAPEX: 200,000 EUR

Making up an inspection plan and implement the inspection	100, 000 EUR
Evaluation and risk mapping	50,000 EUR
Development of an Action plan	50,000 EUR

Source of financing: Municipality, National Government, IFIs

Estimated yearly OPEX: 50,000 EUR (including awaraness raising campaigns)

Environmental and economic benefits

- Longer sewer lifetime (regular inspection and maintenance)
- Improved system performance
- Reduced overflows and flooding of the sewerage system
- Reduced soil and surface water contamination (reduced wastewater leaks)
- Reduced environmental contamination remediation costs
- Risk for human health is reduced

Gender and social inclusion opportunities

- Consultation process will be inclusive and will strive for understanding the needs and expectations of women and community-based organisations
- Improved access to services to previously underserved groups
- Increased awareness of all citizens related to urban drainage and sewerage systems
- Raised environmental awareness of the population

Smart and digital opportunities

- Sector gaps in terms of green / smart solutions: digitalisation of sanitation systems; smart metering and remote data readings along the network and for every customer. Digital maintenance management system for asset care.

Action 22

Permeable infrastructure and sustainable urban drainage systems (SUDS)

Contributing to

SO 1 SO 3

Total CAPEX
706,000 EUR

Estimated timeframe
2022–2025

W Water

Targets

- Reducing with 50% the risk on local flooding
- Demonstrating the cost saving value of the selected SUDS and showing its multifunctional benefits

Scale and location

- Municipality of Bălți – selected pilot area

Estimated annual savings

- 0.28 kg C/m^2 carbon sequestration potential in areas covered by trees
- 1.4 t C/year captured by 5,000 m^2 surface covered with green infrastructure

Context and description

The city of Bălți sets a priority to increase its climate resilience and reduce flood risks. The city is crossed by the Răut river and its tributary Răuțel. There is no widespread rainwater collection system in the city of Bălți. The rainwater drainage system is deteriorated and missing on many streets, which leads to overflows and urban floods in case of heavy rain. Some decanting basins exist, which are sometimes mechanically cleaned to remove silt and other small waste accumulated. In the limited areas which have a rainwater collection system, the rainwater is directed towards the river without any treatment. Several areas have a high degree of concrete sealing, now deteriorated in many parts, so puddles are a common sight after each rain. Therefore, the city of Bălți plans an extension of the drainage network (Local Environmental Action Plan). The city of Bălți wants to reduce flood risks and improve the water balance of the city through implementation of Sustainable Drainage Systems (SUDS). The city of Bălți will therefore start up with a SUDS pilot project.

What are SUDS?

Approaches to manage surface water that take account of water quantity (flooding), water quality (pollution), biodiversity (wildlife and plants) and amenity are collectively referred to as Sustainable Drainage Systems (SUDS). Sustainable drainage systems (SUDS) are a departure from the traditional approach which focused

on the drainage of storm water from urban areas to watercourses by means of grey infrastructure. SUDS mimic nature and typically manage rainfall close to where it falls.

Sustainable drainage systems implement nature-base solutions in cities for an improved urban water balance and reduced/slowed down surface water runoff to watercourses. An urban catchment is distinguished from a natural catchment because of:

- Rapid surface water runoff
- Limited infiltration into the ground
- Reduced evapotranspiration from vegetation and surface water
- Reduced groundwater recharge

The SUDS approach focuses on the maximization of the retention, infiltration and reuse of storm water at the source. The drainage of storm water to the sewerage network and receiving watercourses is reduced to a minimum. Drainage of rainwater from source to watercourses is only necessary in case of heavy rainfall events when the retention and infiltration capacity on site is exceeded.

The principles of SUDS to manage urban stormwater (1 = highest priority, 5 = final step):

1. Reduce and slow down urban surface water run-off (prevention)
2. Allowing rainwater to soak into the ground (infiltration, groundwater recharge)
3. Harvesting and (re)use of rainwater close to where it falls
4. Storing runoff and releasing it slowly (attenuation)
5. Stormwater drainage to sewerage and watercourses (minimized)

The management train[6] (see figure on website) starts with prevention of surface water runoff (e.g. by reducing impermeable areas) and progresses through local source controls to larger downstream site and regional controls. Dealing with the water locally not only reduces the quantity that has to be managed at any one point, but also reduces the need for conveying the water off the site. Only if the water cannot be managed on site should it be (slowly) conveyed elsewhere. This may be due to the water requiring additional treatment before disposal or the quantities of runoff generated being greater than the capacity of the natural drainage system at that point. Excess flows would therefore need to be routed off site.

- **Source control:** The first step is to maximize the retention and infiltration of rainwater locally at the place where the rainwater falls, reducing the runoff. By dealing with runoff at source the volume of water and the potential amount of contamination is less, which requires smaller SUDS components further downstream. Often source control components are within the curtilage of properties and maintained by the property owner or manager and can include green roofs, permeable surfaces, rainwater harvesting and water butts.

[6] The SUDS management train - https://www.susdrain.org/delivering-SUDS/using-SUDS/SUDS-principles/management-train.html

- **Site control:** The surface water runoff can be captured further downstream and still be retained, infiltrated at the site level. The excess surface water runoff can be stored and slowly released.
- **Regional control:** End of pipe solutions where runoff is directly discharged to a wetland or pond should be avoided where possible, as these end of pipe components are likely to be larger, more expensive and potentially receive faster runoff flows and higher levels of pollution.

The benefits of SUDS include flood risk reduction, reduction of urban runoff, groundwater recharge, urban biodiversity, reduced urban heat island effect (evapotranspiration) (although dependent on scale), improved water quality, water reuse and potential reduction in investment cost in grey urban drainage infrastructure. Besides SUDS are multifunctional, adaptable and can provide educational and recreational opportunities. For more information on the benefits of SUDS, see the referenced website.

Examples of the components of SUDS [7]

- Source control (reduced runoff):
  - Green roofs on public and private buildings (source control; reduced runoff)
  - Rainwater harvesting (source control; reduced runoff)
  - Pervious surfaces and permeable paving (allows rainfall to soak into the ground)
- Site control (local depressions that collect, store and mitigate runoff):
  - Rain gardens, infiltration basins, soakaways, Infiltration trench (infiltration components)
  - Bioswales and conveyance channels
  - Tree pits (storage of water, infiltration and shade)
- Regional control (larger depressions that collect, store and mitigate runoff):
  - Bioretention areas (filtration)
  - Retention ponds, detention basins, wetlands, wet/dry basins
  - Water squares (storage with slow release, cooling, urban meeting place)
  - Underground water storage (in combination with water reuse)

More case studies and applications of bluegreen grids and SUDS can be found on the various website such as https://www.urbangreenbluegrids.com/projects/

To respond to these challenges, the following short-term measure has been identified:

[7] Components of SUDS - https://www.susdrain.org/delivering-SUDS/using-SUDS/SUDS-components/SUDS-components.html

Pilot of Sustainable Drainage Systems (SUDS) construction to implement nature-based solutions for an improved urban water balance.

The **pilot project** will include, but not limit to, the following:

- Choosing a project location, scale and typology
- Determine the type of SUDS to be implemented in the pilot project (see examples of SUDS components)
- Minimize the use of grey infrastructure
- Minimize the concrete sealing of the ground (e.g. permeable paving)
- Maximize the retention, infiltration and storage of rainwater in the pilot project
- Focus on multifunctional design of water storage areas (city park, sports field, playground, etc.) and evaluate how they can buffer water excess of nearby areas with a higher proportion of concrete sealing
- Evaluate the positive impact of the SUDS pilot project on flood risk reduction and consider other benefits (cf. multifunctional benefits, for example bluegreen area also offering recreational benefits) or the re-use of stormwater for urban irrigation, public toilets, etc.
- Evaluate the potential reduction in investment cost in grey infrastructure
- Estimate the potential groundwater recharge from the SUDS system

Legal and policy framework

- SUDS are not part of any legal policy framework yet.

Implementation steps

1. Select a location for a pilot case SUDS, i.e. defining factors in the selection will include: urgent need in terms of recurrent flooding issues, planned redevelopment, potential as eye-catcher and leverage for further SUDS implementation.
2. Prepare a study for designing the selected SUDS and evaluating its costs and benefits.
3. Implementing the SUDS and assuring evaluation of the pilot.
4. Awareness raising campaign for further investments in SUDS: consider initiating a working group to identify how to go from a pilot project to a programme; this group is to include relevant authorities and local associations. Actions should include defining need for further SUDS as well as developing an investment plan and communicating to stakeholders and the public the rational and benefits of choosing for SUDS.

Stakeholders

- Municipality of Bălți, Architecture and Urban Planning Department
- Regia Apă-Canal Bălți Municipal Enterprise
- Sewerage Municipal Enterprise

COST ESTIMATE

The costs below are per type of pilot SUDS

Estimated CAPEX: 706,000 EUR

Design study including cost-benefit evaluation	50,000 EUR
Permeable landscaping public areas – 5,000 m^2 at 43 – 79 EUR/m^2	300,000 EUR
Green roofs, private – 5,000 m^2 at 50 – 80 EUR/m^2	350,000 EUR
Stormwater harvesting system, private - 15 tanks, 400 EUR for 1 m^3 tank	6,000 EUR

Source of financing: municipal budget, IFIs, private sector, crowdfunding

Estimated yearly OPEX: 30,000 EUR

Environmental and economic benefits

- Improved resilience to floods and climate change
- Improved water quality
- Potentially reduce the investment cost in underground sewers
- Increased biodiversity
- Sustainable Urban Drainage Systems (SUDS) have reduced GHG emissions compared to traditional urban drainage systems (grey infrastructure). The GHG savings of SUDS are mainly due to a reduced need for cement production. The cement industry contributes 7% of global anthropogenic CO_2 emissions. The production of 1 ton of ordinary Portland cement results in GHG emissions of approximately 622 kg of CO_2-equivalents. The amount of CO_2 released is also depending on differences in the materials used in production, the types of cement used, and the fuels being burned. The cement production can be reduced using SUDS, since there is less need for underground sewerage pipes, clinkers, paving, etc. The absolute value of the GHG savings will depend upon the scale of the pilot project.
- Besides, green urban spaces can also play a role in carbon sequestration and storage. The carbon sequestration of the SUDS pilot project is dependent upon the scale of the project and the vegetation. An estimation of the C sequestration can be made when the design is imported into simulation tools. The C sequestration estimation thus requires a first indication of the location, scale and design of the pilot project.

Gender and social inclusion opportunities

- Consultation with representatives of women and community-based organisations or other key persons in order to determine the needs and expectations in terms of reducing risks and flood prevention
- Improved well-being of the community due to improved natural environment, increased biodiversity, reduced heat island effects etc.
- Risk for human health is eliminated
- Enjoyable bluegreen infrastructure elements lead to improving the overall well-being

Smart and digital opportunities

- GIS and digital solutions are important to monitor the impacts of heavy rainfall events including defining locations of flooding before and after implementing SUDS. Also, smart water sensors may allow for monitoring river and surface water quality.

SW
Solid Waste

Short-term actions

Action 23

Improving waste disposal site and operation

Action 24

Upgrading and expansion of the waste collection system

Action 25

Collection and composting of green waste

Action 26

Collection and recycling of construction and demolition waste

Action 27

Bulky WEEE and other specific waste collection center

Long-term actions

- Feasibility study for closure of existing disposal site and opening of a new sanitary landfill
- Regional Waste Management Centre
- Dedicated project for prevention of food waste. Cooperation with commercial sector for development of a social canteen
- Urban gardening pilot project
- Policy actions and pilot projects for prevention of single use plastic
- Improved collection service through route optimization and digitalization
- Feasibility study for treatment of special waste streams and implementation of pilot actions
- Management of hazardous waste

Action 23

Improving waste disposal site and operation

Contributing to

SO 1

Total CAPEX
2,500,000 EUR

Estimated timeframe
2022–2026

SW
Solid Waste

Targets

- Improved disposal standards at the existing site
- 30% recycling rate due to sorting source separated waste streams

Scale and location

- Țambula-Bilicenii Noi disposal site, currently comprising of 25 ha
- Located southeast of the city at a distance of 5 km from city border and 7 km from city center on the territory of Țambula and Bilicenii Noi local authorities
- Newly allocated land plot: about 20 ha, at the same location appropriate and sufficient for landfilling and installing a sorting station in the short-term planning period

Estimated annual savings

- 45,000 t CO_2 eq per year due to improvements in operation, landfill gas extraction and flaring.

Context and description

The main disposal site used by the municipality of Bălți is located on the Țambula and Bilicenii Noi settlements administrative territory. The site is approximately 25ha. The disposal needs improvement in terms of operations, especially regarding tipping of fresh waste, leachate collection and treatment and daily compaction and cover. Lack of these practices in operation leads to fires and fumes, air pollution and odor but also pollution of soil and water.

However, the location of the disposal site is good, approximately 7 km away from the city, and with improvements, it can be used to serve the city's disposal needs and be the location for sorting. The access

road to the disposal site is in good condition, and the municipality has allocated land in the vicinity of the existing disposal site to develop new cells for disposal.

A series of measures will be implemented to improve the stability of the landfill, prevent waste slides and improve the day to day operation of the disposal site, thus enhancing the current disposal practices as well. Reducing water pollution will be done through improved leachate treatment and drainage. The geometry of the landscape led to the formation of a leachate pond on the west side of the disposal site. Since the pond is located close to other surface waters and the collected quantities are quite significant (depth up to 2m), the pond needs improvement in order to allow for on-site leachate treatment.

Development and use of new landfill cells fully equipped to comply with EU standards and with a tipping design could be a long-term investment that the landfill could greatly benefit from. This is to be confirmed by the proposed feasibility study.

Legal and policy framework

- **Law on Waste no. 209 of 2016** was approved by the Parliament and entered into force on 23 December 2017. It was developed in line with the requirements for landfilling of the EU.

Implementation steps

1. **Carry out a study** for the best way forward for the 5–15 years planning horizon regarding the following: landfill capacity enhancement, sorting source segregated dry waste at the location of the disposal site, partial or complete closure of the current disposal site, and development of new cells. The study should include data collection for 3-6 months on: quantity and composition of waste disposed, quality of soil, surface and underground water quality, hydrological and geological studies for needs to reinforce the disposal site.
2. **Purchase new equipment** and update the existing one. Compactors, bulldozers, and wheeled loader are needed to reshape the landfill and the daily operation; updates for the existing weighbridge or fitting with a new functional weighbridge.
3. **Best practices courses** for the disposal site workers. Implementation of a new day to day management plan for the landfill, including fill plan, rainwater, leachate, and gas management plan. A digital database for the waste that is managed at the landfill should be established. Data regarding the quantity and type of waste landfilled and sorted with destination for recycling will be collected for continued improvement of practices at Țambula-Bilicenii Noi Landfill based on correct baseline information.
4. **Reshape the waste body**, ensuring stability. Waste compacting to reduce the footprint of the landfill, to increase the storage capacity, strengthen the stability of slopes and prevent fires and windblown litter. Improve gates and fencing.
5. **Implement the fill plan**.

6. **Leachate control**: Introduction of soil sealing membrane on the bottom and carrying out consolidation works to strengthen the structure of the current leachate pond in order to mitigate its impact on the soil, surface and underground water. Introduction of on-site leachate treatment. Implement rainwater collection and drainage system.
7. **Implementing a biogas extraction** system to reduce the occurrence of spontaneous fires.
8. **Invest in improving the existing sorting line** or procuring new one.

Stakeholders

- Municipality of Bălți
- Environmental Protection Inspectorate
- Landfill operator

Cost estimate

Estimated CAPEX: 2,500,000 EUR

Feasibility study for disposal site improvement and development of additional cells; Plan and Capacity building for improved site operation	150,000 EUR
Landfill mobile equipment	1,000,000 EUR
Civil works with reshaping the landfill and consolidation works; gates and fencing	100,000 EUR
Insulation of leachate pond and leachate treatment; Rainwater drainage system	500,000 EUR
Gas collection and flaring system	600,000 EUR
Sorting line for dry recyclables	150,000 EUR

Source of financing: Municipality, donor organizations, IFI, private sector

Estimated yearly OPEX: 250,000 EUR

Environmental and economic benefits

- Reduced soil and water pollution due to leachate treatment
- Reduced pollution risk downstream of the disposal site due to enforcement works
- Prolonged landfill life due to compacting and improved disposal practice

Gender and social inclusion opportunities

- Throughout the implementation of the improvement actions and during feasibility stage care will be taken to consult waste pickers, opening up new economic opportunities for project affected people, taking special care to address women and vulnerable groups.

Smart and digital opportunities

- Introduction of a digital database for the waste that is being managed at the improved disposal site. Data regarding the quantity and type of waste that is being managed should be collected. Some of the collected data could also be displayed on the municipality's website to increase transparency and to raise awareness amongst the citizens.

Action 24

Upgrading and expansion of the waste collection system

Contributing to

SO 4

SO 1

Total CAPEX
2,415,000 EUR

Estimated timeframe
2022-2023

SW
Solid Waste

Targets

- 100% collection coverage with adequate infrastructure for source separation of 2 fractions of waste
- Improved frequency and quality of waste collection service
- 30% recycling rate for household recyclables

Scale and location

- City wide implementation

Estimated annual savings

- 2,250 t CO_2 avoided if the 30% recycling target is achieved

Context and description

Mixed waste collection is the predominant collection system in Bălți. There are 63 waste collection platforms in the city equipped with 1.1 m^3 containers; 12 of these have been recently upgraded.

Mesh wire cages are installed in these for the source separation of PET bottles; these are serviced by private companies, the city having no control about this waste stream.

Except for 600 newly bought containers of 1.1 m^3, the city owns containers that are mostly obsolete and need to be replaced.

This action proposes the city-wide introduction of waste collection on two fractions, namely dry/mixed recyclables and wet/residual waste, modernisation of the waste collection fleet and rehabilitation of the remaining collection platforms. The mixed recyclables include paper, cardboard, plastics, metals and glass and it is assumed that about 50% of the volume (equivalent to 20% by weight) is recyclables.

A series of measures are needed to implement this action:

- Feasibility study to calculate container and collection fleet capacity based on waste characterization study, current situation analysis on waste process flow and users of the system. In this study care should be taken to map the best locations to place platforms and containers, verify the needed frequency, stakeholder consultation with citizens and informal sector. This is

best coupled and tendered together with the feasibility study included in Action 23 regarding disposal and sorting line.

- Procurement of new equipment. 1,1m3 metal collection containers will be needed to cover the areas of the city with high rise buildings and 120 litre containers combined with bags for recyclables will be used at individual houses, 10 collection trucks and additional tractors and loaders are needed for the daily operation of the waste collection system.
- Awareness and education campaigns. Public awareness and understanding are key factors for the success of the action.
- Monitoring and management of the collection system to ensure clean material streams and maximizing income streams from recyclables. The inclusion of incentives for recycling in the tariffing structure will be analysed and introduced gradually.

Establishment of new collection platforms is not viable since the city does not have the required space.

Legal and policy framework

- **The Waste Management Strategy in the Republic of Moldova**, approved by the Government Decision no. 248 of 10.04.2013 includes as objective the source separated collection, increased recycling and producer responsibility.
- **The Law on Waste no. 209 of 2016** that entered into force in 2017 includes a 30% recycling target for recyclable household waste based on weight until 2020. However, it includes only a general reference to producer responsibility in Article 21.

Implementation steps

1. Confirm through feasibility study the necessary infrastructure elements.
2. Organize public procurement for purchasing of the necessary equipment.
3. Draft a communication / awareness raising campaign plan for source separation and recycling.
4. Set up and implement a monitoring and management system for the collection service.

Stakeholders

- Municipality of Bălți
- Waste management operator
- Informal sector recyclers
- Citizen associations, NGOs

Cost estimate

Estimated CAPEX: 2,415,000 EUR

Feasibility study for the upgrade an extension of waste collection system	75,000 EUR
Containers	

500 * 1.1 m^3 metallic containers	250,000 EUR
7,000 * 120 l plastic containers	420,000 EUR
consolidation of 50 collection platforms	150,000 EUR
Fleet	
4 * 7 m^3 trucks for dry recyclables	320,000 EUR
10 * 10 m^3 trucks for the wet fraction	1,000,000 EUR
Additional mobile equipment (tractors)	200,000 EUR

Source of financing: municipal budget, PPP, private sector

Estimated yearly OPEX: 1,100,000 EUR

Environmental and economic benefits

- Increased recycling due to source segregation, resulting in increased resource efficiency
- Replacing virgin materials with secondary materials leads to decrease in GHG emissions
- Avoidance of methane generation from biodegradation of paper and cardboard through diversion of these materials from disposal to recycling

Gender and social inclusion opportunities

- New jobs created in recycling
- Consultation of informal sector on technical solutions and operator models may lead to inclusive models
- Consultations with women and community-based organisation will also ensure that best solutions will be adopted for waste collection system, especially related to waste collection points, type and infrastructure available there
- Raised environmental awareness of the population

Smart and digital opportunities

- GPS system on all collection trucks
- Route optimization software
- Real-time monitoring of collected quantities via the weighting system envisaged at the landfill

Action 25

Collection and composting of green waste

Contributing to

SO 4

SO 1

Total CAPEX
1,200,000 EUR

Estimated timeframe
2022-2026

SW
Solid Waste

Targets

- Composting 100% of green waste from parks and cemeteries (3 years)
- Capturing and composting 50% of the generated green waste in the city and the food waste from fresh produce markets (5 years)

Scale and location

- The chosen location for the composting station is in close proximity to Lake Chirpicinoe, on the grounds of a former industrial land.

Estimated annual savings

- 4,500 t CO_2 avoided

Context and description

The Municipal Enterprise Spații verzi is managing the green areas and the green waste from parks and gardens in Bălți. At the moment, the company has some equipment including 3 shredders, but this is insufficient to properly manage all the green waste generated. In the past, the company tried to implement a composting project that was unsuccessful for uncertain reasons.

This action proposes to extend the green waste collection capacity and implement composting in the city.

Green waste collection points equipped with special containers should be placed in key points of the city where the waste could be shredded and prepared to be transported to the composting station. At first the collection points should have sufficient capacity to handle green waste from public green spaces and cemeteries of the city. This waste amount is expected to increase as the Municipality is committing to a better management and maintenance of the city's green areas. Gradually, the established collection points could also be used to collect the green waste generated in private gardens and to collect food waste from the fresh produce markets. Procurement of collection vehicles is needed to assure green waste collection for the whole municipality.

Simple open-windrow composting could be implemented with possibility of upgrading to more advanced composting technologies in the future. Further studies could indicate the best composting technology for the waste composition present in the municipality. The possibility to add sludge resulting from the wastewater treatment plant in small quantities, so that not to disturb the balance and quality results of the composting process could also be explored.

In order to integrate open windrow composting in the waste management system the municipality needs to allocate about 1.4 ha land for composting and for the storage of equipment and the resulted compost. This is the estimated land-take need for a composting facility of 5,000 t/y.

The municipality will also establish a management plan for the composting. The municipality has tried and failed at composting before and there is a need for improved capacity and a clear operations plan. The key to success is a predetermined schedule for aeration and respecting the composting/maturation time. The resulted compost needs to be quality checked to ensure that the composition is suitable for application either to green spaces, or as cover material for the disposal site or other areas in need of remediation.

Thus a composting station for green waste collected from municipal parks, green spaces, cemeteries, and gardens as well as a composting site for unsold vegetable food waste from markets will be established on the municipality's territory. An area was designated for the composting station (20,000 m2) as a futureproof measure; the extra land could be used to implement other, more advanced composting methods down the line. Based on a 6-week maturation time and peak green waste amounts in fall and spring, the land take needed for composting is 1.4 ha.

Legal and policy framework

- **The Waste Management Strategy of the Republic of Moldova for 2013-2027** (approved by Government Decision 248/2013) includes as objective the development of composting.
- **The Law on Waste no. 209 of 2016** sets up obligation for treatment and collection of bio-waste. There are no targets established in the law, but it is left to the local authorities to establish such targets.

Implementation steps

1. Conduct waste composition and quantity study to confirm the scale and suitable composting method for the municipality. This should ideally be done together with feasibility for disposal collection and sorting in Actions 23 and 24.
2. Establish capacity needs and equipment need for shredders, collection vehicles and the composting equipment.
3. Identify suitable key points for the collection points, equip collection points with containers and mobile shredders.
4. Allocation of land on the municipality's territory.
5. Operate the green waste collection and composting system.
6. Provide high quality compost to municipal gardens, parks, green spaces, and cemeteries. Sale of any compost that is not used by the municipality.
7. Awareness raising campaign for the source separation of green waste and use of natural fertilizers.

Stakeholders

- Municipality of Bălți
- Spații verzi Municipal Enterprise

Cost estimate

Estimated CAPEX: 1,200,000 EUR

Transport equipment for green waste	300,000 EUR
Civil works – receiving and maturation area, ancillary (services, fencing etc.), maturation platform	300,000 EUR
Composting equipment (sieve, shredder, windrow turner, front loader, tractor, tipper truck)	600,000 EUR

Source of financing: municipal budget, private sector, IFIs

Estimated yearly OPEX: 150,000 EUR

Environmental and economic benefits

- Reduction of climate change impact that would arise from avoiding the biodegradation of green waste at the disposal site. Indirect greenhouse gas reduction benefits include replacement of carbon chemical fertilizers with high embedded carbon with natural fertilizers and an increased carbon sequestration of soils treated with compost.
- Utilizing compost for soil improvement in the city and reduction of costs with buying fertilizer or rich soil for green space maintenance.
- Prolonging the useful life of the disposal site by diversion of waste to composting.
- Revenue potential for the municipality. The high number of agricultural parcels in the area that could benefit from using the resulted fertilizer create a set-up from which revenue could be generated.

Gender and social inclusion opportunities	Smart and digital opportunities
• Access to newly created jobs • Raised environmental awareness of the population • Information and promotion campaigns	• Digital tools used for compost process monitoring • Digital map of green waste collection points • GPS system for collection trucks and route optimization

Action 26

Collection and recycling of construction and demolition waste

Contributing to

SO 4

Total CAPEX
1,285,000 EUR

Estimated timeframe
2022-2026

SW
Solid Waste

Targets

- Increased capture of construction and demolition waste in the waste management system, working towards the 55% recycling rate established by law
- Reduce the illegal dumping of the C&D waste in the city

Scale and location

- At some of the collection platforms across the city: introduction of C&D waste collection containers
- At the disposal site: grinding station for C&D waste

Estimated annual savings

- N/A

Context and description

The construction and demolition (C&D) waste is frequently mixed in the municipal stream or is illegally dumped. The collection and treatment of this waste stream is beneficial since it is largely inert, often recyclable and occurs in large quantities, thus recycling this stream will significantly extend the capacity of the disposal site.

Illegal dumping of C&D waste in the municipality of Bălți is a persistent problem. The forests in the vicinity of the city are usually used by citizens for the disposal of this waste stream. The community mapping measure included as part of Action 2 in digitalization will help control illegal dumping, and cleaning activities can channel additional materials to the C&D recycling facility. Illegal C&D dumping could also be supervised through the traffic monitoring cameras proposed at Action 5.

This action proposes the introduction of C&D waste collection containers at some of the established collection platforms around the city and implementation of a C&D waste processing plant in the Țambula-Bilicenii Noi disposal site. Waste composition studies are needed to determine the quantity and generation rate of this waste stream in order to properly determine the frequency of collection, size and number of collection containers.

C&D waste is not collected through a preschedule method as the rest of the municipal waste; at the moment, the citizens must pay a certain amount to legally dispose of the C&D waste. This approach favours illegal dumping practices amongst the citizens. The new tariff scheme should imply a small raise in the overall price for waste collection in the city while also collecting the C&D waste from the established special containers. In this way, the citizens would gain a convenient place where to discard this type of waste while having no apparent drawback, the operational costs would be covered, and the illegal dumping would be minimized.

The resulted aggregates could be integrated in the daily cover and later the closure and rehabilitation of the Țambula-Bilicenii Noi disposal site. Consolidation of the access roads and anchoring of the waste could be done by using repurposed C&D waste.

Special containers, collection trucks and processing equipment will be needed to establish the collection and treatment system.

Developing a call on service for C&D waste is a long-term action. Private commercial financing based on public procurement and provision of land by the municipality could be an incentive for a broader engagement of all interested parties.

Legal and policy framework

- **The Waste Management Strategy of the Republic of Moldova for 2013-2027** (approved by Government Decision 248/2013) includes as objective recycling of special waste streams.
- **Law on Waste No. 209 of 2016** establishes a recycling target of 55% or construction and demolition waste.

Implementation steps

1. C&D waste generation study and feasibility of collection and recycling of this waste type in the proposed system. This could be best done together with the feasibility study included in the waste sector actions.
2. Allocation of land for treatment and handling of C&D waste at the existing dumpsite. Asbestos waste should be managed separately.
3. Public tender for purchasing the necessary collection and treatment containers/equipment.
4. Operate the collection and treatment system. Use materials for landfill cover and rehabilitation as appropriate.
5. Put into use Green Procurement strategy and guidelines for construction works and infrastructure development of the municipality through tenders or use of these materials for the municipality's own construction works.

6. Sale of aggregates and secondary construction materials. Collaboration with local cement factories; selling the aggregates as a filling material for cement production.
7. Establish monitoring system including waste collection operators and recyclers to trace the amount of construction and demolition waste recycled in the system.

STAKEHOLDERS

- Municipality of Bălți
- Waste management operator
- Construction companies

COST ESTIMATE

Estimated CAPEX: 1,285,000 EUR

Feasibility study (including market study for outputs)	35,000 EUR
Site	In-kind contribution of the Municipality
Collection equipment and containers	250,000 EUR
Crusher, shredder, loader, vibrating screen, containers	1,000,000 EUR

Source of financing: Municipality, IFI, private sector based on allocation of land and collection/feedstock ensured by Municipality

Estimated OPEX: 3-4 EUR/t

Environmental and economic benefits

- Resource efficiency through recycling and reuse of construction and demolition waste
- Reduced pollution due to adequate handling of hazardous waste streams in the construction and demolition waste
- Increased life of disposal site capacity due to diversion of the construction and demolition waste stream from disposal
- Reduced illegal dumping of construction and demolition waste

Gender and social inclusion opportunities

- Access to employment and business opportunities in the circular economy
- Promoting women, youth and people with disabilities to participate in new business opportunities
- Raised environmental awareness of the population
- Information and promotion campaign

Smart and digital opportunities

- Digital participative community mapping of illegal dumpsites will identify locations of illegal C&D waste disposal and related clean-up activities will redirect materials to recycling. The platform for reporting illegal C&D dumping will be implemented through Action 2.

Action 27

Bulky WEEE and other specific waste collection centre

Contributing to

SO 4

Total CAPEX
825,000 EUR

Estimated timeframe
2022-2026

SW
Solid Waste

Targets

- By 2026, at least 30% of WEEE generated in a given year captured in waste collection centres in the same year

Scale and location

- Placement of 3 collection centres in key points of the city to be as convenient as possible for the citizens

Estimated annual savings

- Around 70% energy savings over virgin materials

Context and description

Waste collection centres are a frequently used system in Europe, as they are suitable for receiving bulky waste, Waste Electrical and Electronic Equipment (WEEE) and other special waste streams as defined by the law. Hazardous household waste such as used oil, batteries and accumulators are often collected in these places. The centres function in the “bring-in” system and often charge little to no fee for accepting waste from the special waste streams listed above. The municipality usually allocates the space and equips the centre. Waste collection centres may operate small reuse and repair shops as well for the waste streams that are brought in, thereby increasing reuse and repair.

The action proposes the implementation of collection centres for the WEEE, and other hazardous materials resulted from households (used oils/batteries) and from public buildings. The collected materials should be temporary stored in special designated areas that do not allow contact with the environment before are transported to treatment facilities. Awareness campaigns and door to door collection from households/multifamily buildings (at least twice a year) must take place in order to encourage good disposal practices among the citizens and increase the collection efficiency. EPR should be implemented; collection and recycling targets should be imposed to the local EEE distributors thus forcing them to invest in sustainable management of the waste they put out on the market.

The centres should be endowed with special containers for each type of collected waste and equipment for collection and transport. The collected waste could be exported to material recovery plants; implementation of a local material recovery plant seems inefficient for the municipality at the moment.

The placement of the collection centres should be in key points of the city to be as convenient as possible for the citizens, increasing the "bring-in" aspect of the collection and reducing the need for multiple collection campaigns across the year. In the long term, the centres should be located in each neighbourhood, especially where the density of population is high; in the 5 year planning horizon 3 centres are envisaged.

Legal and policy framework

- **Law on waste no. 209 of 2016** was approved by the Parliament and entered into force on 23 December 2017. It was developed in line with the specific waste stream (WEEE, packaging, ELV, etc.) directive and includes requirements for the management of these specific streams.
- **Government decision for approving the Regulation for the management of WEEE** entered into force on the 23rd of September through Government Decision 212 from March 2018. The regulation includes a collection target of 5% by 2020 and 30% by 2025. The targets are established based on the average weight of WEEE put on the market in the last 3 years.

Implementation steps

1. Carry out a study to identify the suitable key points and sites for the Waste Collection Centers. This could be best done together with other feasibility studies in the waste actions to facilitate a system approach. The study should explore cooperation with the EPR system in Moldova.
2. Establish operation plan, acceptance of waste, frequency of container emptying, proper storage and occupational health and safety issues, fees, opening hours etc.
3. Acquire the necessary equipment for the waste centres and add amenities to the sites.
4. Establish capture targets for WEEE within the framework of the EPR system and cooperate with Producer Responsibility Organizations for organizing the system.
5. Operate the waste collection centres.
6. Include waste collection centres in the ongoing communication and awareness campaigns of the operator.

Stakeholders

- Municipality of Bălți, Communal Services Department
- Waste management operator
- NGOs and schools
- EPR organizations

COST ESTIMATE

Estimated CAPEX: 825,000 EUR

Feasibility study for defining the technical solution and cooperation with the EPR system	30,000 EUR
Allocate sites	In-kind contribution from Municipality
Equip 3 sites with necessary amenities	45,000
Storing and collection equipment for three waste collection centres at 250,000 EUR each	750,000 EUR

Source of financing: Municipality, donor, IFI, private sector through EPR scheme

Estimated OPEX: 20,000 EUR. (Awareness raising and launch collection campaigns; managing the centres – at least partially should be covered from EPR scheme.)

Environmental and economic benefits

- Disposal will be reduced, thereby pollution and climate change impacts from waste will be reduced and the useful life of disposal site will be extended.
- Resource efficiency will be improved due to repair and reuse of some items but also through recycling of the collected waste streams.
- Reduced pollution due to adequate handling of hazardous waste streams from the household waste.

Gender and social inclusion opportunities

- The increased recycling will create business opportunities and additional jobs in the recycling sector.
- Raised environmental awareness of the population
- Information and promotion campaign

Smart and digital opportunities

- Digital map of collection points
- Online application included in the EPR scheme

LU
Land Use

Short-term actions

Action 28

Building the *Green Heart* of the city

Action 29

Management Plan of the City's blue-green network

Action 30

Future-proofing the General Urban Plan

Long-term actions

- Strengthening the local capacity for implementation of strategic urban planning
- Smart solutions for monitoring the urban development process
- Development of children's playground areas at schools outside the functioning time
- Usage of natural, environmental friendly materials for development of children playground
- Study on remediation of contaminated industrial sites

Action 28

Building the *Green Heart* of the city

Contributing to

SO 3 SO 1 SO 4

Total CAPEX
18,000,000 EUR

Estimated timeframe
2022–2026

LU Land Use

Targets

- 50% increase in the number of users/visitors of the new Green Heart of the city, after implementation of the plan, compared to a same period in the previous year.
- 20% increase in the number of overnight staying visitors to the city (monitored by hotel/hostel bookings).

Scale and location

- Municipality of Bălți. City center – ***Canalul Caiac-Canoe*** Park

Estimated annual savings

- 0.28 kg C/m^2 carbon sequestration potential in areas covered by trees
- 168 t C/year captured by 60 ha surface covered with green infrastructure

Context and description

The development of a Green Heart for the city is meeting the city's demand for environmental protection while at the same time providing multiple cultural and economic benefits such as recreation and increasing value for tourism thereby potentially serving as an attraction pole for visitors from across the country and abroad. Today the area at Canal Caiac-Canoe mainly serves as a spot for watersports while it has ample additional potential. Indeed, considering the size of the area, additional development could include cultural and recreational purposes and areas dedicated to nature. Figure 1 gives a first indication of the possibilities for the area.

The area north of the Canal has extensive potential for cultural and recreational facilities. This may include playground facilities (considering a lack having been indicated and which could include natural play elements), sport pitches, park development (where trees and paths provide guidance as to where driving stops cf. current problems at the eastern end with vehicles and soft mobility takes over), a natural swimming pond8, a performance stage that could range from

[8] For example, https://images0.persgroep.net/rcs/CG9hSDAvskh3ps-oPSpl8vD954Y/diocontent/149778137/_fill/1350/900/?appId=21791a8992982cd8da851550a453bd7f&quality=0.9

facilitating smaller events to possible large events attracting visitors from across the country. The area towards the West, now housing the wholesale vegetable and fruit market and surroundings could potentially be developed with a hotel/ cafe and (multi-level) parking for visitors of the Green Heart of the city.

Figure 7 Possibilities to increase the cultural, recreational and biodiversity potential of the Canal Caiac-Canoe area of Bălți[9]

The area south of the Canal, already having reedbeds and water bodies, could be strengthened in terms of biodiversity with an underlying nature management plan. Considering that further south to this area, next to the houses erosion problems have been indicated, the nature management plan could include the promotion of undergrowth (shrubs etc. to have the roots fixing the soil and preventing erosion) in between the trees that are present as a suitable nature-based solution A suspended boardwalk connecting Soroca district with the leisure area on the other side of the Canal could guide and facilitate nature lovers, potentially including interpretation panels, viewing platform and/or bird hides.

In a further step the pilot could provide leverage as to reach a blue-green network providing benefits across the city of Bălți, connecting it also to surrounding rural arears. Specific examples (see also Figure 1) are linking the Canal Caiac-Canoe area with the Andriesh Municipal Park and Children's Park by greening

[9] The tree symbols represent biodiverse areas including reedbeds, hence should not be interpreted necessarily as trees. The red cars and arrows indicate access points which could be extended by having further access points from other directions for pedestrians and cyclists.

the main roads connecting them (e.g., tree lines, open water parties). Other potentials include the blue-green development of rivers and combining the existing railroad with a pedestrian or bicycle path.

Urban nature can sequester and store carbon. Further, blue areas are most effective in lowering the air temperatures, followed by urban green areas connected to grey infrastructure, parks and external building greens. The development of the green heart, and by extension the development of a blue-green city network will ensure increased carbon uptake. Not only the trees and green areas, but also the waterbodies store carbon. The green heart of the city with its waterbodies and nature, can in addition have a cooling effect on the wider environment, which - especially during hot summers - can reduce energy consumption for air conditioning and cooling. Air conditioners and electric fans account for about 10% of all global electricity consumption.

Legal and policy framework

- Any implemented initiative will need to be in line with policy documents, plans and legal provisions at national and local level, such as the urban planning documents and corresponding regulation.

Implementation steps

1. Outsource a study and launch a working group to evaluate ideas on how to optimally develop the area. This should also include collecting information on financing which could range from public to private funding (land concession) to including innovative financial schemes such as crowdfunding.
2. Map the current blue-green values of the Canal Caiac-Canoe area and evaluate them.
3. Go from design to implementation by deciding on a financial scheme and working towards the development of the area, while in parallel maturing the needs and mapping the benefits of extending from this pilot to a blue-green city network.
4. Include the opportunities to preserve blue-green values and to revitalize open spaces in the update of urban planning documents for the city, to encourage the development of a blue-green network throughout the city

Stakeholders

- Municipality of Bălți
- Alecu Russo University, Faculty of Science, Economics and Environment
- Environmental Protection Inspectorate
- Department responsible for tourism, local nature
- Local sports associations (e.g. Kayak Canoe Federation of Moldova)

- Private companies within the tourism and recreational sector
- Energy department or energy grid company (because of the high voltage line located in the area)
- NGOs

COST ESTIMATE

Estimated CAPEX: 18,000,000 EUR

Feasibility study, including detailed technical design	500,000 EUR
Implementation of water supply and sewerage networks	2,500,000 EUR
Develop multifunctional green spaces – 60 ha of green space on the northern side of the Caiac-Canoe Channel	10,000,000 EUR
Development of vehicle access roads towards 2 entry points and parking areas with permeable pavement	3,000,000 EUR
Development of suspended passages for bicycle and pedestrian access above swamp areas towards leisure areas	2,000,000 EUR

Source of financing: Municipality, National Government, IFIs, Crowd funding, private sector financing

Estimated yearly OPEX: 350,000 EUR (including awareness raising and promotion campaigns)

Environmental and economic benefits

- Increased attractiveness to tourists and citizens
- Social and psychological benefits for the community, such as increased wellbeing due to improved recreational opportunities (i.e. sport infrastructure, playgrounds, enjoyable green environment)
- Increased biodiversity, including a raised awareness on nature conservation
- Improved air quality and public health
- Improved prevention of soil erosion and landslides
- Improved resilience to climate change (improved rainwater drainage), when creating a blue-green network throughout the city
- Preserved biodiversity and improved ecosystem services awareness of citizens
- Economic benefits for developers/investors and for the green economy
- Positive economic activity in surrounding areas
- Revenues for the municipality from land lease contracts and economic activities

Gender and social inclusion opportunities

- The staffing requirements, identified in the feasibility study, will take full consideration of gender equality and equal rights for job opportunities. Similarly, technical specifications for administrative buildings and other working premises will provide for separate utilities for male and female staff and people with disabilities.
- Consultation process related to investments will be socially and gender inclusive
- All elements designed for this investment will consider social and gender mainstreaming aspects

Smart and digital opportunities

- It is beneficial to do the mapping of the current blue-green values in the Canal Caiac-Canoe area, including their scoring on value to the community, in GIS. This will enable the City of Bălți to use reliable information when updating the city's planning documents and re-evaluating the city's blue-green network.

such as: health and safety and security of users, public lighting to be in line with level of expectations and ensuring a comfortable and secure climate for women, gender responsive public restrooms available at the premise, safe and comfortable playground for children, accessibility for persons with disabilities, etc.	

Action 29

Management Plan of the City's blue-green network

Contributing to

SO 3 SO 1

Total CAPEX
136,000 EUR

Estimated timeframe
2022–2024

LU
Land Use

Targets

- Management Plan available
- 50% of homeowner associations taking part in the management plan
- Annual internal meeting to keep the management plan up to date

Scale and location

- Municipality of Bălți
- City-wide scale, focusing on the blue and green infrastructure

Estimated annual savings

- N/A

Context and description

In order to preserve and enhance the city's blue-green network a Management Plan should be implemented. This plan starts from the current state of the blue-green network, and also includes the future development plans and targets. Further it holds the good practices for maintenance and development and builds from transparent regulations on building permits in the vicinity of green or blue structures and modification requests. The plan focuses on maintaining the current network and exploiting opportunities for its enhancement, thus protecting the ecological and hydrological values of the urban landscape and its resilience regarding climate change. Evidence-based and strategic planning of the blue-green network is required for maintaining and developing a city-wide network.

From a hands-on approach, the green area management can include: the pruning of young trees along the roadside, maintenance of green verges, monitoring of invasive species, avoiding pesticides. The implementation of rules concerning agriculture in the vicinity of Bălți helps to preserve (or improve) the current green and blue values in the city (e.g., restrictions on pesticides and fertilization or the construction of green corridors between fields). Green as well as blue elements should be kept free from litter for example by providing enough litter bins, by organizing clean-up actions and by general sensibilization. The blue arteries and areas of the city should be monitored in order to improve or keep their good quality.

From a planning perspective a good overview of where green and blue elements are and which management actions need to be taken allows for an efficient organization of personnel, needed materials and evaluation of whether needed action fit with the available budget.

The green areas around residential compounds provide good opportunities to involve the community in engaging with the municipality in ensuring a proper maintenance of areas of common use. Good communication between the municipality and homeowners' association is a crucial step in planning and successfully executing green space clean-up and maintenance campaigns, as well as green area retrofitting projects. Idea contests and participatory budgeting will have the citizens in an area vote for the project to be implemented, out of several designs pre-selected by the municipality. Success stories and good practices should be showcased by the municipality, encouraging citizens to take part in the maintenance of their neighborhoods.

Legal and policy framework

- This management plan for the green and blue network in Bălți has implications on agriculture (e.g., restrictions on pesticides and fertilization), on infrastructure (e.g., regulations on building permits in the vicinity of green or blue structures and modification requests, minimum open-space requirements including a minimum distance to quality greenspace) and on citizens (e.g., restrictions on the use of pesticides or taking up public spaces).

Implementation steps

1. Outsource a study and launch a working group to develop an inventory of and evaluate the current blue-green network and detail the future development plans and targets.
2. Procure appropriate specialist support for proper management of this blue-green network.
3. Review the current management actions and update where necessary. Synthesize all information in a comprehensive management plan.
4. Involve the public and interested parties following a participatory process and public consultations. Suggestions from interested stakeholders can be incorporated whenever feasible.

Stakeholders

- Municipality of Bălți
- Green Spaces Municipal Enterprise
- Environmental Protection Inspectorate
- Local owners associations
- NGOs

COST ESTIMATE

Estimated CAPEX: 136,000 EUR

Estimated average costs of legal review and update of the current regulations	6,000 EUR
Inventory and evaluation of the current blue-green network	50,000 EUR
Development of regulations and management plan	80,000 EUR

Source of financing: Municipality, National Government, IFIs, Crowd funding, private sector financing

Estimated yearly OPEX: N/A

Environmental and economic benefits

- Improved connectivity of green and blue elements, thus promoting exercise, social encounters, and eco-mobility.
- Improved air quality and public health.
- Improved biodiversity.
- Improved resilience to floods and climate change.
- Mitigating urban heat-island effect.

Gender and social inclusion opportunities

- .Engagement of all citizens and especially women users of green spaces, in the consultation process of the new Management Plan, irrelevant of their age, sex or social status

Smart and digital opportunities

- Substantial opportunity to capture digital data on blue-green infrastructure assets and integrate this data with digital urban planning databases. Potential for data collected to be published and used by future investors in the city's green/smart infrastructure.
- Correlation with Action 2 includes blue-green infrastructure on the newly developed digital urban database and map.

Action 30

Future-proofing the General Urban Plan

Contributing to

SO 3 SO 1

Total CAPEX
650,000 EUR

Estimated timeframe
2024–2026

LU
Land Use

Targets

- Climate change risk assessment and contaminated sites inventory studies finalized within 2 years of GCAP approval
- Future-proof General Urban Plan developed and approved within 4 years of GCAP approval
- Zonal and detailed urban plans developed for GCAP pilot project areas within 3 years of GCAP approval
- Monitoring and adjusting plans on certain aspects as needed – assessment of adequacy every 2 years

Scale and location

- Municipality of Bălți. City-wide

Estimated annual savings

- N/A

Context and description

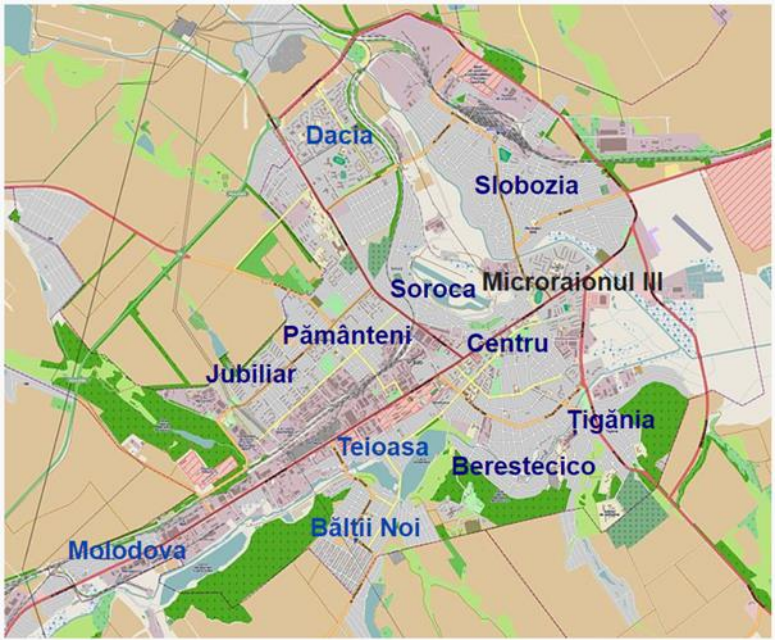
Bălți is facing a series of challenges, which we briefly describe here.

The existing urban services infrastructure is not covering the entire city, it is aging and not designed to withstand future climate challenges. Low density urban development puts pressure on municipal infrastructure networks. The residents of the two villages at the outskirts of the municipality face long commuting times. The city is home to several historical industrial sites located within its boundaries. Furthermore, there is a risk of landslides and flooding due to heavy rainfall and snow melt.

This means that enforceable urban planning regulations are needed to prevent risks and improve quality of life in the city.

Currently, Bălți is updating the Regulation on construction and buildings for the central area of the city, aiming to better manage land use and future constructions, as well as to increase its urban density. Next to the regulations on grey infrastructure, the urban development plans should also include functional blue-green infrastructure and actions for disaster resilience. The development of a Zonal Urban Plan and

Detailed Urban Plan helps to encompass blue-green city development principles and foster the implementation of proposed land use-related actions.



The existing General Urban Plan is currently undergoing public consultations for approval, but the next iteration of the General Urban Plan, as well as the needed Zonal and Detailed Urban Plans should include a comprehensive and deeper understanding of the current and future environment of the city. Some of the elements which need to be included in the next iteration of the General Urban Plan are mentioned below.

There are several areas with either historical or ongoing industrial or military activity in Bălți, several of them located along the main street crossing the city, Ștefan Cel Mare și Sfînt Street and along the railway. It is likely that many of the former industrial sites, as well as some of the current ones have contaminated soils. In absence of a contaminated sites inventory at city level, an inventory of the potential and confirmed contaminated sites as well as an investigation of the level and type of contamination needs to be carried out. This would inform the future urban plans with regards to future development needs and constraints.

Bălți includes several known areas which are prone to stormwater flood and landslide in Soroca, Bălții Noi or Țigănia districts. Climate change is likely to increase these risks and possibly bring forth new ones, such as urban heat islands. A better understanding and quantification of hazard, exposure, vulnerability, and risk are crucial preconditions for reducing the adverse effects of disasters. With access to comprehensive disaster risk information, policy makers and the public can better understand the potential impacts of hazards and carry out risk-informed planning and investment before a disaster strikes. A climate change risk assessment and mapping needs to be carried out in order to inform the future development plans of the city, and be reflected in the General Urban Plan. Green infrastructure and enhancement of ecosystem services should be prioritized when possible to counteract climate risks, along the lines proposed in Action 22 – Permeable infrastructure and sustainable urban drainage systems.

The Urban Development Plan should include guidelines on the integration of blue-green designs at different scales (streets and public places, neighborhoods, quarters and at city level), on the implementation of city distance rules for access to green areas, on imposing requirements of public parks and green infrastructure in new developments and on providing incentives to include green areas in (re)developments.

Some examples of regulations are:

- Distance rules on access to green areas for citizens - for example every citizen has a small park within 400m distance of their house;
- Promote and develop open space standards for new blue-green infrastructure in the urban planning policy;
- Incorporate green and blue infrastructure into new sustainable developments (if new areas / zones are being developed or rehabilitated);
- Regulations should apply to both private and public investments in the city;
- Landowners, investors and developers are often involved in various sites across the city. By linking conditions between different sites, for example the obligation of green/blue space at one site but allowing more built-up space at another, sometimes more can be achieved.

In addition, the newly developed urban plans, as well as the revised General Urban Plan should be coordinated with the Sustainable Urban Mobility Plan (Action 4) and support the connection of green infrastructure with sustainable mobility (Action 9).

To become a future proof city, the urban development plans of Bălți should include functional blue-green infrastructure and actions for disaster resilience. Climate change will make cities hotter and drier in summer, and wetter in winter. These effects will become more dramatic in cities that suffer from urban heat island effect and poor drainage. By implementing nature-based solutions and reducing damage from rainfall events, floods and landslides, the financial and carbon cost (from repairs, new materials needed, waste processing) will be reduced. The evaporative cooling effects from green corridors, open spaces, urban trees and green roofs leads to mitigation of the urban heat island effect. This can reduce energy consumption for air conditioning and cooling, reducing the carbon cost.

Legal and policy framework

- **Bălți Municipal Council decision no 1/17 of 27.03.2019** for the approval of the Municipal land cadaster for 2018 mentions that the Urban plan needs to include provisions for aligning population density with EU levels. Thus, the General Urban Plan must include respective provisions related to development indices. The General Urban Plan of the city has been revised (Document no. 15893/ 1.1.2019 elaborated by IS "Urbanproiect") and it is currently under public consultation as part of the approval process.

Implementation steps

1. Take steps towards the next revision of the General Urban Plan:
    a. Define goals and scope – start from action-oriented planning. Include climate change risk assessment and contaminated sites inventory study
    b. Legal review and update the current regulation
    c. Set up governance and participation structure
2. Procurement documentation for all the required studies including Strategic Environmental Assessment.
3. Climate change risk assessment study, including GIS mapping
4. Inventory and assessment of contaminated sites to inform future development restrictions in the city
5. Development of Urban Development Plan
6. Training and capacity building for municipal departments for procuring and implementing green urban development.

Stakeholders

- Municipality of Bălți

Cost estimate

Estimated CAPEX: 650,000 EUR

Legal review and update of the current regulations	20,000 EUR
Climate change risk assessment study, including GIS mapping	150,000 EUR
Inventory and assessment of contaminated sites	150,000 EUR
Development of Urban Development Plan	280,000 EUR
Training and capacity building for municipal departments for implementing nature-based solutions	50,000 EUR

Source of financing: Municipality budget

Estimated yearly OPEX: 10,000 EUR (for awareness raising and promotion campaigns)

Environmental and economic benefits

- Reduction of pressure on municipal infrastructure networks through centralization and creating high-density development
- Improved air quality, water quality and public health after implementation of regulations
- Improved accessibility of the two villages at the outskirts of the municipality
- Improved early response mechanisms through improved institutional capacity and coordination
- Reducing the risks of landslides and flooding
- Reducing the risks to public health from unsuitable development on contaminated sites

Gender and social inclusion opportunities

-
- Consultation process for the new General Urban Plan will be inclusive and will strive to understand women and community-based needs in order to include elements that will address as much as possible gender mainstreaming and social inclusion challenges.

Smart and digital opportunities

- As a result of the climate change risk assessment as well as the contaminated sites inventory, a GIS map with the sensitive areas clearly marked should be available at city level.
- Digital map produced under Action 2 and all the digital urban datasets available will feed into the new General Urban Plan.
- New development projects should be submitted for approval also in a digital format, with georeferencing of structures and site amenities. This would be a starting point to reaching a fully digital cadaster of the city. This requirement could first apply to projects above a certain size or/and value which require approvals from the urban planning department.

6 Summary of GCAP actions and financial details

Total investment needs for GCAP implementation are estimated at the amount of 180 mln EUR. Since the municipality of Bălți has limited capacity to service loans, grant funding and other financing options are to be considered.

Financiers extending debt for their clients' eligible green projects can issue green bonds, with lower and fixed rate compared to loans. Green bonds are aimed for the funding and refunding of green projects, these include renewable energy, energy efficiency, pollution prevention and control, clean transportation, sustainable water and wastewater management, climate change adaptation, circular economy and/or eco-efficient projects, and green buildings. Green bonds are used to finance and refinance assets that have a longer operating lifetime than the bond's tenor. Long-dated green assets, including their maintenance and/or upgrade costs, may be (re)financed by issuance of multiple consecutive Green Bonds subject to key disclosures by the issuer. Recently the EU issued bonds that are to be repaid by 2058 the very latest[10]. Due to the municipality's limited financial capacity, the repayment of bonds in tranches may be considered; in addition the state budget can be the beneficiary of the green bonds and on-lender to the municipality.

The following mix of financing is suggested for GCAP implementation:

- Grant funding - for development of major programs and policy documents (3.7 mln EUR) and for co-financing road rehabilitation (25 mln EUR, state budget);
- Private sector or private public partnership - for construction of parkings, facilities for construction and demolition waste, for bulky electronic waste (4.8 mln EUR);
- Green bonds – for rehabilitation, modernization and expansion of the drinking water distribution network, sewerage collection and treatment, energy efficiency of buildings, upgrade of district heating and further renewal of public (trolley) bus fleet (118 mln EUR)
- IFI or national loans – for average size municipal waste management investment projects (7.8 mln EUR)
- Municipal budget – for investment projects in greening, biking network, drainage (20.7 mln EUR in total)

[10] https://www.euronews.com/2021/09/13/green-bonds-can-the-eu-really-become-the-world-s-largest-issuer-of-climate-conscious-finan

According to Law no. 397 (2003, last amended 22 December 2020) on Local Public Finance[11], the total amount of annual payments (repayment of the principal, payment of interest and other payments related to services or guaranteed debt) shall not exceed 30% of the total annual revenue of the municipal budget of Bălți, excluding special purpose transfers (Article 15 (5)).

Based on the 2021 planned revenue, excluding special purpose transfers, it can be defined that the total amount of annual debt payments cannot exceed 3.1 mln EUR12.

The following table summarises the actions with their corresponding investment (CAPEX) and operational costs. CAPEX is calculated for the first five years – 2022-2026, while the operational expenditures (OPEX) are annual costs, defined either as internationally accepted percentages to specific investment cost or based on current data (market prices).

[11] https://www.legis.md/cautare/getResults?doc_id=121302&lang=ro

[12] (679 mln MDL-459 mln MDL)*30%/21 = 3.1 mln EUR. However for some reason in Decision 15/1 of 10.12.2020 on adoption of municipal budget for for 2021 it is written (2.15) that the limit of the public dept and guarantees of Balti is 215 mln MDL or 10 mln EUR - http://balti.md/documentele-de-politici/bugetul-municipal/aprobarea/

ACTION		CAPEX [EUR]						OPEX [EUR]
		Total	Timeline [EUR]					
			2022	2023	2024	2025	2026	
1	Strengthening the capacities of Bălți Municipality to implement GCAP	€ 80,000	€ 40,000	€ 40,000	-	-	-	€ 20,000
2	Supporting the digitalization of City Management	€ 245,000	€ 122,500	€ 122,500	-	-	-	€ 75,000
3	Strengthening the capacities of municipal enterprises to implement GCAP actions	€ 125,000	€ 50,000	€ 25,000	€ 25,000	€ 25,000	-	€ 15,000 / unit
4	Developing and approving the Sustainable Urban Mobility Plan	€ 500,000	€ 400,000	€ 100,000	-	-	-	€ 10,000
5	Traffic management plan development and implementation pilot	€ 300,000	-	€ 100,000	€ 200,000	-	-	€ 20,000
6	Green Public Parking System modernization and implementation pilot	€ 2,880,000	€ 30,000	€ 100,000	€ 2,000,000	€ 750,000		€ 80,000
7	Developing an Investment Programme for road maintenance and rehabilitation	€ 25,250,000	€ 100,000	€ 5,000,000	€ 5,000,000	€ 5,000,000	€ 10,150,000	€ 125,000
8	Renewing the public (trolley) bus fleet	€ 28,000,000	-	€ 3,000,000	€ 8,000,000	€ 8,000,000	€ 9,000,000	€ 1,600,000
9	Connecting green infrastructure with sustainable mobility: biking/walking city network	€ 1,800,000	-	€ 500,000	€ 650,000	€ 650,000	-	€ 18,000
10	Developing and approving the Energy Efficiency Programme for public buildings	€ 255,000	€ 127,500	€ 127,500	-	-	-	€ 20,000
11	Energy Efficiency investments for public buildings and institutions	€ 12,120,000	-	€ 120,000	€ 4,000,000	€ 4,000,000	€ 4,000,000	€ 848,000

ACTION		CAPEX [EUR]						OPEX [EUR]
		Total	Timeline [EUR]					
			2022	2023	2024	2025	2026	
12	Promoting small-scale RES	€ 2,190,000	€ 30,000	€ 500,000	€ 800,000	€ 860,000	-	€ 66,000
13	Gradual improvement of the energy efficiency of residential blocks and promotion of self-consumption of RES	€ 6,600,000	€ 100,000	€ 1,625,000	€ 1,625,000	€ 1,625,000	€ 1,625,000	€ 462,000
14	Modernize and upgrade the district heating services t	€ 11,793,000	€ 400,000	€ 2,875,000	€ 2,875,000	€ 2,875,000	€ 2,768,000	€ 590,000
15	Promoting large-scale RES through investments	€ 530,000	-	-	€ 100,000	€ 200,000	€ 235,000	-
16	Energy efficient street lighting programme	€ 1,665,000	€ 20,000	€ 100,000	€ 445,000	€ 545,000	€ 555,000	€ 50,000
17	Implementation of an environmental monitoring system at city level	€ 200,000	-	€ 80,000	€ 60,000	€ 60,000	-	€ 20,000
18	Cooperation platform at local level for green industrial development	€ 300,000	€ 150,000	€ 150,000	-	-	-	€ 10,000
19	Investment Program for the rehabilitation, modernization and expansion of the drinking water distribution network	€ 19,150,000	€ 250,000	€ 900,000	€ 6,000,000	€ 6,000,000	€ 6,000,000	€ 60,000
20	Rehabilitation, modernization and expansion of the rainwater and sewerage collection and treatment	€ 38,100,000	€ 200,000	€ 1,900,000	€ 12,000,000	€ 12,000,000	€ 12,000,000	€ 120,000
21	Urban Drainage and Sewerage Infrastructure Maintenance Program	€ 200,000	€ 50,000	€ 50,000	€ 50,000	€ 50,000	-	€ 50,000
22	Permeable infrastructure and sustainable urban drainage systems (SUDS)	€ 706,000	€ 50,000	€ 220,000	€ 220,000	€ 216,000	-	€ 30,000
23	Improving waste disposal site and operation	€ 2,500,000	€ 150,000	€ 1,000,000	€ 100,000	€ 625,000	€ 625,000	€ 250,000

ACTION		CAPEX [EUR]						OPEX [EUR]
		Total	Timeline [EUR]					
			2022	2023	2024	2025	2026	
24	Upgrading and expansion of the waste collection system	€ 2,415,000	€ 175,000	€ 2,240,000	-	-	-	€ 1,100,000
25	Collection and composting of green waste	€ 1,200,000	€ 600,000	€ 600,000	-	-	-	€ 150,000
26	Collection and recycling of construction and demolition waste	€ 1,285,000	€ 285,000	€ 1,000,000	-	-	-	€ 3-4/t
27	Bulky WEEE and other specific waste collection centre	€ 825,000	€ 30,000	€ 45,000	€ 750,000	-	-	€ 20,000
28	Building the Green Heart of the city	€ 18,000,000	€ 100,000	€ 400,000	€ 6,000,000	€ 5,750,000	€ 5,750,000	€ 350,000
29	Management Plan of the City's blue-green network	€ 136,000	€ 6,000	€ 65,000	€ 65,000	-	-	-
30	Future-proofing the General Urban Plan	€ 650,000	-	-	€ 100,000	€ 250,000	€ 300,000	€ 10,000
	TOTAL	**€ 180,000,000**	**€ 3,466,000**	**€ 22,985,000**	**€ 51,065,000**	**€ 49,481,000**	**€ 53,008,000**	**€ 6,154,000**

Section III.

Monitoring, reporting and verification

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7 Monitoring framework, evaluation and reporting

Monitoring

Monitoring and evaluation of GCAP is designed to understand and assess the results and outcomes of implementing the plan. It aims at identifying the most effective actions and informing the implementation team on how to adjust the ones that are not bringing enough results. The main purpose is to measure the impact GCAP actions have over the quality of environmental factors in Bălți. Also, it measures the progress towards achieving the established targets for each action. Thus, both progress and impact of implementation will be monitored. The rationale behind the monitoring framework (Annex 2. Monitoring framework for GCAP implementation) is presented in the below figure.

A total number of 192 indicators have been identified for monitoring the GCAP vision and the corresponding 4 strategic objectives. Out of these, 30 are progress indicators and 162 are impact indicators. Each overarching indicator is referring to all strategic objectives due to the synergy between the vision, strategic objectives and actions defined within this GCAP.

The monitoring tool includes 3 main spreadsheets presenting the monitoring and evaluation indicators. The first spreadsheet includes the overarching indicators that are aligned with the vision and the strategic objectives focused on the progress in implementation.

The second spreadsheet refers to environmental indicators that have to be monitored during GCAP implementation.

In case the implementation process starts for one action/measure, then we will use the supplementary indicators included in the third spreadsheet. All the indicators will enable us to understand the progress and impact of each action/measure. For each indicator we have defined the format and measurement unit in which the data should be collected and processed, referred to the timeframe for accomplishment of related targets and/or defined frequency for data collection.

The Monitoring framework for GCAP implementation is a dynamic tool and allows tracking down the progress in implementation of each action and corresponding measures.

Evaluation and reporting

Within the Municipality, GCAP implementation will be closely monitored and evaluated by the Department for Sustainable Development established under Action 1.

The DSD will compile all the data received from sectoral departments and will produce an annual progress report for the GCAP implementation period. A summary of this report will be also made available to the public.

The monitoring of GCAP implementation process is intricate and will require additional training and support during the first two years of implementation. Thus, an engagement of an external consultant was foreseen in order to support the DSD and the PIUs at municipal enterprise level with the specific monitoring tasks, as well as optimizing the data collections sheets.

Additionally, two types of audits are foreseen during the first 5-year period of GCAP implementation:

- internal audits –yearly, based on internal procedures. This will focus on understanding whether the internal procedures have been properly followed and if the specific established targets at the level of municipality have been reached;
- third party audit –once in 5 years –this will focus on conducting a full assessment of GCAP implementation process, taking into consideration all elements, such as: technical, financial aspects and utilization of resources.

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The green treasure city of Moldova

EBRD

Olga Mereuță
Operational Leader

mereutao@ebrd.com
www.ebrdgreencities.com

RWA – Arcadis

Reka Soos
Team Leader

reka@rwagroup.net
www.rwagroup.net

PA EcoContact

Natalia Guranda
Local Project Coordinator

natalia.guranda@ecocontact.md
www.ecocontact.md