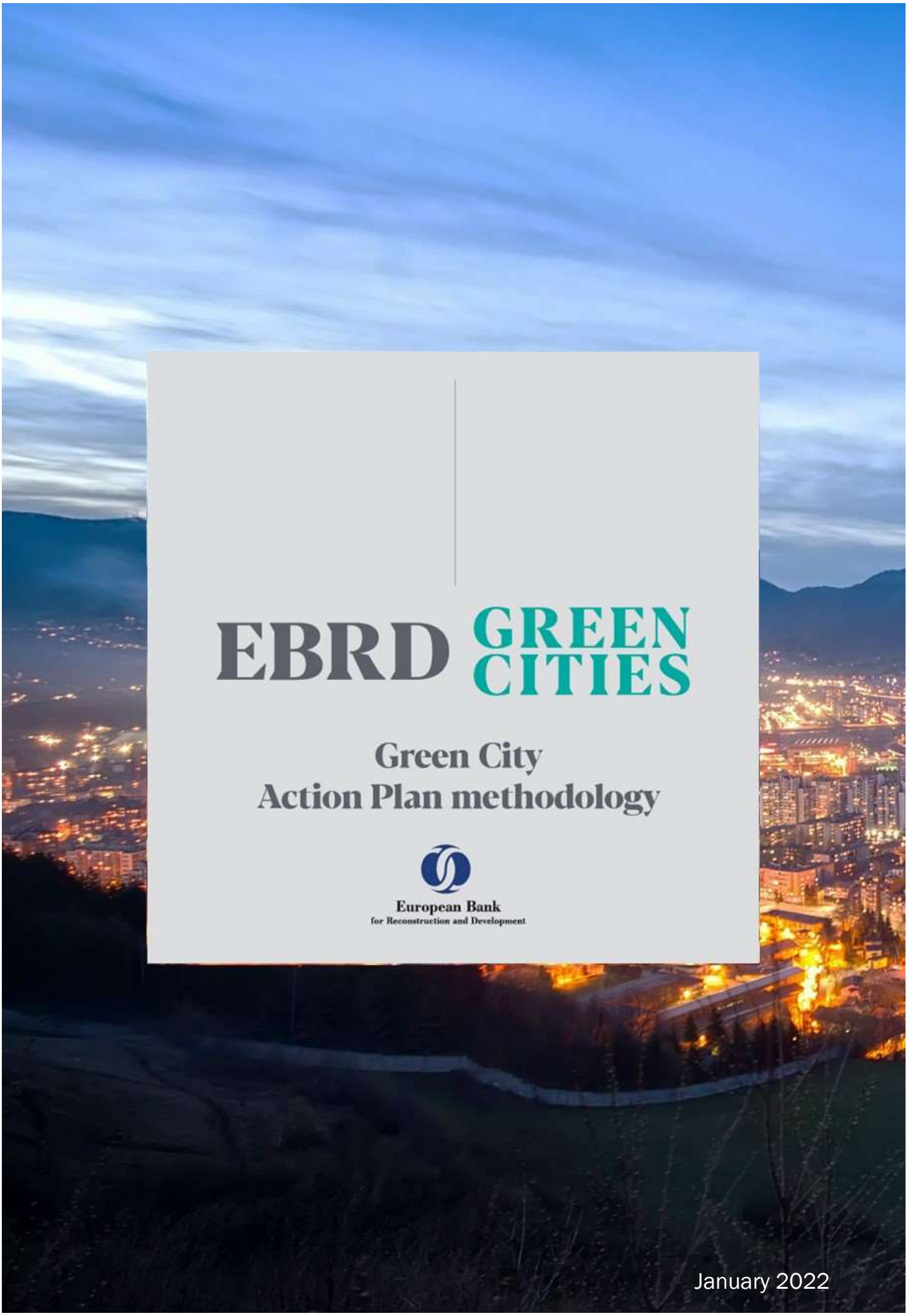


EBRD GREEN CITIES

Green City Action Plan methodology

European Bank
for Reconstruction and Development

January 2022

The Green City Action Plans
are generously funded by:







Acknowledgements

This document is based on work prepared by the Organisation for Economic Co-operation and Development and ICLEI – Local Governments for Sustainability for the European Bank for Reconstruction and Development in 2016. The document has been updated to account for the lessons learned over the past four years of Green City Action Plan development and implementation, and incorporates additional best practice developed through a review of the document and the EBRD Green Cities programme by ICLEI in 2020. This publication was kindly funded by the Government of Japan.

Contents

Executive summary

Cities are dynamic and vital parts of society and the main engines of social, economic and technological development. However, rapid urban growth has vastly increased demand for resources, which, in turn, affects the environment as well as the quality of life of urban residents.

In the EBRD regions, these challenges are particularly acute due to demographic changes, insufficient investment in infrastructure and historical legacies of high energy and carbon intensity. In response, the EBRD has developed EBRD Green Cities (the "programme"), which strives to build a better and more sustainable future for cities and their residents. The programme achieves this by identifying, prioritising and connecting cities' environmental challenges with sustainable infrastructure investments and policy measures.

One of the programme's central components is the Green City Action Plan (GCAP), the process whereby a city's environmental challenges are systematically assessed, prioritised and addressed through various policy instruments and sustainable infrastructure investments. This document describes the Methodology and process for developing a GCAP. It is a revision and update of the original Methodology produced by the Organisation for Economic Co-Operation and Development (OECD) and ICLEI - Local Governments for Sustainability in 2016. This update includes results of a review in April-June 2020 to capture the lessons learned in the course of the COVID-19 virus outbreak starting in January 2020. The revised Methodology incorporates additional best practice to support green outcomes and co-benefits including increased resilience, gender equality, economic and social inclusion.

The primary audience for this document is city officials and consultants who are responsible for implementing GCAPs, as well as urban specialists who are interested in the programme's methodology. It offers implementers a step-by step guide to developing a GCAP, and outlines the political, economic and social considerations that should be taken into account, while in parallel helping prepare cities to better respond to and recover from the physical and socio-economic impacts of future disasters.

The document emphasises that developing a GCAP is a continuous process, allowing cities to adjust their visions and actions over time. Newly occurring challenges and priorities, such as the COVID-19 outbreak (ongoing at the time of writing), can be integrated into a city's mid-to-long-term sustainability programme applying the principle of continuous improvement. The EBRD considers this to be a living document, and further updates may be made in the future. The following is an overview of EBRD Green Cities, as well as how the programme helps cities grow in a way that is socially, environmentally and economically sustainable.

Glossary

Green City actions – defined investment, policy and other initiatives that are principally focused on environmental outcomes and address Green City challenges, which may result in resilience or socio-economic co-benefits.

Green City baseline – the current status of a city's environment and influencing conditions including exposure to risks and vulnerabilities, and socio-economic frameworks

Green City challenges – specific issues affecting a city's environment with respect to the quality of the environment or ecosystem services, infrastructure operations, policy responses, risks and vulnerabilities, or socio-economic pressures

Priority Environmental Challenge – thematic areas stemming from the categories of GCAP state indicators that a city selects to describe the aggregate environmental challenges to address.

Pressure-state-response (PSR) framework - developed by the OECD, the PSR framework categorises various, specific indicators to illustrate the causal linkages between environmental pressures, the resulting state of the environment, and associated responses by the government, residents and the private sector.

Traffic light screening - a simple method of assessing and comparing a city's environmental performance indicators with established benchmarks, whereby a green light indicates good performance in line with international standards; an amber light indicates insufficient performance and cause for concern; and a red light indicates low performance and need for critical attention.

About the EBRD

Founded in 1991, the European Bank for Reconstruction and Development (EBRD) is a multilateral development bank that promotes market economies in the regions where it invests, from central Europe to Central Asia, the Western Balkans and the southern and eastern Mediterranean region.

The Bank's investments and activities target reforms and restructuring aimed at improving the efficiency of the regions' markets and economic operations. Under its founding agreement, the EBRD is also committed to promoting "environmentally sound and sustainable development".

In recent years, environmental objectives have gained critical importance in the Bank's strategies and operations. In 2015, the EBRD launched the Green Economy Transition (GET) approach to help build low-carbon and resilient economies. Through the GET approach, the Bank aims to have 40 per cent of Annual Bank Investment in green projects by 2020.

Green City Action Plan steps

Introduction

Around the world, urban populations are growing rapidly. 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 greenhouse gas emissions worldwide and 70 per cent of energy use.

Other concerns include air quality, traffic congestion and pressure on limited green space, land and water resources. Cities are also particularly vulnerable to the impacts of climate change. Over 90 per cent of all urban areas are coastal, putting most cities at risk of flooding from rising sea levels and powerful storms.

These urban issues are particularly acute in cities in the EBRD regions, where energy intensity is up to three times greater than the European Union (EU) average (IEA, 2015). Public and private buildings often have poor energy performance and urban residents are also exposed to higher levels of air pollution.

Many economies where the EBRD invests are particularly vulnerable to the impacts of climate change. Water supply in Central Asia has decreased by 25 per cent since 1960 and is predicted to shrink by a further 25 per cent in the next 20 years. Municipal solid waste management is another challenge in the EBRD regions, where much waste ends up in landfills that "are simply dumpsite areas where the municipal services (or contractors) pile up or simply deposit waste" (UNECE, 2010). Meanwhile, recycling of waste is negligible and far short of the EU target of 50 per cent of municipal solid waste being recycled by 2020. EU Recycling targets for municipal waste are expected to gradually move up from 50% in 2020 to 65% in 2035 (European Commission, 2018).

For the sustainable development of green cities, it is critical to recognise the relationship between environmental aspects and economic and social issues. This thinking is also very much in line with the UN's 2030 Agenda for Sustainable Development and the Sustainable Development Goals (UN 2015) and particularly the Goal 11 calling for governments to make cities and human settlements inclusive, safe, resilient and sustainable.

EBRD Green Cities

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, with the aim to build a sustainable and resilient future for the EBRD Green Cities.

The EBRD defines a Green City as a city that:

- Preserves or improves the quality of its environmental assets (air, water, land, soil and biodiversity) and uses these resources sustainably
- Mitigates and adapts to the risks of climate change
- Preserves and improves resilience of its infrastructures, services, operations and communities against shocks and stresses
- Ensures that environmental policies contribute to the social and economic wellbeing of residents, regardless of their gender, place of birth, age, sexual orientation, disabilities or other circumstances.

To help cities achieve these goals, EBRD Green Cities employs a unique and systematic approach consisting of three central components:

1. Green City Action Plan (GCAP): Assessing and prioritising environmental challenges and urban vulnerabilities based on specific indicators and developing an action plan to tackle the challenges and vulnerabilities through policy intervention and sustainable infrastructure investments.

2. Green infrastructure investment: Facilitating and stimulating public or private green investments in urban systems such as water and wastewater, urban transport, district energy, energy efficiency in buildings, renewable energy, solid waste, climate resilience, urban regeneration, education, health care, natural capital, social care and food systems.

3. Capacity building: Providing technical support to city administrators and responsible organisations of actions to ensure that infrastructure investments are implemented effectively.

Sustainable Infrastructure Financing

EBRD Green Cities builds on the Bank's proven track record in helping cities invest in sustainable municipal infrastructure.

Since 1994, the Bank has invested over €9.5 billion in transformational municipal infrastructure across more than 500 projects in more than 200 cities in the EBRD regions.

These investments included public transport infrastructure, new or upgraded water supply and wastewater treatment, energy-efficient district energy solutions, municipal solid waste projects, street lighting, urban resilience and renewable energy solutions.

Pressure-State Response Framework

The GCAP process is built on the pressure-state-response (PSR) framework developed by the OECD. The PSR framework provides a useful structure to understand the linkages between activities that place pressure on the environment, the resulting state of the environment and associated responses by the government, residents and the private sector to address the pressures.

We use this framework to select indicators to assess a city's environmental performance, with sensitivity given to overlaps with urban resilience.

For the GCAP, a distinction is made between core and elective (optional) indicators within the state and pressure categories. Only the core indicators must be assessed to fulfil the GCAP's minimum requirements.

The elective indicators can be used to provide supplementary information, either in addition to the core indicators or in the event that a core indicator is not available. In total, there are 114 indicators, 35 of which are core indicators. (p35: *Annex 1. Pressure-State-Response Indicator for Green Cities*)

The PSR framework lays the foundation for the GCAP to identify, prioritise and address environmental challenges through green investments and policies. The following sections outline the steps to ensure successful GCAP development and implementation.

Explaining the Pressure-State Response Framework

Pressure indicators

These indicators are used to understand the factors that may be negatively impacting the environment, for example, increased urban sprawl reducing the availability of green spaces.

State indicators

These indicators are used to understand the quality of the city's environment (for example, soil quality). It also assesses the city's resource availability (such as water storage) and climate risk (such as exposure to flooding).

Response indicators

These indicators measure actions that have been or could be taken to address pressures and improve the state of the environment, for example, imposing planning restrictions to increase green spaces.

1 Prepare and organise

To join EBRD Green Cities, a city needs to have a population exceeding 50,000, initiate a GCAP and commit to a trigger investment project that meets the EBRD's investment criteria.

By committing to developing a GCAP, a city sets a priority for high environmental performance, in a manner that also strengthens urban resilience. Cities undertaking GCAPs should therefore take several steps before developing the action plan to identify relevant stakeholders, set up institutional structures, establish timelines and ensure compliance with all relevant laws, regulations and policies.

1.1. Secure initial commitment

To start the GCAP process, the mayor (or equivalent) and/or the city council should give municipal staff the official go-ahead and mandate to work on the GCAP. Municipal staff need to be engaged early on in the process, as staff members will institutionalise and implement the GCAP process and monitor developments.

A City formally declares its commitment to develop a GCAP and become an EBRD Green City as part of one of the following mechanisms:

1. A loan or project agreement with EBRD for a trigger investment project that meets the EBRD's investment eligibility criteria; or
2. A Memorandum of Understanding with EBRD stating a City will undertake an EBRD-financed sustainable infrastructure investment project in two years; or
3. A Commitment Letter submitted to EBRD outlining a City's intention to undertake an EBRD-financed sustainable infrastructure investment project in two years.

The City will also be required to sign a Waiver Letter with the EBRD once a Terms of Reference for the GCAP Consultants (Step 1.4) has been developed.

1.2. Review existing policies

The EBRD will conduct a review of a city's existing policies, strategies, plans and reports in cooperation with the City. The review ensures that the GCAP builds on any relevant urban, environmental or social policies or strategies previously adopted, developed or in a process of development by the local, regional and national government as well as those prepared by international development agencies (i.e. a Resilience Strategy, Sustainable Energy and Climate Action Plan, waste management or pollution prevention plans, etc.). This review ensures that the GCAP is additional to a City's sustainable development efforts, does not duplicate existing initiatives and incorporates established strategies from its inception.

1.3. Outline approval process

The City will work with the EBRD to outline the approval process for the GCAP, including legal procedures, timelines and formal requirements. The City should draft a summary of the legal process for approving the GCAP with its legal department. The municipal budget cycle should also be considered to ensure alignment with infrastructure investments later proposed in the GCAP.

The City should also confirm whether a Strategic Environmental Assessment (SEA) or similar documentation is necessary and confirm requirements with relevant ministries or regulatory bodies. If an SEA is needed, it should be included in the GCAP.

The GCAP approval process and potential SEA requirements will be further refined and confirmed as part of the GCAP's Inception (Step 1.10).

The findings of Steps 1.2 and 1.3 informs the development of a Terms of Reference for consultants to support the City in developing a GCAP.

1.4. Set up team and institutional structures

Developing and delivering a successful GCAP requires assembling various teams. The following is EBRD's recommendation for a successful organisational structure to oversee and support the development of a GCAP. Ideally, the City should assign and establish the following person(s) and bodies to facilitate the development of the GCAP and accept deliverables as developed. Collectively, these people and bodies form the **GCAP Team**.

a) Political Champion:
The mayor or other high-level official with decision-making authority who is responsible for driving the GCAP.

Intended responsibilities:
- Assign appropriate municipal staff members to work on the development of the GCAP
- Inform and inspire citizens on the development of the GCAP.

b) Green City Officer
The City should identify a member of staff who has the mandate, capacity and expertise to support the GCAP throughout its development. This individual will serve as the key contact for the GCAP within the City and report directly to the mayor or equivalent.

Intended responsibilities:
- Regularly coordinate with the Consultant and EBRD
- Coordinate Steering Committee – provide updates, share deliverables, collect feedbacks etc.

c) Steering Committee
To oversee and steer the GCAP process, the City should establish a GCAP Steering Committee. This Committee will provide strategic oversight and input and be made up of senior representatives/heads from relevant municipal departments including from finance, communications, sectoral departments, and offices responsible for promoting the City's sustainable and resilient development. The City may include members from other public agencies, utility companies, businesses, NGOs, universities, knowledge institutions, and other relevant organisations to the Steering Committee.

Intended responsibilities
- Accept deliverables prepared by the Consultant
- Support the Consultant to access information held internally and, where possible, external stakeholders, to carry out analysis and to prepare actions.

- Review and approve selection of Green City challenges, visions, strategic goals, and actions.
- Inform citizens on the progress of the GCAP development through its website, social media or newsletters.

d) Expert Group

The City should also appoint a GCAP expert group, consisting of technical experts within the City who will provide technical inputs and review the deliverables prepared by the Consultant. This expert group should consist of representatives from municipal departments dealing with city finances and investment or development planning, emergency response and civil protection, climate change, disaster risk reduction and preparedness, and most critically representatives from utilities or municipal service companies operating. The members may overlap with those involved in Steering Committee.

Intended responsibilities

- Revise and comment on deliverables prepared by the Consultant to ensure contents are technically sound.
- Organise stakeholder engagement activities (jointly with the Consultant)
- Provide relevant data and information to the Consultant to carry out analysis and to prepare actions.

The above groups will be supported by:

- **Consultant**

  The EBRD, together with the City, should select a Consultant in line with EBRD procurement rules to support the GCAP's development on a day-to-day basis. The Consultant will consist of international and local experts, with experience in urban sustainability and infrastructure investments yielding green benefits and other co-benefits.

  Intended responsibilities
  - Oversee GCAP development process
  - Prepare deliverables, collect and analyse data, policies and municipal budget
  - Facilitate stakeholder engagement activities

- **EBRD**

  The EBRD will be involved in the GCAP development process to provide appropriate guidance to the Consultant and to support the City overcome any challenges which may arise during the GCAP development.

1.5. Identify stakeholders

An integrated and effective GCAP requires early involvement of key partners and stakeholders. Stakeholders are the persons, groups and/or organisations who:

- have the potential to influence GCAP development or City operations; or implement GCAP actions ("key stakeholders")
- are directly and/or indirectly affected by the GCAP development or outcomes;
- have an interest in the GCAP development or outcomes;

A comprehensive stakeholder mapping and analysis should be performed to identify key individuals and stakeholder groups including businesses, NGOs, knowledge institutions, and public agencies and

utility companies responsible for municipal services such as energy, water, waste and transport utilities, land use planning, health and social care.

Stakeholders should represent multiple sectors, disciplines, and related areas of expertise. Along with representatives from public organisations such as city administrations, municipal utilities, public housing or social care organisations, or national ministries, the EBRD encourages cities to include diverse stakeholders from NGOs, women's organisations, private business, universities, research and knowledge institutions, as well as international and bilateral organisations to enrich the GCAP development process. This stakeholder mapping will form the basis for a Stakeholder Engagement Plan (Step 1.6).

The EBRD encourages all relevant stakeholders to be included in the GCAP development process, regardless of their gender, place of birth, age, sexual orientation, disabilities or other circumstances[1]. Particular efforts should be made to involve women and stakeholders from under-represented or vulnerable groups[2].

Considerations for Gender and Economic Inclusion

The GCAP Team should ensure participation of both women and men, and equal treatment of all vulnerable groups (i.e. elderly, migrants, children, minorities, etc.). They should be particularly attuned to the challenges and obstacles faced by vulnerable and disadvantaged groups, who may face disproportionate barriers to economic opportunities, and take special measures to provide these with equal economic opportunities throughout the GCAP development, implementation and monitoring process.

In addition, the GCAP Team should ensure a balanced participation and gender equality in all aspects of the GCAP development, enabling active representation and participation of all genders, with particular efforts made to engage women and LGBTQI communities in management, dialogue and workshop participation. The GCAP Team should also analyse the different needs of all genders when it comes to access to services and jobs in the city.

1.6 Stakeholder Engagement Plan

Stakeholder engagement is a critical part of the GCAP development process. Therefore, the design of stakeholder involvement needs to be outlined early in the process. This is done in the **Stakeholder Engagement Plan** (SEP): The SEP will help the City communicate with all stakeholders and ensure that the GCAP process is inclusive.

A Preliminary SEP should be discussed and agreed with the City and EBRD as part of Step 1.7. It outlines: Roles and responsibilities; engagement methods; an approximate timeline; information disclosure and a list of stakeholders.

1 e.g. religion, ethnicity, indigenous status, literacy, political views, or social status

2 such as people or groups of people who may be more adversely affected by project impacts than others by virtue of characteristics such as their gender, gender identity, sexual orientation, religion, ethnicity, indigenous status, age (including children, youths and the elderly), physical or mental disability, literacy, political views, or social status.

The full SEP (Please refer to p.54 Annex 2: *Summarised Stakeholder Engagement Approach*) summarizes the overall approach to stakeholder engagement and serves as a steering document for engagement activities. The city should make the document publicly available. It provides stakeholders with an overview of parties involved in the GCAP process, as well as timing and format for upcoming stakeholder engagement events.

Stakeholders may be engaged in multiple ways, for example, as members of, or advisers to the GCAP team or related working groups, through a parallel stakeholder group that works with the GCAP team, or through stakeholder forums organized throughout the planning process with one or more groups. The design of stakeholder involvement, both formal (institutional) and informal, should be outlined clearly in the SEP and their roles should be explored with them directly.

Furthermore, the SEP outlines how information will be disclosed during the GCAP development process and summarizes monitoring and reporting principles. . Annex 2 summarizes the GCAP approach to stakeholder engagement and the role of the SEP. In addition, the Stakeholder Engagement Guidance Note serves as a publically available guide to defining, structuring and documenting engagement activities.

5 key principles of meaningful GCAP stakeholder engagement

1) Those who are affected by a decision have a right to be involved in the decision-making process i.e. those likely to be affected by implementation of the GCAP should be involved in the development of the plan;
2) Engagement and consultations commence early in the process at such a time when contributions from stakeholders can still influence the decisions;
3) Information and opportunities to influence decisions are provided to stakeholders in an accessible and timely manner, and via a range of different channels in order to considering the differing needs of stakeholders and, to allow meaningful participation;
4) It is inclusive in representation of views (with a focus on securing inputs from women and vulnerable or hard-to-reach groups) and free of manipulation, interference, coercion, intimidation and retaliation;
5) Stakeholder inputs feed into the final GCAP whenever possible and feedback is provided to stakeholders on how stakeholders' their contributions were considered in the process.

5 key steps of output-oriented GCAP stakeholder engagement

The GCAP stakeholder engagement is setup through the SEP that serves as a steering document (0). The subsequent engagement process includes four steps: discover environmental challenges (1), prioritise them (2), develop a vision and potential solutions (3) and deliver action (4).

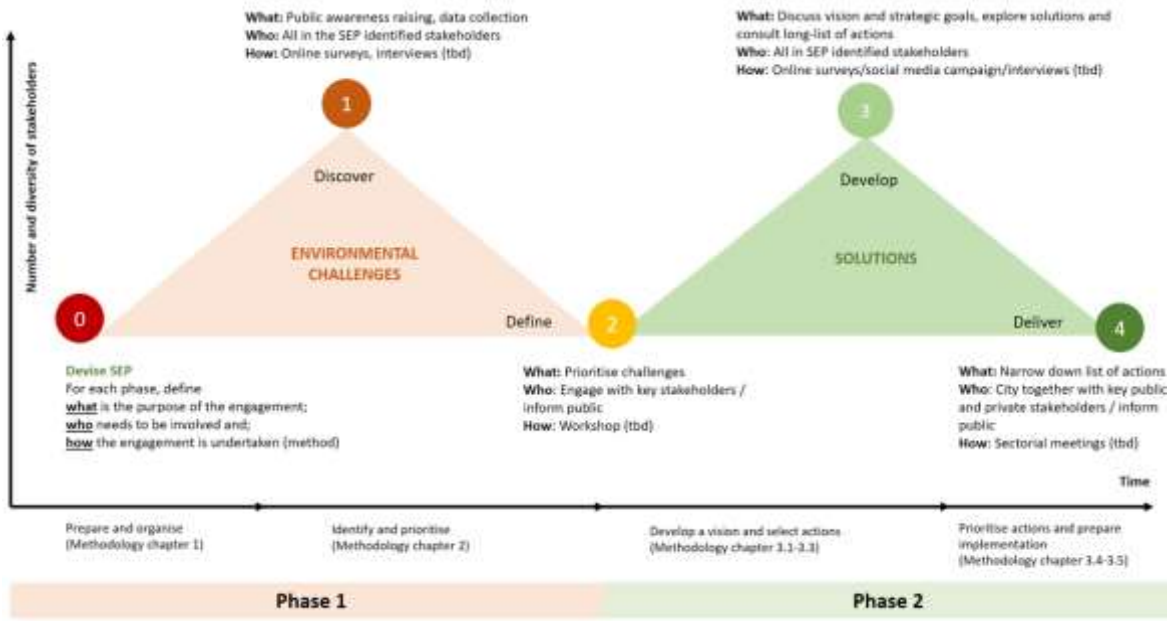


*Figure 1: Engagement activities during GCAP development process (*Please refer to p.54 Annex 2: *Summarised Stakeholder Engagement Approach)information)*

1.7. Kick-Off Meeting

The first GCAP meeting should focus on introducing all relevant parties and outlining the scope of work for the coming roughly year-long process. The Consultant will organise a kick-off meeting (KOM) with EBRD, the Green City Officer and the steering committee. This meeting shall serve as the formal start

of for the GCAP process. At the meeting, attendees should be introduced to the GCAP and EBRD Green Cities, the Methodology and associated steps. The kick-off meeting should discuss the following:

- Steps and schedule of the development of the GCAP;
- Communication protocols to external stakeholders and public disclosure mechanisms;
- Communication between the Green City Officer, Steering Committee, Consultant, and EBRD;
- Preliminary Stakeholder Engagement Plan;
- Current understanding of the GCAP approval process, to be refined in Step 1.10;
- Types of data required for the indicator database (Steps 2.1.B and 2.1.C); and
- Arrangements for the formal GCAP launch event.

The Consultant should share an outline of the GCAP's schedule for development and the preliminary Stakeholder Engagement Plan with the City prior to the KOM.

1.8. Launch event

The second public event should mark the official launch of the GCAP process and should be co-organised with the City and the Consultant. The objective of the event is to announce the City's intention to develop a GCAP, demonstrate its commitment to pursuing environmental and resilience goals, strengthen political commitment and publicise support from the EBRD and the donor community. The participants in the event should be a diverse audience that is as far as possible representative of the City's population

Experience has shown that the event should ideally:

- Include high-level remarks by the mayor or another senior representative. Other statements may be given by relevant national ministries such as the minister or deputy minister of the environment,
- A representative from the embassy of the donor country and the head of the EBRD resident office or equivalent.
- Involve media outlets with the goal of maximising visibility for the event, which should include focus on the donor financing the GCAP.

1.9. Stakeholder engagement: initial discussion on the city's environmental performance

What: In line with the approach illustrated in *Figure 1,* the purpose of the first engagement session is to reach a wide range of stakeholders in order to raise awareness about environmental challenges and the GCAP with the potential to tackle them. The activity further aims to collect views from both internal and external stakeholders on the current situation of the environmental quality, urban planning and infrastructure development of the City. The initial engagement should also highlight perceived vulnerabilities or risks the City faces.

Who: A wide range of participants should be invited, including public agencies, utility companies, businesses, NGOs, women's organisations, universities, research and knowledge institutions, as well as international and bilateral organisations conducting similar work in the city.

How: Due to the large number of stakeholders involved at this first stage, the stakeholder engagement activity can be held as a workshop (in conjunction with the KOM, launch event or as a separate event)

or in the format of a survey, social media campaign, interviews, etc. or as a combination of both, e.g. Start with a survey, the results of which are then discussed at a workshop. The format of the engagement method needs to be agreed with the City.

1.10. Summarise Prepare and Organise steps

To complete Step 1 of the GCAP Methodology – Prepare and Organise, the GCAP team should summarise the decisions, outputs and results of Steps 1.1 – 1.10. This summary helps to establish the foundation for working procedures the GCAP will benefit from during its development, and outlines requirements the GCAP will need to fulfil for approval. The summary should include:

i. GCAP Approval Process - a formal, legal approval process for the GCAP should be finalised and accepted by the City. The Consultant should prepare and submit a report outlining the milestones, timing, and key requirements for the GCAP's ultimate approval, including potential SEA procedures, by the City Council. The approval process section of the Inception Report should also detail a process for incorporating the GCAP's outcomes into the City's municipal budget, investment plan or equivalent document.

ii. SEA requirement - The Consultant should determine if the City will require a Strategic Environmental Assessment (SEA), or an equivalent document, to be submitted with the GCAP, as part of the approval of the GCAP its approval process and timeline;

iii. Names and contact details of the Green City Officer. Names, titles and sectors covered by the Steering Committee members.

2. Identify and prioritise challenges

The next phase in developing a GCAP involves using the pressure-state-response framework to identify and prioritise a city's environmental challenges. Through consultation with key stakeholders, these challenges are then translated into Green City priorities.

Upon completion of these steps, the City will have established its Green City baseline, which documents its current environmental performance, as well as resilience to vulnerabilities and risks, and identifies a set of Green City challenges that the City will address through its GCAP.

The following is an overview of steps that the Consultant should take in collaboration with the City to ensure the successful identification and prioritisation of Green City challenges, concluding the first half of the GCAP process and laying the foundation for the Green City action-planning phase to follow.

2.1. Green City Baseline

2.1.A. Policy and Urban Framework

When beginning this Step, it is important to consider the international / regional / national and sub-national contexts, including political, legal and financial conditions, issues, trends and policies that may affect the GCAP. This requires mapping out relevant political and legal conditions, as well as emerging issues and policies relating to environment and resilience. This work should build on the policy review conducted by the EBRD in Step 1.2. The findings from this exercise should be consolidated in an internal framework report, detailing the following:

i. **Policy Mapping:** a summary of the past, current, and proposed plans, policies, studies and initiatives to promote sustainable urban development and support urban resilience in the City. This includes documents prepared by the City, as well as the other public authorities (including the national and regional government) and organisations (such as industrial groups, development agencies, and any significant community initiatives). The policies reviewed should cover sectors relevant to the GCAP, including water and wastewater, urban transport, energy production and consumption, buildings, energy, solid waste, climate resilience, and urban regeneration, and education, health care, natural capital and food systems where deemed relevant. Identify areas where planning and policy measures are insufficient and/or ineffective. The analysis should include an assessment of the extent to which plans, policies, studies and initiatives have been implemented, the effectiveness, and areas for improvement.

ii. **NDC Assessment**: An overview of the Nationally Determined Contributions of the national government pursuant to the Paris Agreement. The assessment should highlight how the targets and priorities agreed in the relevant NDC link to urban environmental performance and the City's operations.

iii. **Jurisdictions and responsible authorities**: a summary of the City's jurisdiction of influence and management over specific environmental or infrastructure sectors. Identify organisations or public authorities responsible for or that have influence over the municipal sectors covered in the GCAP (transport, energy, water, etc.) to ensure responsibilities for GCAP actions are clear.

iv. **Financial analysis and municipal budget**: a summary of the City's fiscal autonomy and capacity including its financial stability (including credit-worthiness if relevant).The analysis

should include financial information of revenues and expenditures of the municipal budget over the most recent three-year period. Information collected should include inter alia: a balance sheet and cash flow for the city's finances; revenues delineated by major sources and sectors; operating expenditure by major costs and sectors; and annual investment in new or improved infrastructure. Sources of additional finance, being from national entities, private co-finance or donors should also be identified. The analysis should identify a City's capacity to invest in potential Green City actions over the coming five years.

v. **Assessment of social and economic conditions**: Describe the socio-economic and demographic landscape in the City with the goal of identifying any social and economic issues that could influence urban environmental performance. The information should be collected from input from stakeholder engagement and existing reports and articles. Findings should be supported by quantitative data.

The Consultant should look at the current and projected conditions in the City that will influence the demand for and operation of municipal services, as well as impact urban level environmental performance. To conduct this analysis, the Consultant should collect information relating to current conditions as well as projections out to 2050 on:

- Demographics: city-level population data including – inter alia – gender, age structure, disabilities, nationality, and other relevant groups. The Consultant should also identify key social conditions and trends influencing the operations of urban sectors;
- Economic: city-level economic productivity and growth, per capita and household economic data, key economic trends, and employment trends and levels of education in the city level (by gender, and other groups – youth, people with disabilities, etc.).

vi. **Gender and vulnerable population representation and participation in city development**: The Consultant should also assess the extent to which men, women and vulnerable groups have equal economic and other opportunities in the City's governance and socio-economic framework, and their representation in a City's decision-making and governance processes. The assessment should consider institutional, political and legal barriers women and vulnerable groups, who may face disproportionate barriers to economic opportunities, face to participate in the City's infrastructure development. The assessment should answer whether there is political support within the municipal government towards vulnerable groups and gender-inclusive policies and approaches, and if the City has already developed such approaches. If yes, the assessment will review these policy approaches, and will ensure that this assessment builds on any urban policy previously developed. It should also consider a City's capacity to develop and implement gender-responsive policies and measures. (Please refer to p75 Annex 7. *Guidance Note for developing the Gender Assessment*)

2.1.B. Map environmental performance (pressure and state indicators)

The next step is to map the City's environmental performance by collecting and benchmarking state and pressure indicators to international standards. These complement the response indicators to be collected in Step 2.1.C. Together, the state, pressure and response indicators form the full Green Cities indicator database. This assessment is conducted through a traffic light screening[3] of a prescribed set

[3] *TRAFFIC LIGHT SCREENING

of indicators (Annex 1 presents the thresholds for this benchmarking exercise). The GCAP set of state and pressure indicators includes 35 core indicators. In the event that core indicators are not available, elective indicators may be used to provide a more thorough analysis.

Although the set of PSR indicators provides a useful framework for evaluating urban environmental performance, there may be amendments or additional indicators proposed that address areas of critical concern for a city. While the City and the Consultant should strive to compile information for all indicators, a minimum of 85 percent of core indicators has proven sufficient.

Where quantitative information is not available for specific indicators, further analysis and stakeholder engagement will be necessary to fill these gaps with more qualitative information. Local businesses, NGOs and knowledge institutions can provide support to address gaps in the indicators assessment.

Once this information has been gathered, state and pressure indicators marked red in the traffic light screening can be used to develop an initial list of challenges to consider. If the traffic light screening results in a large number of red-flagged indicators, trend analysis[4] can be used to prioritise among them (for example, selecting only red-flagged indicators with declining trends). If the traffic light screening results in no or very few red-flagged indicators, amber indicators may be considered, using trend analysis to prioritise among them. These initially identified challenge areas will be further refined through subsequent analyses and stakeholder engagement.

2.1.C. Map policy performance (response indicators)

Once initial environmental challenges and risks have been identified, the next step is to collect and assess response indicators. This is to evaluate whether the City and other public authorities have sufficient plans, policies, studies and initiatives in place to address environmental and urban resilience challenges matched against an established set of *EBRD Green Cities* indicators measuring city responses to urban challenges. This analysis should draw from the Policy Mapping exercise carried out in Step 2.1.A. This exercise should be conducted as part of assessing the response indicators[5] using the traffic light approach.

Given that the response indicators are largely qualitative, the response gaps they reveal (for example, lack of investment or lack of regulations) will be general in nature. However, the response indicators assessment should still aim to indicate the presence, absence and quality of relevant policies.

2.1.D. Map city resilience based on risks and vulnerabilities

A city's pathway to a greener future is dependent on its ability to implement that vision while mitigating risks affecting its current and future functioning. As such, understanding the risk landscape is crucial for supporting the implementation and long-term resilience of the GCAP. This step involves

A traffic light screening is applied to each indicator to compare a city's environmental performance against international standards.

- Green light = good performance, in line with international standards
- Amber light = insufficient performance, cause for concern
- Red light = low performance, in need of critical attention

[4] Trend analysis looks at the performance of a specific indicator over a given period. For example, has the local air quality improved or declined in the last decade?

[5] Annex 2 presents the Green Cities indicators' thresholds for this benchmarking exercise.

performing a Risk and Vulnerability Analysis (RVA), supported by inputs from a diverse range of stakeholders. This analysis articulates a city's risks and vulnerabilities to either address in the present or design for in the future, both in terms of exposed populations and assets. (Please refer to *p53: Annex 3. Incorporating Resilience into Green Cities* for more information.) The RVA uses the following process:

i. **List hazards relevant to the City** – these include environmental (physical and climatic), technological, and socio-economic or anthropogenic hazards to identify that affect a city and its citizens. Not all hazards will have an impact on green outcomes, thus those with connections to emissions, climate resilience or environmental quality should be prioritised. This analysis should include environmental considerations, such as current and future climate conditions, as well as considerations under objectives such as resilience, economic opportunity, and public health, amongst others.

ii. **Identify impacts on critical urban systems and services** – the City should identify those systems, assets or infrastructure that are already under stress or are likely to be disturbed by further stresses and shocks. These critical areas should then be mapped against the current and future hazards identified earlier to refine which areas are particularly exposed.

iii. **Assess vulnerabilities** – this considers the sensitivity of systems and assets, and communities and people to expected impacts and their respective adaptive capacity. First, the assessment considers the adaptive capacity of the critical urban systems and services identified in the previous step. Those systems or assets with limited ability to adapt should be denoted as more vulnerable. Second, the assessment identifies communities and persons, including their locations, exposed to hazards and impacts identified in the previous two steps. In identifying vulnerable communities, the assessment should consider opportunities to promote gender equality and economic inclusion. The assessment then classifies the vulnerability of certain communities based on their sensitivity and capacity to adapt to expected impacts.

iv. **Analyse and prioritise risks and vulnerabilities** – prioritise the risks by considering their extent or scope of impact, and likelihood of occurring. This step should involve stakeholder outreach to fully articulate the potential impacts from certain risks occurring. This final step should result in a clear prioritisation and consolidated set of risks a city should consider to identify its Green City challenges (Step 2.3) and develop its Green City Actions (Step 3.2 and 3.3.C).

2.1.E. Smart Maturity Assessment

Cities increasingly rely on digitalisation of municipal services to support more effective and targeted operation, maintenance and planning. The Smart Maturity Assessment takes into consideration the extent to which a City has taken advantage of and incorporated smart measures into their operations to date. (Please refer to *p63: Annex 4. Incorporating Smart into Green Cities* for more information.) The following steps should be included in the assessment in the context of urban infrastructure and municipal services:

- Collect and analyse data on provision, quality, and use of IT infrastructure available in the City, including but not limited to, broadband, 4G, 5G and public WIFI.
- Evaluate the extent to which the City has integrated and benefitted from the provision smart technologies in of urban infrastructure and municipal services to date.
- List and analyse municipal strategies if any to promote the use of smart technologies.
- Evaluate the maturity and the readiness of the City to expand the use of smart technologies. In another word, assess the appropriate level of technologies the City should invest in for the

next 5 years, and, if relevant, suggest how governance structure and/or strategies should be set up.

The findings of the assessment should support identifying or recommending appropriate smart technologies for each GCAP action to be prepared as part of Step 3.2.B in order to enhance the potential environmental outcomes or to improve efficiencies of managing urban infrastructure and services. Information should be collected disaggregated by gender where possible.

2.1.F. Complete technical assessment and identify Green City challenges

The traffic light indicator screening provides a high-level picture of a city's environmental and resilience performance. The next step is to perform a deep technical assessment to uncover why the indicators appear as they do, and why risks and vulnerabilities may exist. (Please refer to *p69: Annex 5. Technical Assessment Guidance Note* for more information.)

The following should be included:

- Descriptions of current and projected urban environmental and infrastructure performance and management. Sectors included in the pressure and state indicators should be assessed, but other sectors may be added as appropriate for the context of the City. Use both quantitative and qualitative analysis to describe the status of operations in each sector.

  Examples of the supplemental information to collect to inform the status of municipal operations includes:
  - modal split for transport, number of transport operators
  - total MSW generated, and status of waste management practices
  - energy production and consumption information by primary energy source and final energy usage
  - total urban footprint, and area of parks and green space
  - proportion of buildings by type and use
  - status of reserves and sources of water

- The analysis should examine both the current conditions and operations of urban ecosystem services and infrastructure performance, and projections and trends to 2050 for the information above.

- In addition to these operational considerations, gender considerations with respect to the status of infrastructure performance and management should be assessed. The analysis should also consider the extent to which there is female representation and economic opportunities in the workforce of the sectors considered.

- Drivers of indicator performance: In the case of state indicators, related pressures and their level of influence may be explored: transport, land use, buildings, energy, solid waste, water cycle management and industries and additional sectors, such as food systems, health, education and social care as agreed with the City. For each pressure, a description of the current quality of its infrastructure should be highlighted. For instance, when exploring the city's transport infrastructure, the following may be considered: modality, private vehicle fleet, resident behaviour patterns, public and commercial fleet, congestion, road safety and infrastructure needs.

- Existing management approaches: Here, the body responsible for managing related pressure indicators should be determined (national, regional, municipal governments). Policies, directives, standards and legal frameworks governing or affecting the indicator should also be explored.

  For example, in the case of air quality, is there a Directive in place to regulate ambient air pollution, establish fuel quality standards and reduce emissions across sectors? Does the City have any action plan or strategy that has identified air quality as one of its main action areas? Does the City follow national directives when it comes to air quality?

- Drivers of risks and vulnerabilities: potential links between identified risks and vulnerabilities to sectors covered in the indicators should be identified. The analysis should seek to understand what may drive such risks and vulnerabilities, and where there is overlap with a city's environmental concerns.

Following the technical assessment, Green City challenges should be identified. These challenges should pinpoint areas of concern with respect to the current quality of environmental assets, potential future pressures from development, climate change, areas to improve a city's resilience, gaps in policy or strategies in relevant sectors.

2.2. Stakeholder engagement: prioritising Green City challenges

What: A stakeholder consultation should be organised to present the findings from Step 2.1 – Green City Baseline. The goal of the stakeholder engagement is to translate the Technical Assessment's identified Green City challenges, with respect to urban environmental performance, into a shortened list of specific priorities for the GCAP to address.

Challenges stemming from core and elective indicators marked red in the traffic light screening should take priority. Challenges relating to indicators marked amber but trending towards red can also be prioritised.

The final agreed list will be the Green City challenges integrated into the GCAP.

Who: City representatives and key stakeholders (as defined in the SEP, cf. Step 1.5) should confirm the relevance and prioritise the Green City challenges that have been identified. Ideally, stakeholder consultations should be cross-departmental. The wider range of stakeholders should be informed about summarised findings across the Green City Baseline assessments.

How: In a workshop or similar format, key stakeholders should select and discuss a short, high-level list of priority environmental challenges stemming from the Green City challenges. This list of priority environmental challenges identifies which of the thematic areas under the GCAP's state indicators should be a focus. Stakeholders that were not part of the prioritisation workshop should be informed about the outcomes of the baseline assessments and the prioritisation (via email, social media, etc.)

2.3. Complete Green City baseline and prioritisation of Green City Challenges

The results of all activities in this chapter constitute the Green City baseline, which documents the City's current environmental performance and related vulnerabilities to certain risks related, including the governance and policy frameworks in place that affect it. The final output of the Green City

baseline identifies a set of Green City challenges, and high-level list of priority environmental challenges, that the City will address through its GCAP.

As a final step in this phase, the baseline should be reviewed and confirmed by the City's Green City Officer and Steering Committee, ensuring buy-in from key stakeholders and experts. The Green City baseline does not necessarily require formal council approval at this stage, but it still offers a platform for political debate, review and recommendations.

3. Plan Green City actions

The GCAP process can be divided into two phases. The first establishes the Green City baseline, described in the previous chapter, which provides a comprehensive picture of where the city is today and which areas need attention. The second phase, planning Green City actions, lays out a plan to improve a city's environmental performance through targeted actions.

The following is an overview of this second phase.

Steps to formulating Green City actions

VISION
(15 years)
Where would we like the city to be in 15 years?

STRATEGIC GOALS
(10 to 15 years)
Which specific areas do we need to address across sectors to achieve this vision?

LONG LIST OF ACTIONS
(1 TO 5 YEARS)
Which actions do we need to implement to reach our strategic goals for each sector?

MEDIUM TERM TARGETS
(5 TO 10 YEARS)
Which targets should we aim to achieve through our actions?

Final Green City actions
(1 to 5 years)

3.1 Develop a vision

3.1.A. Establish the GCAP structure

GCAPs can be structured according to the municipal sectors set out in the PSR indicators (for example, transport, water, buildings) or by specific cross-cutting themes (such as climate mitigation or resource efficiency). The selected structure should be agreed with the City and should promote a cross-sectoral, integrated approach to sustainable urban development.

3.1.B. Set a vision and determine strategic goals

Set vision for Green City development (15 years)

Single, overarching vision for its Green City development, or multiple visions relating to specific sectors or thematic areas.

The resulting vision should be used to guide GCAP development and the selection of Green City actions.

Determine strategic goals (10 to 15 years)

Having clarified its vision, the City then needs to set specific strategic goals for Green City development aimed at achieving this vision. These goals may relate to environmental improvements or socio-economic and resilience considerations. This will set the basis for a distance to-goal comparison over a 10 to 15 year period and should follow the same structure as the City's vision. (following the structure decided in 3.1.A). If there are multiple visions, there must be at least one strategic goal for every vision. Specific PSR indicators may also be referenced in the strategic goals to help establish a measurable target.

Example relationship between Green City vision, strategic goals, medium-term targets and actions

3.2. Select Green City actions

3.2.A. Review existing Green City initiatives and responses

After the City has defined a draft vision(s) and strategic goals, the next step is to identify Green City actions in collaboration with the Consultant. Before developing a list of new actions, existing responses and initiatives addressing Green City challenges should be compiled.

This should draw from the Policy and Urban Framework Report and should identify investment, policy and other initiatives the City already has planned for the next one to five years.

3.2.B. Select Green City actions (1 to 5 years)

Following the assessment of existing responses and policy gaps, an initial longlist of Green City actions may be developed. These actions should enable the City to achieve its strategic goals and vision. Green City actions may be categorised as follows:

- **Policy:** actions concerned with legislative, regulatory or standard-setting measures
- **Investments:** actions focused on capital expenditures to improve the environmental performance of local infrastructure
- **Other initiatives:** partnerships, outreach campaigns and other efforts that contribute to strategic goals. Thorough consideration should be given to the scope of each action and the body responsible for executing it. While most actions should pertain to a city's geographic and political jurisdiction, some actions may need to be targeted at the national or regional level. The list of actions developed should be feasible and particularly sensitive to the availability of finance to support the scope of activities identified.

The initial longlist of Green City actions should describe the scope and scale of the proposed initiatives, the main implementing party to be responsible, and an initial estimate of capex range for investments to be refined in later stages.

The initial longlist of Green City actions should also be evaluated to consider opportunities to maximise co-benefits. In order to determine where resilience co-benefits exist, the outcomes of the RVA should be used (i.e. list of prioritised risks developed at step 2.1.D). In order to determine where gender equality or economic inclusion co-benefits exist, the outcomes of the assessment of social and economic conditions in step 2.1.A should be considered. Actions should also consider opportunities to benefit from smart measures and digitalisation.

EBRD has developed an EBRD Green Cities policy tool, available on ebrdgreencities.com. The tool presents a comprehensive menu of possible urban green policies and relevant examples. Cities can use the tool as inspiration for measures and best practices to consider in developing their own Green City actions.

3.3. Stakeholder engagement: discuss Green City vision, strategic goals and long-list of actions

What: The third stakeholder engagement activity aims to 1) discuss, amend and endorse the City's vision and strategic goals for green development and 2) seek for solutions to tackle the defined environmental challenges. The consultation should be based on a proposal for a vision and also a first long-list of potential actions. At the same time, the consultation should be taken as an opportunity to solicit additional ideas from stakeholders on possible solutions to local environmental challenges.

Who: Defining a vision and strategic goals as well as developing actions are steps that concern all citizens. Hence, this consultation should be undertaken with a wide range of stakeholders. Consequently, all in the SEP defined stakeholders should be invited to take part in this third stakeholder activity.

How: Experience from past GCAPs has shown that a vision can be well identified through an online vote. It has also been proven that it is difficult to discuss the long-list of action in a workshop with a large group of stakeholders, as it is time-consuming to go through all the actions and consequently,

there is often not enough time for discussion in the end. Alternatively, a first long-list could also be put to vote (either together with the vision and strategic goals, or at a later stage under step 3.4). Additional ideas for actions could be gathered through surveys or interviews.

3.4. Prioritise Green City actions

3.4.A. Impact and cost implications of actions

As a next step, the implications of the refined list of Green City actions should be assessed. Impacts on the City's annual expenditure and capital expenditure (capex) budgets should be estimated and presented separately for each action proposed in the GCAP. In an effort to further prioritise the actions, benefits and savings should be estimated to allow for a thorough political consideration of proposed actions.

Potential sources of finance for the list of actions should also be identified. Traditional sources, such as municipal and national budget loans from international financial institutions, should be considered. In addition, funding sources such as external donors and private-sector financing should also be explored.

Beyond financial commitments, each action should be evaluated to determine its potential benefits. Within the green dimension, impacts such as emissions, energy, and material or water savings should be estimated. Beyond green, each action should detail its job creation potential and other socio-economic dimensions where information is available.

This analysis should provide the City with sufficient detail and clarity to finalise the list of actions in the next step. For each Green City Action a group of relevant actors for implementation should be identified. Specific attention should also be given to those actions that can begin implementation within the first year of the GCAP's 5-year plan.

For more information please see the box entitled 'impact and cost implications of actions' below.

Impact and Cost Implications of Actions

Based on international experience, the following are commonly provided in draft GCAPs.

- Estimated capex costs and annual implementation costs per action.
- Estimated environmental benefits per action, which include:
  - physical impact of the action such as GHG emissions savings, water savings, individuals benefiting, materials savings or reductions, primary energy savings, and energy intensity reductions;
  - climate resilience benefits in light of projected climate change: increased water availability, increased energy availability, increased agricultural potential, increased human health/productivity, reduced damage and disruption
- Estimated economic benefits per action, which include:
  - potential reductions in operating expenditures (opex)
  - potential job creation
  - the estimated cost of pre-investment (feasibility and impact studies, and so on)
- Indicative implementation and an operational timeline.
- Total estimated annual budget for the GCAP, including all actions, for the entire duration of the GCAP and per year.

(For energy projects, please refer to p73: *Annex 6. Water Consumption for Energy Technologies*.)

3.4.B. Map actions against challenges, risks and vulnerabilities identified, and co-benefits

The Green City Action Plan should address the Green City challenges identified in the Green City baseline, as well as risks and vulnerabilities highlighted. To confirm the Plan achieves this objective, each Green City action should be mapped against relevant challenges, risks and vulnerabilities.

The analysis should expand the information and detail provided for each Green City action to include the Green City challenge and high-level priority environmental challenge it addresses. Additionally, the description of each action should look beyond purely green outcomes to consider potential resulting co-benefits in other dimensions. As such, each action should connect to its ability to address the risks and vulnerabilities identified as part of Step 2.1.D and prioritised in Steps 2.2 and 2.3.

Last, actions should seek to maximise co-benefits along with pursuing green outcomes. This analysis should consider and affirm the extent to which actions contribute to ends such as improved urban resilience, recovery from the impacts of the COVID-19 pandemic, economic benefits and social improvements. The table below provides an example framework to analyse co-benefits of actions. The co-benefits of all actions should be documented.

Dimensions for evaluating Green City Action Benefits				
Primary	Co-benefits			
Green benefits	Resilience benefits	COVID-19 response benefits	Economic benefits	Social benefits
Reduced GHG emissions	Improved public health	Reduced impact on respiratory system	Job creation	Enhanced gender equality
Improved energy efficiency	Increased access to sustainable food	Retaining the benefits citizens have experienced from reduced pollution	Increased local business opportunities	Improved social equality
Improved climate resilience	Increased access to sustainable energy	Enhance possibilities for social distancing	Revenue generation	Reduced poverty
Increased green and recreational spaces	Increased access to sustainable and safe mobility	Preventing or mitigating the effects of future pandemics	Cost savings	Improved, community engagement
Improved air, water or soil quality	Improved access to education services			Improved safety (e.g. road safety, GBVH, crime, etc.)
Reduced pollution, including noise	Improved supply chain security			Training/ education opportunities for women, elderly, youth and minorities
Improved or maintained ecosystem services	Increased access to sustainable housing			Barrier free access / improved access to services
	Increased access to water / sanitation			Vulnerable population addressed

3.4.C. Determine medium-term targets (5-10 years)

Setting benchmarks on a 5 to 10 year timescale, medium-term targets create links between the short-term Green City actions and longer-term strategic goals. As such, a medium-term target can relate to a single Green City action or a group of actions.

3.4.D. Stakeholder engagement: finalise Green City actions

What: The detailed list of Green City actions should be discussed and approved in a final round of stakeholder discussions. An important part of the stakeholder consultation is the reality check of the actions and a forward-looking vision of how the defined actions can actually be implemented (with which partners).

Who: Key stakeholders (as defined in the SEP, cf. step 1.5) that are relevant for decision-making and the implementation of GCAP actions (incl. from the private sector) should be invited to this final consultation. The wider group of stakeholders should be informed about the process and decisions made.

How: Appropriate formats for discussing and finalising GCAP actions may include workshops or sectoral meetings.

3.5. Finalise Green City Action Plan

3.5.A. Resource implications for implementing the GCAP

Throughout the GCAP process, areas in which the City lacks the capacity to undertake and monitor the implementation of Green City actions may become apparent. The GCAP should identify such capacity gaps and offer a list of general resources and capacity-building measures to support GCAP implementation.

These measures can broadly be divided into:

- Human resources: additional staff required and capacity building activities needed for relevant stakeholders
- Public education and awareness measures
- Data collection and monitoring measures: areas where data quality may need to improve to better assess environmental performance.

As with the GCAP actions, cost estimates for these capacity-building measures should be included.

3.5.B. Monitoring and reporting

A monitoring and reporting plan for overseeing the implementation and eventual impacts of Green City actions should be developed within the GCAP. Further details on the monitoring and reporting requirements for the GCAP are provided in Step 4.

3.5.C. Draft GCAP

Findings from the Green City action-planning process should be compiled into the final GCAP. The GCAP's language should reflect that this is the City's document and should be written as such, including using first-person pronouns. The final document should also include a brief summary of how stakeholder feedback has been incorporated into the GCAP and how the GCAP contributes to strengthening the overall resilience of the City considering projections to 15 years ahead and reflecting the Green City vision.

As certain information may be deemed too sensitive to be published, the Consultant should agree on the final contents of the GCAP with the City.

3.5.D. Present GCAP for approval

All GCAPs are submitted for approval to the city council or equivalent. Appropriate steps should be taken to ensure that the GCAP meets all requirements for approval. Public disclosure of the GCAP for comment is often required, while the *Stakeholder Engagement Guidance* for GCAPs requires consultation on the draft GCAP before approval as a minimum level of disclosure. The final GCAP should be published on the City's website for public access and should include a short summary of how the comments from the public disclosure period have been taken into account. This step is also important as it ensures buy-in for the Green City actions proposed.

If a SEA is required, the SEA should follow the procedures necessary to enable a GCAP's subsequent approval. Ideally, there will be no need to carry out separate GCAP and SEA consultation processes and a unified consultation approach can be designed.

Upon the conclusion of this step, the City will have clearly defined its vision, strategic goals, medium-term targets and Green City actions. With responsibilities clearly delineated and buy-in secured from relevant stakeholders, the City can then move to the implementation and monitoring step of the GCAP.

4 Implement and monitor

A GCAP provides cities with a blueprint for transforming their local environment and addressing their most pressing challenges. After defining its Green City vision, strategic goals, medium-term targets and actions, the City is now ready to implement and monitor the GCAP.

4.1. Implementation and monitoring

Continuous monitoring of all projects and measures in the GCAP is an integral part of implementation. By regularly and methodically tracking all Green City actions and their impacts on the environment, the City can determine whether the GCAP is progressing as planned and contributing as expected to the established goals.

Successful monitoring requires two key components:

- Implementation monitoring plan: This tracks the status and progress of the GCAP projects being implemented.
- Impact monitoring plan: This measures the impact of the GCAP project and policies on the City's environmental and resilience performance. Part of the impact-monitoring plan should be the continuous observation of the risk and vulnerability landscape and the extent to which the Green city actions are contributing towards resilience.

The implementation and monitoring structure should be integrated into the GCAP, reviewed and approved by the City as part of the overall GCAP package.

4.1.A. Define responsibilities

The first step to effective implementation is to clearly define a key person responsible for overseeing all Green City actions.

Primary responsibility for implementation and subsequent monitoring should preferably be assigned to the Green City Officer, who has the authority to successfully coordinate with all relevant municipal departments. This person will serve as the implementation and monitoring coordinator, as well as having the role of advocating, facilitating and fostering the inclusion of the GCAP in other City relevant planning instruments. This process should also be endorsed and supported by the Political Champion.

Within each municipal department, a project leader should be appointed to manage internal staff responsible for:

- overseeing the implementation of specific actions
- reporting on the progress of implementation
- collecting the required impact data

Each department should set budgets and timescales for delivering assigned actions. The assigned departmental staff should provide regular reports on the progress of implementation and environmental impact to the City's implementation and monitoring coordinator. The results of this will inform the planning of subsequent stages of each action, including amendments to timescales, resources and the budget, as needed.

Project leaders should also aim to align GCAP monitoring with other planned City activities and initiatives to prevent duplication and improve efficiency. For example, the results from the GCAP monitoring can be used for urban planning, disaster risk resilience and sustainability plans.

4.1.B. Develop implementation monitoring plan

Implementation monitoring should be done on both a short-term and long-term basis. The implementation monitoring plan should list all Green City actions and clearly indicate project status and milestones (started/ not started, complete/not complete).

The plan provides an opportunity to assess implementation by:

- Comparing implementation efforts with original goals and targets: Are the actions being implemented?
- Determining whether sufficient progress is being made towards achieving expected results: Are the targets being reached?
- Determining whether implementation is progressing according to schedule.
- Determining whether implementation is progressing in a different direction than planned (link to Step 4.1 E).

4.1.C. Develop impact monitoring plan

While implementation monitoring tracks the progress of Green City actions, impact monitoring measures how effective these actions have been in achieving the environmental targets and goals.

These targets, goals and related actions all derive from the environmental challenges identified previously in the GCAP through the pressure-state-response (PSR) framework. The PSR framework therefore provides a useful model for categorising indicators in the impact monitoring plan. For example, the following pressure, state and response indicators could be employed when monitoring the effectiveness of extending a local bus system:

- Pressure: whether private transport has decreased.
- State: whether air pollution impacts have decreased.
- Response: how many buses and new connections have been introduced?

For each of the indicators to be tracked, the impact monitoring plan should also identify the municipal department responsible for providing the required data.

It is important to note that while some impacts can be detected immediately, others, such as improved air quality and greenhouse gas emissions, can only be monitored in the long term.

4.1.D. Set data collection standards

To help project leaders manage data correctly, the monitoring coordinator should set guidelines for the recording and storage of data. Since the GCAP indicators should be measured against global benchmarks, the data guidelines, including, where possible, gender-disaggregated data for population

/ workforce etc. and indicators should also include definitions of terms within the local context and clarify data privacy principles.

Data should be collected across all relevant PSR indicators for each action to measure progress relative to the Green City baseline. Relevant indicators for each action will have previously been identified in the GCAP but may be expanded as new indicators and data collection tools become available. A full list of all indicators can be found in Annex 2.

When drafting the monitoring and implementation plans, consultants should use the templates developed by the EBRD.

4.1.E. Evaluate and amend GCAP implementation including timelines and plans

Unexpected events can change the GCAP implementation plan. For example, an extreme weather event, an earthquake or a global pandemic could mean that the City needs to prioritise repairing critical infrastructure over a GCAP-recommended investment.

The City could also delay implementing an action or decide to amend one. For example, instead of purchasing 100 electric buses to meet its air-quality and transport-sector targets, the City might only purchase 50.

The implementation and monitoring coordinator is responsible for updating and revising the implementation and impact monitoring plans to reflect these changes. The Green City Officer should work with relevant departments and stakeholders within the City to ensure that any updates to the monitoring plans receive appropriate approvals.

The path to becoming a Green City is continuous; through periodically monitoring the progress of the GCAP, the City can inform the public on what was accomplished and adjust their visions, strategic goals and actions as needed.

Annex 1. Pressure-State-Response Indicators for Green Cities

Green City indicators are structured according to the pressure-state-response framework. In total, there are 114 indicators, 35 of which are core indicators. An additional sub-classification between core indicators and elective (optional) indicators is proposed for the state and pressure categories only. This is to narrow down the number of indicators used for the benchmarking and prioritisation process. The core indicators are in blue and the optional indicators corresponding to each core indicator are in white and listed in terms of priority. In other words, if Indicator 1 is not available, Indicator 1.1 should be the first choice to replace it, then 1.2, and so on. For each indicator, it is important to collect multiple years of data to assess and document whether the trend is upward, neutral or downward.

State indicators

	Indicator	Description	Unit	Benchmarks			Sources
Quality of Environmental Asset							
Air quality			Refer to TAR guidelines for examples of additional indicators and information				
1	Average annual concentration of $PM_{2.5}$	Particulate matter in suspension, with a diameter lower than 2.5µm, annual average. The data should be collected twice a month through sensors in multiple locations of the city, and averaged. The locations should reflect the diversity of urban areas (residential, roadside, industrial zones, parks etc.).	µg/m^3	< 10 (annual)	10–20 (annual)	> 20 (annual)	WHO http://www.who.int/mediacentre/factsheets/fs313/en/
1.1	Average annual concentration of PM_{10}	Particulate matter in suspension, with a diameter lower than 10µm, annual average. The data should be collected twice a month through sensors in multiple locations of the city, and averaged. The locations should reflect the diversity of urban areas (residential, roadside, industrial zones, parks etc.)	µg/m^3	< 20 (annual)	20–50 (annual)	> 50 (annual)	
1.2	Average daily concentration of SO_2	Sulphur dioxide in suspension 24-hour average. The data should be collected twice a month through sensors in multiple locations of the city, and averaged. The locations should reflect the diversity of urban areas (residential, roadside, industrial zones, parks etc.)	µg/m^3	< 20 (24 hour)	20–50 (24 hour)	> 50 (24 hour)	
1.3	Average annual concentration of NO_x	Nitrogen dioxide in suspension, annual average. The data should be collected twice a month through sensors in multiple locations of the city, and averaged. The locations should reflect the diversity of urban areas (residential, roadside, industrial zones, parks etc.)	µg/m^3	< 40 (annual)	40–80 (annual)	> 80 (annual)	

Water bodies, drinking water							Refer to TAR guidelines for examples of additional indicators and information
2	Biochemical Oxygen Demand (BOD) in rivers and lakes	BOD shows how much dissolved oxygen is needed for the decomposition of organic matter present in water. The data should be collected in several locations of each river / lake, twice a month.	mg/L	< 2	2–4	> 4	EEA http://www.eea.europa.eu/data-and-maps/indicators/freshwater-quality/freshwater-quality-assessment-published-may-2
2.1	Ammonium (NH_4) concentration in rivers and lakes	Ammonium concentrations are normally raised as a result of organic pollution, caused by discharges from waste water treatment plants, industrial effluents and agricultural runoff. The data should be collected in several locations of each river / lake, twice a month.	µg/L	< 150	150–200	> 200	
2.2	Bathing waters meeting minimum standards	Percentage of designated bathing water quality (inland and coastal) meeting minimum standards. For none EU countries, use the following WHO guidelines and selected regulatory levels to determine minimum standards. (https://circabc.europa.eu/d/d/workspace/SpacesStore/9e89152c-7cfe-4391-9bcf-c173519e8181/WHO%20Recommendations%20on%20EC%20BWD.pdf)	%	>95%	95-70%	<70%	EEA / WHO https://www.eea.europa.eu/themes/water/europes-seas-and-coasts/assessments/state-of-bathing-water/bathing-water-directives
3	Water samples complying with national potable water quality standards	The data should be collected in several locations of the water supply network. Ideally the quality of water should be frequently measured to avoid health hazards (once a week)	% in a year	> 97	90–97	< 90	IADB's ESCI
Soil							Refer to TAR guidelines for examples of additional indicators and information
4	Contaminated sites	The term **'contaminated site'** (CS) refers to a well-defined area where the presence of soil contamination has been confirmed and this presents a potential risk to humans, water, ecosystems or other receptors. Risk management measures, e.g. remediation, may be needed depending on the severity of the risk of adverse impacts to receptors under the current or planned use of the site. Sensitive areas, such as industrial zones and solid waste disposal sites, should be covered Identify sources of soil contamination	CSs / 1000 inh.(or km^2)	< 10	10–20	> 20	EEA http://www.eea.europa.eu/data-and-maps/indicators/progress-in-management-of-contaminated-sites-3/assessment
4.1	Concentration of mercury in soil	Concentration of (a) mercury, (b) cadmium and (c) zinc in soil. Other heavy metals that could be measured include chromium, arsenic, lead, copper and nickel. The data should be collected in multiple locations of the city, twice a month. Sensitive areas, such	mg/kg	< 0.3	0.3 – 10	> 10	EEA/ the Dutch Ministry of Housing, Spatial Planning and the Environment.
4.2	Concentration of cadmium in soil		mg/kg	< 0.8	0.8 – 12	> 12	

4.3	Concentration of zinc in soil	as industrial zones and solid waste disposal sites, should be covered. Benchmarks follow standards set by the Dutch Ministry of Housing, Spatial Planning and the Environment.	mg/kg	< 140	140–720	> 720	http://www.eea.europa.eu/data-and-maps/indicators/progress-in-management-of-contaminated-sites-3/assessment
4.4	Concentration of mineral oil in soil (using infrared spectroscopy)	The data should be collected in multiple locations of the city, twice a month. Sensitive areas, such as industrial zones should be covered. Benchmarks follow standards set by the Dutch Ministry of Housing, Spatial Planning and the Environment.	mg/kg	< 50	50–5000	> 5000	
Availability of Resources							
Water use		Refer to TAR guidelines for examples of additional indicators and information					
5	Water Exploitation Index	The Water Exploitation Index Plus (WEI+) is the total water use as a percentage of the renewable freshwater resources in a given territory and time scale.	%	< 20	20–40	> 40	EEA http://www.eea.europa.eu/data-and-maps/indicators/use-of-freshwater-resources-2/assessment-1
Open space		Refer to TAR guidelines for examples of additional indicators and information					
6	Open green space area ratio per 100 000 inhabitant	Hectares of permanent green space per 100,000 city residents. The data should be compiled bi-annually.	Hectares	> 10	7–10	< 7	IADB
6.1	Share of green space areas within urban limits	This indicator measures the amount of green, blue and vacant land within urban limits. The data should be compiled bi-annually.	%	> 50	30–50	< 30	OECD/ICLEI
Biodiversity		Refer to TAR guidelines for examples of additional indicators and information					
7	Abundance of bird species (all species)	This indicator measures the percentage of change in bird population in one year. The data for the whole city can be estimated from a sample of an inventory of bird population in a given area. The data should be compiled once a year	Annual % of change	Positive or stable	Slight decline (of 0%-2%)	Strong decline (> 2%)	EEA http://www.eea.europa.eu/data-and-maps/indicators/abundance-and-distribution-of-selected-species/abundance-and-distribution-of-selected-2
7.1	Abundance of other species	This indicator measures the percentage of change in a given species population in one year. The data for the whole city can be estimated from a sample of an inventory of bird population in a given area. The data should be compiled once a year	Annual % of change	Positive or stable	Slight decline	Strong decline	
Climate Change Risks							
Mitigation (GHG emissions)		Refer to TAR guidelines for examples of additional indicators and information					

8	Annual CO_2 equivalent emissions per capita	CO_2 emissions of the city, divided by city population. This indicator controls for the size of city population. Estimates of CO2 emissions must first be made within each sector (transport, electricity etc.) and averaged. The data should be compiled once a month.	Tonne / year / capita	< 5	5–10	>10	IADB
8.1	Annual CO_2 emissions per unit of GDP	CO_2 emissions, divided by the GDP of the city. The data should be compiled once a month.	Tonne / USD of GDP	< 0.35	0.35–0.8	> 0.8	IADB
Adaptation (resilience to natural disaster risks)			Refer to TAR guidelines for examples of additional indicators and information				
9	Estimated economic damage from natural disasters	This indicator should measure overall losses (not only uninsured losses) of floods, droughts, earthquakes etc. as a share of GDP. Usually a city already has such data. Otherwise, the information may be found in the EM-DAT database or the NatCatService database. If such data is not available, data on past damages can be used (as an average of damages over the past 10 years).	**%**	< 0.5	0.5–1	> 1	OECD / ICLEI http://www.eea.europa.eu/data-and-maps/indicators/direct-losses-from-weather-disasters-1/assessment
9.1	Percentage of public infrastructure at risk	Percentage of public infrastructure vulnerable to natural disasters due to inadequate construction or placement in areas of non-mitigable risk. This requires an identification of urban areas exposed to a disaster (e.g. located in a low-lying area, exposed to a landslide…) together with information about the quality of housing in such areas. The data should be collected based on a selected climatic / geological event (e.g. 10-year flood, if flood is the most common type of disaster that usually hit the city). The data should be collected bi-annually.	**%**	< 10%	10–20%	> 20%	IADB
9.2	Percentage of households at risk	Percentage of households vulnerable to natural disasters due to inadequate construction or placement in areas of non-mitigable risk. This requires an identification of urban areas exposed to a disaster (e.g. located in a low-lying area, exposed to a landslide…) together with information about the quality of housing in such areas. The data should be collected based on a selected climatic / geological event (e.g. 10-year flood, if flood is the most common type of disaster that usually hit the city). The data should be collected bi-annually. The data should be collected bi-annually.	**%**	< 10%	10–20%	> 20%	IADB

Pressure indicators

	Indicator	Description	Unit	Benchmarks			Sources
TRANSPORT							
Energy efficiency and type of energy used			Refer to TAR guidelines for examples of additional indicators and information				
10	Average age of car fleet (total and by type)	The data can be compiled from the vehicle registration database of the municipality, once a year.	Years	< 6	6–12	> 12	IADB
10.1	Percentage of diesel cars in total vehicle fleet	The data can be compiled from the vehicle registration database of the municipality, once a year.	%	< 20	20–30	> 30	EEA http://www.eea.europa.eu/data-and-maps/indicators/size-of-the-vehicle-fleet/size-of-the-vehicle-fleet-2
10.2	Fuel standards for light passenger and commercial vehicles	Adoption of latest EURO standards or equivalent for light passenger and commercial vehicles.	n.a.	EURO 6	EURO 5	EURO 4 or below	OECD / ICLEI
10.3	Share of total passenger car fleet run by alternative energy. (total and by type)	Alternative energy here refers to electric, hybrid fuel cell, Liquefied Petroleum Gas (LPG) and Compressed Natural Gas (CNG) energy. The data can be compiled from the vehicle registration database of the municipality, once a year.	%	> 3	1–3	< 1	EEA http://www.eea.europa.eu/data-and-maps/indicators/proportion-of-vehicle-fleet-meeting-4/assessment
Choice of transport mode			Refer to TAR guidelines for examples of additional indicators and information				
11	Transport modal share in commuting	The number of commuters working in the subject city who use each mode of transport (cars, motorcycles, taxi, bus, metro, tram, bicycle, pedestrian) divided by the number of commuting trips to work. Surveys are a common data collection method. The data can be collected bi-annually.	%	Private transport < 30%	Private transport = 30–50%	Private transport > 50%	OECD / ICLEI
11.1	Transport modal share in total trips	The number of commuters working in the subject city who use each mode of transport (cars, motorcycles, taxi, bus, metro, tram, bicycle, pedestrian) divided by the number of all trips in the city.	%	Private transport < 30%	Private transport = 30–50%	Private transport > 50%	OECD / ICLEI

		Surveys are a common data collection method. The data can be collected bi-annually.					
11.2	Motorisation rate	Number of private vehicles (cars, motorcycles) per capita. This can be calculated by dividing the total number of vehicles (obtained from the vehicle registration database) by the population. The data can be collected bi-annually.	Number of vehicles per capita	< 0.3	0.3-0.4	> 0.4	EEA http://www.eea.europa.eu/data-and-maps/indicators/size-of-the-vehicle-fleet/size-of-the-vehicle-fleet-2
11.3	Average number of vehicles (cars and motorbikes) per household	Number of private vehicles (cars, motorcycles) per household. This can be calculated by dividing the total number of vehicles (obtained from the vehicle registration database) by the number of households. The data should be collected bi-annually.	Number of vehicles per household	< 0.5	0.5-1	> 1	OECD / ICLEI
11.4	Kilometres of road dedicated exclusively to public transit per 100 000 population	The total centreline kilometres dedicated exclusively to bus way and rail way, divided by 100,000 of city population. The data should be collected once a year.	km	> 40	10–40	< 10	IADB
11.5	Kilometres of bicycle path per 100 000 population (please distinguish between mixed use and dedicated)	The total centreline kilometres dedicated to bicycle path, divided by 100,000 of city population. The data should be collected once a year.	km	> 25	15–25	< 15	IADB
11.6	Share of population having access to public transport within 15 min by foot	Share of population that can reach a public transport station within 15 min by foot. The data can be collected through surveys, once a year.	%	> 80	60–80	< 80	OECD / ICLEI
Road conditions and congestion			Refer to TAR guidelines for examples of additional indicators and information				
12	Average travel speed on primary thoroughfares during peak hour	The average travel speed for all private motorised vehicles and public transit vehicles, across all locally defined thoroughfares during the peak commuting hours (typically, morning and evening)	Km/h	> 30	15-30	< 15	IADB
12.1	Travel speed of bus service on major thoroughfares (daily average)	The data should be collected continuously.	Km/h	> 25	15-25	<15	EBRD

Resilience of transport system							Refer to TAR guidelines for examples of additional indicators and information
13	Interruption of public transport systems in case of disaster	A qualitative assessment of the ability of public transport systems to run efficiently during a natural disaster (flood, earthquake, storm)	n.a.	Bus and rail transit systems are able to run normally in case of disaster	Bus and rail transit systems are able to run in case of disaster, but with reduced efficiency	Bus and rail transit systems are not able to run in case of disaster	OECD / ICLEI
13.1	Efficiency of transport emergency systems in case of disaster	A qualitative assessment of the ability of emergency transport systems (firefighters, police, ambulance) to run efficiently during a natural disaster (flood, earthquake, storm)	n.a.	Emergency transport systems are able to run normally in case of disaster	Emergency transport systems are able to run in case of disaster, but with limited efficiency	Emergency transport systems are not able to run properly in case of disaster	OECD / ICLEI
Energy							
Electricity provision							Refer to TAR guidelines for examples of additional indicators and information
14	Share of population with an authorised connection to electricity	Percentage of the city's households with a legal connection to sources of electrical energy	%	> 90	70–90	< 70	IADB
14.1	Electrical interruptions	Average number or hours of electrical interruptions per year, per customer.	# / year / customer	< 10	10–13	> 13	IADB
14.2	Percentage of network line losses	Loss based on technical and non-technical losses as a percentage of total electricity output measured over the year	%	< 5%	5-10%	>10%	EBRD
Thermal comfort by source							Refer to TAR guidelines for examples of additional indicators and information
15	Share of population with access to quality heating / cooling	Quality heating or cooling refers to meeting the required demand to achieve norm temperatures in the building. The data should be collected for all residential buildings over the year.	%	> 90	70–90	< 70	OECD / ICLEI
15.1	Share of households connected to district heating	Percentage of the city's for households or residential building stocks with a legal connection to centralised district heating The data should be the average over the year.	%	>50%	50-25%	25%<	EBRD

15.2	Share of district heating from carbon intensive sources	Percentage of the city's for households or residential building stocks connection to district heating that are sourced by carbon intensive heat sources such as coal, heating oil, etc. Use 15.1 as denominator. The data should be the average over the year.	%	<10%	10-30%	30-100%	EBRD
15.3	Share of district heating from less carbon intensive sources	Percentage of the city's for households or residential building stocks connection to district heating that are sourced by less carbon intensive heat sources such as natural gas and LPG. Use 15.1 as denominator. The data should be the average over the year.	%	<40%	75-40%	100-75%	EBRD
15.4	Share of district heating from renewable sources	Percentage of the city's for households or residential building stocks connection to district heating that are sourced by renewable energy such as heat pump, solar and biomass. Use 15.1 as denominator. The data should be the average over the year.	%	100-50%	50-10%	<10%	EBRD
Renewable energy			Refer to TAR guidelines for examples of additional indicators and information				
16	Share of renewable in total energy consumption	Proportion of total energy derived from renewable sources as a share of total city energy consumption for electricity, heating and cooling, and transport, and expressed as a share against gross final energy consumption (in TJ; compared to benchmark of 20%)	%	> 20	10–20	< 10	EEA http://www.eea.europa.eu/data-and-maps/indicators/renewable-gross-final-energy-consumption-4/assessment
Electricity network			Refer to TAR guidelines for examples of additional indicators and information				
17	Power outages by climate extremes	Share of population experienced power outage over the year due to climatic extremes such as heatwave, wind, thunder, snow etc. Use 14.1 and/or 14.2 to calculate this data.	%	< 10	10–25	> 25	OECD / ICLEI
Buildings							
Electricity consumption			Refer to TAR guidelines for examples of additional indicators and information				
18	Electricity consumption in buildings	Average electricity consumption of all types of buildings per square meter measured over the year.	kWh / m2	< 47	47 – 75	> 75	Odyssee, CIBSE, IEA IEA Energy Efficiency Market Report 2015, Odyssee-Mure

							database, CISBE Guides 19, 72, 286
18.1	Electricity consumption in residential building	Electricity consumption in urban residential buildings per square meter measured over the year.	kWh / m^2	< 21	21 – 26	> 26	EBRD
18.2	Electricity consumption in commercial buildings	Electricity consumption in urban non-residential buildings per square meter measured over the year.	kWh / m^2	< 122	122 – 213	> 213	EBRD
18.3	Electricity consumption in public buildings	Electricity consumption of all public buildings per square meter. Type of buildings which considered as public buildings will be based on national or local definition of each country or city. Please see link for examples; https://www.designingbuildings.co.uk/wiki/Public_building_definition.	kWh / m^2	< 122	122 – 213	> 213	EBRD
Thermal conform by building type			Refer to TAR guidelines for examples of additional indicators and information				
19	Fossil fuels consumption for heating and cooling	Average fossil fuel consumption for heating and cooling in all types of buildings per square meter measured over the year.	kWh / m^2	< 104	104 – 148	> 148	Odyssee, CIBSE, IEA IEA Energy Efficiency Market Report 2015, Odyssee-Mure database, CISBE Guides 19, 72, 286
19.1	Fossil fuels consumption for heating and cooling in residential buildings	Annual fossil fuel consumption for heating and cooling in urban residential buildings per square meter	kWh / m^2	< 96	96 – 126	> 126	EBRD
19.2	Annual fossil fuels consumption for heating and cooling in commercial buildings	Annual fossil fuel consumption for heating and cooling in urban commercial buildings per square meter	kWh / m^2	< 127	127 – 210	> 210	EBRD
19.3	Fossil fuels consumption for heating and cooling in public buildings	Annual fossil fuel consumption for heating and cooling public buildings per square meter. Type of buildings which considered as public buildings will be based on national or local definition of each country or city. Please see link for examples; https://www.designingbuildings.co.uk/wiki/Public_building_definition	kWh / m^2	< 127	127 – 210	> 210	EBRD

Building Standards							Refer to TAR guidelines for examples of additional indicators and information
19.4	Share of new buildings with green certification	Total value of projects with green building certification as a share of the total value of projects granted a building permit per year	%	> 50	25-50	< 25	OECD / ICLEI
19.5	Share of buildings with energy performance certificates (EPC)	Share of buildings with energy performance certificates (EPC) over total building stocks.	%	> 50	25-50	< 25	EBRD
Industries							
Industrial electricity consumption							Refer to TAR guidelines for examples of additional indicators and information
20	Electricity consumption in industries, per unit of industrial GDP	This indicator measures the electricity productivity of industries.	kWh / 2010 USD	< 0.3	0.3 - 0.4	> 0.4	OECD / ICLEI
Industrial Heat Consumption							Refer to TAR guidelines for examples of additional indicators and information
21	Heat consumption in industries, per unit of industrial GDP	This indicator measures the heat productivity of industries.	MJ / 2010 USD	< 0.1	0.1 – 0.25	> 0.25	OECD / ICLEI
Consumption of fossil fuels in industrial processes							Refer to TAR guidelines for examples of additional indicators and information
22	Heavy metals (Pb) emission intensity of manufacturing industries	This indicator is used to illustrate the emission intensity of manufacturing industries expressed as the amount of pollutant discharged in water per unit of production of the manufacturing industries (one million USD gross value added). The indicator shows a decoupling of economic growth (GVA) from environmental impact (emission of pollutants).	kg heavy metals equivalent released per million USD GVA	< 0.02	0.02-0.04	> 0.04	EEA
22.1	Fossil fuel combustion in industrial processes, per unit of industrial GDP	This indicator measures the fossil fuel use productivity of industries	MJ / USD	< 1.4	1.4 – 2.2	> 2.2	OECD / ICLEI
22.2	Share of industrial energy consumption	Share of energy consumption from renewable energy in all industrial activities of the city measured over the year.	%	> 20	10–20	< 10	OECD / ICLEI

	from renewable energy						
Industrial Waste Treatment			Refer to TAR guidelines for examples of additional indicators and information				
23	Share of industrial waste recycled	Share of industrial waste recycled as a share of total industrial waste produced. Green benchmark to be set as 90%	%	> 95% (90%)	80 – 95% (90%)	< 80%	OECD / ICLEI
Industrial Wastewater			Refer to TAR guidelines for examples of additional indicators and information				
24	Percentage of treated industrial wastewater	Percentage of industrial wastewater that is treated according to applicable national standards	%	> 60	40–60	< 40	OECD / ICLEI
Wastewater							
Water consumption, supply, production, and storage			Refer to TAR guidelines for examples of additional indicators and information				
25	Domestic water consumption per capita	Annual consumption of water per capita of people whose homes have a water connection to the city's network. The data can be obtained from the utility agency supplying the water. The data should be collected several times per year, as climate differences across seasons is likely to result in different water consumption levels.	L / day / capita	120-200	80–200 or 200-250	< 80; > 250	IADB
25.1	Non-revenue water	Percentage of water that is lost from treated water entering the distribution system and that is accounted for and billed by the water provider. Calculated as a percentage of water lost before reaching the customer. This includes actual water losses (e.g., leaking pipes) and billing losses (e.g., broken water meters, absence of water meters, and illegal connections). It should be calculated as the ratio of water production out of actual water consumption.	%	0–30	30–45	> 45	IADB / OECD (2014), Green Growth Indicators 2014
25.2	Daily number of hours of continuous water supply per household	The data should be calculated as an average of continuous water supply to residential buildings over the year.	h/day	> 20 h/day	12–20 h/day	< 12 h/day	EBRD
25.3	Energy used for urban water production and supply	Amount of electricity used for production, storage and distribution of water supply per cubic metre. The data should be calculated as an average of all the water production and distribution facilities over the year.	Kwh/m 3	<0.35	0.35 to 0.5	>0.5	EBRD
25.4	Potable water storage	Amount of potable water stored in reservoirs in terms of average daily volume of water consumed. The data should be calculated as an average over the year of all the reservoirs and water storage facilities serving the urban area.	Days	> 1 day	½ day	< ½ day	EBRD

25.5	Water consumption per unit of city GDP	This indicator measures water resource productivity. The data can be obtained from the utility agency supplying the water. The data should be collected several times per year, as climate differences across seasons is likely to result in different water consumption levels.	L / day / USD	< 0.022	0.022 – 0.055	> 0.055	OECD (2014), Green Growth Indicators 2014
25.6	Share of Industrial water consumption	Share of Industrial water consumption as percent of total urban water consumption. Used to flag if industrial water consumption represents a larger portion of total urban water consumption than international norms. Industrial water consumption marked as 'green' may still have water efficiency challenges, but total water consumption does not represent a burden on municipal water resources beyond international norms. The data should be obtained from municipal water supply utility.	%	< 17%	17 – 50%	50%	EBRD
Wastewater conveyance, treatment, and sludge			Refer to TAR guidelines for examples of additional indicators and information				
26	Percentage of residential and commercial wastewater treated	Percentage of residential and commercial wastewater that is treated according to applicable national standards.	%	> 60	40–60	< 40	IADB
26.1	Percentage of buildings (non-industrial) equipped to reuse grey water	Percentage of buildings connected to facilities that treat wastewater from sinks, showers, tubes, and washing machines. The data should be collected through surveys, once a year.	%	> 80	60–80	< 60	OECD (2013) Green Growth in Cities
26.2	Percentage of treated wastewater from energy generation activities	Percentage of wastewater from energy generation activities that is treated according to applicable national standards	%	> 60	40–60	< 40	OECD/ICLEI
27	Sewer Network Integrity (Pipe break)	Average length of sewer pipes breakages/malfunctioning recorded each year.	Break/km/ year	<2	2-10	>10	EBRD
27.1	Energy used for wastewater collection and treatment	Amount of electricity consumed for collection and treatment including sludge treatment for each cubic meter of wastewater. The data should be calculated as an average of all the wastewater collection and treatment facilities over the year.	Kwh/m3	<0.75	0.75 to 1.0	>1.0	EBRD
27.2	Sludge safely treated disposed of or safely used.	Percentage of sludge that are treated, safely disposed of (according to national standards) or safely used (for power generation, agriculture, etc.). The data should be calculated as an average of all the wastewater collection and treatment facilities over the year.	%	> 80%	50 – 80 %	< 50%	EBRD
Wastewater conveyance, treatment, and sludge			Refer to TAR guidelines for examples of additional indicators and information				

28	Percentage of dwellings damaged by the most intense flooding in the last 10 years	Percentage of dwellings that were affected in terms of assets and health. The data can be collected through surveys. An estimate can be calculated from a sample population but it should be representative of different types of urban areas in the city (high / low elevation, close to / far from water bodies etc.)	%	< 0.5	0.5–3	> 3	IADB
28.1	Annual number of storm water/sewerage overflows	Annual number of storm water/sewerage overflows per 100km of network length. The data should be collected by monitoring the number of overflow in some areas of the city, and by deriving an estimate for the entire city. The data should be calculated as an average of several measurements over the year.	Number of events per year	< 20	20–50	> 50	OECD / ICLEI
Solid Waste							
Solid waste generation and collection			Refer to TAR guidelines for examples of additional indicators and information				
29	Total municipal solid waste generation per capita	Mixed waste and separately collected waste from households and from other sources, where such waste is similar in nature and composition to waste from households. It does not include waste from production (industrial waste), agriculture, forestry, fishing, septic tanks and sewage network and treatment, including sewage sludge, end-of-life vehicles or construction and demolition waste.	Kg / year / capita	< 300	300–500	> 500	OECD/ ICLEI
30	Waste collection service coverage rate	The data should be calculated either as ratio of municipal solid waste collected : municipal solid waste generated or percentage of households / population having access to regular waste collection services.	%	>90%	80-90%	80%<	EBRD
30.1	Proportion of dry recyclables	Proportion of dry recyclables that are separated at the source or from the mixed municipal solid waste stream including paper and cardboard, glass, ferrous and non-ferrous metals, packaging waste, textiles, wood. The data should be calculated as a percentage of municipal solid waste collected.	%	>35%	15-35%	<15%	EBRD
30.2	Proportion of organic waste	Proportion of organic waste that is separated at the source or from mixed municipal solid waste stream. The data should be calculated as a percentage of municipal solid waste collected,	%	>20%	5-20%	5%<	EBRD
Solid waste treatment and disposal			Refer to TAR guidelines for examples of additional indicators and information				
31	Municipal solid waste treated in sorting, processing and treatment plants.	Municipal solid waste treated in sorting, processing and treatment plants including material recovery facilities, mechanical-biological treatment plants, composting facilities, energy recovery (biogas plants, mass-burn solid waste incineration etc). The data should be calculated as a percentage of municipal solid waste collected,	%	>75%	25-75%	<25%	EBRD

31.1	Municipal solid waste disposed in open dumps	Percentage of the city's municipal solid waste disposed of in open (non-engineered) dumps. The data should be calculated as a percentage of municipal solid waste collected,	%	< 10	10–20	> 20	IADB
31.2	Municipal solid waste disposed in EU-compliant/equivalent sanitary landfills	Percentage of the city's municipal solid waste disposed in sanitary landfills. Waste sent for recovery (composting, recycling, etc.) is excluded. To be considered sanitary, the landfill should have leachate and landfill gas collection and treatment systems. The data can be collected from estimates produced at each landfill. Several measurements over the year and an averaged mean may be necessary to obtain data representative of long-term patterns. The data should be calculated as a percentage of municipal solid waste collected,	%	90–100	80–90	< 80	IADB
32	Remaining life of current landfill(s)	Remaining useful life of the site of the sanitary or controlled landfill, based on the city's municipal solid waste generation projections (in years). The data can be collected twice a year.	Years	> 8	5–8	< 5	IADB
Land Use							
Density / Integrated land use			Refer to TAR guidelines for examples of additional indicators and information				
33	Population density on urban land	People who live in the urbanised area of the municipality, per km^2 of urbanised area of the municipality. The data can be collected bi-annually.	Residents / km^2	4000-7000	2500-4000; 7000-12000	<2500; >12000	EBRD
33.1	Average commuting distance	Average distance travelled by all commuters to work. The data should be collected through surveys, once a year.	km	> 5	5–10	<10	OECD / ICLEI
33.2	Average commuting time	Average time spent in commuting by all commuters. The data should be collected through surveys, once a year.	min	< 30	30–60	> 60	OECD / ICLEI
33.3	Population living within 20 minutes to everyday services	Proportion of the population living within 20 minutes to everyday services such as grocery stores.	%	> 75	50–75	< 50	OECD / ICLEI
Urban Sprawl			Refer to TAR guidelines for examples of additional indicators and information				
34	Growth rate of built-up areas	Average annual growth rate of the areal urban built-up areas (excluding green space and vacant land) within the city's official limits. The data should be collected from the building permits database, once a year.	%	< 3	3–5	> 5	IADB
34.1	Share of brownfield development	Proportion of urban development that occurs on brownfield, over development that occurs on greenfield on the urban fringes. The data should be collected from the building permits database, once a year.	%	> 40	20-40	< 20	OECD / ICLEI

Use of existing built up areas							Refer to page. Xyz for examples of additional indicators and information
35	Vacancy rates of commercial buildings	Percentage of offices that are vacant out of the total office stock. The data can be collected through surveys once a year.	%	< 6%	6 – 10%	> 10%	OECD / ICLEI
35.1	Vacancy rates of residential buildings	Percentage of residential buildings that are vacant out of the total office stock. The data can be collected through surveys once a year.	%	< 6%	6 – 10%	> 10%	OECD / ICLEI

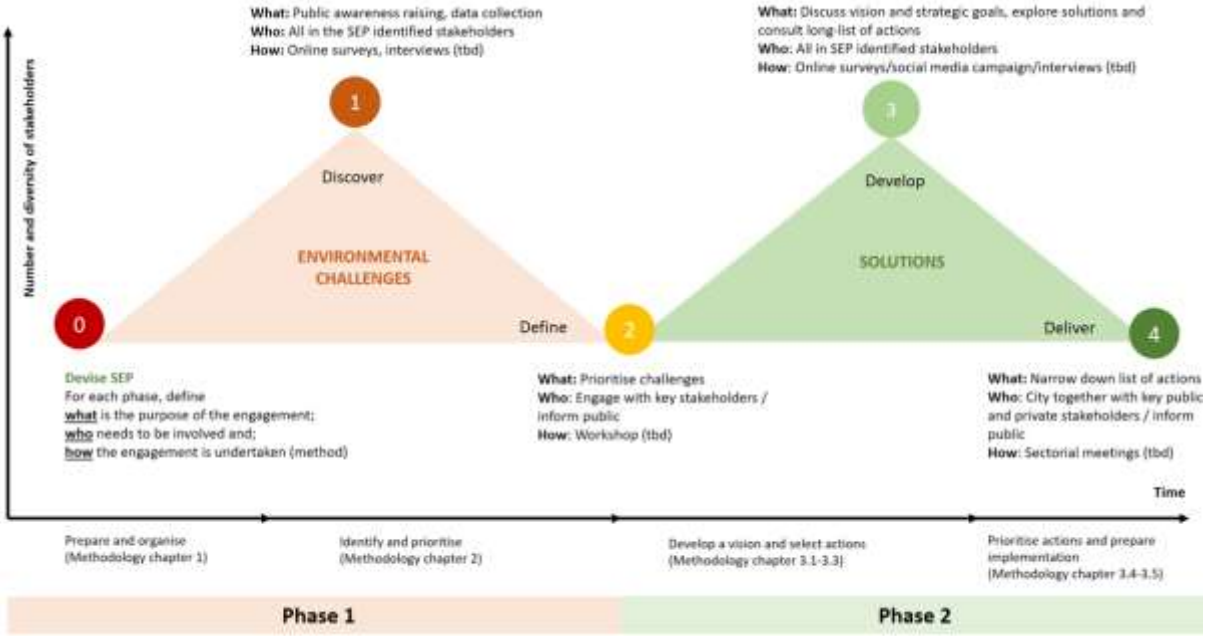
Response Indicators

Sector	Item	#	Indicator	Benchmarks		
TRANSPORT	Energy efficiency and type of energy used in transport	36	High-polluting vehicles are regulated / Energy-efficient vehicles are incentivised through fiscal instruments	Existing and well implemented, and there is no significant need to further expand this type of response	Existing, but implementation challenges have been observed, and/or existing policies are not sufficient to solve the issue at stake	Not existing
	Choice of transport mode	37	Extension and improvement of public and non-motorised transport is planned and supported through investment in place			
		38	Public and non-motorised transport is promoted through Information and awareness campaigns			
	Congestion	39	Traffic demand is managed (congestion charges, smart technologies)			
	Resilience of transport systems	40	Public transport emergency management (in publicly and/or privately run networks) is planned and tested			
	System Integration	41	System integration is sought and supported (integrated ticketing, user information, open data and traffic control)			
BUILDINGS	Electricity and heat consumption	42	Green building is promoted through standards and fiscal incentives	Existing and well implemented, and there is no significant need to further expand	Existing, but implementation challenges have been observed, and/or existing policies are not	Not existing
		43	Public and private investment in energy efficiency in buildings			

		44	Metering and billing for personal energy use is regulated	this type of response	sufficient to solve the issue at stake	
		45	Support schemes for building renovation established (amounts committed)			
		46	Building inspectors employed and trained			
INDUSTRIES	Electricity and heat consumption / energy efficient industrial processes	47	Energy efficient industrial machinery is regulated and incentivised through fiscal instruments (electricity, heat, industrial processes)	Existing and well implemented, and there is no significant need to further expand this type of response	Existing, but implementation challenges have been observed, and/or existing policies are not sufficient to solve the issue at stake	Not existing
		48	Energy efficient industrial technologies (electricity, heat, industrial processes) is supported through private investment			
	Industrial waste / material consumption	49	Material efficiency of new built industrial facilities and waste recycling is regulated and incentivised through fiscal instruments			
	Industrial wastewater	50	Industrial wastewater treatment / reuse / recycle is promoted through regulations and fiscal incentives			
ENERGY	Electricity and heat provision	51	Coverage and quality of electricity and heat supply is improved through investment	Existing and well implemented, and there is no significant need to further expand this type of response	Existing, but implementation challenges have been observed, and/or existing policies are not sufficient to solve the issue at stake	Not existing
	Renewable energy development	52	Renewable energy facilities in private buildings are incentivised through fiscal instruments			
		53	Renewable energy technologies are developed and supported through public and private investment			
		54	Renewable energy facilities are incentivised through awareness campaigns			
	Resilience of the electricity network	55	The resilience of electricity networks in case of disaster is tested and enhanced through investment			
WATER (SUPPLY, SANITATION, DRAINAGE)	Water consumption	56	Metering and billing for water use is regulated	Existing and well implemented, and there is no significant need to further expand this type of response	Existing, but implementation challenges have been observed, and/or existing policies are not sufficient to solve the issue at stake	Not existing
		57	Water saving / reuse is encouraged through awareness campaigns			
	Efficiency of water supply networks	58	Coverage and efficiency of water supply networks is improved through plans and investment			
	Wastewater treatment	59	Buildings' access to wastewater collection and treatment systems is improved through plans and investment			
		60	Wastewater treatment is promoted through regulations and fiscal incentives			
		61	Wastewater billing is regulated			

	Drinking water pre-treatment	62	Drinking water pre-treatment is enhanced through plans and investment			
	Resilience to floods	63	Drainage facilities are developed through plans and investment			
		64	Business and community resilience is encouraged through awareness campaigns			
SOLID WASTE	Solid waste generation	65	Reduction of material consumption / solid waste generation is promoted through awareness campaigns	Existing and well implemented, and there is no significant need to further expand this type of response	Existing, but implementation challenges have been observed, and/or existing policies are not sufficient to solve the issue at stake	Not existing
	Collection of solid waste	66	Coverage of solid waste collection system is improved through plans and investment			
		67	Littering and non-compliance to sorting systems is dis-incentivised through fines and penalties			
	Treatment of solid waste	68	Composting, recycling and waste-to-energy facilities are developed through plans and investment			
		69	Solid waste reuse, sorting and recycling is promoted through information and awareness campaigns			
	Landfill efficiency and overcapacity	70	Overcapacity issues in landfills are tackled through plans and investment			
LAND-USE	Density / Integrated land-use / urban sprawl	71	Density is regulated	Existing and well implemented, and there is no significant need to further expand this type of response	Existing, but implementation challenges have been observed, and/or existing policies are not sufficient to solve the issue at stake	Not existing
		72	Transit-Oriented Development is promoted			
	Use of existing built-up areas	73	Mixed-use development is promoted through zoning regulations / incentives			

Annex 2. Summarised Stakeholder Engagement Approach



0 Devise Stakeholder Engagement Plan

Stakeholder engagement is a critical part of the GCAP process. Therefore, the design of stakeholder involvement needs to be outlined in detail. A complete Stakeholder Engagement Plan (SEP) shall be developed as part of project inception.

Content of the Stakeholder Engagement Plan:

Consistent with Step 1.6 of the GCAP method, the SEP should include the following elements:

Executive Summary: principles and approach to stakeholder engagement

- City specific "What / Who / How"-approach for each step as outlined in Figure 1.
- Information disclosure
- Approximate work plan

SEP chapters:

1) Overall approach to stakeholder engagement for the GCAP, based on the design thinking approach summarised in Figure 1.
2) Stakeholder identification and analysis (incl. setup of the city and/or municipality within the scope of the GCAP)
3) Information disclosure
4) Roles and responsibilities for implementing the SEP
5) Monitoring and reporting of stakeholder engagement process

SEP Annexes for internal purpose (share externally if there is interest)

I. Legal and Regulatory Requirements
II. Existing city engagement practices
III. List of stakeholders

Four step approach for stakeholder engagement

1

Discover environmental challenges

Understand local environmental context by gathering data and insights from broad range of stakeholders. At the same time, *raise awareness* about GCAP.

2

Define environmental priorities

City representatives and key stakeholders to *confirm* and prioritise the Green City challenges that have been identified. The wider range of stakeholders should be *informed* about summarised findings across the Green City Baseline assessments.

3

Develop solutions

Engagement activity integrating a wide-range of stakeholders to define a Green City vision, strategic goals and vote on a long-list of actions. Consultation is an opportunity to find out which goals and actions are important to citizens but also to gather additional ideas for potential actions from the public.

4

Deliver actions

Detailed list of Green City actions to be *discussed and approved* in a final round of discussion with key stakeholders and the City. The focus is on the forward-looking vision of how the defined actions can be implemented. Wider range of stakeholders to be *informed* about decisions made.

Annex 3. Incorporating Resilience into Green Cities

Consultant requirement: Conduct a Risk and Vulnerability Assessment, including as a minimum:

1) Expected environmental, climatic and other hazards particularly relevant for the local area and/or wider region,
2) Vulnerabilities of the local area and/or wider region,
3) Expected impacts within the local area and/or wider region,
4) People, assets, and systems at risk from impacts[6],
5) List of prioritised risks to take into consideration for development of actions.

Conducting an RVA

A city's residents, and the assets and essential services on which they depend, cannot be made more resilient without an understanding of the risks they face. Risk is defined in the Fifth Assessment Report (AR5) of the IPCC Working Group II (2014) as a product of the interactions between three components: hazard, exposure and vulnerability (see figure below). All three components need to be assessed as part of an RVA.

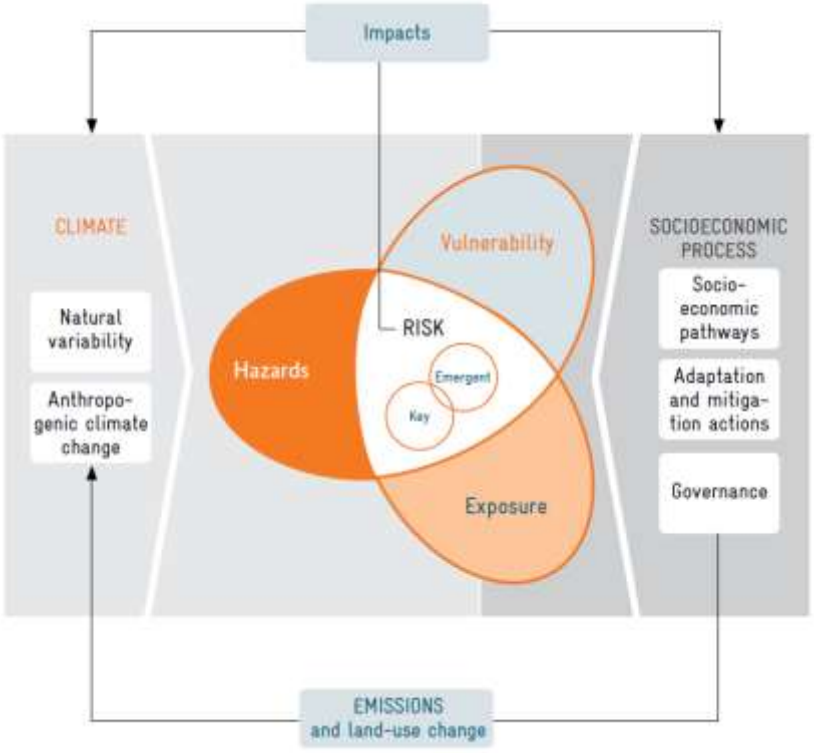


Figure: IPCC AR5 definition of risk. Source: IPCC 2014, p. 1046

[6] These four elements adapted from Guidebook 'How to develop a Sustainable Energy and Climate Action Plan (SECAP)' – Part 1 (JRC, 2018). Available at: http://publications.jrc.ec.europa.eu/repository/bitstream/JRC112986/jrc112986_kj-na-29412-en-n.pdf.

As a minimum, the RVA should capture information on risks and vulnerabilities to impacts arising from climate (and other) hazards, each broken down by the GCAP focus sectors, and taking into account identified vulnerable populations.

A qualitative RVA is relatively less demanding in time and resources than a quantitative (spatially explicit) one, and should be considered the minimum requirement for a GCAP.

However, a quantitative (spatially-explicit) RVA is highly recommended if resources allow, as it can be used to generate maps of risk and vulnerability distribution. This is an extremely valuable resource to spatially locate risk hotspots and target them for action, as well as to make clear the uneven distribution of impacts among different neighbourhoods (and different socio-economic populations) and prioritise risk reduction for those who need it most.

There are many different methodologies available to conduct a (qualitative or spatially explicit). Regardless of which method is selected, the RVA should be a collaborative exercise (e.g. in workshop format) with input from all members of the GCAP expert team (See Step 1.4 in the Methodology) as well as selected stakeholders.

The following is not a comprehensive guide to conducting an RVA, and the consultant may choose to adopt a slightly different approach. However, the steps below provide direction on the minimum requirements that the GCAP consultant is expected to fulfill. These steps are adapted from ICLEI's Urban Resilience Methodology, currently under development (forthcoming publication).

Step 1. List hazards relevant to city

The Consultant should review the hazard classification table below as a starting point adapted from a combined classification developed by the World Bank and GFDRR (Global Facility for Disaster Reduction and Recovery). (Adapted from: World Bank and GFDRR[7])

TABLE: CLASSIFICATION OF URBAN HAZARDS

Environmental (physical, climatic)	Technological	Socio-economic and human-induced
Earthquake Flooding Severe storm Wildfire Extreme temperature Drought Tsunami	Fire Building collapse Explosion Transport accident Gas leak Oil spill Chemical spill	Political conflict Social conflict Labor strike/unrest Terrorism War Economic crisis Business discontinuity

7 http://documents1.worldbank.org/curated/en/659161468182066104/pdf/709820PUB0EPI0067926B09780821389621.pdf

Insect infestation	Poisoning Radiation System breakdown (e.g. ICT, water, energy, health, education etc.)	High unemployment Corruption Supply crises (e.g. food, water, housing, energy etc.) Epidemic/pandemic

Consider both observed (historical) and projected (future) hazards.

From the City's own records, universities or research institutes, NGOs or other bodies (consultation with stakeholders could help facilitate this process) assess each hazard including:

a. Nature of changing urban conditions [e.g. climate change projections, urban growth, economic, social etc. trends)
b. Amount of expected change (expressed as a range) including baseline year(s) from which change is measured and the planning horizon year by which change will have occurred
c. Geographical area for which each projection is relevant [e.g. a specific region or location]
d. Level of confidence [degree of certainty (less certain / more certain) of the projected change and justification]
e. Source of information [this would need to be specified for the supplementary local assessments]

Step 2. Identify impacts on critical urban systems and services

After identifying hazards, it is useful to develop a "menu" of the most exposed critical city systems, i.e. those which are already under stress and which are most likely to be disrupted by further stresses and shocks. This list is then the basis for further analysis. There are several possible ways a Critical Systems analysis can be conducted, e.g. a City Systems approach, or the Arup CRI Resilience Drivers approach, which was adapted for the 100 Resilient Cities Program.

First identify which city systems or functions are already under greatest pressure or stress, then add the potential impacts of the most likely urban hazards. Use the table below as a starting point.

TABLE: CRITICAL URBAN SYSTEMS

Core systems (EBRD traditional sectors)	**Other core systems**	**Other secondary systems**
Solid waste management	Public health and sanitation	Finance

Water supply	ICT	Markets
Wastewater treatment	Food supply	Public safety and security
Transport and mobility	Education	Taxation
Energy	Social welfare	
Lighting	Housing	
Buildings		
Land-use		
Biodiversity		

Considering the hazards identified earlier, list observed and projected impacts of hazards on the urban systems and services listed.

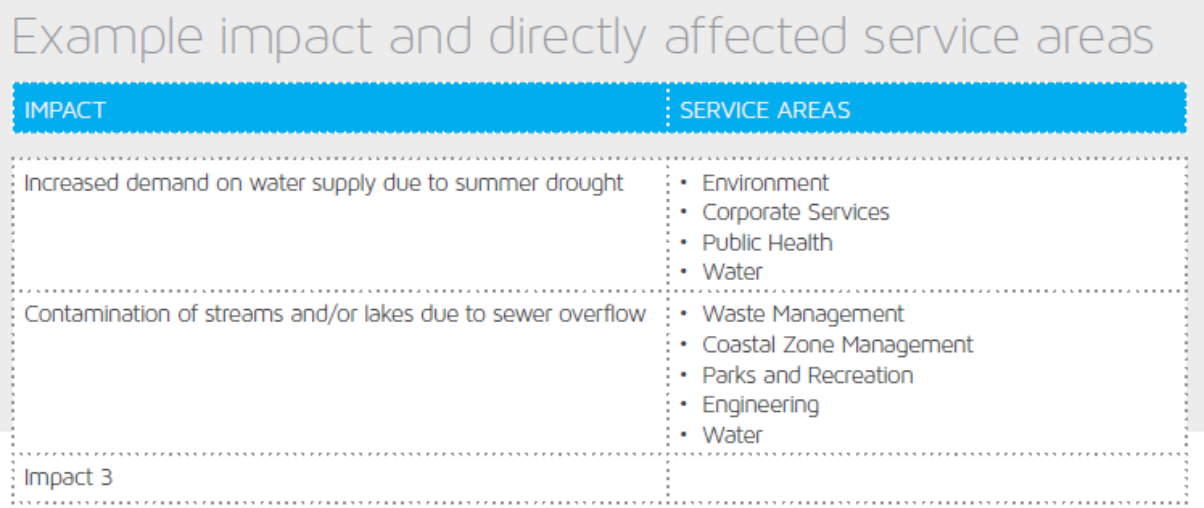


Figure: Example of documenting impacts on critical systems. Source: RAMSES Transition Handbook and Training Package (2017).

Step 3. Assess vulnerabilities

Vulnerability concerns the characteristics of exposed elements (systems, assets, people) which may either increase or decrease the impacts of a hazard. Vulnerability is made up of sensitivity (the magnitude of an expected impact) and adaptive capacity (the ability to respond or recover).

Assess the adaptive capacity of impacted systems and services

Using the list of impacted systems and services created earlier, **rate each from low to high** for its ability to adjust to the projected changes with minimal costs and disruption. To do this, you may consider criteria such as:

- the presence of economic resources (private and public)
- access to technology
- availability of information and skills
- access to social capital (private)
- institutional/governance structures (public)
- equitable access to resources (publicly facilitated).

Assess the vulnerability of communities

Identify and evaluate the vulnerability of communities and their locations based on their adaptive capacity and sensitivity. As above, consider:

- access to economic and technological resources,
- access to social capital,
- availability of information and skills,
- availability of institutional and community support systems,
- political and social in/equality,
- access to natural resources and services,
- pre-existing exposure to stresses /risks / disadvantages.

Assess the degree of sensitivity of people in these communities to the risks identified, including potential disruptions to urban systems and services as identified above. Consider how, and to what extent, they will be positively or negatively impacted by these changes. Again, **rate each from low to high.**

- Document the results on a Vulnerability Matrix showing adaptive capacity and sensitivity

ADAPTATION CAPACITY	SENSITIVITY SCORE				
AC1	S1	S2	S3	S4	S5
AC1	V2	V2	V4	V5	V5
AC1	V2	V2	V3	V4	V5
AC1	V2	V2	V3	V4	V4
AC1	V1	V2	V2	V3	V3
AC1	V1	V1	V2	V3	V3

Figure: Combining adaptive capacity and sensitivity to evaluate vulnerability using a scoring system. Those impacts with high scores for sensitivity (S4 and S5) and low scores for adaptive capacity (AC1 and AC2) are highly vulnerable (V5 and V4). Source: RAMSES Transition Handbook and Training Package (2017).

Step 4. Analyse and prioritise risks and vulnerabilities

Use the results above to produce a Risk Matrix, indicating prioritised risks.

A simple way of prioritizing risks is to assign a score for Likelihood of it occurring (e.g. High=3, Medium=2, Low=1) and a score for the Consequence if it does occur (e.g. Catastrophic=3, Moderate=2, Insignificant=1). The consequence needs to be weighted according to the evaluated vulnerability of each exposed element (taking into account also impacts on vulnerable populations). Multiply the scores to obtain a shortlist of priority risks.

CONSEQUENCE RATING	IMPACT ON SYSTEM	IMPACT ON POOR AND VULNERABLE	SCORE
Catastrophic	System fails completely and is unable to deliver critical services, may lead to failure of other connected systems	Severe impacts on poor and vulnerable groups in the city leading to situations of extreme destitution	5
Major	Serious impact on the system's ability to deliver critical services, however not complete system failure	Loss of confidence and criticism in city government; ability to achieve city vision and mission seriously affected; Significant impacts on poor and vulnerable groups in the city that seriously affects their lives and livelihoods	4
Moderate	System experiences significant problems, but is still able to deliver some degree of service	Moderate impacts on the lives and livelihoods of the poor and vulnerable groups in the city	3
Minor	Some minor problems experienced, reducing effective service delivery, possibly affecting certain other systems or groups	Minor impacts on the lives and livelihoods of the poor and vulnerable groups in the city	2
Insignificant	Minimal impact on system: may require some review or repair, but still able to function	Minimal impacts on the lives and livelihoods of the poor and vulnerable groups in the city	1

Figure: Evaluating the consequence of a risk needs to take into account both system impacts and impacts on the most vulnerable populations. Source: RAMSES Transition Handbook and Training Package (2017), adapted from Building Urban Climate Change Resilience: A Toolkit for Local Governments (ICLEI South Asia and ACCCRN, 2014).

Depict these scores on a Risk Matrix, bringing together the evaluation (i.e. assigned ratings) of 1) identified hazards, 2) exposed elements and impacts, and 3) vulnerability of exposed elements (including adaptive capacity and sensitivity). There are tools available to combine and present this information e.g. the UNDRR's Quick Risk Estimation (QRE) tool. Available here: https://www.unisdr.org/campaign/resilientcities/toolkit/article/quick-risk-estimation-qre

LIKELIHOOD	CONSEQUENCES				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	Medium (RS = 5)	Medium (RS = 10)	High (RS = 15)	Extreme (RS = 20)	Extreme (RS = 25)
Likely	Low (RS = 4)	Medium (RS = 8)	High (RS = 12)	High (RS = 16)	Extreme (RS = 20)
Possible	Low (RS = 3)	Medium (RS = 6)	Medium (RS = 9)	High (RS = 12)	High (RS = 15)
Unlikely	Low (RS = 2)	Low (RS = 4)	Medium (RS = 6)	Medium (RS = 8)	Medium (RS = 10)
Rare	Low (RS = 1)	Low (RS = 2)	Low (RS = 3)	Low (RS = 4)	Medium (RS = 5)

Figure: Likelihood x Consequences = Priority risks. Source: RAMSES Transition Handbook and Training Package (2017), adapted from Building Urban Climate Change Resilience: A Toolkit for Local Governments (ICLEI South Asia and ACCCRN, 2014).

CLIMATE RISK PRIORITIZATION	LIKELIHOOD	CONSEQUENCE	RISK SCORE (LIKELIHOOD X CONSEQUENCE)	RISK STATUS
Increased precipitation causes water to freeze in the pipes	4	4	16	High
Increased precipitation disrupts/ damages water supply infrastructure	3	3	9	Medium
Risk 3	...	...	...	...

Figure: Risk matrix: once scores are determined for likelihood and consequence of risks, each risk can be assigned a status (e.g. high, medium or low), resulting in a list of priority risks. Source: RAMSES Transition Handbook and Training Package (2017), adapted from Building Urban Climate Change Resilience: A Toolkit for Local Governments (ICLEI South Asia and ACCCRN, 2014).

Optional:

- If conducting a spatially explicit RVA, create a summary Hotspot Map by identifying which parts of the city area will be most affected by each high-risk system or service vulnerability. These can then be merged using GIS or similar to produce an aggregated hotspot map for the city, showing the areas which are likely to be at greatest risk due to multiple vulnerabilities.

The consultant shall deliver the following outputs under this task:

Required:

- Risk Matrix
- Vulnerability Matrix
- Prioritized list of risks

Optional:

- Hotspot maps – for each category of vulnerability and aggregated for all vulnerabilities

Key definitions[8]

- Understanding the following terms is crucial as a basis for carrying out and interpreting the results of an RVA.

- Adaptive capacity: The ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences.

- Exposure: The presence of people, livelihoods, species or ecosystems, environmental services and resources, infrastructure, or economic, social, or cultural assets in places that could be adversely affected[9].

- Hazard: The potential occurrence of a natural or human-induced physical event or trend, or physical impact, that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, and environmental resources (…) the term hazard usually refers to climate-related physical events or trends or their physical impacts[10].

- Impact: The term impact is used primarily to refer to the effects on natural and human systems of extreme weather and events and of climate change. Impacts generally refer to effects on lives, livelihoods, health, ecosystems, economies, societies, cultures, services and infrastructure due to the interaction of climate changes of hazardous climate events occurring within a specific time period and the vulnerability of an exposed society or system. Note: Impacts are also sometimes referred to as consequences or outcomes[11].

- Resilience: The capacity of a social ecological system to cope with a hazardous event or disturbance, responding or reorganizing in ways that maintain its essential functions, identity, and structure, while also allowing for adaptation, learning, and transformation.

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[8] The majority of the definitions below derive from a glossary developed for the project RESIN – Climate Resilient Cities and Infrastructures, funded by the European Union's Horizon 2020 research and innovation programme under grant agreement no. 653522. The original version can be found on the project website: www.resin-cities.eu/resources/deliverables.

[9] IPCC (2014). Annex II: Glossary [Mach, K.J., S. Planton and C. von Stechow (eds.)]. In: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, pp. 117-130.

[10] IPCC (2014).

[11] Adapted from IPCC (2014).

Building resilience needs to address: the vulnerability of the community impacted, taking into account existing imbalances in power distribution in that community and ensuring that neither impacts, nor the policies and actions taken to address them, exacerbate existing or create new inequalities across different groups[12]. Adapted from Climate Just (after IPCC, 2007)

- Risk: The potential for consequences where something of value is at stake and where the outcome is uncertain, recognising the diversity of values. As part of a Risk and Vulnerability Assessment, risk is often represented as the probability of occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur. Risk results from the interaction of vulnerability, exposure, and hazard[13].

- Sensitivity: The degree to which a system or species is affected, either adversely or beneficially, by climate variability or change. The effect may be direct … or indirect[14].

- Stress: Longer term trend that undermines the performance of a given system and increases the vulnerability of actors within it, such as natural resource degradation, loss of agricultural production, demographic changes, climate change, political instability, economic decline. Stresses can be cumulative, compounding gradually until a tipping point is reached, and transformed into a shock[15].

- Shock: Sudden event that affects the performance of a system, such as disease outbreak, flood, high wind, landslide, drought, earthquake, outbreak of fighting or violence, or severe economic volatility[16].

- Vulnerability: The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts including sensitivity or susceptibility to harm and lack of

[12] Climate Just, "Glossary." [Online]. Available: https://www.climatejust.org.uk/glossary/R. [Accessed: 15-Nov-2019]. Also see: IPCC (2007) Climate Change 2007: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Parry, M. L., Canziani, O. F., Palutikof, J. P., van der Linden, P. J. and Hanson, C. E. (eds). Cambridge: Cambridge University Press p. 883

[13] IPCC (2014).

[14] Adapted from IPCC (2014).

[15] United Nations. (2017). Report of the open-ended intergovernmental Expert Working Group on Indicators and Terminology Relating to Disaster Risk Reduction. A/71/644. United Nations General Assembly. Retrieved 10 July 2020 from www.un.org/ga/search/view_doc.asp?symbol=A/71/644

[16] United Nations (2017).

capacity to cope and adapt[17], as well as the structural conditions, (including physical, social, cultural, economic and political systems) that render people and communities susceptible to the impacts of hazards, and which make it possible for a hazard to become a disaster[18].

[17] IPCC (2014).

[18] Dominey-Howes, A. Gorman-Murray, and S. McKinnon (2016). "Emergency management response and recovery plans in relation to sexual and gender minorities in NEW South Wales, Australia," Int. J. Disaster Risk Reduct., vol. 16, pp. 1–11, Jun.

Annex 4. Incorporating Smart into Green Cities

Purpose of this document
This is a guidance note to inform EBRD Green Cities consultants of the approach to be taken to incorporate the consideration of smart cities solutions and cities smart maturity assessments into the Green Cities Action Plan (GCAP) development process.

'Smart' Definition
Smart cities utilise smart, interconnected devices that communicate with one another to connect disparate utility, infrastructure and public services to generate real-time data. This data can help cities manage their services more effectively to deliver a range of benefits for their citizens including reducing pollution and improving the environment of a city.

The Smart Opportunity
GCAPs need to recommend actions that can most optimally be achieved to fully realise the Green Cities objectives. In many cities, smart technology is endemic across new and renewed infrastructure projects providing improved value for money, better utility and improved performance against key indicators. In addition, a recent 2018 McKinsey report[19] states that smart applications in infrastructure could cut greenhouse emissions by 10-15%.

Consultant Requirement 1: Smart Maturity Assessment
This is Step 2.1.E in the Methodology. Green Cities included in the programme will be at different levels of maturity and will have different attitudes and approaches with regard to the adoption of smart technology. We know from several discussions with mayors and city officers of their interest in the amenity that smart technology can bring to their green infrastructure and energy projects. However, even by their own acknowledgement, some cities will have little or no capacity or knowledge of how smart technology can help them, how it could be integrated and how they should maintain and operate this for the benefit of their citizens and the environment.

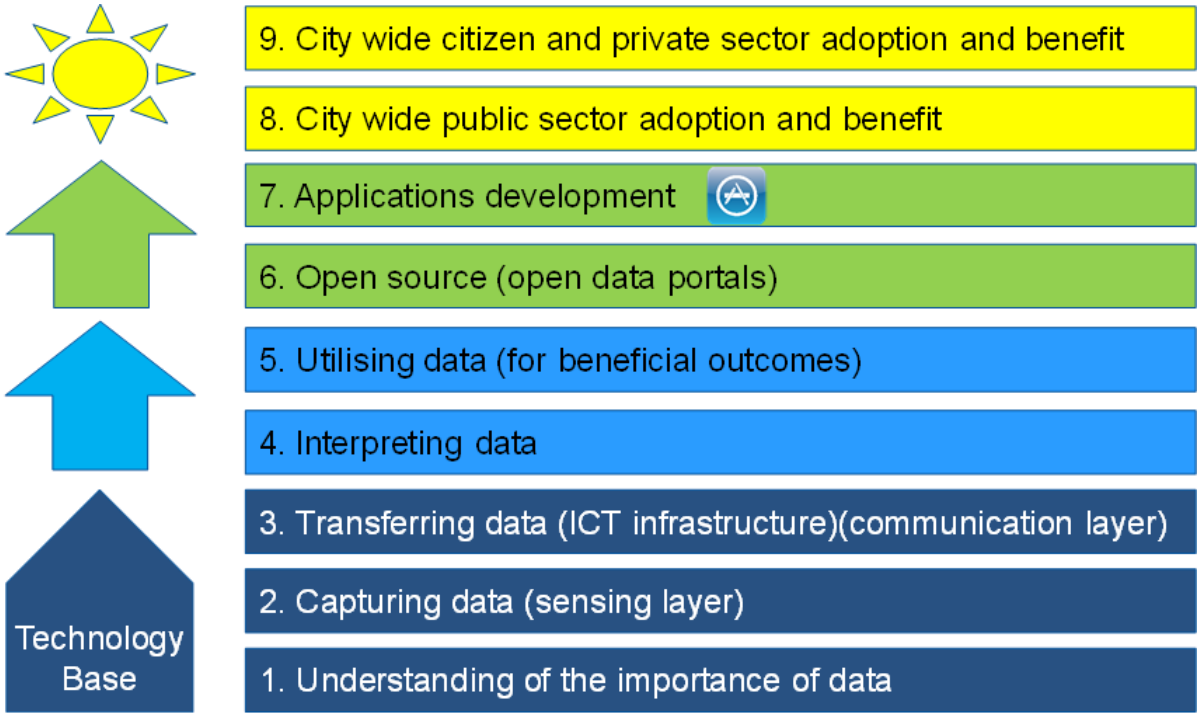
As part of the External Framework Report, the Consultant should determine the extent to which a city has integrated and benefitted from smart technologies in the provision of their urban services to date. Consultants are to evaluate the maturity of the city to adopt smart technology and comment on the readiness now or what steps might be taken to be ready in the future (over what timescale) to be able to utilise and benefit from this smart technology. This analysis will lead to better decision making when developing new green infrastructure/energy projects recommended by the GCAP with regards to:

- Whether actions should be developed in an entirely smart way now such that the city can benefit from this immediately because they have the maturity and capacity for this, or

[19] 'Smart Cities: Digital Solutions for a more liveable future', McKinsey Global Institute 2018

- Whether actions should be designed and developed to be 'smart ready' for the future such that the city might retrospectively convert the project to be smart once they have gained appropriate maturity and capacity.

The following Green Cities smart maturity assessment scale has been developed to help Consultants in rating the maturity assessment of cities:



Consultants are to indicate in their smart maturity assessment where the city, or specific departments, currently lies on this scale and provide justification for this. Further details of each stage within this scale are provided in Appendix 1. This assessment should form part of the External Framework Report, and provide a baseline understanding of a city's operations with respect to the applications of smart solutions. The development of beneficial smart applications in city infrastructure can develop through the following approaches:

1. **Ad-hoc:** new city infrastructure projects are smart or contain smart components that provide city and/or end user benefits despite the fact that the procuring department or city has no apparent strategy for smart development.
2. **Opportunistic:** through the open availability of data, the private sector has developed smart applications that the public sector is benefitting from.
3. **Strategic:** the city, or sub-set departments within the city, has developed a strategy or strategies for data collection and utilisation or smart inclusion within city infrastructure.

In evaluating a city's maturity for smart adoption, Consultants are to comment on which of the above approaches might have been successful to date and which are likely to be successful in the immediate future given where the city is currently on the maturity scale. Consultants are to include in this commentary details of the following for each city:

a. **Smart leadership and governance:** does this currently exist and if so provide details including responsibilities and organisational structures. What investment does this identify for further maturity and benefit? Does this include partner collaboration or open source availability of data for private sector smart development?

b. **Stakeholder engagement:** how have stakeholders been engaged with to determine how best smart inclusion can provide benefit? Is there a citizen, community or even an environmental/green benefit focus and if so what are the intended benefits?

c. **Data and integrated ICT infrastructure:** is data captured and if so how? Does the necessary ICT infrastructure exist to transfer and utilise the data and if so provide details? What is the capacity and can this be enhanced? Does the city have the competency and capacity to fully utilise the data available and the ICT infrastructure? To what extent does the City disaggregate data by gender?

The Consultant is to provide details within the Smart Maturity Assessment of the stakeholders within the City responsible for, or with a keen interest in, smart/digital integration within the City infrastructure. This is to enable EBRD to follow up with specific smart/digital integration support and capacity building. The details are to include name, contact details, position and responsibilities and specifically the reason for their interest in smart/digital integration. The City stakeholder details are to include public and private sector stakeholders within or external to the municipal government.

Consultant Requirement 2: Integrating Smart Solutions into GCAP Actions

When generating the GCAP actions, particularly the initial long-list of options developed following the Green City vision setting, the Consultant should consider the potential for actions to exclusively call for smart solutions or integrate smart solutions to achieve green outcomes.

Green City actions can generally fall into three categories regarding smart technology inclusion, namely:

1. The recommended action/project is entirely smart in nature
2. The action/project can be improved through the application of smart technology or through key components being smart in nature
3. There is no foreseeable smart application at this time

In developing the initial concepts and more detailed descriptions of GCAP actions, the Consultant should:

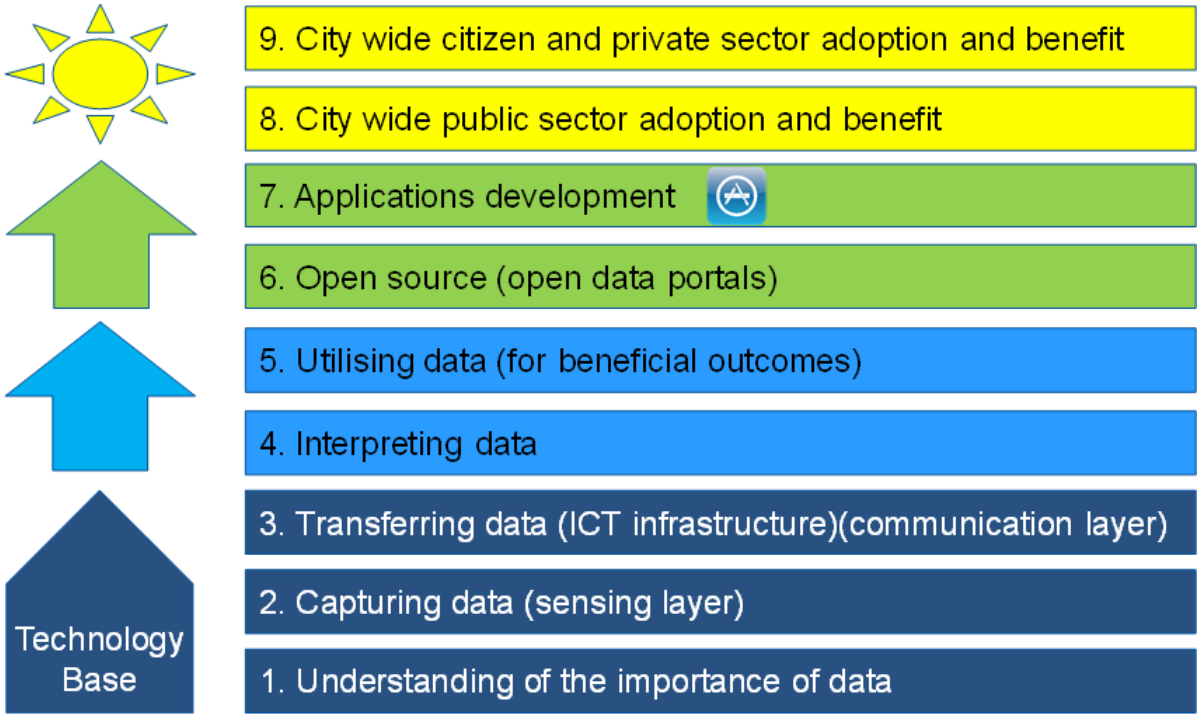
a. Consider whether an action is i) either entirely smart in nature, ii) could benefit from smart technology and/or smart components, iii) or if no smart applications can be envisaged.

b. Include details of the smart technologies and solutions featured in the action.

GCAPs have the potential to support an array of smart solutions that contribute to cities' green objectives. Such green actions might include (non exhaustive list):

- Digital public transit payment
- Utilities smart metering
- Intelligent street lighting and traffic signals
- Enterprise asset management of infrastructure utilising digital twins
- Energy automation systems
- Real-time water quality monitoring, leakage detection and control
- Smart irrigation in green spaces
- Dynamic electricity pricing
- Real-time public transit information
- Real-time road navigation
- Sensors and meters for green infrastructure maintenance

Table: Smart Maturity Assessment Scale



1. Understanding the importance of data

The city governance or departments within it have developed a basic understanding of the importance of data as the foundation to a city wide or departmental digital strategy and/or the achievement of smart benefits. The city might have strategies in development or commencing for digital enhancement.

2. Capturing data (sensing layer)

Having recognised the importance of digital data, the city, or any department therein, has started capturing and storing this data. The city might have commenced strategies to capture more data from infrastructure or the public and private sector identifying that this can lead to beneficial smart outcomes. Where strategies are advanced, cities might have installed intelligent sensors/meters specifically to feedback data on infrastructure/energy performance.

3. Transferring data (ICT infrastructure)(communication layer)

The city has identified the importance of transferring data at high speed is essential for the development of the digital strategy. High-speed broadband and/or mobile data coverage is widespread or the city has strategies in place for this. Whilst data transfer speeds and coverage are increasing the costs for this are decreasing.

4. Interpreting data

The city, or any department therein, has developed software and people skills to clean, filter and interpret digital data and understand what this is telling them about infrastructure and energy performance. More advanced cities will have strategies in place to improve data

interpretation leading to improvements in the amount and quality of data captured and processed and in speeds of interpretation.

5. Utilising data (for beneficial outcomes)

Smart outcomes realisation. The city has strategies in place of infrastructure or energy improvements that result in beneficial outcomes for the government and communities that are a direct result of data interpretation. More advanced cities will have monitoring regimes in place with feedback loops such that beneficial outcomes and user satisfaction is measured and further improvements can be made.

6. Open source (open data portals)

The city governance or any departments have made available publicly digital data via open data portals. This can be free to access or a paid-for service but the public and private sector markets are able to access data and utilise this without restriction. More advanced cities will make this data available real-time.

7. Applications development

As well as the city governance developing software to interpret and utilise data (stages 4 and 5 above) the private sector is now developing applications that utilise open-source data for beneficial outcomes. This might start through the city administration commissioning the private sector to develop applications that benefit the city and/or the communities within. More advanced cities will have active private sector applications developers regularly developing and upgrading applications for public and private sector good.

8. City wide public sector adoption and benefit

The city has adopted digital or smart strategies for the beneficial good of the public sector community and has committed significant funding for these. Most infrastructure and energy sectors within the city are benefitting to some degree from smart technologies and innovations. User feedback and monitoring data are demonstrating beneficial outcomes, meaning outcomes that generate public benefit.

9. City wide citizen and private sector adoption and benefit

Outside of city administration sponsored smart and digital programmes, the private sector has developed a number of beneficial infrastructure and energy applications that are in regular use by city citizens. User feedback and monitoring results prove that these are beneficial and users are willing to pay for these. Infrastructure and energy application contribute to the city digital market economy.

The Consultant should make sure that any directly provided or observed data by the residents of the city will be treated in confidentiality, but also with the maximum sensitivity if needed.

Annex 5: Technical Assessment Guidance Note

This guidance to the Technical Assessment Report (TAR) aims to make the analysis and reporting consistent across GCAPs.

The guidance includes 'additional supporting information' for consultants to collect to inform the baseline analysis in GCAPs. This information aims to build a comprehensive picture of sectors' environmental status. This guidance collates these additional supporting questions with the aim to gain a more detailed understanding of the city's environmental challenges but also suitability and readiness to adopt certain solutions. These questions are to be considered when undertaking the sectoral analyses as part of the TAR, but EBRD is aware that not all of them may be available to source nor are all relevant. Please use this list for guidance.

EBRD is also aware that data is not always readily available in all cities to the same degree. Consultants must thus aim to focus on the core indicators and fill the indicator's database as much as possible (a level of 85% is adequate) as not to delay the next GCAP tasks. By using the questions below to complement the indicator's database analysis, the assessment is envisaged to be more complete.

State indicators

Environmental Indicator	Source of pressure
Air	• Sources of air pollution (in %) for each particle pollutant (PM_{10}, $PM_{2.5}$, SO_2, NO_x)
Water bodies	• Sources of water pollution (in surface and ground water), including major point sources
Soil	• Sources of soil contamination, including major point sources
Water use	• Total water consumption and abstraction • Water consumption by sector (domestic, commercial, industrial, agriculture)
Land use/Green Space	• Share of population within 15 minutes of open green space by foot
Biodiversity and ecosystem	• Sources of biodiversity degradation
Mitigation (GHG emissions)	• Total CO2 emissions • CO2 emissions by sector
Adaptation	• Human casualties • Main type of natural disasters • Type of infrastructure at risk • Type of household at risk (by income level and by location)

Pressure indicators – Additional supporting information

Transport
Energy efficiency / type of energy used
• Number of electric vehicle charging stations (describe the type)

Choice of transport mode

- Kilometres of public transport (bus, tram, underground, rail) per 100 000 population (where relevant)
- Average age and condition of bus, tram, train fleet
- Condition of pavements and high level assessment of walkability (particularly for disabled users, low income, minority groups, women)
- Public transport customer satisfaction survey results if available
- Description of street public transport stops (sheltered, real time information availability, seating, wifi, etc) – inclusivity and accessibility
- Ticketing system description (type of tickets used for different modes, integrated ticketing etc.) + description of fares (dynamic, integrated between modes…etc.)
- Description of any informal provision of public transport
- Occupancy rate of public transport / Occupancy rate of private vehicles
  Annual passenger volume of public transport (bus, tram, underground, rail)

Road conditions and congestion

- Number of transport fatalities per 100,000 population
- Parking availability in the city centre (licenced and on-street) – specifying % of parking dedicated to EVs, disabled, women, elderly etc.

Electricity provision

- Compare planning and operational criterion with latest available grid data
- Compare number of substations having automated protection, control, monitoring, and communications with total number of substations
- Electricity distribution grid automation
- Percentage of power storage as compared to overall power demand
- Average annual cost of energy per capita compared to percentage share of average annual income per capital
  Share of LED street lights

Thermal comfort provision

- Annual growth of district heating in percentage compared to growth in new buildings

Buildings

Electricity consumption

- Percentage of consumers using “time of use” philosophy (due to tariffs or behavioural measures)
- Percentage of consumers using smart technologies (smart meters, smart home equipment)
- Percentage of consumers with energy storage ability
- Percentage of consumers with ability to produce electricity (also known as prosumers)
- Percentage of buildings with solar water heaters installed
- Percentage of buildings with solar PVs installed

Building standards

- Greenhouse gas emissions from buildings
- Average building deep renovation rate
- New construction rate (commercial, residential, public)
- Share of buildings with ACs
- Share of floor space heated by coal, natural gas, biomass, electricity and district heating.
- Share of buildings with energy performance certificates (EPC)

Industries

Industrial electricity consumption

- Electricity consumption for essential services
- Percentage of industrial consumers using smart technologies (smart meters, machine automation, automated demand flexibility or similar)

- Percentage of industrial consumers with energy storage ability
- Percentage of industrial consumers with ability to produce electricity (also known as prosumers)

Water

Water consumption, supply, production and storage

- Water Network Integrity (volume of water lost)
- Supply resilience (amount of water unable to be produced/total amount of water production)

Water conveyance, treatment and sludge

- Sewer Network Integrity (blockages)
- Septic tank treated

Water services

- Revenue collection rate
- Capital maintenance expenditure (amount of investment allocated/spent to sustain infrastructure service)
- Utilisation of renewable energy (water and wastewater)
- Infiltration of unwanted water in sewer system
- Impervious surface area within urban limit
- Awareness and preparedness to natural disasters

Solid Waste

Solid waste generation

- Share of non-residential waste generation in percent of the MSW collected
- Share of MSW generated that is collected by formal operators[20]
- Other collection / disposal practices (including for example illegal dumping, backyard burning, animal feeding, informal waste picking, etc) in percent of MSW generated
- Waste composition and seasonal variation of MSW[21]
- Quantities and composition of other waste streams that might put pressure on the system either because of generated quantities or qualities (e.g. hazardous characteristics)[22]
- Proportion of MSW streams that are separated at the source or sorted out of the mixed MSW stream - assessing this for specific waste types, e.g. for dry recyclables (paper and cardboard, glass, ferrous and non-ferrous metals, packaging waste, textiles, wood), organic waste, hazardous waste (incl. healthcare waste, waste batteries and accumulators, waste electrical and electronic equipment etc.), bulky waste, construction and demolition waste etc. including information on whether the waste streams were separated at the source or sorted out from the mixed waste stream
- Final products and usages of organic waste treatment processes (If organic waste is separated at the source or out of the mixed MSW stream)
- Usage of waste materials for energy production (including landfill gas utilization, anaerobic digestion, RDF usage and incineration, mass-burn solid waste incineration etc.)
- Costs of the waste management system (e.g. total costs per inhabitants with access to services) and whether costs are recovered by tariffs. To include the financial sources to cover the costs of the system and on the actual tariffs.

Land Use

Use of existing built-up areas

[20] Formal operators are either private companies or public utility companies (or similar) formally in charge of waste collection services.

[21] It is important to describe where and how the data were obtained. Especially in cold climates and depending on the heating system, it shall be assessed if seasonal variations occur in the waste composition (e.g. in winter partly waste might be burned in stoves, or there is in general higher ash content during that season). In addition, it is important to have a reliable estimate on the content of dry recyclables and organic waste. Consultants should put an emphasis on food waste contribution to organic waste production (including an observation of the value chain) in order to identify potential hotspots.

[22] These waste streams shall be described qualitatively (or quantitatively in case data are available) and include inter alia: construction and demolition waste, industrial waste, hazardous waste, hospital waste, batteries and accumulators, waste electrical and electronic equipment, end-of-life vehicles etc.

- Average rent for commercial property/sq.m compared to national average or average wage
- Average rent for residential property/sq.m compared to national average or average wage
- Share of multi-storey apartments in the total housing mix (compared to single detached houses)

Annex 6. Water consumption factors for energy technologies (Litre MW-1 h-1)

Fuel Type	Cooling	Technology	Min	Median	Range	Max	Sample Size
PV	N/A	Utility scale PV	0	1	1-5	5	3
Wind	N/A	Wind turbine	0	0	0-0	0	2
CSP	Tower	Trough	725	906	906-1109	1109	18
		Power Tower	751	786	786-912	912	4
		Fresnel	1000	1000	1000-1000	1000	1
	Dry	Trough	43	78	78-79	79	11
		Power Tower	26	26	26-26	26	1
	Hybrid	Trough	117	338	338-397	397	3
		Power Tower	102	170	170-302	302	2
	N/A	Stirling	4	5	5-6	6	2
Biopower	Tower	Steam	480	553	553-965	965	4
		Biogas	235	235	235-235	235	1
	Once-through	Steam	300	300	300-300	300	1
	Pond	Steam	300	390	390-480	480	1
	Dry	Biogas	35	35	35-35	35	1
Geothermal	Tower	Flash	5	15	15-361	361	4
		Dry Flash	5	5	5-5	5	1
		Binary	270	270	270-270	270	1
		EGS	290	505	505-720	720	1
	Hybrid	Binary	221	461	461-700	700	2
Hydropower	N/A	In-stream and reservoir	1425	4491	4491-18000	18000	3
Nuclear	Tower	Generic	581	672	672-845	845	6
	Once-through	Generic	100	269	269-400	400	4
	Pond	Generic	560	610	610-720	720	2
Natural Gas	Tower	Combined Cycle	130	205	205-300	300	6
		Steam	662	826	826-1170	1170	4
		Combined Cycle with CCS	378	393	393-407	407	2
	Once-through	Combined Cycle	20	100	100-100	100	3
		Steam	95	240	240-291	291	2
	Pond	Combined Cycle	240	240	240-240	240	1
	Dry	Combined Cycle	0	2	2-4	4	2
Coal	Tower	Generic	480	687	687-1100	1100	5
		Subcritical	394	479	479-664	664	7

		Supercritical	445	493	493-594	594	8
		IGCC	318	380	380-439	439	8
		Subcritical with CCS	394	479	479-664	664	7
		Supercritical with CCS	445	493	493-594	594	8
		IGCC with CCS	318	380	380-439	439	8
	Once-through	Generic	100	250	250-317	317	4
		Subcritical	71	113	113-138	138	3
		Supercritical	64	103	103-124	124	3
	Pond	Generic	300	545	545-700	700	2
		Subcritical	737	779	779-804	804	3
		Supercritical	4	42	42-64	64	3

References

See https://bit.ly/2kQ9aDC (last accessed 18 September 2019)

See www.iea.org/statistics (last accessed 18 September 2019)

See http://bitly.ws/5hyL (last accessed 18 September 2019)

J Macknick, R Newmark, G Heath and K C Hallett (2012). “Operational water consumption and withdrawal factors for electricity generating technologies: a review of existing literature”, Environmental Research Letters, Vol. 7, No. 4.

European Commission, 2018 - https://ec.europa.eu/info/news/commission-reviews-implementation-eu-waste-rules-proposes-actions-help-14-member-states-meet-recycling-targets-2018-sep-24_en (accessed on 15.06.2020)

Annex 7. Guidance Note for developing the Gender Assessment

Purpose of this guidance

This annex provides guidance on how to develop the Gender Assessment described in Task 3e. The GCAP takes a comprehensive approach to integrating gender equality and economic inclusion throughout its development. The Gender Assessment aggregates these analyses and information gathered throughout the GCAP development process into a clear output describing the analysis undertaken and the recommendations to address gender and inclusion in the City. The Gender Assessment should be presented as part of the Stakeholder Engagement to refine Green City actions (Step 3.3.E in the Methodology, Task 3f), as well as shared with the City and EBRD as a supplementary output to the GCAP. It should be refined to reflect final decisions on materials to include in the final version of the GCAP to be submitted for approval.

The Gender Assessment is comprised of two parts:

A. Gender Analysis

The Gender Analysis is the combination of multiple Steps of the GCAP Methodology within the Green City Baseline (Step 2.1 in the Methodology). The Consultant should describe the steps taken to analyse gender and economic inclusion conditions in the City during the Baseline, and outline the information collected as a part of these steps. Specifically the Gender Analysis should include the following Items:

1. A summary of considerations for gender and economic inclusion adopted in the GCAP development process to ensure balance participation and gender equality in all aspects of the GCAP development (see Step 1.9 in the Methodology).
2. Outputs from Step 2.1.A.v – Assessment of social and economic conditions, which are relevant to gender
3. Outputs from Step 2.1.A.vii – Gender and vulnerable population representation and participation in city development
4. Outputs from Step 2.1.B – Map city resilience based on risks and vulnerabilities, with particular attention to vulnerable communities and person identified in Step 2.1.B.iii.
5. Gender disaggregated data collected as a part of 2.1.C – Smart Maturity Assessment.

6. The Gender Analysis should also outline information collected and conclusions drawn with respect to gender equality and economic inclusion as part of the Technical Assessment (Step 2.1.F in the Methodology). Within the Technical Assessment, the Consultant should address gender considerations for each sector (gaps, needs, status), following the questions below, covering both:
   (i) Access to urban infrastructure
   Needs and the gender gaps in terms of use of urban infrastructure**.** This analysis will include the dimensions of access to, safety and affordability of services.
   (ii) Women's Skills and Employment in the urban infrastructure sectors

Methods: To provide the gender perspective, the Consultant will analyse relevant available reports, legislation, and public documents. The Consultant will analyse gender-disaggregated data available in documents such as national/municipal census, international/national poverty and household database, municipal transportation data, public harassment database, etc. The Consultant can complement the analysis with findings of reports from various partners, interviews, and observations of the local context. Stakeholder engagement and targeted consultations with women will also enable to gather relevant data and information.

Appendix I to this Annex provides a list of gender related questions by sector the Consultant should evaluate as part of the Technical Assessment.

The full Gender Analysis will detail Items A1 through A6, including the Green City Challenges identified with links to gender equality and economic inclusion.

B. Gender Recommendations

Green City actions should support the City to address its identified challenges, while ensuring co-benefits in areas including gender equality and economic inclusion. The Gender Recommendations part of the Gender Assessment details gender considerations embedded within actions and gender co-benefits of actions. Specifically, the Gender Recommendations should outline:

1. The subset of Green City actions with gender or economic conclusion components. These should be only those actions - investment, policy or other – calling for demonstrable steps to improve gender equality of economic inclusion in its sector or area of focus. The description of these actions should not be as detailed as the actions in the GCAP itself, but rather focus on the details most relevant to gender and inclusion goals.
2. The gender equality and economic inclusion co-benefits derived from the subset of Green City actions identified in B.1 above.

Gender relevant questions for evaluation municipal service operations

The following list of questions consider gender dimensions of infrastructure operations to evaluate in the Technical Assessment (Step 2.1.F in the Methodology). Analysis of gender considerations for each sector will help to better understand, at the municipal level, the different needs and perspectives of women and men in terms of access to services and to employment opportunities in urban infrastructure. The analysis will be used as a basis to improved prioritisation and inclusive designs of green infrastructure investments and policies recommended in the GCAP.

Questions by sector:

Sector	Aspect	Questions

Transportation	Access	• What are the mobility patterns of men and women in the city?
		• Do men and women have any **preferences** in terms of means of transportation used? Why? Do women usually use public transportation alone or with children/family members?
		• Is the city's public transportation system **accessible** to all?
		• Is the city's public transportation system **affordable** to all?
		• **Safety** – Is the city's public transportation system **safe** to all?
		  o Is there adequate security and lighting in buses, metro, bus shelters, footpath and bike lanes etc?
		  o Are there mechanisms in place that prevent and mitigate harassment in public transportation? Are there mechanisms to report sexual harassment and support victims?
		• **Schedule and Timing** - Do the bus, metro and train schedules meet the needs of all genders and do not only focus on traditional commute patterns? How is bus and train scheduling? What is the average wait-time? Is there a real-time signage?

	Skills and Employment	• Labour market participation of women and men (employment / unemployment rates, etc.) in the urban transport? • How are women represented in the supply chain workforce for this sector?
Buildings	Access	• Are buildings accessible to all? • Is online billing available? • Have international or national standards on inclusive design been adopted?
	Skills and Employment	• Labour market participation of women and men (employment / unemployment rates, etc.) in this sector? • How are women represented in the supply chain workforce for this sector?
Water	Access	• Are clean, secure, accessible public WASH and sanitation facilities available for girls and women? • What is the level of access to water and sanitation among male-headed and female-headed households? • Is there an equitable tariff or payment structure for water access (in particular for low income / women-headed households)?

		• How are women represented in water management committees? How is women's participation and decision-making positions in water users' organizations?
	Skills and Employment	• Labour market participation of women and men (employment / unemployment rates, etc.) in the water sector? • How are women represented in the supply chain workforce for this sector? • Are there education or training programs for women in civil and water engineering, water resource management? • What are the safety constraints for women to participate in maintenance / water infrastructure?
Energy	Access	• In the city, what are the light hours in public spaces (street, parks, etc)? • Are women the primary energy users in the households? Do men or women manage family electricity / heating use? • Are female consumers targeted to facilitate the adoption of energy efficiency solutions? Do programs for women and single-headed households to rent energy appliances exist?
	Skills and Employment	• Labour market participation of women and men (employment / unemployment rates, etc.) in the energy sector? • How are women represented in the supply chain workforce for this sector?
Waste water and solid waste	Access	• In the city/country, what roles women and men play in waste storage, separation, and recycling at the household level? • What is the schedule of waste picking in the city? Does it affect men and women differently?
	Skills and Employment	• Labour market participation of women and men (employment / unemployment rates, etc.) in the waste water and solid waste sector? • How are women represented in the supply chain workforce for this sector? • What is the proportion of men/women among the waste pickers? What is the proportion among the formally hired refuse collectors and also among the informal waste pickers? • Are there consequences in terms of safety of the men and women involved in the waste picking activities? Are these activities part of the formal or informal economy? Does this affect men and women differently? Are the safety equipment and practices designed in a gender-sensitive manner?
Public spaces	Access	• Are the city's public spaces (parks, streets, etc.) **accessible** to all? • Do women and men use public spaces differently in the city? • To what extent are the WASH facilities in public spaces **clean**, **secure** and **accessible**? Are safe sanitation facilities available in the entire city? • Are public facilities (toilets, etc.) **safe** and **accessible** to women? Are there mechanisms in place that prevent and mitigate sexual harassment in public spaces? • Are the city's streets walking-friendly? Are some streets in the city pedestrian only? Do street crossings enable slow traffic and thus safer space? How is street and building signage?

	Skills and Employment	• Labour market participation of women and men (employment / unemployment rates, etc.) in this sector? • How are women represented in the supply chain workforce for this sector?
Land use	Access	• Is the proportion of single-headed households higher in certain areas of the city? Within the population living within / beyond 20 minutes to everyday service, is the proportion of women and/or single-headed households higher?
	Skills and Employment	• Labour market participation of women and men (employment / unemployment rates, etc.) in this sector? • How are women represented in the supply chain workforce for this sector?

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