GREEN CITIES PROGRAMME
METHODOLOGY

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Local Governments for Sustainability

Based on the work of OECD and ICLEI on Green Cities

This document (the "Report") is based on work prepared by the OECD and ICLEI (the 'Experts') for the European Bank for Reconstruction and Development (the "EBRD"). The views, opinions, assumptions, statements and recommendations expressed in this Report are those of the Experts and do not necessarily reflect the official policy or position of the EBRD.

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EXECUTIVE SUMMARY

1. The multiplicity and diversity of urban environmental activities in the world

1. The **European Bank for Reconstruction and Development (EBRD)** is committed to promoting environmentally sound development as expressed in the Agreement Establishing the EBRD. This commitment is demonstrated in the Bank's Environmental and Social Policy (ESP), the Municipal and Environmental Infrastructure (MEI) Sector Strategy and more recently in its Green Economy Transition (GET) approach, which targets to have 'green' projects represent 40% of the EBRD's investment by 2020. Given cities' environmental impacts and their important economic role, the Bank should further implement these strategies and accelerate transition in its Countries of Operations (COOs) by developing a green cities programme.

2. A review of existing green cities initiatives by international actors reveals the growing importance given to the urban environmental agenda and the increasingly decentralised character of green (or sustainable) city actions, which underlines the importance of EBRD's MEI investments for GET and ESP. Another critical finding is the growing attention paid to a comprehensive approach to green cities. That is, most programmes take a systematic approach to cities covering the broad range of environmental issues and linking these issues to economic and social objectives (e.g. inclusiveness). There are two major hurdles impeding the dissemination of a common, systematic green cities approach: *i)* it is challenging to translate such comprehensive approaches into investment projects, which tend to focus on single urban sectors; *ii)* there is a lack of agreement on the definition and approach to developing a green city , which is reflected in the numerous terminologies and contents of existing urban environmental activities (e.g. green cities, sustainable cities, resilient cities etc.).

2. Definition of a green city

3. This report proposes **a definition of a green city** that can be guide the EBRD in addressing environmental problems and accelerating transition in its COOs. For the Bank, green cities are characterised predominantly by their environmental performance, with the intent to maximise subsequent social and economic benefits. In this approach, the social and economic characteristics of a green city are used to prioritise, monitor and evaluate green city activities and services that ultimately seek to improve the environmental performance of cities. The report offers the following definition of a *Green City:*

> *A Green City is a city which shows high environmental performance relative to established benchmarks in terms of i) quality of environmental assets (air, water, land/soil and biodiversity), ii) efficient use of resources (water, energy, land and materials) and iii) mitigating and adapting to risks deriving from climate change, while maximising the economic and social co-benefits and considering its context (population size, socio-economic structure and geographical and climate characteristics).*

4. In addition, this report proposes a definition of a **Green City Approach**. While a green city is defined as a "state", or level, of environmental performance, it is also useful to have a common understanding of "actions" that are relevant to maintain/enhance the performance:

A Green City Approach is an integrated, multi-sector process whereby a city's environmental challenges are periodically identified, prioritised and addressed through targeted investments and services, regulations and other relevant policy instruments with the aim to enhance the city's environmental performance in a cost-efficient and financially sustainable manner, while at the same time seeking to maximise the economic and social co-benefits .

5. In order to apply such a Green City Approach to the methodology, this report proposes a **Green City Pressure-State-Response (PSR) framework**, adapted from a framework developed by the OECD. The Green City PSR framework identifies human activities that exert *pressures* on the urban environment (categorised by the following six sectors: transport, energy, building, industry, water, solid waste, and land-use) and change its *state* in terms of environmental performance. It also identifies how society *responds* to these changes through general environmental, economic and sectoral policies, and through changes in behaviour, thus affecting the *pressures* caused by human activities. The Green City PSR framework therefore builds causal linkages between the environmental performance of a green city; the key associated economic activities; and investment, services and policy instruments to respond to these challenges.

3. Benchmarking and prioritising green city challenges and actions

6. There is little consensus on which urban environmental measures and implementation methods cities should employ, including **benchmarking and prioritisation tools,** which are critical for a city to identify challenges and suitable actions. For example, to date existing **green city indicators** vary significantly from one initiative to another, reflecting the lack of uniformity of approaches in existing urban environmental activities.

7. This report recommends developing green city indicators and a benchmarking and prioritisation process following the structure of the Green City PSR framework. The proposed green city benchmarking methodology is inspired by the Emerging and Sustainable Cities Initiative (ESCI) developed by the Inter-American Development Bank (IADB) and involves applying a **traffic light screening** over the green city indicators with benchmarks corresponding to traffic light thresholds ("green"; "amber"; "red"). While some indicative benchmarks are suggested, it is recommended that EBRD establishes country-specific benchmarks data in order to follow national standards and laws, thereby taking the context of its COOs into account. The traffic light benchmarking will be used to identify priority green city challenges and in prioritising green city actions/policy options. Both the prioritisation of green city challenges and green city actions/policy options will follow a three-step assessment:

- **Technical assessment**, executed by city employees and other experts. In prioritising green city challenges, this assessment will include the use of the traffic light screening on the PSR indicators, which also evaluate indicators' individual, projected trends. Another technical assessment will take place in the drafting of the Green City Action Plan and will consist in selecting policy options and applying priority filters (environmental, economic, and social impacts; budget cost estimates).

- **Stakeholder-based prioritisation**: local experts and relevant stakeholders will complement the technical assessment by verifying and/or editing green city challenges and actions identified. **Political assessment**: this is a formal assessment of the results of the previous steps in order to provide a final prioritisation of challenges to address and priority actions to take.

4. Methodology for Green City Action Plans (GCAPs)

8. The Green City Action Plan (GCAP) presents the results of benchmarking and prioritisation exercises and defines the long-term Green City vision – within a timeframe of 10-15 years – and strategic objectives for each priority area. It focuses on the priority environmental dimensions, using relevant indicators and time-related targets and measures for cities' operations. The GCAP also outlines the scope of actions, the targets set and the major actions developed, and the initial steps of implementing the Plan for a period of 1-5[1] years. It is an overarching strategic document which contains the guiding principles offering orientation for cities' decision-making and the administration's implementation work in the medium-term, i.e. within 3-10[2] years.

9. The overall timeline for developing the GCAP is 12-24 months for the introductory period (first GCAP cycle), and 12-18 months for the following regular periods. Implementation of GCAP cycles is on a continuous basis, i.e. individual steps are partly implemented overlapping with other steps. Its **four main stages/steps** are:

- **Green City Baseline (6 months for the introductory period, then 1-3 months when revisited)**: aims to inform policy and strategic decision-making at the start of the process (or the review phase for advanced local governments) and provide the reference scenario for the business-as-usual against the Green City approach and action. The prioritisation of green city *challenges* is included in this step.

- **Green City Action Plan (6 months for the introductory period, then 3 months)**: aims to compile and present the agreed development vision and objectives for a period of 10-15 years, the targets to work towards in a period of 3-10 years, and the scope of actions and targets proposed. The prioritisation of green city *actions* is included in this step.

- **Green City Implementation (12-36 months)**: aims to operationalise and implement the Green City Action Plan, break it down into concrete tasks, allocate budget, time and staff, and monitor the contribution of each measure to the objectives and targets established in the GCAP. This stage will also link to provisions made in municipal budgets, and formally establish the reference base for mayors, councillors, and administrative decision makers with regard to further development & investment decisions.

- **Green City Reporting (3 months)**: aims to analyse the successes and failures of the implementation period, provide the basis for taking further political decisions and inform city officials, stakeholders and the public on what the city has done and achieved.

[1] The immediate timeline of the GCAP should be decided in consultation with the City government. Actions plans can cover an immediate period of 3 to 5 years depending on the City's preference.

[2] The timeline of the medium-term targets should be decided in consultation with the City government. Timelines may need to be catered to specific targets. The presented range of 3 – 10 years is, therefore, indicative and dependent on the City's preferences.

SECTION 1 – URBAN ENVIRONMENTAL ACTIVITIES IN THE WORLD

1.1. EBRD's strategic orientations

10. The **European Bank for Reconstruction and Development (EBRD)** is a multilateral development investment bank founded in 1991. It aims to promote market economies in 30 countries from central Europe to central Asia where investments and activities financed by the Bank systematically target reforms and restructuring aimed at improving the efficiency of markets and economic operations in the region. The Agreement Establishing the EBRD also states that the Bank is committed to promoting "environmentally sound and sustainable development". Over the past few years, environmental objectives have gained critical importance in the Bank's strategies and operations. The Green Economy Transition approach (GET), the Municipal and Environmental Infrastructure (MEI) Sector Strategy and the Environmental and Social Policy (ESP) are main vectors of environmental promotion in this regard. Economic Inclusion and Gender Equality are also two major objectives of the Bank. Although they do not support environmental objectives directly, they are closely related to the GET, MEI Sector Strategy and ESP (**Table 1**).

Table 1. EBRD's strategic orientations

Name of Strategy	Description
Green Economy Transition (GET)	The **Green Economy Transition (GET)** approach aims to scale up green finance to achieve EUR 4 billion per year by 2020, or about 40% of total Bank annual business volume, up from the current target of 25. The increase in green financing will be achieved by scaling up current activities in sustainable energy and resource finance such as the EBRD's Sustainable Energy Finance Facilities (SEFF) programme. In parallel, the Bank will support governments at different levels (national and local) to introduce improved legislation, regulations and investment planning to ensure maximum impact. The Bank is working to integrate the Green Economy Transition approach into its Transition Impact Monitoring System (TIMS). TIMS is used by the Country Sector Economics team to assess the transition impact of every project as part of the process of choosing, preparing and appraising projects. While the tool has been used in the past to promote market-based transitions, it is now incorporating other evaluation dimensions such as reduction in greenhouse gas emissions.
Municipal and Environmental Infrastructure (MEI) Sector Strategy	The objective of the **Municipal and Environmental Infrastructure (MEI) Sector Strategy** is to achieve the sustainable delivery of essential services, notably in water wastewater, public transport, urban roads and lighting, solid waste management, district heating and energy efficiency, throughout the EBRD region. To reach this goal, the core themes of the Bank's actions are: decentralisation, commercialisation, and environmental improvement. The Municipal and Environmental Infrastructure Sector Strategy will be a core instrument to ensure the Green Economy Transition, considering cities' impacts on the local and global environments.
Environmental and Social Policy	Through the **Environmental and Social Policy**, the EBRD is committed to promoting "environmentally sound and sustainable development" in the full range of its investment and technical co-operation activities. All projects financed by the EBRD shall be structured to meet the requirements of this Policy, and meet a set of specific Performance Requirements (PRs).
Economic Inclusion	EBRD is promoting **Economic Inclusion** in view of growing youth unemployment, low participation of women in the workforce – especially in southern and eastern Mediterranean (SEMED) countries – and the stark differences in economic performance between regions, particularly in south-eastern Europe (SEE). For these reasons, the EBRD has extended its

	transition methodology to incorporate economic inclusion into its assessment of structural transition gaps. Examples of EBRD projects that promote economic inclusion include credit lines for women entrepreneurs; retail developments that help young people gain skills and find jobs; and investments that facilitate access to safe drinking water for rural communities.
Strategy for the Promotion of Gender Equality	The **Strategy for the Promotion of Gender Equality** aims to increase women's economic empowerment and equality of opportunities in the countries where the EBRD invests, as an important contributor to well-functioning market economies and inclusive societies – a core component of sustainable and equitable transition. The Strategy focuses on three specific objectives: i) To increase access to finance and business support for women-led businesses; ii) To increase access to employment opportunities and skills for women; and iii) To improve equitable access to services for women. These will be achieved by: enhancing the EBRD's performance through increasing operations and improving delivery, with the aim of mainstreaming gender equality into EBRD operations by 2020; and by contributing to the creation of an enabling environment that can address the constraints which gender inequality places on transition.
Local climate initiatives	EBRD is supporting **local climate initiatives.** The EBRD launched an assignment supporting the Municipality of Gaziantep in Turkey to update its Climate Change Action Plan (GCCAP). It is the first local action plan of such kind that the EBRD provided support for; the project is completed and the CCAP was published.

Source: EBRD's website and strategic documents

11. Cities are sources of important environmental impacts, such as air pollution and pressure on water resources, and are also often vulnerable to climate change induced disasters. Such urban environmental issues are particularly acute in EBRD's Countries of Operations (COOs), and reinforced by patterns of urbanisation. In this regard, a "Green Cities" approach seems critical to translate EBRD's environmental agenda at the local level. This section will review the main urban environmental activities in the world as a starting point of a Green Cities methodological development.

1.2. Existing environmental activities in cities in the world

12. The promotion of environmental activities in cities has become a core activity of many stakeholders. This report reviewed major initiatives recently undertaken by different actors. The review considered the following aspects:

- *Type of organisation*: international organisations, NGOs, development partners, national and local governments, private sector, research centres and local communities.
- *Type of activity* (e.g. study, action plan, or infrastructure project). While some organisations only focus on one aspect, many organisations and governments address all the steps of green city actions (from study to implementation).
- *Targeted sector* (e.g. what type of infrastructure). While many institutions take a comprehensive approach, there is a substantial diversity in terms of sectors targeted by each initiative.

13. The results are listed in **Annex 1**. Key observations from the reviews and lessons for EBRD are listed in **Table 2** below.

Table 2. Main lessons from urban environmental activities in the world

Observation	Lessons
More decentralised actions. The promotion of environmental activities in cities is increasingly undertaken directly with and by local	This reinforces the importance of EBRD's MEI,, which adopted

governments, in line with the growing recognition of the critical role they play in shaping the economy. In parallel, local capacity-building programmes for environmental actions are part of many initiatives listed in Annex 1.	decentralisation and environmental improvement as two missions, and also other EBRD's local initiatives (GCCAP in Gaziantep, Green Cities Methodology), to realise GET's objectives. GET recognises the importance of public channels but does not develop much on city initiatives. City initiatives listed in Annex 1 can provide inspiration and best practices for EBRD when supporting national and local governments in designing local action plans, and in introducing regulations and planning reforms.
Growing attention to a comprehensive approach, but which is difficult to undertake on the ground. Although there is no commonly adopted approach of environmental actions in cities, there is a notable evolution of the approach and understanding of urban environmental activities over time, from an emphasis on green spaces and biodiversity to an emphasis on every sector that affects the urban environment. This comprehensive approach has a broad scope, covering issues from urban utility systems (transport, energy, solid waste, water etc.), for example, to the impacts of the environment on cities (i.e. disaster risk resilience). In addition, there is a growing attempt to link environmental activities with economic and social objectives (e.g. inclusiveness) and understand green / sustainable cities as a system. The necessity to adopt a comprehensive approach to green / sustainable cities has created gaps between the scope of studies – which tend to be wide – and the scope of investment projects – which tend to be specific to some urban sectors (e.g. transport, energy…).	EBRD's Environmental and Social Policy integrates many environmental dimensions but does not always recognise all the aspects that can relate to green cities. GET is more comprehensive in this regard. The gap between the scope of studies and projects on the ground shows the importance of the GET as a comprehensive strategy to be translated into investment. This first observation also reflects well the connections between some of EBRD's strategic orientations, in particular the importance of MEI and its various components to achieve GET, but also the fact that green cities can also support EBRD's Economic Inclusion Strategy and Gender Equality to some extent (e.g. access to public transport).
The broad scope and lack of uniformity of approaches is reflected in the numerous terminologies used by environmental activities: green cities, sustainable cities, resilient cities, urban green growth are examples of major initiatives that place environmental performance of cities as a core objective, but often with different scope or conceptual approaches;	The green cities methodology needs to adopt a clear definition identifying objectives, and a clear conceptual framework.
The need for indicators: the complexity and broad scope of green cities (or sustainable cities) associated with a recognition of the necessity to adopt a comprehensive approach has generated interest in developing indicators as concrete tools of diagnostic and basis for action. As explained in Annex 3 and section 3.3 however, existing indicators vary substantially and there is a lack of clarity on what indicators should be considered as green city indicators. This illustrates the diversity of urban environmental approaches, as mentioned earlier in this Table.	Further work on green cities indicator is necessary and should be integrated with a clear green city definition and action plan methodology.
Growing recognition that governance systems have a substantial impact on the feasibility of city-based green actions (OECD, 2013). Many activities have acknowledged the necessity to integrate issues such as co-ordination between the national, regional and local governments, metropolitan governance, involvement of communities and private sector, for instance, to green cities. In particular, the role of national governments to create enabling environments cannot be overstated. Finance has also gained high attention worldwide as a lever to enable cities to become green. This	Support for institutional reforms to achieve transition is needed at both the national and local level, as expressed in the GET. Likewise, attention should be paid to cities' financial capacities and financial instruments to promote green cities in the green city action planning. Municipal finance are already seen as incremental activities in the GET, and

includes cities' financial capacity generally speaking but also more targeted means to promote green cities, at the international (official development finance) national (e.g. fossil fuel (dis)incentives) and local levels (e.g. tariff and fees in transport, water, solid waste, energy). Attracting private investment in green city sectors (e.g. Public-Private-Partnership) is also critical in many initiatives.	issues of tariffs and fees and cost recovery are mentioned in the MEI. This observation also supports EBRD's strategies to unlock green finance for cities and to support cities' green action plans at different levels of government. Stakeholder engagement is also one of the objectives of the MEI, and could support the Gender Equality Strategy.
Growing involvement of the private sector in enhancing cities' environmental performance. Such involvement has taken different forms. The most common type of activity is the development and management of urban utilities (energy, buildings, transport and water). Other activities include consulting services for green cities, and corporate social responsibility (although the latter is not specific to cities). There is also a growing recognition of the concept of sustainable / green cities as a whole (e.g. Siemens), although this is still not well translated into multi-sectoral investment. The growth of the market for smart city services[3] mainly developed and offered by multinational companies such as Siemens, Cisco, and IBM, and traditional utility companies is a critical trend. Some of these tools may positively impact cities' environmental performance This is promising thanks to the dramatic increase in the global market, the rise in national and local governments' interest in these technological solutions, and their potential impact on city greening and economic benefits (especially considering the speed of change of digital technologies/ICT).	This shows the importance of involving private stakeholders in green city planning processes, and the need to tap on the opportunities offered by the private sector in terms of utility management. In other words, this illustrates some potential benefits of promoting market development for green cities. Involvement of the private sector is expressed in the GET but there is no mention of urban technologies. MEI emphasises the need for PPP in water, wastewater, transport, district heating and solid waste. Privatisation and outsourcing are also mentioned in the MEI. The private sector can also be an important vector to raise citizens' awareness on green cities.
Civil society organisations (CSOs) and local non-government organisations (NGOs) have also undertaken environmental initiatives, mainly support for solid waste collection and treatment, urban farming, tree planting and volunteering for public space cleaning**.** It is difficult to track these initiatives as they are small in scope and do not have much visibility. Many existing activities show growing acknowledgement of municipalities of the necessity to involve local communities in green policymaking and implementation, or to support existing green community practices. Many successful examples result of a collaboration between the city authorities and the communities (for instance, the municipality creates regulations to allow urban farming to take place in more areas like rooftops).	Municipalities should ensure that CSOs are engaged in the Green City Action Plan process. They can be important actors of a green city, although the impact may be hard to assess. They can also be important vectors to raise public awareness.

Source: Authors

14. The most relevant initiatives to EBRD listed in Annex 1 are as follows:

- **In terms of green city approach and methodology**: the Inter-American Development Bank (IADB)'s Environmental and Sustainable Cities Initiative (ESCI) provides a comprehensive conceptual framework for sustainable cities, including benchmarking and prioritisation. It is broader than the scope of green cities but the methodology is

[3] The concept of smart city (also known as or similar to other concepts such as "digital city", "intelligent city" or "knowledge-based city") has often been used in different and inconsistent ways, resulting in some confusion about its added value. A common understanding, as articulated in recent studies of the OECD *Green Cities Programme* (*Green Growth in Bandung, Indonesia*, forthcoming), is that smart cities use Information and Communication Technologies (ICT), or digital technologies, to make the critical infrastructure components and services of a city more interconnected and efficient. There are many applications and potential objectives of using such digital technologies, and not only to improve cities' environmental performance.

nonetheless useful (see next section for more details). The Asian Development Bank (ADB)'s Green City Development Toolkit and the Cities Development Initiative for Asia (CDIA)'s Toolkit for Infrastructure Prioritisation also provide interesting methodological approaches in terms of green city prioritisation processes (see next sections for more details).

- **In terms of networking / potential synergies on the ground** (for any future application of the green cities methodology): the Rockefeller Foundation's 100 Resilient Cities (disaster risk resilience), the Covenant of Mayors (energy and climate change), C40 Cities (climate change) ICLEI (urban sustainability in general) and the World Bank's Europe and Central Asia (ECA)'s Sustainable Cities Initiatives (SCI) are influent organisations with wide network, including in some parts of EBRD's Countries of Operations. Some of them undertake technical assistance on the ground in this region – in particular World Bank's SCI – and EBRD could build partnerships or tap on existing projects to ensure higher impact. The TRACE pilot in Gaziantep, Turkey, is an example of synergy.

- **In terms of green city policy best practices**: OECD's Green Cities Programme, ADB's Green Cities (2012), World Bank's Eco2Cities, World Wild Fund's Sustainable cities database and some individual city initiatives could be sources of inspiration for green city policy best practices that EBRD could use when assisting cities to develop their green city plans. Some private sector and CSO's initiatives listed in Annex 1 could also be sources of inspiration if relevant to a city's needs.

SECTION 2 – DEFINITION OF A GREEN CITY

2.1. Definition of a green city and approach for EBRD

15. There is no universally accepted definition for what a green city is, or universally observed practical approach to it. As shown in Annex 1 and Table 1, many stakeholders have contributed to environmental activities in cities but often through different angles, for instance by working on specific urban sectors, or by adopting a broader approach of urban sustainability where economic, social and financial sustainability are primary parameters on equal footing as environmental indicators. As a result, there is a lack of consensus and clarity on what could be defined as a green city.

16. This report proposes a definition of a green city emphasising the environmental performance of such a city. Social and economic performance are therefore not the primary target – although they also constitute important characteristics of a green city and will be useful to consider in priority setting, monitoring and evaluation of green city activities and services (cf. next sections for more details).

> *A Green City is a city which shows high environmental performance relative to established benchmarks in terms of i) quality of environmental assets (air, water, land/soil and biodiversity), ii) efficient use of resources (water, energy, land and materials) and iii) mitigating, and adapting to, risks deriving from climate change, while maximising the economic and social co-benefits and considering its context (population size, socio-economic structure and geographical and climate characteristics).*

17. It is important to give clear distinction to a green city from the following existing concepts, although partly overlapping:

- **Sustainable city**: this concept is broader in scope and includes objectives of economic growth and social equity and justice as primary parameters alongside environmental performance. It is also more ambitious and applying a concrete methodology may be more challenging.

- **Smart city** (also known as or similar to other concepts such as "digital city", "intelligent city" or "knowledge-based city"): this concept has often been used in different and inconsistent ways, resulting in some confusion about its added value. A common understanding, as articulated in recent studies of the OECD *Green Cities Programme* (*Green Growth in Bandung, Indonesia*, forthcoming), is that smart cities use Information and Communication Technologies (ICT), or digital technologies, to make the critical infrastructure components and services of a city more interconnected and efficient. There are many applications and potential objectives of using such digital technologies, and not only to improve cities' environmental performance. In other words, smart city tools can be a *means to support* green cities.

- **Resilient city**: the basic idea behind the concept is that resilient cities are prepared for and able to withstand shocks of different natures (environmental, economic, political, social

etc.). The concept is still vague and lacks a practical definition. One of the most concrete aspects of this approach is resilience to natural disaster risks, which is a sub-set of the above green city definition and the approach below.

18. In addition, this report proposes a definition of a *Green City Approach*. While a green city is defined as a "state", or level, of environmental performance, it is also useful to have a common understanding of "actions" that are relevant to maintain/enhance the environmental performance. There are indeed a range of actions to address cities' environmental problems, with some more relevant to EBRD's Green Economy Transition mandate, its Municipal Environmental and Infrastructure Strategy, and cities' policymaking responsibilities:

> *A Green City Approach is an integrated, multi-sector process whereby a city's environmental challenges are periodically identified, prioritised and addressed through targeted investments and services, regulations and other relevant policy instruments with the aim to enhance the city's environmental performance in a cost-efficient and financially sustainable manner, while at the same time seeking to maximise the economic and social co-benefits .*

2.2. Environmental, economic and social objectives of a green city

19. The proposed Green City definition and approach considers three environmental dimensions to be addressed in priority: *i)* quality of environmental assets; *ii)* efficient use of resources, and *iii)* climate change risks. This can be translated into more targeted objectives as listed in **Table 3** below.

Table 3. Green cities' environmental dimensions

General environmental dimension	Targeted environmental dimension
Quality of environmental assets	Air quality
	Water quality
	Land/Soil quality
Stock of resources	Water resources availability
	Green space availability
	Biodiversity and ecosystems
Climate change risks	Mitigation (greenhouse gas emissions)
	Adaptation (resilience to climate change risks)

Source: Authors

20. The proposed definition also includes economic and social dimensions linked to the environmental dimensions which should be taken into account to fully grasp the ins and outs of a green city. The main economic and social dimensions and objectives relevant to a green city are listed in **Table 4**. As outlined in the definition of a *Green City Approach*, actions to enhance a city's environmental performance should also seek to maximise economic and social co-benefits. These links between economic, social and environmental objectives will provide additional motives for city leaders to undertake green city actions. For instance, a green city activity which can generate substantial employment co-benefits can easily be justified and prioritised compared with other green city activities with less positive economic impact. Also, providing access to clean and efficient water, energy and solid waste collection services to all urban residents (including in slums) will not only enhance cities' environmental performance but also meet social objectives. Conversely,

an urban population with high environmental awareness will be more likely to use sustainable infrastructure systems (public transport, use of separation garbage) and encourage elected governments to adopt a green city agenda.

Table 4. Green cities' economic and social dimensions and objectives

Economic and social dimensions		Examples of economic and social dimensions that green city actions contribute to improving
Economic	Economic growth and employment	Development of green city sectors contributes to GDP output and employment (see Table 6 for a list of sectors and specific activities)
		Innovation in green city sectors contributes to GDP output
	Economic resilience	Resilience to the impacts of climate change improves economic resilience
	Revenue and expenditure	Green infrastructure and services provision, financial incentives, charges and taxes to promote green cities generate expenditures and revenues for a municipality
Social	Public health	Improvements in water and air quality reduce public health issues
	Access to urban services (indirectly: poverty, equality)	Enhancement of the efficiency and coverage of water supply infrastructure/network increases access of such services for the urban population and may participate in poverty and inequality reduction efforts
		Enhancement of the efficiency and coverage of low-emission (in terms of air pollutants and GHG) electricity and heat supply network increases access of such services for the urban population and may participate in poverty and inequality reduction efforts
		Enhancement of the efficiency and coverage of sustainable modes of transport (low-emission public and private transport, cycling, walking) increases access of such services for the urban population and may participate in poverty and inequality reduction efforts
		Enhancement of the efficiency and coverage solid waste collection system increases access of such services for the urban population and may participate in poverty and inequality reduction efforts
		Enhancement of the efficiency and coverage of safe and energy-efficient housing increases access of such services for the urban population and may participate in poverty and inequality reduction efforts
		Affordable basic services for all the urban population may participate in poverty and inequality reduction efforts
		Enhancement of the quantity of green spaces increases access of such services for all the urban population and generate well-being
	Behaviour and awareness	“Green” behaviours increase the use of existing sustainable urban utility systems (transport, solid waste recycling systems)
		High public awareness on natural disaster risk enhances the civil society’s preparedness to such events
		Citizens with “green” behaviours are more likely to preserve habitats and ecosystems
		“Green” behaviours result in lower consumption of water and energy resources
	Citizen	Involving citizens in green city planning processes helps to achieve public

	engagement	participation objectives and buy-in of the population
		Community involvement in green city actions (e.g. solid waste, nature conservation) can be an effective implementation means and provide social benefits
	Social resilience	Tackling the vulnerability of poor communities to natural disaster risk can have high benefits on a city's resilience and avoid further urban inequalities
	Gender equality	Enhancement of the safety and accessibility of public transport participates in promoting gender equality

Source: Authors

2.3. Key economic activities and services to be addressed under a Green City Approach, and relevance to EBRD's mandate

21. A Green City Approach requires identifying, prioritising and addressing a city's environmental challenges through targeted investment and services and other relevant policy instruments (regulations, etc.). In this regard, there is a wide range of urban economic activities and services that can be targeted to address urban environmental challenges. **Table 5** builds on the targeted environmental dimensions listed in Table 1 by identifying sources of pressure on urban environmental performance and their relevant sector. **Table 6** expands this approach and provides a more specific list of economic activities and services categorised by the following seven sectors identified in Table 5: transport (public transport, fuel efficiency, traffic and parking management), buildings (energy efficiency [EE] in buildings), industries (energy efficiency [EE] in industry), energy (energy supply, renewable energy [RE])[4], water (water supply, wastewater, efficiency of water use, and drainage), solid waste (collection, treatment), and land-use. The same table also identifies responses to each economic activity and service factor that are relevant to cities or EBRD.

Table 5. Key environmental dimensions and related economic activities and policies to be addressed under a Green City Approach (by targeted environmental objective)

General environmental dimension	Targeted environmental dimension	Source of pressure	Sector
Quality of environmental assets	Air quality	Pollution from urban transport	Transport
		Pollution from electricity and heat generation	Energy (RE) Industries (EE) Buildings (EE)
		Pollution from industrial processes	Industries
		Pollution from solid waste incineration	Solid Waste
	Water quality	Pollution from wastewater discharge from energy generation, industrial, residential and commercial activities	Industries Buildings
		Pollution from solid waste dumping in water bodies	Solid waste
		(Low) quality of drinking water pre-treatment and wastewater treatment	Water
	Land/Soil quality	Pollution from wastewater discharge	Water

[4] In this report and in Annex 5 on green city indicators, the energy sector will be defined only under the aspects of energy provision (electricity, heating) and renewable energy (RE). Energy efficiency (EE) will be considered separately in the building and industry sectors.

		Pollution from solid waste dumping	Solid waste
Stock of resources	Water availability	Water consumption in industries, buildings and energy generation activities	Industries Buildings Water
		(In)efficiency and low coverage of water supply networks	Water
	Green space availability	Loss of green spaces	Land-use
	Biodiversity and ecosystems[5]	Air, water and soil pollution (see above)	Transport Energy Industries Buildings Water Solid Waste Land-use
		Depletion of water and green space resources	Water Land-use
Climate change risks	Mitigation (greenhouse gas emissions)	GHG emissions from urban transport	Transport
		GHG emissions from electricity and heat generation	Energy (RE) Industries (EE) Buildings (EE)
		GHG emissions from industrial processes	Industries
		Methane emissions from landfill	Solid waste
		Lack of green space	Land-use
	Adaptation (resilience to climate change risks)	Lack of green space/infrastructure	Land-use
		Lack of drainage and polder infrastructure	Water
		Resilience of urban service networks	Transport Energy Water
		Uncollected solid waste (health hazard)	Solid waste

Source: Authors

Table 6. Key environmental challenges and related economic activities and services to be addressed under a Green City Approach (by sector)

Sector (from Table 5)	Source of pressure (from Table 5)	Examples of EBRD or city responses
Transport	• Pollution from transport (use of fossil fuels, energy efficiency, choice of transport, congestion) • Resilience of transport systems	Fuel Switching
		Vehicle Energy Efficiency
		Public and Non-Motorised Transport
		Electric, hybrid, LPG, CNG vehicles
		Transport Tariff
		Traffic and Parking Management
		Emergency Transport Management

[5] Table 5 illustrates the peculiar relationship of biodiversity and ecosystems with the other environmental dimensions. It is not a sectoral dimension but rather a cross-cutting, overarching dimension affected by all the others (i.e. biodiversity is affected by air and water pollution)

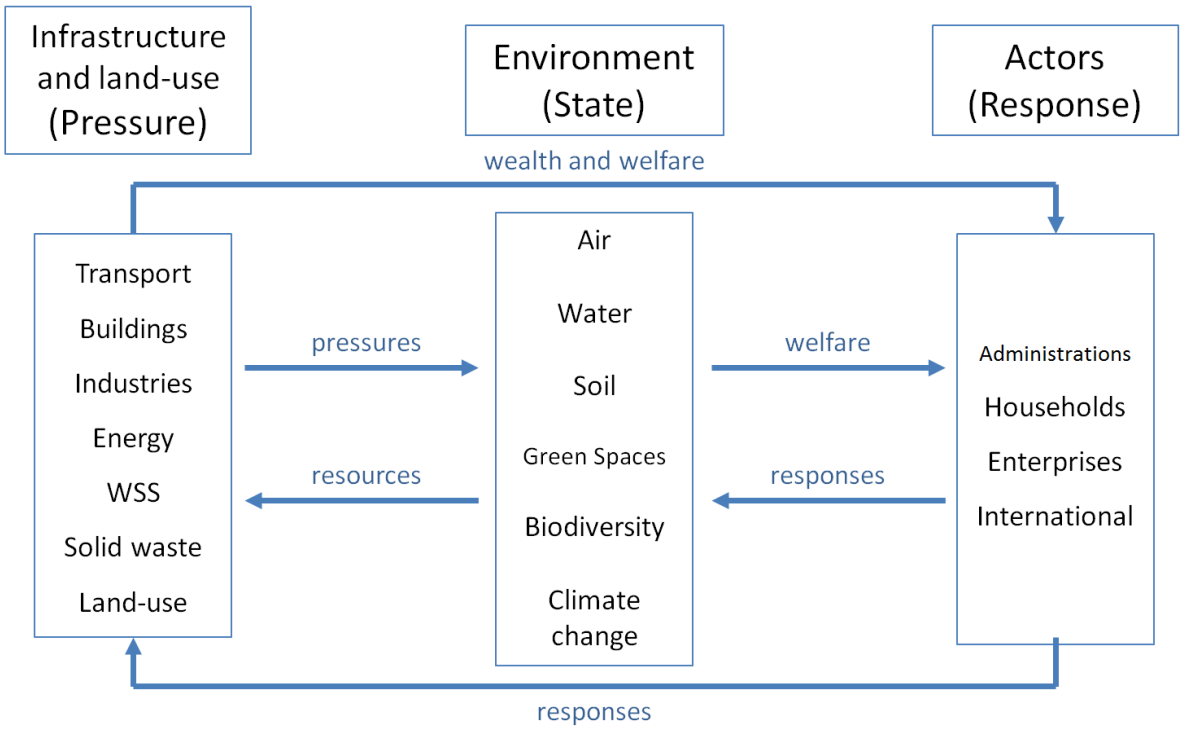
Buildings	• Pollution from electricity and heat consumption in industries (energy efficiency)	Building Energy Efficiency
		Metering technologies
		Energy Tariff and Billing
Industries	• Pollution from industrial processes • Pollution from electricity and heat consumption in industries (energy efficiency) • Solid waste generation in industries • Discharge of wastewater from industries	Industrial Energy Efficiency
		Energy Tariff and Billing
		Metering technologies
		Industrial Material Recycling
		Industrial Material Reuse
		Industrial Material Efficiency technologies
		Water efficiency and reuse / recycle technologies in industries
Energy	• Provision of energy (electricity, heating) • Pollution from electricity and heat consumption in industries (i.e. use of fossil fuels / renewable energy for electricity and heat provision) • Resilience of electricity networks	Renewable Energy
		Energy tariff and billing
		Provision of electricity and heat; efficiency and resilience of supply networks
		Street lighting
		Access to cleaner energy sources
Water	• Water consumption in households • (In)efficiency of water supply networks Discharge of wastewater (residential and commercial activities) • Drinking water pre-treatment • Low resilience to natural disasters (lack of drainage and polder infrastructure, resilience of water supply networks)	Reduction in water supply losses
		Water supply coverage, continuity and resilience of network
		Drinking water pre-treatment
		Wastewater Treatment
		Drinking Water and wastewater treatment technologies
		Water supply, wastewater treatment and sewerage tariff and billing
		Water efficiency and reuse technologies (energy generation, buildings)
		Drainage and polder systems
		Metering technologies
Solid Waste	• Solid waste generation • Uncollected solid waste • Solid waste treatment (incineration of solid waste, landfill overcapacity etc.) • Methane emissions from landfills	Solid waste collection (including hazardous waste)
		Material Recycling
		Material Reuse
		Waste to Energy
		MSW Methane Reduction
		Solid waste collection and treatment tariff and billing
Land-Use	• Lack of green spaces / infrastructure Compactness • Integration with other sectors (transport, energy etc.)	Green space and infrastructure preservation/provision
		Urban density
		Transit Oriented Development

Source: Authors

2.4. The Pressure-State-Response approach: conceptualising the causal linkages between green city components

22. The causal linkages elaborated above support the need to adopt a **Pressure-State-Response (PSR) approach to conceptualise green cities.** The PSR approach was developed by the OECD in the 1990s and re-used in the OECD's *Green Growth in Cities* (2013). Human activities exert *pressures* on the environment (cf. Table 4 and 5), and change its *state* in terms of its quality and its stocks of resources (cf. Table 2). Society *responds* to these changes through general environmental, economic and sectoral policies, and through changes in behaviour, thus affecting the *pressures* caused by human activities. The original PSR framework is adapted to the city level and made coherent with the green city definition as well as the environmental dimensions and sources of pressure conceptualised in section 3.2. **Figure 1** presents the Green City Pressure-State-Response framework. The Green City PSR framework will be critical to organise indicators and develop a green city action prioritisation methodology (cf. section 3.3).

Figure 1. Green city Pressure-State-Response framework



Source: Adapted from OECD (1994), Environmental Indicators, OECD Core Set

SECTION 3 - GREEN CITY STRATEGIC PLANNING INSTRUMENTS (BENCHMARKING AND PRIORITISATION)

3.1. Review of existing international best practices on green city strategic planning instruments (indicators, benchmarking and prioritisation)

23. There is little consensus on which urban environmental measures and implementation methods cities should employ for green city development. Many studies have attempted to conceptualise green city or sustainable city models and elaborate on how to translate them into action at the city level by analysing green city / sustainable city indicators, policy instruments and action planning. This report reviewed existing studies and research on indicators and action planning. The results are listed in Annexes 3 (review of green city indicators) and 4 (review of green city actions benchmarking and prioritising).

Green city indicators: the need for a conceptual framework

24. Annex 3 reviews the literature on green city indicators. There are several key observations from the results. A general overview of indicators' characteristics is below:

- The comprehensive character of environmental activities (in particular studies) and the lack of uniformity of approaches to promote green / sustainable cities, as mentioned in the previous section, are reflected in **the heterogeneity of existing indicators**. This is easily observable from Annex 3. While some studies have only included a few indicators which are purely environmental (e.g. air quality, pollution of the environment), others have included a broader range of indicators covering topics other than the environmental performance of cities. The OECD's work promotes the green growth concept, with indicators focusing on economic growth and some social considerations. The IADB uses a sustainable city concept and employs one of the most comprehensive sets of indicators which include governance indicators. ISO 3721 also employs a broad range of indicators (e.g. economy, education, environment, governance, urban planning…)

- **Another factor of heterogeneity is the inclusion (or not) and the inconsistent use of indicators referring to the response (i.e. policies, investment, behaviour) of municipalities**.; For example, Siemens' Green City Index includes indicators on the presence of environmental master plans. IADB's ESCI also included some response indicators (e.g. disaster risk master plan, early warning systems) but only sporadically. The OECD, taking a different approach, did not include indicators on policies. Instead, OECD green city indicators refer to the quality and availability of environmental assets and their causes from the performance of urban infrastructure and the economy. Specific policy response are not measured but rather analysed in depth and recommended in each relevant sector for green growth.

- In this regard, a review of existing indicators suggests **the need for a conceptual framework guiding indicator selection and use for green city action planning processes**. Such conceptual framework should be linked to a clear green city definition and make sense of causal linkages between indicators, which is rarely the case in existing

activities. In Section 3.2, this report proposed the Pressure-State-Response (PSR) framework as a green city diagnostic tool.

- **There is a general lack of baseline/benchmark**. This is due in part to the complexity of conceptualising green / sustainable cities (which may imply a large number of indicators) and the lack of established standards. Likewise, there are few attempts to track the evolution and progress of cities' environmental performance over time. IADB's ESCI's benchmark effort is the most comprehensive of existing studies. OECD has tried to come up with indicators which are internationally comparable (using Functional Urban Areas[6]), although the data availability is an obstacle to develop such a methodology.

- **There is a lack of standard means of displaying results**. Some indexes have attempted to visualise the results in a performance "web" (Siemens), others have adopted a traffic light approach (IADB); others have not applied any scoring methodology (OECD, ADB).

- Overall, the most recommendable pieces of work on indicators are **ISO 37120, IADB's ESCI, OECD Green Cities Programme, and Siemens Green City Index**.

IADB's ESCI provides a complete benchmarking and prioritisation approach

25. The study identified four international practices for green city action *prioritisation* (including initiatives which covers broader policy areas): the **Asian Development Bank's Green City Development Toolkit**; the **Inter-American Development Bank's Environmental and Sustainable Cities Initiatives (ESCI),** the **Clean Development Initiative for Asian Cities' City Infrastructure Investment Programming and Prioritisation Toolkit** and **the Centre for Low Carbon Futures (CLCF)'s *Economics of Low Carbon Cities Series***. These three approaches are summarised in **Annex 4**. Only IADB makes a thorough use of indicators as a support within a broader framework of prioritising action. In addition, it is the only study which has developed a benchmarking methodology embedded in a complete prioritisation process. The main lessons are:

- **IADB's ESCI** is the most complete methodology for benchmarking and prioritisation, thanks to a scientific and thorough use of indicators and also the application of five filters (the traffic light scoring of indicators, public opinion, climate change, economic impact, and multi-sectorality). It links the indicator section to the planning process more clearly than ADB's Green City Development Toolkit, for instance. Indicators are part of a wider green city action process which includes in order: preparation (e.g. form work teams), analysis and diagnostics (i.e. the traffic light exercise), prioritisation (integrating variables such as economic cost), and formulating the action plan. It could serve as a basis for a green city action benchmarking and prioritisation for our purpose, although their indicators are not specifically focusing on green cities (they are aiming to cover wider issues). The use of response indicators is inconsistent, however and should be refined. Another possible caveat is that, whereas the prioritisation filters are applied to identify problems, no methodological process is proposed to select policy options to address problems. In other words, there is a policy gap in this methodology (the programme helps you to identify problems but does not tell what to do). In addition, the application of filters may also need to be simplified to make sure this can be used by city administrators;

[6] Identification of cities as functional economic units, characterised by a densely inhabited "urban core" and a "hinterland" whose labour market is highly integrated with the "urban core" (OECD's *Compact City Policies, A Comparative Assessment* (2012). Identification of FUAs is mostly based on commuting data.

- **ADB's Green City Development Toolkit** adopts an assessment matrix promoting comprehensive approach of prioritisation by not only looking at a city's environmental performance in each sector of infrastructure related to green cities, but also looking at financial, governance and implementation obstacles by sector. A traffic light methodology is recommended to score these elements in each sector; however, the link between the choice of colour and the indicators is unclear and is mostly left to city administrators' appraisal. There is no indicated benchmark for each indicator. Also, there is no additional filter (e.g. economic and social impacts, public opinion) to further prioritise action;

- **Cities Development Initiative for Asia (CDIA)'s Infrastructure Prioritisation Toolkit**'s principles could also be applied to green cities. The approach is however different from ADB and IADB in the sense that there is no assessment of needs through indicators as the initial step. Instead, the selection of projects is made as a wish list by city administrators, and refined through an assessment of the city's financial capacity. This approach will not be retained here as more thorough green city diagnostic is recommended to prioritise action.

- The **Centre for Low Carbon Future's *Economics of Low Carbon Cities Series*** has developed a model for assessing the costs and carbon effectiveness of a wide range of the low carbon options that could be applied at the local level in households, industry, commerce and transport. It is more a detailed scientific study focused on CO_2 emissions and cost-benefit of low carbon measures. Replicating it for every green city sector is probably too ambitious and not practical.

26. In summary, IADB's ESCI is a good model for green city action prioritisation. It must however be narrowed down to specific environmental issues. Additional filters such as financing and implementation issues – as used by ADB and CDIA – but also social impacts to build links between EBRD's Green Economy Transition Approach and Social strategies could be used. It must also be noted that none of the above studies analyse green city policies on a sector by sector basis. They instead propose a methodology to identify environmental issues and their sources, yielding an action plan. However, there is no discussion in the same studies of what kind of policies should be undertaken to tackle each sustainability issue. The response aspect of their framework is therefore weak or absent.

27. There are a few more practices which could be relevant for green city action *benchmarking.* However these studies do not use indicators as an instrument for prioritising green city actions. The two main specific initiatives on green city benchmarking are **Siemens' Green City Index** and the **European Green Capital Award**. Another noticeable initiative is **City Blueprints** on water management. However, both mostly benchmark cities' environmental *performance* and not green city *action*. There is no best practice in benchmarking green city action. The three initiatives mentioned above are summarised also in **Annex 4**. The main lessons are:

- **Siemens' Green City Index** (also referred to as Economic Intelligence Unit (EIU)'s Green City Index) is the most complete benchmark for green city. Siemens also created a similar version was created for other continents. A more meaningful approach however would be to give a score to each city's green sector only, and not an overall score. In addition, it is more suitable to drop the 'response" (policy) aspects from the methodology, as it is difficult to give an objective rating.

- The **European Green Capital Award** is less thorough and rather "ranks" cities relatively to one another, without benchmarking based on a set of measurable indicators.

- **City Blueprints'** methodology is a bit more similar to Siemens' Green City Index, but also less thorough as there is no clear link between the indicators used and the ranking 0 to 10. The performance web could be useful to replicate if any benchmarking on green city is to be done.

3.2. Proposed green city benchmarking methodology

Selecting and organising green city indicators along the Green City Pressure-State-Response framework

28. Benchmarking and prioritising green city action will require thorough instruments of assessment and comparison in order to evaluate cities' environmental performance and determine priorities of action. In this regard, indicators should be central instruments for benchmarking and prioritising green city action in the most "scientific"/objective way possible. IADB's ESCI, which is the most advanced benchmarking and prioritisation methodology, also makes an intense use of indicators. However, as pointed out in section 3.1 and observable in Annex 3, more work is required to establish boundaries between indicators that relate to green cities and those which do not, and to conceptualise the causal linkages between green city indicators.

29. The proposed green city indicators in this document deviate from IADB's ESCI methodology in the sense that they focus exclusively on green cities (and not sustainable cities) and are articulated along the **Pressure-State-Response (PSR) approach** presented in section 3.2. The Green City indicators (and the benchmarking and prioritisation methodology) are categorised in a PSR framework to give a sense of the causal linkages in a green city, which is not conveyed in IADB's work. Within the "state" and "pressure" categories, an additional sub-classification of indicators is applied between "core" indicators and "elective" (or "optional") indicators. The purpose is to limit the number of necessary indicators. As explained below, only the "core" indicators need be taken into account in the prioritisation process and solely their collection is sufficient for the GCAP process. The "elective" indicators instead provide a menu of options in the event that the "core" indicator is not available in a given city. Core indicators are located in blue cells in Annex 5, while elective indicators are located in white cells. In total, there are **70 indicators** (114 including optional indicators). The list of indicators is provided in **Annex 5.** In detail, these three categories refer to:

- **Pressure**: this category refers to indicators measuring the sources of pressure and adverse impacts on the environment from human activity the environmental performance of the city. It relates to urban infrastructure (transport, energy, water supply, sanitation and drainage, solid waste) and land-use. There are 26 core indicators (59 indicators in total);

- **State**: this category refers to indicator that attempt to measure the state, condition or quality of the city's environment 'State' indicators also measure the stock and quality of natural resources. The quality and availability of environmental assets, and climate change risks are the three main 'state' subcategories, composed of 9 core indicators (20 indicators in total);

- **Response** indicators attempt to measure beneficial impacts of activities – actions to reduce pollution or consumption of resources or investment in environmental protection. This category refers to indicators measuring the aspirations, in terms of policymaking and instruments, of a city to become green, in each of the sectors listed in the other two tables on "pressure" and "state". Indicators listed in Annex 5 are general in scope, due to the potentially high number of responses. Annex 6 provides a more detailed list of possible

response for each general response indicator. This category is mostly qualitative and includes an assessment of the quality of implementation of green city policies. It is composed of 35 indicators.

Criteria for indicator selection and potential indicator challenges

30. Indicators were selected assuming they respond to the following criteria: relevance to the green city conceptual framework laid out in section 3.2, measurability, analytical validity, cost effectiveness, and practicability (i.e. indicators are not too complex). However, the proposed indicators need to be tested on the ground with several cities and refined if necessary. The data source will be recorded to ensure data quality, comparability and consistency of the baseline (review). For the same reason, the source of benchmark will also be recorded. Assessing and benchmarking a city's green performance, and establishing priorities through indicators will meet a range of issues related to data availability, collection and quality. Any city undertaking to assess its green performance must bear in mind the following obstacles:

- **Availability**: Some detailed indicators such as the proportion of population living within 20 minutes of everyday services, may not be available in some cities (i.e. it has never been produced by anyone / any stakeholder). The practicability of collecting the proposed indicators should therefore be frequently assessed with tests on the ground;

- **Reliability**: For instance, air quality measurement is often taken in only a few spots in the city, and is not frequent. Some indicators may be difficult to measure (e.g. percentage of households at risk). Available but unreliable indicators could be flagged by municipalities for improvement in the next green city planning cycles;

- **Scale:** If covering only the core city of a metropolitan area, some indicators may be misleading and do not reflect the environmental performance or urban pressure on the environment (e.g. the quantity of green spaces may be low within urban centres but be compensated by large forests right outside city limits).

- **Ownership**: The previous point raises the issue of ownership: collecting and gathering data will require contacting a range of agencies (national and local government, state or provincial government, private utility firms…). This may also create obstacles to harmonise the scale of indicators (e.g. indicators are produced by different agencies and stakeholders working which operate sometimes on territories of different sizes). The main likely sources of indicators are: statistical yearbooks; academic studies, private utilities, national government agencies.

- **Comparability (if two or more cities' green performance are compared):** comparing some indicators such as water consumption per capita or renewable energy supply as a share of total energy consumption may be misleading if comparing cities with very different geographical and climate context. The proposed methodology should be restrained to comparing cities with similar characteristics as much as possible.

31. The proposed indicators tables in **Annex 5** also include complementary information located in three extra columns on the right, in particular:

- A **"trend" column** informing about the evolution of the value for each indicator over the past 5 to 10 years. This should be useful in order to understand dynamics of green cities over time and the evolution of the city's performance. Concretely, the information provided will be used to further prioritise green city challenges, if necessary (see Section 3.3 for more details).

- Indicators informing on the **sources** of environmental degradation identified in the "state" indicator table. These should be particularly useful to understand the links between the environmental issues in the "state" table and which "pressure factors" exert the most influence on them.

32. The projected timeframe for the collection of the green city PSR indicators is 4 months for the first green city action plan cycle (12-24 months). The first data collection process is more demanding due to need to organise the workforce, locate the necessary data or produce it out of other statistical knowledge. The indicator collection process in the following green city action plan cycles will draw upon the first inventory, therefore it is estimated that from the second cycle, the indicator collection process can be reduced to 2 months. Due to the crucial importance of indicators to identify green city challenges and prioritise action, and the intense work that will be required to collect them, the cost estimate of the collection process is around EUR 50 000.

Benchmarking methodology: "traffic light" screening of state and pressure indicators

33. Green city indicators will be used to benchmark cities' performance. The benchmarking exercise will also be used as one of the steps of green city action prioritisation, as explained in the next section. This section will elaborate in more details on the benchmarking methodology first.

34. The *state* and *pressure* indicators should be used to benchmark cities. Response indicators are difficult to benchmark because they are entirely qualitative and "respond" to existing problems. A city does not need to respond to a problem that does not exist (for instance, a city does not need a disaster risk master plan if it scientifically proven that it is safe from all type of natural disasters). Instead, response indicators should be used in a second screening step to identify policy options that should be considered in order to tackle the state and pressure issues initially identified (cf. prioritisation methodology below). Likewise, additional supporting indicators (sources and trends) are not used for benchmarking.

35. A **traffic light screening**, as used by IADB, is applied to each indicator to simplify the assessment (green light = high performance; amber light = medium performance; red light = low performance) and compare cities' performance against established benchmarks or proposed indicative benchmarks. **Annex 5** presents starting point boundaries for this benchmarking exercise. The thresholds for the traffic light screening should be established combining the following methods:

- Use international standards (such as WHO air quality standards), EU Directives and national laws, when applicable.

- When standards and laws are not applicable, it is recommended that the proposed boundaries between each of the three "lights" be checked within the EBRD. They should follow data ranges extracted from the literature for quantitative indicators, and subjective boundaries for qualitative indicators. Benchmarks could be established based on literature indications on cities' performance in the world, or according to national averages, if the data is available. The latter option would help to avoid comparing a city performance with benchmarks established from data in cities with very different demographic, geographic, economic and climate profiles.

- From the above remarks, it is recommended that EBRD establishes country-specific benchmarks data in order to follow national standards and laws.

36. Such visualisation will help to better assess priorities and transfer the data into the technical and political decision-making process as well as to communicate and engage relevant stakeholders as effective as possible given their (commonly) limited time availability. The application of a traffic light screening to the Green City state indicators will help to identify the most urgent environmental problems (topics) faced by the city marked as "red", while highlighting areas of compliance and green city quality marked as "green". As such, the traffic light screening is a central step of the green city action prioritisation process detailed below.

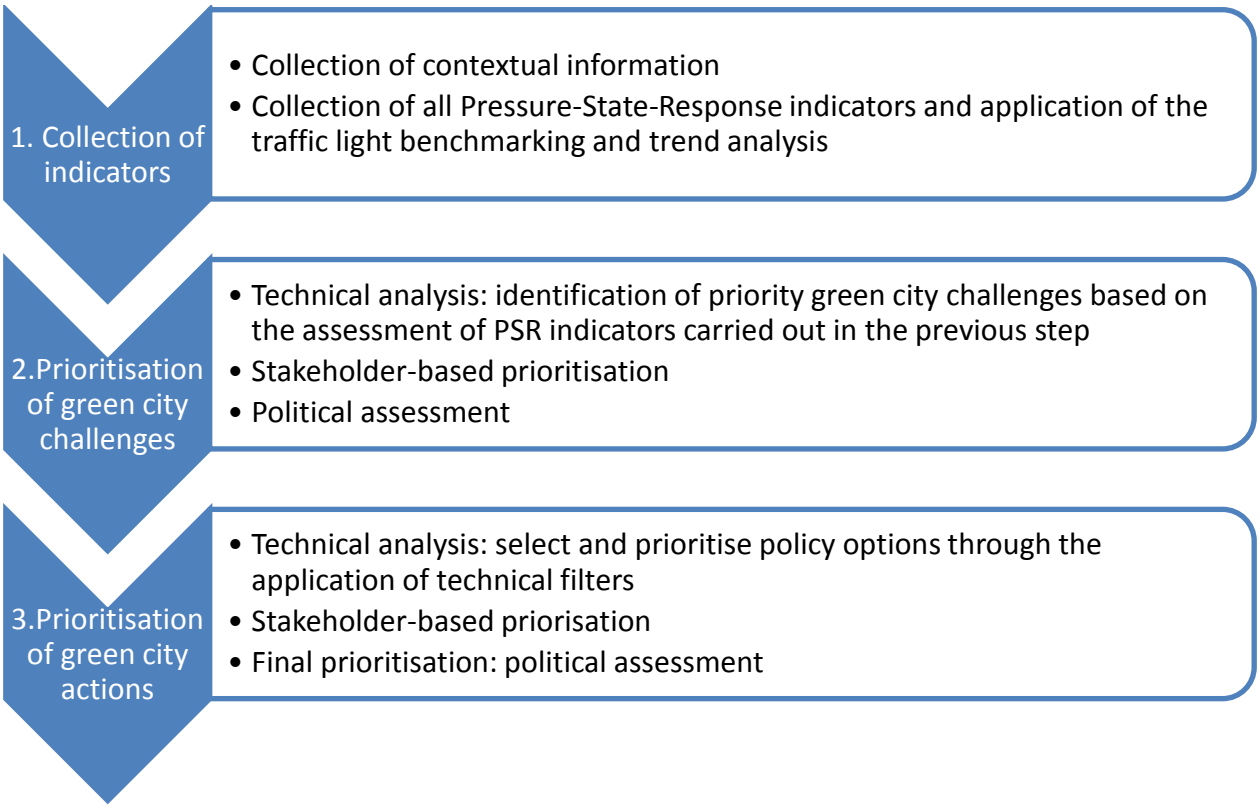
37. The indicators and benchmarking methodology will not only be used for prioritisation but also evaluation and monitoring of green city actions. For instance, if a city wants to assess the effectiveness of extending the local bus system in order to reduce GHG emissions from the transport sector, the following aspects should be measured using the benchmarking methodology:

- How many buses and new connections have been introduced (response);
- The impact of the measure on the number of passengers in public transport, or on the use of private transport modes (cars, motorcycles) (pressure);
- The impact of the measure on air quality and CO_2 emissions (state).

3.3. Proposed green city action prioritisation methodology

38. Indicators and proposed benchmarks using the traffic light screening will be used in the process of prioritising green city actions. The whole process is summarised in **Figure 2** below and subsequent text, and is also described in the full Green City Action Plan process developed in Section 4.

Figure 2. Summary of the benchmarking and prioritisation process



Source: Authors

1. Collection of indicators (cf. Step 1.2 in Table 11 and Annex 7)

1.2.1 Map external framework conditions

This includes financial status, governance, socio-economic and management inventory and analysis. Previous strategic planning or sectoral studies conducted for or by the City should be of particular focus in developing this framework. The GCAP should be informed by these plans, strategies and reports to ensure that the targets or actions identified through previous efforts are considered and potentially integrated into the GCAP.

1.2.2 Map environmental and linked infrastructure challenges:

This is the step when the city staff and GCAP team collects and assesses the "state" and "pressure" indicators, including additional indicators in the "state" indicator table. The assessment is done by applying the benchmarking methodology (traffic light screening) and the analysis of trend over time. The Green City indicators provide a useful, common framework for evaluating urban environmental performance, but should not be considered exhaustive. The GCAP team has the discretion to amend or expand the indicators to address areas perceived as lacking in technical assessment as outlined in the Methodology.

1.2.3 Map local policy framework:

This is the step when the city staff collects and assesses the "response" indicators. The assessment is done by applying the traffic light approach which uses in this case more qualitative thresholds compared to the "state" and "response" indicators (cf. Annex 5).

2. Prioritisation of green city challenges (cf. Step 1.3 in Table 11 and Annex 7) – Identifying baseline conditions

1.3.1 Technical analysis undertaken[7]

1. The prioritisation of green city challenges stems from the Green City indicators benchmarked to approximate urban environmental performance. The GCAP team can select which level of the methodology's Pressure-State-Response framework is best to lead the prioritisation analysis. Means of assessing each level of this framework are detailed below.

Select "state" indicators which show urgent need for action. "Core" state indicators (highlighted in blue-coloured cells) marked as "red" from the application of the traffic light screening should be selected. If a city fails to provide a "core" indicator, one of the elective indicators from the same category in Annex 5 can be used. If the traffic light benchmarking results in a great number of red-flagged indicators, the trend analysis can be used to further prioritise among the red-flagged indicators (e.g. only red-flagged indicators with declining and / or stable trends are selected). If, on the contrary, the traffic light benchmarking results in no or very few red-flagged indicators, amber indicators should be considered and the trend analysis can also be used to further prioritise among the amber-flagged indicators, if there are many of them (i.e. only amber-flagged indicators with declining trends are selected).

Select "pressure" indicators which show urgent need for action. "Core" pressure indicators (highlighted in blue-coloured cells in Annex 5) marked as "red" from the application of the traffic light screening should be selected. If a city fails to provide a "core" indicator, one of the elective indicators from the same category in Annex 5 can be used. If the traffic light benchmarking results in a great number of red-flagged pressure indicators, the trend analysis can be used to further prioritise among the red-flagged indicators (e.g. only red-flagged indicators with declining and / or stable trends are selected). If, on the contrary, the traffic light benchmarking results in no or very few red-flagged pressure indicators, amber pressure indicators should be considered and the trend analysis can also be used to further prioritise among the amber-flagged indicators, if there are many of them (i.e. only amber-flagged indicators with declining trends are selected).

Identify "response" gaps[8]. *A qualitative traffic light screening should be applied to the* "response" indicators. The result should reveal general response gaps (lack of investment, lack of regulations etc.), as opposed to specific. However, it is important to note that the traffic light screening of response indicators should aim, as much as possible, to indicate both the presence or absence of policies and the quality of those policies. Further, analysis will sometimes be necessary to understand the response "gaps". For instance, some pressure indicators may be identified as a priority while the response table shows that

7 The technical analysis may be carried out with the guidance of an external consultant.

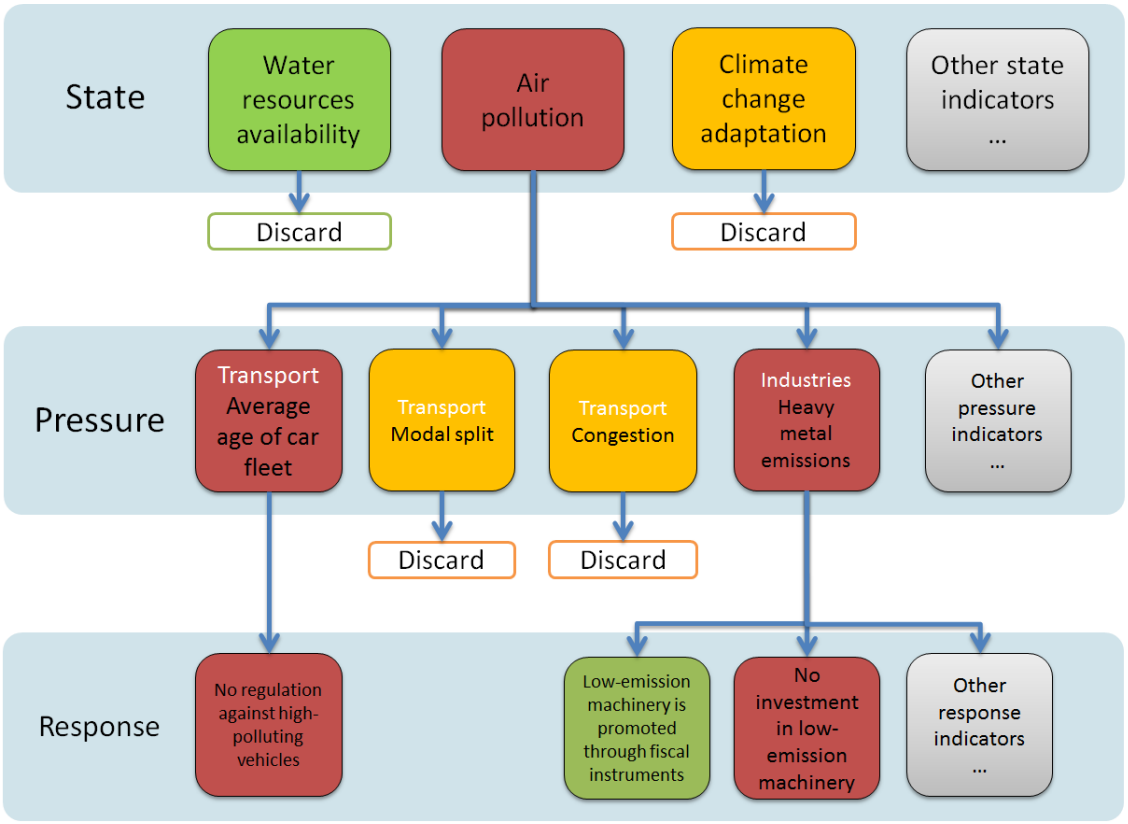
8 Annex 5 indicates which category of pressure indicators each response category refers to.

there are already policies and/or investment in this area. A more detailed analysis may reveal that existing policies are not well implemented, or not ambitious enough.

2. Indicators should be linked across the Pressure-State-Response framework to draw connections between selected indicators (i.e. those that show need for urgent action) for "pressure", "state" and "response". These connections will identify clusters of selected indicators, which can inform the development of the key environmental challenges presented in the GCAP.

At this stage, one option is to draw a diagram of an indicator "traffic light" as a way to visualise the main green city challenges. Such a diagram can also serve as a sort of "problem tree" to visualise the causal linkages between the red-flagged PSR indicators. **Figure 3** below provides an example. Note that it is up to the discretion of the GCAP team as to whether it is useful to a) develop problem trees and b) use them as communication tools within the GCAP. The problem tree method is not required, and teams are free to employ other means of drawing linkages between indicators.

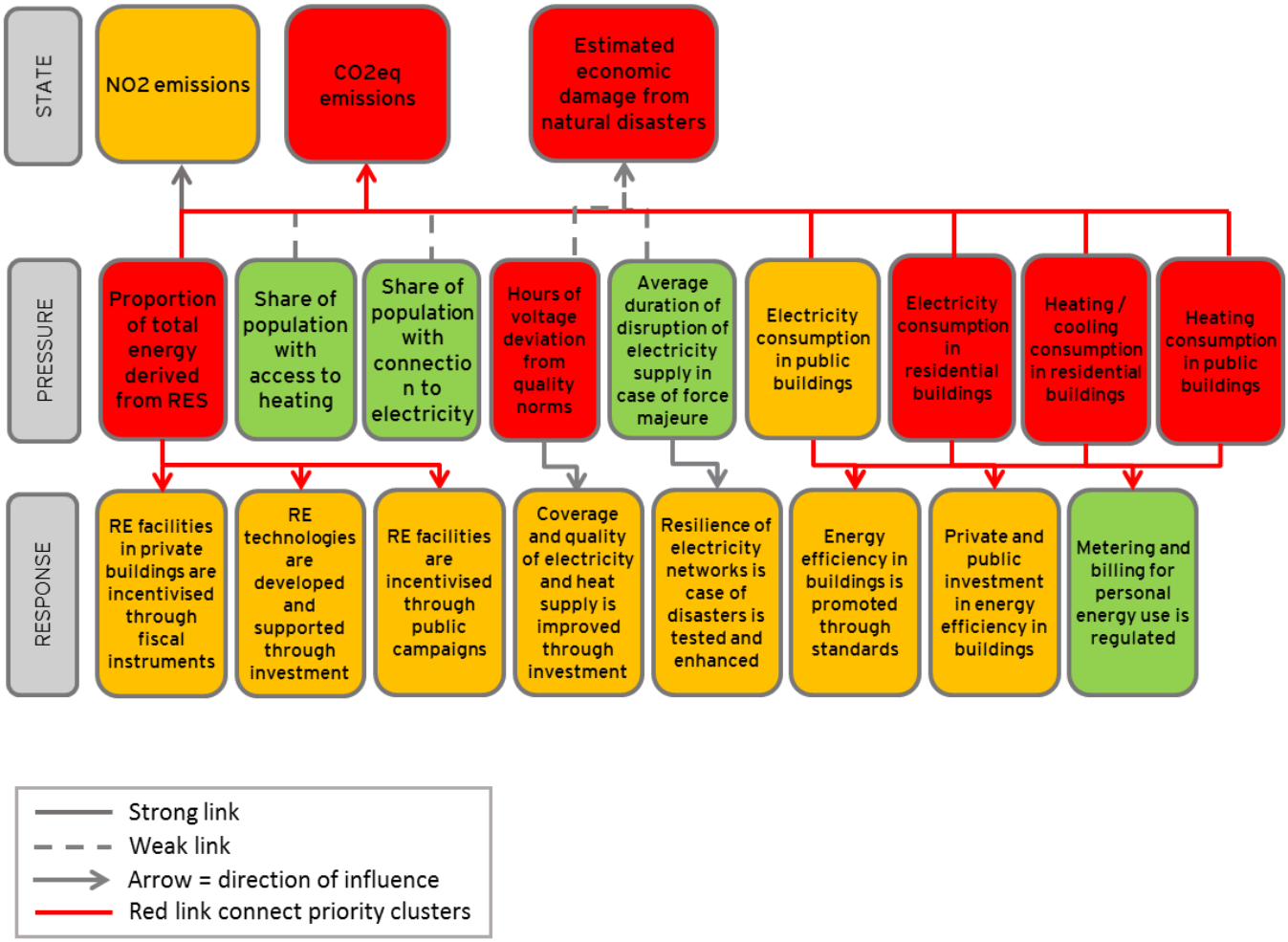
Figure 3. Example of green city baseline problem "tree" using the traffic light benchmarking methodology starting from 'State'



Note: This diagram shows the outcome of the technical analysis under a scenario where there is no need to further prioritise with the trend analysis. In other cases, some red indicators may be discarded or some amber indicators may be selected through the trend analysis (see text above for more explanations).

Source: Authors

Figure 4. Example of a Green City baseline problem "tree" for Energy and Buildings using the traffic light benchmarking methodology starting from 'Pressure'



1.3.2 Stakeholder-based analysis of green city challenges

The green city challenges identified as a result of the technical analysis within the city administration – i.e. the green city baseline indicators and problem "tree" – should be checked and complemented through a stakeholder consultation. External experts and citizens representatives will confirm or dispute the relevance of identified green city challenges. Critical economic and social dimensions linked to the environmental dimensions will be taken into account to refine the prioritisation of the challenges. The GCAP indicators should be used as a baseline and foundation for discussion for identifying a city's most pressing challenges, with stakeholder based conversations testing, and where appropriate, refining and expanding on the analysis. The issues raised and covered by the indicators are not absolute. Local knowledge can identify issues outside the environmental indicators included in the GCAP methodology. It is important to find a balance between the measured approach of the indicators and inclusion of contextual understanding gathered through stakeholder consultation.

This can be done in a larger group that involves a broader range of stakeholders, gathered in a workshop. A SWOT analysis has proven to be an appropriate tool for this assessment, but other methods can also be applied. Guiding questions can help to set links between socio-

economic development and environmental dimensions and derive priorities (e.g. which environmental dimensions impact socio-economic development of the city at most?). The priority environmental challenges identified through these discussions can stem from clusters of critical indicators within a given sector. Results will be summarised and thoroughly documented.

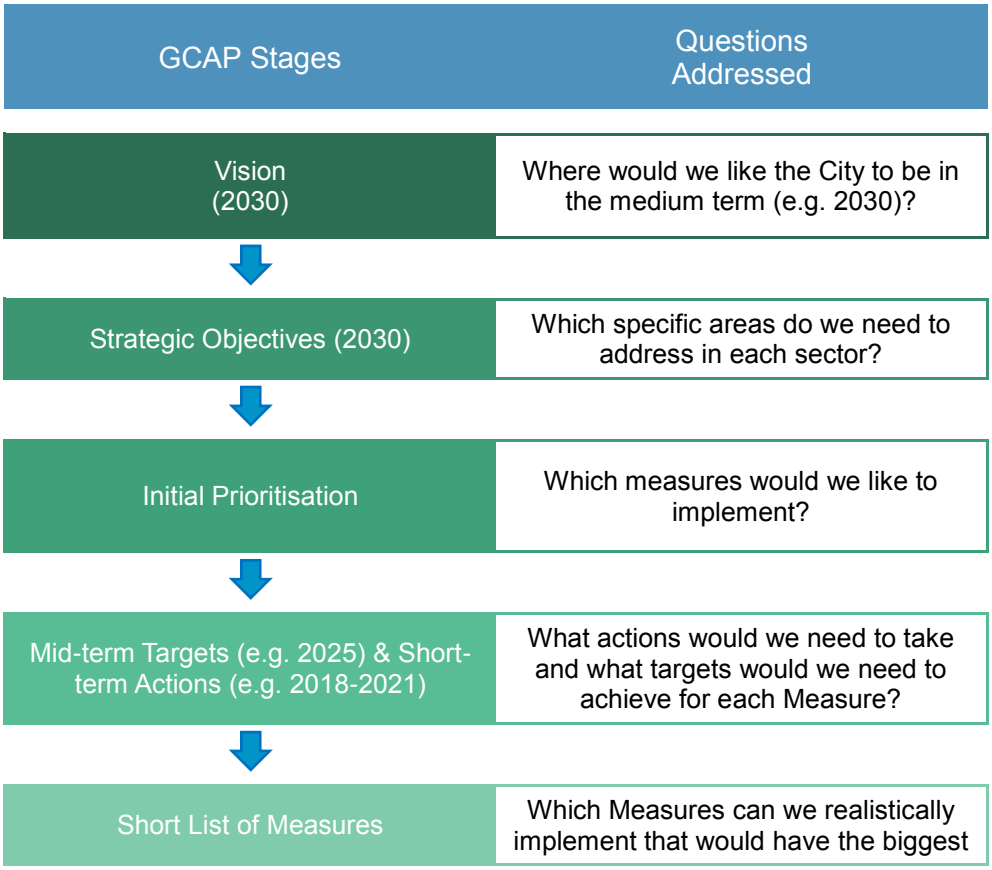
1.3.3 Political assessment of green city challenges

Political assessment: this is a formal assessment of the results of all previous steps in order to politically determine priorities to address in the Green City Action Plan. Findings of the baseline review will be presented in different ways depending on the targeted audience. Political ratification of priorities set by relevant bodies is advantageous, with the aim to obtain a strong mandate for continued action. This does not necessarily require a formal Council approval yet, but offers an opportunity for political debate, review and recommendations. In any case, the Council should formally 'take note' of the Green City Baseline. Upon establishing a political mandate and buy-in for specific priorities, the selected gaps and priorities should be clearly articulated.

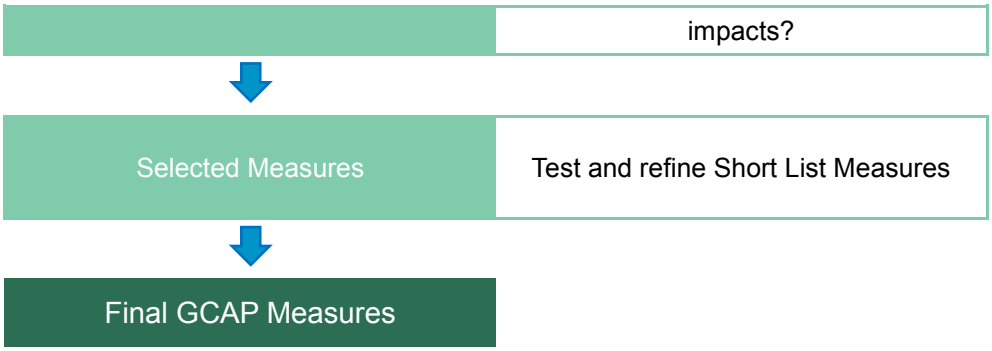
3. Prioritisation of green city actions (cf. Step 2.2 in Table 11 and Annex 7)

(Second) Technical analysis[9]

Figure 5. Flowchart of Green City actions formulation



[9] The second technical analysis may be carried out with the guidance of an external consultant.



2.2.1 Review of existing Green City initiatives and responses

Strategic objectives and medium-term targets will be achieved through short-term actions and measures. The first step in this process is a consideration of the existing responses and initiatives addressing green city challenges (resulting from step 1.2.2 and 1.2.3). If appropriate, existing instruments and procedures will be confirmed or adapted to more efficiently and effectively achieve the objectives and targets of the Green City Action Plan. Also, gaps within existing measures for addressing the strategic objectives will be identified as a basis for the next step.

2.2.2 Select Green City actions

Following from the identification of priority environmental challenges and policy gaps and drafting the strategic objectives, new actions and measures will be reviewed, considered and adopted by relevant bodies including stakeholders. Actions include policy, investments and other initiatives where policy is concerned with legislative or regulatory measures, investments focus on Green City infrastructure projects, and other initiatives include public, private and community based initiatives and partnerships that contribute to the strategic objectives. The selected options should ideally be arranged into "packages" reflecting financial, policy, operational, technological requirements.

Selection of the initial list of Green City actions should be informed by the previous analyses conducted as part of the GCAP process along with supplementary research. The priority environmental challenges identified through the technical analysis should be examined further to determine key contributors to certain challenges like air pollution, water pollution or building energy inefficiency for example. Green City actions to address these challenges, taking into consideration to the contributing factors to each challenge, should then be put forward.

The investments identified through this process will form a list of indicative investments, which the city can pursue to meet its objectives and Green City development visions. These investments, like all Green City actions, should address the priority environmental challenges identified and prioritised through step 1.3.

2.2.3 First Prioritisation of Green City Actions – prioritisation filters

Each policy option aimed at addressing the priority environmental challenges should go through some form of cost-benefit analysis. As a way to identify and communicate all the relevant socioeconomic benefits one could apply certain "filters" in order to determine the

degree to which a policy option will bring environmental, economic and social benefits. Once the filters have been applied and the benefits have been identified for all policy options, the City can assess the cost and select those that receive the highest scores. A non-exhaustive list of filters reflecting the types of "benefits" that green city actions should aim for are listed in **Table 7** below. These are mostly taken from the table on environmental dimensions, and economic and social impact of green cities listed in the previous section 3.2 (cf. Tables 3 and 4). The choice of prioritisation filters should be flexible, and reflect the prioritisation of green city challenges (or baseline conditions) carried out in Step 1.3.

The degree to which each policy option addresses improvements in performance of each selected filter could be measured from 0 to 3, 3 meaning "highest" and 0 "lowest" (Table 8). The present report recommends visualising the values given in each filter in a web integrating all filters (Figure 4). Visualising the filters in a web gives a practical approach to policymakers. If a city prefers to weight the different filter categories, separate webs could be created according to the importance given by the municipality to each filters. For instance, a web on filters given high priority could be made separately from two webs of filters given medium priority and low priority. Another option could be to separate webs according to environmental, economic and social filters.

Table 7. Menu of green city policy prioritisation filters

Type of filter	#	Menu of specific filters to be selected by the municipality (impact of the selected measures on…)	Filter score (3=high; 2=medium; 1=low; 0=none)
Environment	1	Air quality	3
	2	Water quality	2
	3	Soil quality	0
	4	Biodiversity	0
	5	Water use	1
	6	Energy use	2
	7	Land use	3
	8	Material use	1
	9	Climate change mitigation	0
	10	Climate change adaptation	1
Economic	11	Economic returns for investor	2
	12	Economic growth	2
	13	Employment	0
	14	Economic inclusion	3
Social	17	Public health	3
	18	Access to basic services (public transport, energy, water, solid waste collection, green spaces)	1
	19	Safety	2
	20	Gender equality	0
	21	Green behaviour and awareness	1
	22	Community involvement	3

Note: this is an indicative list of relevant filters where environmental filters to match green city challenges identified during Step 1.3.

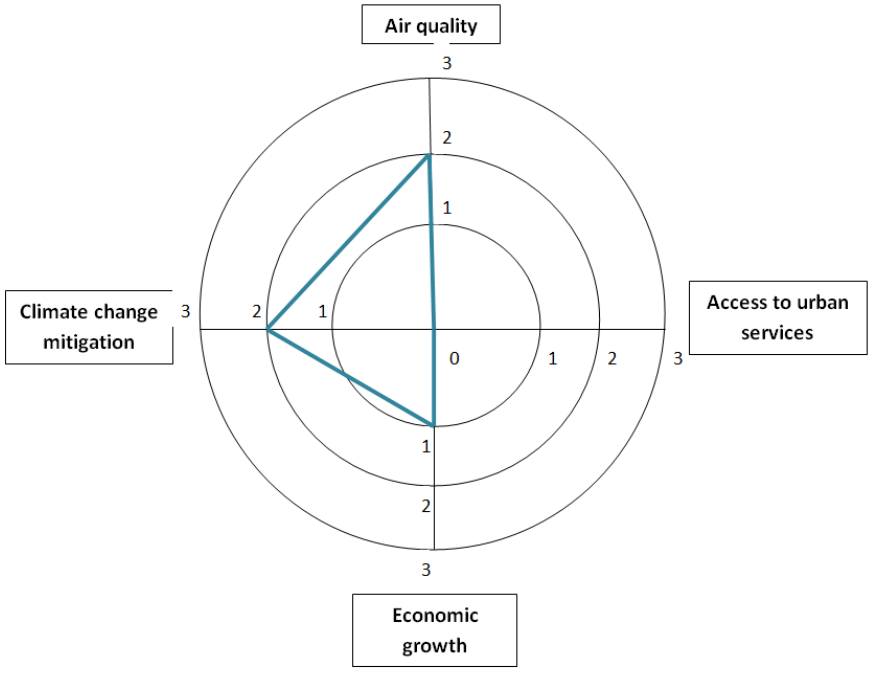
Source: Authors

Table 8. Template of green city policy filter application – example with four filters selected by a municipality from the menu given in Table 7

	Air quality	Climate change adaptation	Economic growth	Public health
Action Option 1	1	2	2	1
Action Option 2	2	1	3	1
Action Option 3	1	0	1	1
Action Option 4	3	0	3	2

Source: Authors

Figure 6. Example of web of four filters applied to a given policy measure



2.2.4 Costs and budget implications of potential actions and key information

Impacts on the City's annual expenditure and capital expenditure (capex) budgets should be estimated and presented in the Green City Action Plan for each selected measure separately. This will help to further prioritise selected green city measures according to their cost. In addition, benefits and savings should be estimated to provide a comprehensive picture and allow for a thorough political consideration of the plan's actions. These estimates will be quite relevant for the forthcoming Council debate with a view to understand budget implications associated to the Green City Action Plan in a short, medium and long-term perspective. Both the annual budget costs and capex estimates presented in this step are indicative only. They do not lead to a compulsory investment plan. More concrete and reliable cost calculations will be refined as part of the in-depth project implementation plan in the next phase: Green City Action. The level of analysis for the indicative investments depends on the requirements of the

City; however, as a minimum, the estimated capital cost and operating costs should be provided for each indicative investment.

Based on international experience, the following estimates are commonly provided in Draft Green City Action Plans:

- Estimated annual implementation and capital expenditure costs per measure
- Estimated annual savings and (environmental and economic) benefits per measure covering:
    - physical impact of the action such as GHG emissions savings, water savings, individuals benefitting, materials savings or reductions, primary energy savings, and energy intensity reductions
    - climate resilience benefits measured as: i) increased water availability; ii) increased energy availability; iii) increased agricultural potential; iv) increased human health/productivity; v) reduced disruption (OPEX) and/or vi) reduced damage (CAPEX) – all in the light of projected climate change
    - potential reductions in operating expenditures
- Key stakeholder for implementation
- Estimated cost of pre-investment (feasibility and impact studies, etc.)
- Indicative implementation and operational timeline

These measures should also be considered as a whole package to provide information including:

- Total estimated annual budget cost for the Green City Action Plan including all measures across the environmental dimensions spread across entire duration and per year
- Total estimated savings and (economic) benefits for the Green City Action Plan

In most cases budgetary resources are needed to effectively implement a project and monitor developments (to cover the costs of human resources, capital investment, etc.). Not all measures require huge upfront capital investment, but many will deliver cost savings over time but only after initial costs. A wide variety of funding sources, innovations and ideas will have to be explored to successfully implement the wide range of actions identified in the Green City Action Plan. External grant or donor funding may be available for specific projects. Private sector partners may be interested in specific projects with financial return on investment or with return in terms of protection of their key assets. Please see Annex 8 for a reference structure documenting a GCAP's strategic objectives, medium-term targets, and Green City actions and their budget implications.

2.2.5 Second prioritisation of Green City actions – Stakeholder-based assessment and final prioritisation

The green city *actions* identified and ranked as a result of the technical analysis within the city administration should be checked and complemented through additional stakeholder consultation. Thorough time and effort should be given for this consultation process where external experts, citizens representatives and other relevant parties should be involved and given the opportunity to support or dispute the relevance of identified green city policies. There should also be opportunities for related parties to provide suggested refinement or alternative solutions to the policy options presented by the GCAP team and the authorities. This can be done in a larger group that involves a broader range of stakeholders, gathered in workshop, in bilateral meetings, presentations and discussions in media and social networks. Public opinion is particularly important, as it is likely to be followed by city leaders, and should therefore be given significant attention. In addition, undertaking policy which is favourably viewed by citizens is likely to be more easily implemented. This step is different from the stakeholder-based prioritisation of green city challenges (cf. Step 1.3.2) in the sense that it aims to prioritise green city actions, and not challenges.

Simultaneously, a formal assessment of the policies selected for the Green City Action Plan. Political assessment could help to select some policy options which meet the political agenda of the city, the national government or the international community (climate change). This step would help to ensure final leadership from the Mayor and Council.

SECTION 4 – METHODOLOGY FOR DEVELOPING GREEN CITY ACTION PLANS

4.1. The structure of Green City Action Plans

39. The Green City Action Plan (GCAP) presents the findings of all above-mentioned activities and defines the long-term Green City vision and strategic objectives for each priority area. Visions are high level narratives of cities' futures that outline a target state for development. Strategic Objectives, while also high-level, are more specific and potentially quantitative in the development targets they set. The GCAP is structured according to affected environmental dimensions and significant aspects, using indicators and time-related targets and measures for the Council's operations related to the environmental dimensions. The GCAP also outlines the scope of actions, the targets set and the major actions developed, and the initial steps of implementing the Plan for a period of 1-5 years. It is an overarching strategic document which contains the guiding principles offering orientation for the Council's decision-making and the administration's implementation work in the medium-term, i.e. within 3-10 years. **Table 9** provides an overview of the contents of contents of a GCAP.

As part of the due diligence in Step 1.1.1 (Annex 7), teams should be prepared to conduct a full Strategic Environmental Assessment (SEA) if required by national or local rules. The requirement to develop an SEA should be confirmed with the City, where the GCAP's ultimate approval could be contingent on the appropriate disclosure and submission of SEA documents. The full timeline of the SEA, its requirements, and how it should best be integrated into the GCAP process should be confirmed through agreement between the team, City representatives and EBRD.

Table 9. Structure and contents of Green City Action Plans

Sections	Content
Messages / presentation	• Foreword /messages to present Green City Plan on behalf of the Mayor
About the plan	• Background of the plan • 'How to read'
Work team	• Authors of the plan • Coordination team • Contributors to the process (according to the different stakeholder groups)
Summary	• Green City Baseline • Development forecast or scenario • Key programmes and strategic objectives • Priority Challenges and Actions
Green City Action Plan Methodology	• Basic concept • Phases • Key activities • Primary outcomes
Green City Baseline	• City Profile • Activities / studies implemented in the Green City Baseline • Environmental Challenges / Analysis of indicators (PSR) (benchmarks) • Local stakeholder consultation • Priority areas/challenges for action
Green City Action Plan	• Visions for development • Strategic objectives

	• Medium-term targets • Key measures to address environmental challenges • Timelines • Responsibilities • Investment needs: Pre-investment and long-term financing • Key measures for tracking
Green City Monitoring, Verification & Reporting	• Description of MRV and benchmarking • Aspects of Reporting • Public disclosure and citizen engagement
Conclusions	• Main findings • Next steps and timelines • Opportunities for engagement
References	• Reference used in the document
Annexes	• Green City Baseline details with results for each indicator, including benchmarking and traffic light analysis

Source: Authors, based on the ESCI Methodological Guide presented by IDB, July 2014

4.2. The contents of the main sections of Green City Action Plans

40. The critical aspects of the Green City Action Plan, and how they will be integrated in the complete methodology, are listed in **Table 10**. The main aspects to be envisaged for the GCAP were initially suggested by EBRD, and also discussed during a workshop with OECD and ICLEI. This will help to understand how broad objectives of GCAP are implemented and can be identified in Table 11 and **Annex 7**.

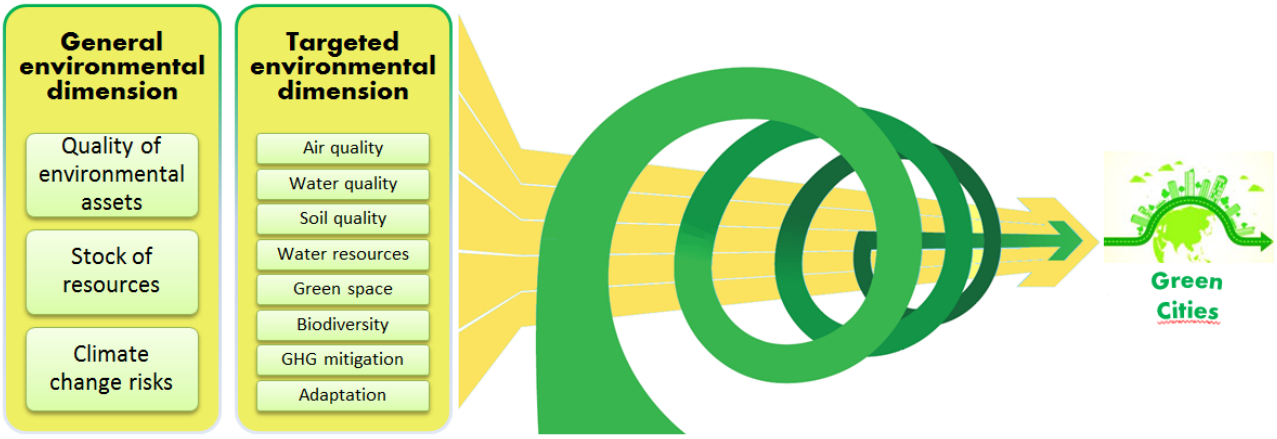
Table 10. Translation of the main aspects of Green City Action Plans into the methodology

Main aspects of the GCAP		Implementation in the GCAP methodology
GCAPs will be strategic planning documents that balance high-level aspirations with pragmatic actions and investment priorities for cities; **The method will integrate a short-term, medium-term and long-term perspective in the action plan;**	✓	Step 1.3-2.3: Implemented by introducing a prioritisation process and both strategic objectives, medium-term targets, and key green city actions applying specific timelines: • strategic objectives (10-15 years) • medium-term targets (ca. 3 - 10 years) • short-term actions (1-5 years)
GCAPs could be complemented by sector- focused plans and build on existing multi-sector environmental programmes where such exist that define and analyse in greater detail the investments required to achieve the vision set out in the GCAP. Note that the Consultant is not required to work on the method or content of these more detailed sector plans;	✓	Step 2.3: The Green City Action plan triggers or links to sectoral-focus action plans for different sectors, which define short-term actions that serve as stepping stones to reach the medium-term targets and strategic objectives.
This method for developing GCAPs will be able to be applied to any city in the EBRD COOs;	✓	The suggested GCAP methodology and the environmental dimensions and indicators selected involving EBRD experiences. The process applied would be in line with requirements of international standards such as ISO 37101 on Sustainable Development in Communities. However, then, further dimensions would need to be considered.
This method for developing GCAPs will be written in a way that will provide guidance to city officials	✓	A mostly visual guidance is being introduced allowing to easily grasp the methodology.

and their advisers on how to develop a GCAP;		
The method to develop GCAPs will advise on how to include civil society, businesses and government officials and all relevant stakeholders;	✓	Starting with step 1.1, involvement of stakeholders in horizontal and vertical manners is made an essential and ongoing activity in the methodology.
The method will also define the institutional/policy framework relevant for a well-structured GCAP approach;	✓	The method is based on experiences in applying policy and management cycles in city administrations.
The method to develop GCAPs will outline a menu of relevant indicators and data requirements that a city can draw on to measure GCAP progress;	✓	The environmental dimensions and indicators have been selected involving EBRD, OECD and ICLEI experiences. Focus is on environmental indicators applying a (widely known and applied) Pressure – State – Response approach.
The method will adopt a cycle approach of green city action planning instead of a linear approach (Figure 5).	✓	The methodology adopts a cyclic and integrated approach based on policy and management cycle knowledge. The process applied would be in line with requirements of international standards such as ISO 14001 (on Environmental Management) or 37101 (on Sustainable Development in Communities). However, then, further dimensions and indicators may need consideration. Figure 5 below illustrates the cyclical process of GCAPs.

Source: Authors

Figure 7. Green cities' environmental dimensions and the cyclical process of Green City Action Plans



Source: Authors

41. The proposed Green City Action Plan methodology is summarised in **Table 11** and **Figure 6**. **Annex 7** elaborates on each section in further details. The GCAP methodology is based on work previously implemented by ICLEI together with numerous partners in different contexts, supplement by consideration of the IADB's ESCI methodology. References considered for the elaboration of the GCAP methodology are listed in **Annex 9**.

Table 11. Summary of the methodology for developing Green City Action Plans

Step	Sub-step	Short description
Step 1 Green City Baseline **Key question of step 1:**		

- **What is the current state of the environment?** **Aim:** - **The "Green City Baseline" aims to inform policy and strategic decision-making at the start of the process (or the review phase for advanced local governments) and provide the reference scenario for the business-as-usual against the Green City approach and action.** **Primary outcomes:** - **Commitment to Green City development for the local community.** - **Process initiated within local government and community.** - **Overview of status quo (understanding situation, constraints and capabilities).** - **Priorities identified to address environmental challenges most effectively and in an integrated manner.** **Indicative timeline:** - **1st (introductory) GCAP cycle: 6 months** - **Following (regular) GCAP cycles: 1-3 months**	
1.1 Prepare & organise	1.1.1 Secure initial commitment - agreement with the Council
	1.1.2 Confirm approval process
	1.1.3 Set up team & institutional structures
	1.1.4 Identify & engage stakeholder group(s)
	1.1.5 Consider formal requirements
1.2 Map local situation (preparation phase in the prioritisation process elaborated in Section 3)	1.2.1 Map external framework conditions – including financial status , governance and management inventory and analysis
	1.2.2 Map environmental and infrastructure challenges (collection and assessment of state and response indicators)
	1.2.3 Map local policy framework (collection and assessment of response indicators)
1.3 Assess & prioritise (green city *challenges* prioritisation process elaborated in Section 3)	1.3.1 Conduct technical analysis
	1.3.2 Stakeholder-based prioritisation
	1.3.3 Political assessment & Green City Baseline
Step 2 Green City Action Plan **Key question of step 2:** - **Where do we want to go and how do we get there?** **Aim:** - **The "Green City Action Plan" compiles and presents the agreed development vision and objectives for a period of 10-15 years, the targets to work towards in a period of 3- 10 years, and the scope of actions and targets proposed.** **Primary outcomes:** - **Visions for Green City development drafted in line with priority environmental challenges identified** - **Strategic objectives outlined according to environmental and socio-economic dimensions** - **Medium-term targets for the long-term strategic objectives identified** - **Priority Green City actions defined** - **Draft Green City Action Plan compiled** **Indicative timeline:** - **1st (introductory) GCAP cycle: 6 months** - **Following (regular) GCAP cycles: 3 months**	
2.1 Develop a vision (10-15 years)	2.1.1 Develop visions for priority areas
	2.1.2 Determine strategic objectives based on priority areas

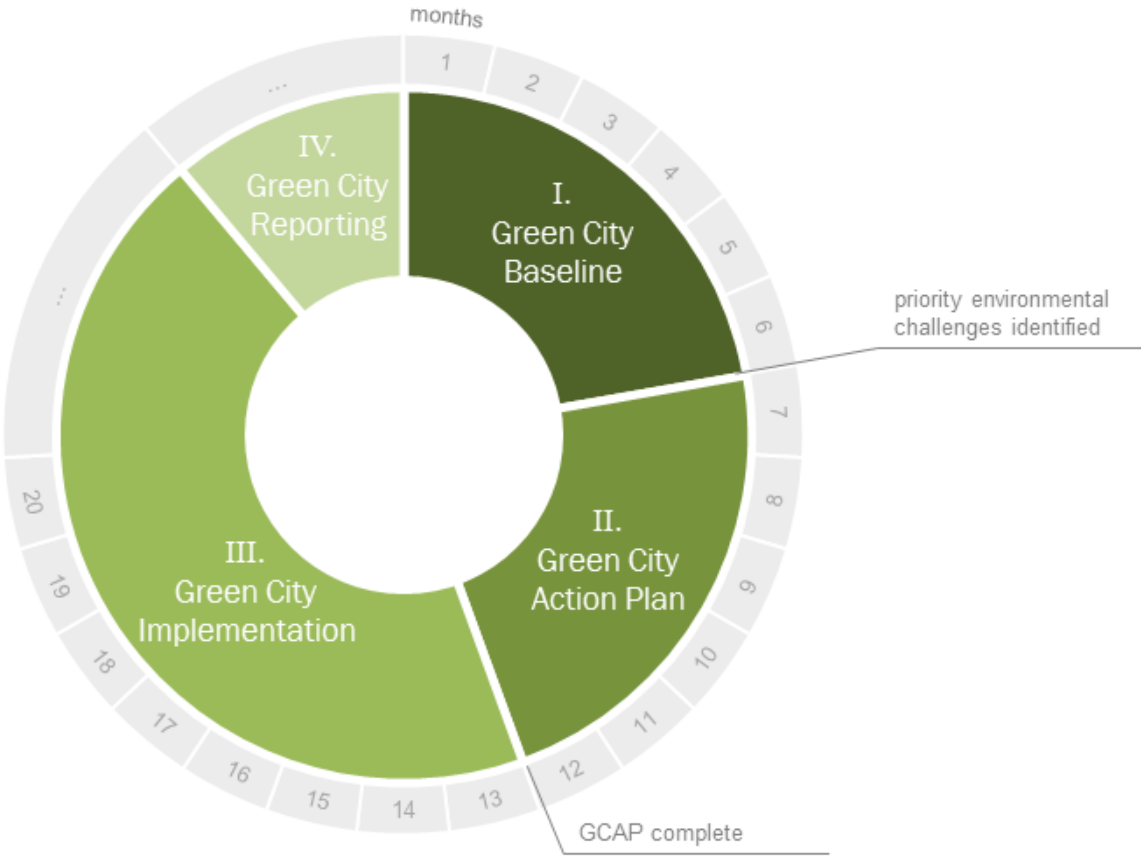
	2.1.3 Determine medium-term targets for strategic objectives
	2.1.4 Consider scope incl. territory and stakeholders
2.2 Select and prioritise green city policy measures (green city *action* prioritisation process elaborated in Section 3)	2.2.1 Review of existing Green City initiatives and responses
	2.2.2 Select Green City actions
	2.2.3 First prioritisation of Green City actions –prioritisation filters
	2.2.4. Derive budget implications and indicative investment needs to address priority areas
	2.2.5. Second prioritisation of Green City actions - Stakeholder-based assessment and final prioritisation
2.3 Draft Green City Action Plan (1-5 years)	2.3.1 Draft Green City Action Plan
	2.3.2 Present Green City Action Plan
Step 3 Green City Implementation **Key question of step 3:** - **How do we operationalise the plan, and what are resources available to assist?** **Aim:** - **The "Green City Implementation" will operationalise the Green City Action Plan, break it down into concrete tasks, allocate budget, time and staff, and monitor the contribution of each measure to the objectives and targets established in the Plan. This will include building political support for the Plan's targets and actions by linking to municipal budget resources and reaching out to key government members.** **Primary outcomes:** - **Initiating and running projects as part of a comprehensive Green City Action Plan.** - **Monitoring of implementation of actions and progress towards objectives and targets.** - **Political Commitment to Green City Action Plan.** - **Mitigation of environmental challenges and risks / environmental improvements started.** - **Consideration of financial resources in municipal budget.** - **Established implementation partnerships.** **Indicative timeline:** - **12 - 36 months**	
3.1 Engage politicians and their bodies	3.1.1 Prepare political framework
	3.1.2 Inform political debates
3.2 Prepare council resolution	3.2.1 Consider formal requirements
	3.2.2 Draft council resolution
	3.2.3 Prepare presentation and council meeting
3.3 Establish implementation partnerships	3.3.1 Publish Green City Action Plan
	3.3.2 Engage stakeholders and form alliances
	3.3.3 Formalise action and implementation partnerships
3.4 Implementation Plan for key measures	3.4.1 Refine generic Green City Action Plan and mobilise
	3.4.2 Plan implementation of selected key measures
	3.4.3 Execute measures
3.5 Monitor implementation and progress	3.5.1 Set up monitoring scheme
	3.5.2 Implementation monitoring

	3.5.3 Control progress
3.6 Implement corrective measures	3.6.1 Consider monitoring results
	3.6.2 Plan and implement corrective measures
	3.6.3 Monitor impact of corrective measures
Step 4 Green City Reporting **Key question of step 4:** - **What have we been able to achieve – and how?** **Aim:** - **The "Green City Report" will analyse successes and failures during the implementation period, provide the basis for taking further political decisions and inform Council, stakeholders & the public on what the city has done and achieved** **Primary outcomes:** - **Institutionalized evaluation, audit and reporting system in use.** - **Green City Report reflecting achievements based on objectives and targets established in the Green City Action Plan.** - **On-going and increasing environmental improvements.** - **New policy options identified to accelerate Green City development.** **Indicative timeline:** - **Suggested to implement as annual report, i.e. 12 months from Council decision** - **Duration of phase ca. 3 months**	
4.1 Evaluate process and achievements	4.1.1 Evaluate effectiveness of process
	4.1.2 Green City Benchmarking
	4.1.3 Evaluate effectiveness of measures/investments to address environmental challenges and risks
4.2 Implement audit	4.2.1 Implement internal audit
	4.2.2 Implement external audit
	4.2.3 Audit response action
4.3 Report results	4.3.1 Draft Green City report
	4.3.2 Present Green City report and ensure sufficient public disclosure and communication of achievements aimed at maximising citizens' engagement and buy-in for subsequent GCAP cycles.
	4.3.3 Draw conclusions and prepare for subsequent cycle

Note: phases corresponding to the prioritisation processes developed in Section 3 are marked in orange.

Source: Authors

Figure 8. Green City Action Plan - Summary Diagram



Source: Authors

4.3. Indicative timelines for developing Green City Action Plans

42. **Table 12** summarises the indicative timelines provided in existing green cities action plan methodologies (Aalborg Commitments, ESCI, ADB, 100 Resilient Cities, ecoBUDGET, Integrated Management Systems). **Table 13** indicates the timelines for each of the four sections of the Green City Action Plan. As can be seen, the EBRD GCAP process timeline is consistent with other approaches.

Table 12. Timelines in international references for management methodologies similar to GCAP

Reference	Timelines
Aalborg Commitments	
Baseline	12 months
Strategy	12 months
ÊSCI / ADB	
Overall timeline	48-60 months

1st stage: Preparation (5 %), Prioritisation (5%), Action Plan (30 %)	12 months
2nd stage: Pre-investment (50 %), Monitoring (10%), Action Plan (n.n.)	36-48 months
100 Resilient Cities	
Overall timeline	Not specified
Preliminary resilience assessment Strategy Initiation (1 month), Stakeholder Engagement Plan (1 month), City Context & Preliminary Resilience Assessment (3 months), Focus Areas and Custom City Approach (1 month)	3 months
Resilience Strategy: priorities and initiatives Phase II Initiation (1 month), Focus Area Analysis & Diagnostic (3 months), Opportunity Assessment (2 months), City Resilience Strategy (1 month)	6-9 months
Implementation and evaluation	Not specified
***eco*BUDGET**	
Overall timeline	annual (first cycle 16 – 24 months)
initial set-up and diagnosis draft ecoBudget implementation evaluation	4 months 2 months 12 months 2 months
Integrated Management System	
Overall timeline	Annual (first cycle 18-25 months)
Baseline Review Target Setting Commitment Implementation & Monitoring Evaluation & Reporting	3 months 3 months 2 months 12 months 2 months

Source: Authors

Table 13. Timelines of the Green City Action Plan methodology

Step	Timeline
Overall timeline	1st (introductory period) 12 – 24 months Following regular periods: 12-18 months Note: Implementation of Green City Action Plan cycles will be on a continuous basis, i.e. individual steps will partly be implemented overlapping with other steps.
Green City Baseline	1st (introductory) period: 6 months (including 4 months for the collection of the green city PSR indicators) Following (regular) period: 1-3 months (including 2 months for the collection of the green city PSR indicators) Notes: The establishment of the first Green City Baseline is obviously more demanding due to need to map all aspects of the Baseline and develop an inventory of eg. data storages and owners etc. Also, participants will need to be trained on the contributions. Subsequent similar exercises will draw upon the first inventory and training

	A full revision of the Green City Baseline will be needed either in the occurrence of significant changes or demands. Otherwise, updates will be sufficient, reducing the time and effort for subsequent cycles. Regardless of significant changes, a full revision is suggested to be implemented every 3 years (TBC).
Green City Action Plan	1st period: 6 months Following (regular periods): 3 months Notes: The establishment of the first Green City Action Plan is obviously more demanding due to new requirements and involvement, but most importantly of the agreement on long- and medium-term targets. In following years, targets and actions will be reconsidered based on the monitoring and evaluation concluding the previous cycle and in case of significant changes in framework conditions (following the Green City Baseline). A full revision is due every 3-5 years (TBC).
Green City Implementation	12-36 months Notes: Timelines for the implementation of individual actions will be determined when developing the Green City Action Plan. These might reach beyond individual implementation periods, in which case interim results will be considered in the evaluation.
Green City Reporting	12-36 months Notes: Includes whole preparation and execution

Source: Authors

4.4. Range of skill sets, both within a city administration and external support, required to develop GCAPs

43. A Green City Action Plan management needs to allow for maintenance of the system, communication with all relevant actors and support for political strategy and decision-making. The local administration is seen as the only body able to promise all three aspects. The strategic approach suggests a central position for this co-ordination function.

44. Success of the approach is best supported by a city administration that perceives itself to be a 'learning administration' and a partner to other stakeholders involved in the process. The city administration is considered the 'engine' of the process. To efficiently implement the rather complex dimensions, a capable, efficient and motivated administration is key, even more so under condition of budgets constraints. It will be important for the city administration to be prepared for continual change and adopt requirements from societal transition. **Box 1** below provides a list of administrative considerations found to be relevant in international and European contexts.

Box 3. Important administrative considerations according to international / European experience

A list of administrative considerations found to be relevant in international and European contexts is provided below:

- Senior management and Council back up the Green City Action Plan;
- The Green City Action Plan will be integrated with the overall city development;

- A cross-cutting, integrated organisation structure and management;
- Management style is cooperative and staff oriented with clear objectives in all departments. Superiors are positive examples with regard to engagement, creativity and motivation
- Employees are encouraged and motivated and are given room for their own initiatives and decisions. They feel in line with their tasks and do not feel overburdened or unchallenged
- Employees feel identified with “their” administration (corporate identity)
- Horizontal and vertical interconnectedness of relevant actors;
- Transparency and active information policy towards the public (good service for the customer is more important than to fulfil bureaucratic rules)
- Communication is clear and transparent and does not depend on hierarchies. Oral communication is as important as written documentation
- Topical and financial integration of financing programmes;
- District-level representatives and contact points;
- Qualitative analysis of framework conditions;
- Regular and objective control of results and objectives approved allows to react on time in the case of variations, and to face new pressures and challenges
- Changes emerging from these assessments must be communicated in order to avoid misunderstandings
- Respectful feed-back and contacts with civil stakeholders engaged.

Source : Authors

Coordinating the effort

45. It is important that the City establishes an effective coordination structure to oversee the GCAP development. The GCAP is necessarily comprehensive, and as such crosses many departmental interests. In response to this, it is important that the coordination structure is inclusive and cross-departmental. International experience suggests that two groups are important in this regard: coordination board and coordination team.

Co-ordination Board

46. The Co-ordination Board is responsible for supervising the whole Green City Action Plan. Ideally, it is a group of about 10-15 high-level local government politicians and managers. However, the number depends on the size of the administration and it is gradually expanding together with expanding scope and contents of the system. Participation in the Co-ordination Board should follow a cross-departmental approach comprising representatives from all departments relevant for resource management – be it natural, human or financial resources. Participants could represent departments responsible for the different sectors addressed, e.g. mobility, public works, energy supply, culture and social issues, etc., but in

a case, the financial department. Additionally, representatives of relevant local authority services (municipal companies) and stakeholder groups should be involved.

Co-ordination (Team)

47. The Co-ordination (Team) should be established centrally in the City administration for the operational activities. Often this is best situated within the Mayor's Office. Furthermore, it is advisable that a separate entity be responsible for drawing up and implementing the Green City Action Plan. This separate entity may be an existing department or a department or office specially created for the task. The Co-ordination Team is likely to consist of a few persons according to volume of the objectives to be managed and the size of the city. The head of the team is the Green City Co-ordinator, who will need to comply with particular demands and skills as follows:

- A change agent, that can rally resources, support, and buy-in for innovative work while working in an environment where resources are scarce, where they may be starting with almost nothing (100 Resilient cities)
- Capable to bridge between policy and implementation and able to build partnerships and alliances of diverse stakeholders able to resolve conflicts;
- A strategic, innovative, cooperative and collaborative personality and 'good listener';
- Excellent manager with good overview and coordination skills;
- Powerful 'driver' able to set clear goals and persevere;
- An excellent communicator and inspirational ambassador;
- An excellent facilitator of activities between different stakeholder groups able to organise and implement inspiring events

48. The Rockefeller Foundation's 100 Resilient Cities initiative recommends a similar approach, with the nomination of a Chief Resilience Officer (**Box 2**).

Box 4. Example of administrative skills: What a Chief Resilience Officer Does?

The Green City team and its Co-ordinator could be inspired by the Chief Resilience Officer (CRO) of Rockefeller Foundation's 100 Resilient Cities initiative. The CRO is the centerpiece of 100RC's vision for helping cities deal with their challenges, while empowering them to develop improved urban resilience. To be effective in this instrumental role, a CRO:

1. Works across government departments to help a city improve internal communications, and to address its own complexities. By facilitating communication that reaches across sometimes-significant internal divisions, the CRO promotes new collaboration; makes sure that offices aren't wasting resources doing duplicative work; and promotes synergy between the various projects and the plans that agencies are drafting.
2. Brings together a wide array of stakeholders to learn about the city's challenges and help build support for individual initiatives, and for resilience building in general. These stakeholders include government officials, and it is critical that representatives from the private sector, non-profits, and civil society are also included.
3. Leads the resilience strategy, a six-to-nine-month process during which the CRO brings in a wide variety of stakeholders, to help identify the city's resilience challenges, its capabilities and plans to address them, and then to identify the gaps between these two. At the end of this process, the CRO will have a series of resilience-building initiatives that he or she will then work to put in to action, with assistance from 100RC and

our platform partners.

4. At the same time, the CRO acts as the "resilience point person," ensuring that the city applies a resilience lens so that resources are leveraged holistically and projects planned for synergy. This lets the city get the most "bang for its buck" on its projects, potentially achieving multiple resilience goals with one project. This could include, for example, a flood barrier also serves as a bike path, promoting healthy citizens and cohesive communities.

Effective CROs perform all these functions, helping their cities manage their own complexities to make resilience efforts more impactful, and collaborating externally to identify and integrate lessons other cities have learned, so solutions scale globally.

Source : http://www.100resilientcities.org/blog/entry/what-is-a-chief-resilience-officer1#/-_/

Internal Auditor

49. The internal auditor needs to be a person with profound knowledge regarding structure and competences of a local authority and independent from the coordination team. This person could come from the Strategic Department of the local authority, from a regional authority or from another city (Peer to Peer Review). Within an annual procedure, the internal auditor evaluates the Green City Plan management process and achievements as the basis for a subsequent cycle.

External Auditor

50. If the city decides that it wishes to have an ISO 14001 or ISO 37101 certification and/or EMAS registration, an external auditor performs an audit of the system according to the resp. requirements.

Capacity Building and Motivation

51. The expertise of every employee is of great importance for a successful Green City Action Plan management. The employees' level of competency should be continually improved, in particular through training courses as a complement to their job-related education and job experience. For this reason, careful and targeted personnel and organisational development incl. education, level of awareness and competency are important fields for the implementation and success of the Green City Action Plan. Key to this is the motivation of staff members. Improving their understanding of the problems to be solved increases their motivation and the level of participation. Also, along with training courses for job-related topics, employees should regularly receive information about sustainability management and its progress in the organisation. A coherent approach to personnel and organisational development would apply instruments such as:

- Personnel management and supervision (including related evaluation mechanism, and "leading by objectives";
- Personnel development (incl. targeted facilitation of performance and learning capacities of staff);
- Increased targeted training and professional education;
- Staff maintenance programmes;
- Recruitment and selection strategies to ensure job profile and skills match;
- Controlling of personnel costs;

- Continual organisational improvement process;
- Change management approach with internal facilitation capacity;
- Professional project management;
- Benchmarking and structural comparison with peer cities.

ANNEX 1. EXISTING ENVIRONMENTAL ACTIVITIES IN CITIES IN THE WORLD

Annex 1 lists existing environmental activities in cities in the world. A summary table and a detailed table are displayed below.

Summary Table

Name of initiative	Type of activity	Sectors[10]	Detailed information publicly available	URL
INTERNATIONAL ACTIVITIES				
Eco2Cities, World Bank	Study	T/ SW / WSS / E	Yes	http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTURBANDEVELOPMENT/0,,contentMDK:22501973~pagePK:148956~piPK:216618~theSitePK:337178,00.html
OECD Green Cities Programme and OECD Metropolitan Reviews	Study	T/ SW / WSS / D / E	Yes	http://www.oecd.org/regional/greening-cities-regions/citiesclimatechangeandgreengrowth.htm http://www.oecd.org/gov/regional-policy/urbanmetroreviews.htm
ADB's Green Cities Initiative and Green Development Toolkit	Study	T/ SW / WSS / D / E	Yes	http://www.adb.org/publications/green-cities http://www.adb.org/documents/green-city-development-tool-kit
UNEP – UN HABITAT Greener Cities Partnership	Technical assistance	T / WSS / D	Yes	http://unhabitat.org/unep-and-un-habitat-greener-cities-partnership/
Rockefeller Foundation's 100 Resilient Cities and ACCCRN	Technical assistance and awareness	S / WSS / D	Yes	http://www.100resilientcities.org/#/-_/ http://acccrn.net/
World Bank's ECA SCI	Technical assistance	T / SW/ WSS / E	Yes	http://web.worldbank.org/archive/website01419/WEB/0__CO-18.HTM
ICLEI's Urban LEDS	Technical	T/ SW / WSS	Yes	http://urbanleds.iclei.org/

[10] T = transport; L = land-use; SW = solid waste; WSS = water supply and sanitation; D = drainage; E = energy

Programme	assistance	/ D / E		
Covenant of Mayors	Technical assistance	T/ WSS / E	Yes	http://www.covenantofmayors.eu/index_en.html
IADB's ESCI	Technical assistance	T/ SW / WSS / D / E	Yes	http://www.iadb.org/en/topics/emerging-and-sustainable-cities/emerging-and-sustainable-cities-initiative,6656.html
CDIA	Technical assistance	T/ SW / WSS / D / E	Yes	http://cdia.asia/
Global Platform for Sustainable Cities, World Bank	Technical assistance	T/ SW / WSS / D / E	Little	http://www.worldbank.org/en/news/press-release/2016/03/09/world-bank-and-global-environment-facility-gef-launch-new-multi-million-dollar-global-platform-for-sustainable-cities
E5P	Grants	E	Yes	http://e5p.eu/
Urban Clean Development Mechanism	Grants and Study	T / SW / E	Yes	http://www.unep.org/urban_environment/PDFs/UNEP_UrbanCDMreport.pdf
European Green Cities Network	Awareness / Networking	E	Yes	http://europeangreencities.com/
WWF's Sustainable Cities	Awareness / Networking	T / SW / WSS / D / E	Yes	http://wwf.panda.org/what_we_do/footprint/cities/
C40 Cities	Awareness / Networking	T / D / E	Yes	http://www.c40.org/
UCLG	Awareness / Networking	WSS / D / E	Yes	http://www.uclg.org/
CITY INITIATIVES (SELECTED)				
Singapore's Four National Tap	-	WSS / D	Yes	http://www.pub.gov.sg/water/Pages/default.aspx
Yokohama's waste management	-	SW	Little	http://citynet-ap.org/wp-content/uploads/2011/10/Intergrated_solid_waste_management_in_Yokohama.pdf
Tokyo's Cap and Trade Programme	-	E	Yes	https://www.kankyo.metro.tokyo.jp/en/climate/cap_and_trade.html
Stockholm's eco-district	-	T	Little	https://mjscapes.wordpress.com/2016/03/11/stockholms-eco-district/
Reykjavik's renewable energy policy	-	E	Little	http://www.go100percent.org/cms/index.php?id=70&tx_ttnews%5Btt_news%5D=33
Lyon's eco-district	-	E	Yes	http://www.lyon-confluence.fr/en/living-in-la-confluence/going-green.html
Kitakyushu's clean industrial policy	-	E	Yes	http://www.city.kitakyushu.lg.jp/english/file_0064.html
PRIVATE SECTOR INITIATIVES (SMART CITY)				
Veolia Environnement	-	E / WSS / SW	Yes	http://www.veolia.com/en/our-customers/achievements/municipalities
Cisco's	-	T / E	Yes	http://www.cisco.com/c/en/us/solutions/industries/smart-connected-communities.html

Smart+Connected				
Siemens's Green City Index	-	T / E	Yes	https://www.siemens.com/global/en/home.html
Google Sidewalk Labs	-	?	Yes	http://www.sidewalklabs.com/
IBM	-	T / WSS / D / E	Yes	http://www.ibm.com/smarterplanet/us/en/smarter_cities/overview/
Schneider Electric	-	E	Yes	http://www.schneider-electric.com/b2b/en/solutions/for-business/smart-cities/explore-our-offer/
Intel	-	T / E	Yes	https://newsroom.intel.com/news-releases/san-jose-implements-intel-technology-for-a-smarter-city/
Microsoft CityNext	-	T / WSS / E	Yes	https://enterprise.microsoft.com/en-us/industries/citynext/sustainable-cities/
McKinsey & Company's Sustainable Cities	-	T/ SW / WSS / D / E	Little	http://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/how-we-help-clients/sustainable-cities
CIVIL SOCIETY ACTIVITIES				
Solid waste collection in Surabaya, Indonesia	-	SW	Little	http://www.slideshare.net/ummikhairia/surabaya-waste-management-system
Urban farming in Boston, USA	-	L	Little	http://inhabitat.com/top-10-cities-in-the-us-for-urban-farming/

Source: Authors

Outline	Description	Type of Activity	Urban Infrastructure of Application[11]						Target countries / cities	Relevance to EBRD's green cities agenda
			T	L	SW	WSS	D	E		
MULTI-LATERAL / INTERNATIONAL INITIATIVES										
"Eco2Cities: Ecological Cities as Economic Cities", World Bank, 2011	**Eco2Cities** is a programme to help cities in developing countries achieve greater ecological and economic sustainability. The program will provide practical and scalable, analytical and operational support to cities. The program also aims to build a global partnership among forward-looking cities in developing countries, global best-practice cities, academia, and international development communities.	Study	x	x	x	x		x	The study covers all countries (including policy analysis of OECD countries). The operation is for WB countries.	This programme is oriented towards practical action planning and solutions for integrated urban development. It also proposes a range of resources in each sector as a support to cities. It is more of a general methodology for a green city, but does not address the benchmarking and prioritisation approaches requested by EBRD. WB does not have particular project finance tools based on this programme, but several countries have applied it in the normal operation of the Bank.
OECD Green Cities Programme, OECD, 2010 – (ongoing)	This **OECD** programme aims to assess how urban green growth and sustainability policies can contribute to improve the economic performance and environmental quality of metropolitan areas and thus enhance the contribution of urban areas to national growth, quality of life and competitiveness. Mostly, it aims to provide a *review and evaluation* across multiple cities of the impact of urban sustainability and green growth policies on jobs growth, economic attractiveness and environmental quality. It provides policy assessments and recommendations for both OECD and non-OECD cities, across a range of geographical, economic and national	Study	x	x	x	x	x	x	All countries and cities. The first phase analysed four cities from OECD. The second phase (ongoing) covers 5 cities in Southeast Asia.	This programme is focused on the environment – economy nexus. It contains detailed analysis of green growth benefits with best policy practices in both developed and emerging countries based on multi-city comparisons of green city indicators, providing policymakers with strong evidence-based information for policy prioritisation. It also proposes reforms of governance structures. The OECD does not provide financial support. Monitoring of policy recommendations can be conducted after a research

[11] T = transport; L = land-use; SW = solid waste; WSS = water supply and sanitation; D = drainage; E = energy

	regulatory contexts.									project. It does not contain green city action planning methodology but can be used in several steps of the methodology proposed in Annex 7 (e.g. review and evaluation process).
OECD Metropolitan Reviews	OECD Metropolitan Reviews are conducted in collaboration with local governments (cities, regions and other sub-national levels of government) and central governments, in pursuit of the following objectives: • enhance the city's economic competitiveness and attractiveness; • improve the policies put in place to strengthen social inclusion and environmental sustainability; • assess the city's environmental performance and its vulnerability to climate change, and explore ways in which environmental and economic development policies can foster more sustainable development; and • identify obstacles to competitiveness and sustainable development within the spheres of governance and local finance, and make recommendations for overcoming them	Study	x	x	x	x	x	x	All metropolitan areas, potentially (depending on interest).	OECD Metropolitan Reviews are not specifically focused on green cities, but often tackle urban environmental issues and infrastructure challenges. It does not contain green city action planning methodology but can be used in several steps of the methodology proposed in Annex 7 (e.g. review and evaluation process).
ADB's Green Cities Initiative (2012) and Green Development Toolkit (2016)	**ADB**'s **Green Cities Initiative**: the book directs the green agenda toward compact, multifunctional, and efficient urban areas. It thus focuses on "greening" of a number of urban infrastructure services such as urban transport, and provision of water and sanitation services, waste management, and energy sources for urban areas. The **Green City Development Toolkit** adopts a more practical approach and focuses on providing advice on how to develop green city action plans (see	Study	x	x	x	x	x	x	Asian cities	ADB's Green Cities programme focus on infrastructure and environmental issues. The Toolkit provides an approach to policy prioritisation and action plan methodology for green cities that could provide guidance for the EBRD. The work on green city indicators is not strong.

	Annex 2).									
UNEP-UNHABITAT Greener Cities Partnership (2014-now)	The **UNEP-UNHABITAT Greener Cities Partnership** is envisaged to upscale the successful collaboration between UNEP and UN-Habitat. Initially covering the period 2014-2016 leading up to the Third United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in 2016, "Greener Cities" is expected to continue beyond Habitat III. It aims to strengthen synergies between the two agencies and among their partners. Broadly, the objective of this cooperation is to mainstream the environmental perspective into urban policymaking and incorporate urban perspectives into environmental policy-making, as well as to highlight the local-global linkages of environmental issues.	Technical assistance	x			x	x		All countries	This programme focuses mainly on resilience, sustainable transport and mobility, and water supply and sanitation.
Rockefeller Foundation's 100 Resilient Cities (100RC) and ACCCRN	Cities in the **100RC** network are provided with the resources necessary to develop a roadmap to resilience along four main pathways: i) Financial and logistical guidance for establishing an innovative new position in city government, a Chief Resilience Officer, who will lead the city's resilience efforts; ii) Expert support for development of a robust resilience strategy; iii) Access to solutions, service providers, and partners from the private, public and NGO sectors who can help them develop and implement their resilience strategies; and iv) Membership of a global network of member cities who can learn from and help each other. The Rockefeller Foundation also pioneered the Asian Cities Climate Change Resilience Network (ACCRN), which aims to improve capacities of 50 cities in Southeast Asia.	Technical assistance (100RC) and awareness raising (ACCCRN)		x	x	x	x		100 cities from all over the world	These 2 initiatives focus on disaster risk resilience, and therefore emphasise first and foremost climate change adaptation. These networks could be useful for the EBRD's work on adaptation.
World Bank's Europe and Central Asia	The **World Bank's ECA Sustainable Cities Initiative (SCI)** is a multi-year program designed to support cities and	Technical assistance (mainly)	x	x	x	x		x	Europe and Central Asian countries	Although in its conceptual framework the project aims to be integrated, the specific support to

(ECA) Sustainable Cities Initiative (SCI)	governmental programs at the national level in pursuing an agenda of enhancing the sustainability of ECA cities. SCI aims at encouraging approaches to optimise the economic, financial, social, and environmental sustainability goals of cities in ECA. SCI is organised around four core activities called the Applied Knowledge Framework (AKF) which include: (i) orientation, awareness, and exposure workshops; (ii) development and implementation of local diagnostic tools; (iii) Policy Reforms and Investment Strategies; and (iv) project financing, technical assistance and implementation support.									cities is disaggregated. There is also an emphasis on action planning. No link between ECA SCI and the Bank's Integrated Approach Pilot has been found. However, Gaziantep, Turkey, is one of the pilot cities for the Tool for Rapid Assessment of City Energy (TRACE).
ICLEI's Urban LEDS Programme	**ICLEI** is an international association of local and metropolitan governments dedicated to sustainable development. ICLEI counts 12 mega-cities, 100 super-cities and urban regions, 450 large cities, and 450 small and medium-sized cities and towns in 84 countries dedicated to sustainable development. ICLEI provides technical consulting, training, and information services to build capacity, share knowledge, and support local government in the implementation of sustainable development at the local level. One of the current programmes is Urban LEDS, funded by the European Commission, and implemented by UN-Habitat and ICLEI, whose objective is to integrate the GreenClimateCities methodology into all sectors of urban planning and development in emerging economy countries	Technical assistance	x	x	x	x	x	x	84 countries and 1012 cities	ICLEI is particularly looking at governance and has developed practical expertise through its assistance to local governments. They also provided guidance on indicators and green city action planning processes.
Covenant of Mayors - 2008	After the adoption, in 2008, of the 2020 EU Climate and Energy Package, the European Commission launched the **Covenant of Mayors** to endorse and support the efforts deployed by local authorities in the implementation of	Technical assistance	x		x	x		x	Europe	The Covenant of Mayors provides technical support in the design and monitoring of the implementation of each SECAP. Each SECAP contains analysis of sectors relevant to the objectives

	sustainable energy policies. The new integrated Covenant of Mayors for Climate & Energy was launched by the European Commission on 15 October 2015 during a Ceremony in the European Parliament in Brussels. The three pillars of the strengthened Covenant - mitigation, adaptation, and secure, sustainable and affordable energy - were symbolically endorsed on this occasion. In order to translate their political commitment into practical measures and projects, Covenant signatories commit to submitting, within two years following the date of the local council decision, a Sustainable Energy and Climate Action Plan (SECAP) outlining the key actions they plan to undertake. The plan will feature a Baseline Emission Inventory to track mitigation actions and a Climate Risks and Vulnerability Assessment.									of the Covenant, including current situation, CO2 emissions tracking, and actions to be taken. The approach is centred around energy use and climate change (in some plans the climate change adaptation aspect is missing), and not necessarily on access to urban services and water, solid waste and land resource use.
IADB's Emerging and Sustainable Cities Initiative (ESCI) - 2014	The **Emerging and Sustainable Cities Initiative (ESCI)** is the IDB's non-reimbursable technical assistance program providing direct support to national and subnational governments in the development and execution of city Action Plans. ESCI employs a multidisciplinary approach to identify, organise and prioritise urban interventions to tackle the main roadblocks that prevent the sustainable growth of **emerging cities** in Latin America and the Caribbean. This transversal approach is based on three pillars: (i) environmental and climate change sustainability, (ii) urban sustainability, and (iii) fiscal sustainability and governance.	Technical assistance	x	x	x	x	x	x	Latin America and the Caribbean's (LAC)	Clear focus on developing and implementing City Action Plans. The ESCI considers cities' sustainability in a broad approach, i.e. not only environment but also economic, social, financial, and institutional. The benchmarking and scoring approach is very complete. The conceptual framework for sustainability indicators is a bit weak: they are laid out on the same plan without attempt to explain the causal linkages between indicators (see Annex 2 for more details).
Cities Development Initiative for Asia (CDIA)	**CDIA** provides assistance to medium-sized Asian cities to bridge the gap between their development plans and the implementation of their infrastructure	Technical assistance	x		x	x	x	x	Asia	CDIA possesses a database of best practices for cities' development as well as a city infrastructure prioritisation toolkit

	investments.									(Annex 3 for more details)
Projects of development banks and agencies	Project financing by multi-lateral banks and development agencies (World Bank, ADB, JICA, USAID, AFD, GIZ)	Grants and loans	x	x	x	x	x	x	Developing countries	These approaches are project by project, with focus on one type of infrastructure. It usually responds to basic infrastructure gap or inefficiency. The national governments are usually the main interlocutors, so direct collaboration with cities is still limited.
E5P (2009-now)	The **E5P** is a EUROS 168 million multi-donor fund initiated during the Swedish Presidency of the European Union in 2009 to encourage municipal investments in energy efficiency and environmental projects in the Eastern Partnership region. Initially active in Ukraine, in 2014 the fund formally extended its activities to Armenia, Georgia, Moldova and will also endeavour to operate in Azerbaijan and Belarus. The contributions are used as grants to support municipal sector projects. The grant allocations are flexible and recognise priorities of each recipient country with the overall aim to reduce energy use, pollution and GHG. The fund also supports policy dialogue and regulatory reform.	Grants						x		This approach is project by project, with focus on one type of infrastructure. Climate Change and air pollution are the main priority.
***Urban Clean Development Mechanism (CDM)* - 2012**	The **Clean Development Mechanism (CDM)** allows emission-reduction projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one tonne of CO2. These CERs can be traded and sold, and used by industrialised countries to a meet a part of their emission reduction targets under the Kyoto Protocol. In 2012, a study was prepared on the quality of access of cities to CDM, making recommendations for the establishment of an Urban CDM.	Grants and Study	x		x			x		The study mentioned has not been followed by the creation of any specific Urban CDM yet
Global Platform	**The Global Platform for Sustainable**	Technical	x	x	x	x	x	x	23 cities in 11	None of the 23 cities are part of

for Sustainable Cities, World Bank, 2016	**Cities (GPSC)** was launched in March 2016 in Singapore. Co-ordinated by the World Bank and supported by multilateral development banks, UN organisations, think tanks and various city networks, the GPSC is a knowledge sharing program that will provide access to cutting-edge tools and promote an integrated approach to sustainable urban planning and financing. It will be implemented by the World Bank in partnership with the African Development Bank, the Asian Development Bank, the Development Bank of South Africa, the Inter-American Development Bank, the United Nations Environment Programme, the United Nations Development Programme, and the United Nations Industrial Development Organization. EBRD is now a formal partner of the GPSC.	assistance / knowledge -sharing							developing countries for the technical assistance (Brazil, Cote D'Ivoire, China, India, Malaysia, Mexico, Paraguay, Peru, Senegal, South Africa, Vietnam)	the EBRD's COOs. It may however be interesting to check the database for best practices, and consider options to join the network to expand the core cities to the COOs.
European Green Cities Network (EGCN)	**European Green Cities Network (EGCN)** is a network of cities, organisations and companies focusing on contributing to the development of green cities and buildings in a sustainable Europe. EGCN is working with innovation projects, implementation of best practice in planning and building projects, education and dissemination. Actual activities include arranging seminars, editing newsletters and magazines for European research and Development projects.	Awareness / Networking						x	Europe (Bulgaria, Hungary, Poland, Slovenia)	This network has limited influence.
World Wild Fund's Sustainable Cities	**WWF** advocates for cities to reduce their ecological footprints and protect biodiversity. The website provides 100+ inspiring examples of how cities around the world are stretching and innovating to meet the overall goal.	Awareness / Networking	x		x	x	x	x	All countries	The website is a convenient interface to check green city initiatives in the world by sector. However, none of the listed initiatives are found in EBRD's COOs.
C40Cities	**C40Cities** is a network of the world's megacities committed to addressing climate change.C40 offers cities a forum where they can collaborate, share	Awareness / Networking	x				x	x	All continents (83 affiliated cities)	Among member cities are Amman, Cairo, Athens, Istanbul, Moscow and Warsaw, which are also in EBRD COOs.

	knowledge and drive action on climate change. The work of C40Cities focuses on research and publications, measurement of CO_2 emissions and planning, case studies and open data portal.									
United Cities and Local Government (UCLG)	**United Cities and Local Governments** supports international cooperation between cities and their associations, and facilitates programmes, networks and partnerships to build the capacities of local governments. UCLG advocates and builds partnerships in the areas of water and sanitation, disaster risk management, climate change, among a broader range of topics.	Awareness / Networking				x	x	x	143 countries, more than 240 000 cities, towns and regions are members	UCLG works as a network of cities and diffuse knowledge on urban policy. There is no emphasis on green city but they tackle urban environmental issues through separate sectors (WSS, climate change, disaster risk reduction)
CITY INITIATIVES										
Singapore's water supply, sanitation and resilience policy	**Singapore's Four National Taps** is a programme set up in the late 1990s to tackle high water stress in the island. It is based on desalinisation, reclamation of used water, water imports and rainwater collection and storage. It is a great illustration of green infrastructure complemented by advanced technology, to create a "water loop" that encourages water conservation and protection of ecosystems.	Municipal initiatives				x	x		Singapore	An inspiration for Green City Action Plans Possibility of technology diffusion in EBRD cities?
Yokohama's waste management	The **City of Yokohama**, Japan's second largest city, has demonstrated how an integrated approach to waste management, combined with stakeholder engagement, could reduce solid waste by 38.7% and during a period when population actually grew by 170 000. This significant waste reduction allowed Yokohama to save USD 1.1 billion which was otherwise required for the renewal of two incinerators, as well as USD 6 million annual operation and maintenance costs.	Municipal initiatives			x				Yokohama	An inspiration for Green City Action Plans. This is a good example of the need to stress other aspects than infrastructure in the type of green city policies to be designed. Public awareness and behaviour have conditioned in many cases the success or behaviours of green city actions.
City of Tokyo's Cap and Trade	The **Tokyo** cap-and-trade program is the world's first urban cap-and-trade	Municipal initiatives						x	Tokyo	An inspiration for Green City Action Plans

programme: launched on April 1, 2010,	program, requiring CO_2 reductions from large commercial, government and industrial buildings through on-site energy efficiency measures or participation in the emissions trading scheme.									
Stockholm's eco-district	**Stockholm** has demonstrated how integrated and collaborative planning and management can transform an old inner city industrial area into an attractive and ecologically sustainable district - based on a cyclical urban metabolism. The district is seamlessly integrated into the larger urban fabric, and has provided inspiration for more initiatives in the city and catalysed change. Some of the initial results have been a 30% reduction in non-renewable energy use, a 41% reduction in water use, and a 29% reduction in global warming potential.	Municipal initiatives	x						Stockholm	An inspiration for Green City Action Plans. The case of Stockholm shows the importance of land-use
Reykjavik's use of renewable energy	In the **City of Reykjavik**, 100% of electricity comes from geothermal energy, and 81% in the transport and heat sectors.	Municipal initiatives						x	Reykjavik	Probably not a useful inspiration for EBRD cities, unless some cities possess similar geothermal resources. But it shows well the impact of cities' specific profiles on its ability to go green.
Lyon's eco-district	The **City of Lyon** has re-developed an old industrial and logistics area into new eco-district called Confluence, in the 2nd district ("arrondissement"). Within this new district, three buildings named "Hikari" ("light", in Japanese) have been developed as positive-energy buildings. By combining smart architectural design, ICT such as sensors and energy-efficient technology, these building can produce more energy than they consume	Municipal initiatives						x	Lyon	An inspiration for Green City Action Plans Possibility of technology diffusion in EBRD cities?
Kitakyushu's clean industries policy	In addition to environmental benefits, the energy efficiency of **Kitakyushu**'s iron and steel manufacturing makes this sector an asset for the city's green growth agenda. Kitakyushu's iron and steel industry offers a range of products	Municipal initiatives						x	Kitakyushu	An example of economic benefits associated with green policies (here energy efficiency in industries). It also shows that realising the green city is not necessarily a trade-off between

	with advanced energy performance, such as flat rolls, magnetic steel sheets, thin sheets or surface-treated steel sheets. Besides iron and steel, successful energy-efficient and resource-saving products from a number of traditional local industries contribute strongly to Kitakyushu's growth. The local ceramic, chemical and electric manufacturing industries successfully sell resource-saving products to national and international markets									growth and green.
PRIVATE SECTOR INITIATIVES										
Veolia Environnement	**Veolia Environnement** is a branch of Veolia, a multinational utility company. The main stakes identified by Veolia Environnement include: climate change, natural resources, sustainable urban development, and ecosystem and biodiversity. Their business in sustainable urban development includes traditional models (management of water, power, solid waste services) and creative solutions, which mainly involve digital technologies or ICT.	Infrastructure management			x	x		x	All continents (the presence in Eastern Europe and Central Asia is not strong, however)	This is a good example of how private companies may contribute to green cities through urban utility management in the world.
Cisco's Smart+Connected	**Cisco's Smart+Connected** solution portfolio includes remote access to government services as well as Infrastructure Management solutions for connected parking, traffic, and safety and security. Smart+Connected solutions include:	Smart city	x					x	All countries (potentially)	To be considered for the green city action plan
Siemens' Green Cities Index	**Siemens**' Green Cities Index scores cities across 8 categories and 30 individual indicators (see Annex 2) Siemens also promotes IT and automation for transport, energy management and green buildings	Smart city	x					x	All countries (potentially)	To be considered for the green city action plan
Google Sidewalk Labs	**Google** has recently launched in 2015 the Sidewalk Labs focusing on smart cities.	Smart city							All countries (potentially)	Too recent for assessment, but promising
IBM intelligent	**IBM** has developed integrated intelligent	Smart city	x			x	x	x	All countries	To be considered for the green

infrastructure	systems to collect, analyse big data and inform decision makers about the functioning of critical utility systems. Some remarkable examples include the Intelligent Control Centre of Rio de Janeiro, which uses citywide data system integrating information on different types of urban infrastructure. It collates all data, input online, to identify trends and complex impacts of potential disasters, such as floods, fires and landslides. This can help decision makers select the most appropriate action and identify which urban areas need support.								(potentially)	city action plan
Schneider Electric and General Electric	**Schneider Electric** and **General Electric** also proposes services for smart cities	Smart city						x	All countries (potentially)	To be considered for the green city action plan
Intel	**Intel**'s smart city programme mostly focused on air pollution, traffic flow and energy efficiency	Smart city	x					x	Mostly US cities so far	To be considered for the green city action plan
Microsoft CityNext	**Microsoft CityNext** is a partner-led initiative that empowers cities to be more sustainable, prosperous, and economically competitive—with a simplified approach. It helps cities unlock their potential by delivering innovative digital services that can help citizens lead safer, healthier, and more educated lives.	Smart city	x			x		x	All countries (potentially)	To be considered for the green city action plan
McKinsey & Company's Sustainable Cities	**McKinsey and Company**, through its Sustainable Cities business function, support mayors and city authorities in establishing a fact base defining sustainable economic development, and delivering solutions tailored to local needs. They also work with water, power, and waste utilities to improve services. They assist private sector clients such as real-estate developers, infrastructure providers, and logistics companies in engaging with cities and creating solutions that support	Consulting service	x	x	x	x		x	Undefined	This is a good example of consulting service provided by the private sector on green cities. This is however not directly relevant to EBRD. The McKinsey Global Institute has done some interesting research on urbanisation in the world.

	sustainability goals. Finally, they help shape strategies to capture growth opportunities by developing district development plans, revitalising older cities, and building greenfield cities.									
CIVIL SOCIETY ACTIVITIES										
Solid waste collection in Surabaya, Indonesia	**Surabaya** is the capital of the East Java Province and the second largest city in Indonesia. Rapid and uncontrolled urbanisation resulted in a range of environmental issues in the city by the mid-2000s, including solid waste pollution due to unsorted garbage and open waste disposal. The city set up a solid waste management programme base on community involvement. 420 Environmental Facilitators were appointed and trained by the local government. They were recruited from community leaders, young generation and cadres of the Family Welfare Programme (PKK). They role is to further raise awareness of the population about the need to preserve the environment and drop habits that result in local pollution, such as open waste dumping.	Civil society activity initiated by the municipality				x			Surabaya, Indonesia	A potential inspiration for the green city action plan, if a city faces high problems of solid waste collection. This exampled shows how a municipality can take leadership in creating CSO activities for green cities.
Urban farming in Boston, USA	**Boston** is home to at least 200 community gardens with another 100 or so in local schools. Two of the most well-known are the Fenway Victory Gardens, the oldest continuously operating WWII "Victory Gardens" in the country, and the Boston Food Forest Coalition, which is pioneering biodiverse food ecosystems to help bring healthy produce to underserved neighbourhoods. In 2013, a city ordinance allowed the diversification of such activities (to beekeeping for instance) and their expansion on rooftops.	Community initiative supported by the municipality		x					Boston, USA	This example takes a reverse approach from Surabaya. It shows that municipalities can support existing community initiatives through regulations and incentives.

ANNEX 2. ENVIRONMENTAL ACTIVITIES IN TBILISI AND YEREVAN

Tbilisi, Georgia

Organisation	Description	Type of activity	Sector of relevance	Date / Timeframe	URL
Municipality of Tbilisi / World Bank (Cities Alliance) / UNDP / GTZ	The **City Development Strategy 2030** sets four broad objectives: worldwide connectivity competitiveness, liveability, and governance. It integrates objectives of the SEAP (cf. below). In order to support the CDS, the World Bank set up the Participatory Capital Investment Planning and Budgeting project in 2011 (until 2013).	Development plan + Action plan	Transport Housing provision Green spaces WSS Solid waste Disaster risk	2010	https://www.google.fr/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjK9aCI4MDMAhWJcBoKHfL3BawQFggcMAA&url=http%3A%2F%2Fwww.economicforum.ge%2Fupload%2Ffiless%2Fled_forum_7%2FMr.%2520Zviad%2520Archuadze_ENG.pdf&usg=AFQjCNHI-QZglYJrO55K6U_tH-M3-69WCg&sig2=KMCV7VaZ4FEmHCh9NV3vjw&bvm=bv.121099550,d.d2s&safe=active
Municipality of Tbilisi and Covenant of Mayors	The 2011-2020 **Sustainable Energy Action Plan (SEAP)** supports Tbilisi's objective of becoming a low-carbon city by 2020, in line with the objective of the Covenant of Mayors	Action plan	Transport Energy efficiency in buildings Power supply Solid waste Wastewater Green Spaces	2011-2020	http://www.energy-cities.eu/db/Tbilisi_SEAP_2011_en.pdf
Municipality of Tbilisi	**Tbilisi Sea Eco-Green City** aims to be a new green eco-district with energy efficient housing supplied at 90% by renewable energy	Infrastructure project	Renewable energy Energy efficiency	2016	http://cbw.ge/business/1-billion-to-be-invested-in-tbilisi-sea-eco-green-city/
Municipality of Tbilisi	The **Energy Efficiency Concept Paper** contains estimation of energy saving potential and energy analyses for various energy consuming sectors in Tbilisi region.	Study	Energy efficiency (transport, buildings, water supply, street lighting, solid waste)	2008	Not available online.

ADB	The updated **Tbilisi Sustainable Urban Transport (SUT) Strategy** defines policy directions and prioritizes interventions along a multimodal and integrated approach to be gradually implemented between 2015 and 2030, phased over short (2015-2017), medium (2018-2021) and long (2022-2030) terms.	Study	Transport (all modes)	2015	Not available online.
ADB	A bid for a **pre-feasibility Study (PFS) on BRT** was prepared following the first Tbilisi SUT strategy 2015-2030. There is no information whether expressed was interest by a consulting firm. The deadline was February 2016.	Study	Transport (BRT)	2010	https://www.devex.com/projects/tenders/supporting-the-cities-development-initiative-for-asia-geo-tbilisi-bus-network-improvement-and-bus-rapid-transit-pre-feasibility-47285-001/198693
GIZ	The report **Prospects for an Establishment of an Energy Agency** in Tbilisi assesses how to establish a unit that implements the projects listed in the SEAP, as required by the rules of the Covenant of Mayors	Study	Energy	2011	http://www.economicforum.ge/upload/filess/Energy%20Agency%20Tbilisi_Feasibility%20Study_Final%20Version_21_12_2011.pdf
Mobility Consultants / MLA+ / Move Mobility	Three Dutch companies delivered the **report Smart Mobility Tbilisi**, financed by the Embassy of the Netherlands in Tbilisi. The report makes recommendations on strategic network planning, bicycle infrastructure, public space, and parking.	Study	Transport Land-use	2014	Not available online.
UNEP	The goal of **Geo-Cities Tbilisi** is to improve environmental decision-making and promote integrated environmental assessment as a key instrument for informed decision making on important municipal-level environment and security issues. Furthermore, the project aims at building capacity of municipalities in urban environmental planning and management, and integrated environmental assessment (IEA) at the local level, in cooperation with civil society organisations.	Study + capacity building	WSS Solid Waste Energy Green spaces Transport Disaster risk	2011	http://www.unep.org/geo/pdfs/GEO-Cities_Tbilisi_Full-report.pdf
World Bank ECA	The report **Improving energy efficiency in Tbilisi** uses TRACE (Tool for Rapid Assessment of City Energy), a simple and quick diagnostic tool that is used to assess a city's energy performance in six service areas (urban transport, municipal buildings, water and wastewater, solid waste management, public	Study	Energy efficiency (in transport, WSS, Solid Waste, Buildings) Power supply and heat Street lighting	2011	https://databox.worldbank.org/Energy-Efficient-Cities/TRACE-Georgia-Tbilisi-Deployment/ggug-h75d

	lighting, and power and heat), and to provide recommendations for improving energy efficiency.				
OTHER PROJECTS OF RELEVANCE					
National Government of Georgia	The **National Environmental Action Programme (NEAP-2)** is a comprehensive national plan for addressing the most acute environmental problems and setting the national agenda for cost-effective improvement of the environment and meaningful protection of the natural resources of Georgia. Long-term goals, short-term targets and respective activities are presented in NEAP-2 for eleven themes. Each thematic chapter in this document clarifies the environmental problems and causes, stakeholders, the actions taken to-date, national and international developments and an assessment of the regulatory framework. Each chapter concludes with a table of activities that clearly states what actions will be undertaken, who will take those actions and what the estimated costs are.	Action plan	Transport Land-use Solid waste Water Disasters	2012-2016	http://moe.gov.ge/files/Saministros%20Prioritetebi/NEAP_eng_2012.pdf
World Bank	The report **Georgia Environmental Sustainability Analysis** assesses the institutional, economic and poverty dimensions of environmental sustainability in the country	Study	Land-Use Disaster risk Solid Waste Transport	2015	http://documents.worldbank.org/curated/en/2015/07/24750133/georgia-country-environmental-analysis-institutional-economic-poverty-aspects-georgia%E2%80%99s-road-environmental-sustainability

Yerevan, Armenia

Organisation	Description	Type of activity	Sector of relevance	Start date	URL

Municipality of Yerevan / EU Covenant of Mayors / Foundation to Save Energy	The city of Yerevan joined the EU Covenant of Mayors in September 2014. Developing the **Sustainable Energy Action Plan of Yerevan (SEAP)**. It includes: • a) «Basic Cadastre (or inventory) for Emissions» to estimate annual benchmark rates of energy consumption and CO2 emissions, • b) the list of actions aimed at energy saving and energy efficiency increase, as well as at using renewable energy sources to reduce the emissions at least by 20% by 2020 • c) the program and schedule of suggested actions as well as information on the persons in charge for the actions implementation and/or the organisations and sources of financing • d) estimates of the economic and ecological results expected after the realisation of the actions • e)monitoring of the results received	Action Plan	Urban Planning, green spaces, urban forests, Sustainable energy, climate change mitigation, public & residential buildings, water, wastewater, transport (vehicle, electric, bike-lanes), street lighting, other	2014	https://www.yerevan.am/en/covenant-of-mayors/
Municipality of Yerevan / UNDP	**Energy Efficiency and Thermal Public Building Refurbishment Project**: the project is embedded into a long-term investment programme aiming at addressing the refurbishment of both public and residential buildings as was already initiated through a successful cooperation between UNDP and Yerevan Municipality. Thus, the programme consists of a “pilot phase”, the current project, and a “roll-out phase”. The “pilot phase”, or current project, targeting only public buildings, has a total cost of around EUR 18 million. The “roll-out phase” of the project is currently NOT defined but is expected to consist in extending the financing far beyond the EUR 18 million on municipal and residential projects.	Infrastructure project	Energy efficiency (buildings) Heating	2016	http://cfapp2.undp.org/gef/documents/1/g5684/g2_20583/FP-UNDP-280116-5684-Annex%20IVf%20-%20EIB%20term%20sheet.pdf
Municipality of Yerevan / with UNDP / GEF	The overall objective of the UNDP/GEF full sized Project “**Elimination of Obsolete Pesticide Stockpiles and Addressing POPs (Persistent Organic Pollutants) Contaminated Sites Within a Sound Chemicals Management Framework in Armenia”** Project is to protect human health and the environment globally as well as locally through elimination of POPs and obsolete pesticide stockpiles, and addressing associated contaminated sites within a sound chemicals management framework. The	Infrastructure project	Solid waste management	2015	http://jobs.undp.org/cj_view_job.cfm?cur_job_id=60050 http://www.un.am/en/news/268

	Global Environment Facility (GEF) provided a USD 4.7 million grant to initiate the project, while an additional USD 19 million co-funding will be provided by the Government of Armenia, international organisations and the private sector in order to successfully accomplish this project's goals. The City of Yerevan.				
Municipality of Yerevan / UNDP / GEF	The overarching goal of the **Green Urban Lighting** project is to save energy and to reduce emissions of greenhouse gases by increasing energy efficiency of municipal lighting in the cities of Armenia via implementation of municipal investment programs and national policies. The project focuses on urban lighting sector, which covers all lighting installations managed and paid for by municipalities, such as lighting of streets, outside public areas, illumination of city buildings, lighting system in municipally-owned and operated buildings and facilities, and yards in residential areas	Infrastructure project	Energy	2015	http://www.am.undp.org/content/armenia/en/home/operations/projects/environment_and_energy/green-urban-lighting.html
Municipality of Yerevan	The municipality of Yerevan announced that **green areas** will be expanded starting from 2012. There is no information available on the status of this project.	Infrastructure project	Green spaces	2012	http://news.am/eng/news/94296.html
Government of Armenia / ADB	The Government of Armenia has received a loan from the Asian Development Bank (ADB) to finance **the Sustainable Urban Development Investment Program (SUDIP)** – Project 1 and Project 2. This project derives from a request from the Yerevan Municipality (YM) to ADB to define a strategic plan to improve urban transport in Yerevan aligned with the urban master plan of Yerevan city. However, the infrastructure project in Yerevan is mainly focused on road construction and extension.	Infrastructure project and capacity building	Road construction and extension	2015-2020	http://www.sudipyerevan.am/en/ http://www.adb.org/projects/42417-023/main http://www.adb.org/projects/42417-023/main
ADB	Through the **Sustainable Urban Transport Project**, ADB is helping Armenia upgrade its urban transport services in 12 major and secondary cities. The first tranche of the multi-tranche financing facility includes road improvements in the capital, Yerevan, and institutional development and capacity building.	Infrastructure project (road)	Transport	2009-2011 (closed)	http://www.adb.org/projects/42417-012/main#project-pds
UNDP	UNDP has completed a **Strategic Environmental Assessment (SEA)** of Yerevan's Master Plan in 2005. The main objective was to provide recommendations for environmental optimising and modifications of the Yerevan City Master Plan.	Study	Air pollution Water Solid waste Green areas	2005	https://www.unece.org/fileadmin/DAM/env/eia/documents/SEA_CBNA/Armenia_SEA_Yerevan_en.pdf
OTHER PROJECTS OF RELEVANCE (NON-SPECIFIC TO YEREVAN)					
National Government /	The main purpose of the **National Program on Energy Saving and Renewable Energy** is to set targets for the	Development Plan	Energy efficiency Renewable energy	2007	http://www.ase.org/sites/ase.org/files/national_program_e

USAID / Alliance to Save Energy	energy saving and renewable energy development in Armenia and to determine the means for their realisation. It is directed at solving the following problems: 1. Plan the development of energy resources of the country parallel to the advancement of energy saving and renewable energy, taking into account that increased energy efficiency usually has a low-cost nature. 2. Synchronise the state policy on development of fuel-energy resources with the growth of the economy as a whole. This guarantees country-wide sustainable development through the introduction of regulatory reforms and an increase in public participation throughout the process. 3. Direct the finance and credit policy of the country to energy saving and renewable energy development, providing equal conditions for capital investment. 4. Establish and maintain an active market structure through introduction and explanation of energy efficiency benefits, providing an effective choice mechanism for market participants. 5. Organise, promote and provide equal accessibility to modern technologies for all members of society, consumer and corporate alike. The project was also supported by the Alliance to Save Energy.				nglish.pdf
USAID / Alliance to Save Energy	**Armenia's Urban Heating Policy Assessment** report describes the evolution and current state of Armenia's heat supply system, and the recent policy developments in the country's heat supply rehabilitation in the context of energy sector legislation. The paper further summarises the involvement of international organisations, donor-funded heat sector programs and pilot projects, and the centralised and individual heat supply options available to urban households	Study	Heating	2006	https://www.habitat.org/sites/default/files/heating20-armenia_uh_analysis.pdf

ANNEX 3. GREEN CITY INDICATORS: LITERATURE REVIEW

Name of organisation / study	Description	Category of indicator	Assessment
International Standard Organisation (ISO)	ISO 37120:2014 defines and establishes methodologies for a set of indicators to steer and measure the performance of city services and quality of life. The standard's uniform approach will enable cities to seamlessly compare where they stand in relation to other cities. This information can in turn be used to identify best practice and learn from one another.	Economy Education Energy Environment Finance Fire and Emergency Response Governance Health Recreation Shelter Solid Waste Telecommunication and Innovation Transportation Urban Planning Wastewater Water and Sanitation	ISO 37120 is very comprehensive and assesses cities' performance beyond the scope of the green city concept.
Siemens' Green City Index	**Siemens' European Green City Index** scores cities across eight categories – CO_2 emissions, energy, building, transport, water, waste and land-use, air quality and environmental governance – and 30 individual indicators (16 quantitative indicators measuring how a city is currently performing and 14 qualitative indicators assessing the cities' aspirations to reduce their future environmental impacts). Siemens also applied similar index to other continents.	CO2 Energy Buildings Transport Waste and land-use Water Air Quality Environmental Governance	Siemens's Index is much focused on the environment, and also integrates the "response" aspects (i.e. policies) into the indicators. It does not contain analysis of green city action planning, although the case studies of cities analysed provide information on the type of policies undertaken there
European Green	Participating cities are judged on an evolving indicator set:	Contribution to climate change	Emphasis is placed on improving

Capital Award	37 indicators that cover nine categories of urban environmental sustainability. The Award is based on 12 indicators related to environmental areas.	Transport Green urban areas Nature and biodiversity Air quality Noise Waste production and management Water consumption Wastewater treatment Eco-innovation and sustainable employment Local environmental governance Energy performance	performance over time, which is rather innovative. There is no specific indicator provided however and seems a bit too subjective. The policy aspect is also central to the indicators.
Global City Indicators Programme	This focuses on two main themes: city services and quality of life. The tool covers all aspects of urban life, with an emphasis on economic and social measures of sustainability.	Education Governance Health Recreation Urban Planning Safety Solid Waste Transport Wastewater Water Electricity Finance Fire and Emergency Response Civic engagement Culture Economy Environment Shelter Social Equity Technology and Innovation	It does not measure pollution or air quality and there is little mention of renewable energy sources.
Star Community Rating System	The Sustainability Tools for Assessing and Rating Communities (STAR) Community Rating System is a toolbox developed for community leaders in the USA to assess the sustainability of their community, set targets for the future, and measure progress along the way.	Built Environment Equity and Improvement Climate and Energy Health and Safety	The indicators were developed over time by a number of technical advisory committees, and will continue to be adjusted as necessary. The tool includes economic, environmental and social aspects of

		Economy and Jobs Natural systems Education, Arts and Community Innovation and Process	sustainability, and consists of a number of goals, objectives, and evaluation measures.
Urban Ecosystem Europe (ICLEI and other)	The indicators were chosen to reflect a city's progress towards the Aarlborg Commitments for sustainable cities. The focus is on local governance and quality of life, but the indicators manage to touch on almost all aspects of urban sustainability.	Local action for health Responsible consumption and lifestyle choices Planning and mobility Energy and climate change Sustainable local economy and social equity Sustainability governance	This approach uses 25 indicators non-differentiated on environmental profile, policies and also social issues.
Indicators for Sustainability Report	The Indicators for Sustainability report (Dekker et al., 2012) from Sustainable Cities International took a different approach to the development of an indicator set compared to the other frameworks mentioned so far. It began with case studies of several international cities of varying size. From this information they chose indicators that were common to several cities, easy to understand and implement, and covered multiple related sustainability goals.	Economy (jobs, economic growth) Environment (green spaces, GHG, energy efficiency, water quality and availability, air quality, solid waste) Social (Compact city, housing, public space, education, sanitation; health)	The report divides sustainability indicators between the environmental, economic and social dimensions.
OECD Green Cities Programme	OECD has developed two sets of indicators related to green growth: one at the national level (cf. Green Growth Indicators 2014), and one at the city level in developed countries (cf. Green Growth in Cities 2013; OECD Metropolitan Database). One set of indicators is being developed for urban green growth in developing context (Urban Green Growth in Dynamic Asia 2016). Indicators in all OECD Green Growth Studies focus on the nexus between economy and environment, and therefore include dimensions such as GDP, green job creation and green innovation. Indicators are also aiming to decouple economic growth and environmental performance (e.g. CO2 productivity) Indicators at the city level include detailed sectoral analysis, along a State/Pressure/Response framework.	Land use Urban air Water use Urban water quality Waste management Transport and traffic Climate change and energy Environmental health General, awareness and behaviour	OECD work is useful to think green city policies in terms of co-benefits between environmental and economic performance. There is not so much methodological work on the process of action planning itself, but detailed analysis on how sectoral policies can contribute to greening cities has been made and can inform the contents of city action plans.
ADB's Green	The **Asian Development Bank's Green City**	General information	ADB's Toolkit is not very developed in terms

City Development Toolkit	**Development Toolkit** (2015) adopts an approach in 3 steps for green cities: i) establishment of the city profile and context; ii) prioritisation and option; and iii) Project design and evaluation. In the first step, ADB recommends to establish a general profile of the city that includes not only key infrastructure to be considered but also other contextual information such as geography and finance. The Toolkit does not provide detailed indicators to assess the city's needs but rather give an example of city profile template that should be developed by each city to establish its profile. ADB then proposes to complement it with a needs/gaps assessment matrix for each infrastructure sector, with information on environment, policy and governance, financial management and implementation. The prioritisation step is based on the needs assessment matrix in each sector, and includes three thematic areas for investment: improvement of existing services, new proposals and special projects.	Location and climate Land use composition Ecological / natural features Financial profile Infrastructure services Housing Green initiatives Land-use Planning and urban management system Disaster management and mitigation	of indicators, scoring and benchmarking. They have a traffic light approach but there are no baseline definitions or benchmarking, therefore the assessment is mostly left to cities' appraisal. It also means the prioritisation process is a bit subjective.
IADB's ESCI	ESCI employs a multidisciplinary approach to identify, organise and prioritise urban interventions to tackle the main roadblocks that prevent the sustainable growth of **emerging cities** in Latin America and the Caribbean. This transversal approach is based on three pillars: (i) environmental and climate change sustainability, (ii) urban sustainability, and (iii) fiscal sustainability and governance. The approach is broader than green city.	Environmental Sustainability and Climate Change (water, sanitation and drainage, solid waste, energy, air quality, mitigation of climate change, noise, vulnerability to climate change disasters) Urban Sustainability (land-use, inequality, transportation, competitiveness of the economy, employment, connectivity, education, security, health) Fiscal Sustainability and Governance (participatory public management, modern public management, transparency, tax and financial autonomy, expenditure management, debt)	ESCI provides comprehensive indicators that can apply to a green city but also include other indicators to grasp the whole concept of sustainability (e.g. finance, institutions, social issues) which may not all be relevant for EBRD work. A lot of efforts have been made on benchmarking and scoring each indicator, which should be useful for the present report. The work lacks a prioritisation between all indicators which are all considered equally important. ESCI also includes recommendations on action planning. The proposal may be too linear and does not take into account the cyclical process of city action planning.

ANNEX 4. INTERNATIONAL BEST PRACTICES FOR PRIORITISING AND BENCHMARKING GREEN CITY ACTIONS

Reference	Description	Assessment
Asian Development Bank (ADB)'s Green City Development Toolkit	The **Asian Development Bank's Green City Development Toolkit** (2015) adopts an approach in 3 steps for green cities: i) establishment of the city profile and context; ii) prioritisation; and iii) project design and evaluation. There is no benchmarking methodology in this study. The prioritisation step is based on an assessment matrix identifying strategic interventions, implementation mechanisms, and preliminary ranking by priority. The matrix analyses priorities in each green city sector according to three types of projects: existing services, new proposals and special interventions. The goal of the matrix is to carry a detailed green city gap analysis. First, it highlights current deficiencies in green city investment (infrastructure, service delivery, resources, etc.); and second, it highlights where information or data is absent and what additional work is required to enable robust decision making and investment programming. In each of the three types of projects, the priority matrix assesses four elements: i) environment, ii) policy and governance, iii) financial, and iv) implementation. A traffic light approach is recommended to assess each of these four elements.	An interesting aspect of this methodology is that it combines directly environment assessment with policy, financial and governance assessments in each green city sector. It gives a more specific understanding of the need and range of implementation issues by sector (IADB's ESCI for instance has indicators on institutional aspects but not specifically tied to green city sectors). The prioritisation methodology is not straightforward. There are some inconsistencies between the explanations in the text and the methodology presented in the priority matrix. Also, the category "environment" in the matrix is unclear. The traffic light approach is also very subjective, and not very much based on scientific baseline or literature (the three "lights" do not correspond to a quantitative division). There is no information on whether such toolkit was actually applied and what the lessons learnt are.
Inter-American Development Bank (IADB)'s Environmental and Sustainable Cities Initiative (ESCI)	ESCI employs a multidisciplinary approach to identify, organise and prioritise urban interventions to tackle the main roadblocks that prevent the sustainable growth of **emerging cities** in Latin America and the Caribbean. One of the steps of the methodology is the establishment of cities' profile, based on a set of indicators in (i) environmental and climate change sustainability, (ii) urban sustainability, and (iii) fiscal sustainability and governance. A traffic light scanner is applied to each indicator to classify their value as "green" (sustainable, good performance), "yellow" (potentially	This study is not specifically about benchmarking, although the thorough indicator methodology could be used to compare cities' performance. Nonetheless, IADB's ESCI appears to be the most complete methodology on prioritisation, through a robust indicator base and legible filter approach to identify priorities.

	problematic performance), or "red" (unsustainable, highly problematic performance). This step is eventually considered as one filter for prioritisation (out of 5 in total). The topics that are classified red, or critical, are then evaluated and prioritised based on four filters: i) public opinion (how important this issue is to the citizens), ii) economic impacts, iii) vulnerability to climate change (impact of climate change on this topic or mitigation problems associated with this topic), and iv) multi-sectorality. The performance of each indicator reading each filter is given a performance from 1 to 5. In total, there are 5 filters. The final prioritisation step is to give an overall priority score to each topic, based on the performance on the 5 filters. The overall figure is calculate using coefficient for each filter (e.g. traffic light = 30%). With the city's input and approval, the three to five topics with the highest scores after these prioritisation exercises are selected to be the subject of the action plan.	The study is broader than green cities, but the specific part on "environmental and climate change sustainability" could be used in the green cities methodology. Some elements in the "urban sustainability" part are however also relevant to green cities and this is confusing. A "state-pressure-response" approach integrating both may help to make more sense of the relationships that link green city indicators together. The filter approach can also be used for the green cities methodology as a prioritisation strategy. Social impacts could be used as an additional filter. The filter methodology may be too complicated or time-consuming. There is a strange discrepancy between the filters used to prioritise in the general guide and those in the Annex on Indicators.
Clean Development Initiative for Asian Cities (CDIA)'s City Infrastructure Investment Programming and Prioritisation Toolkit	The aim of the toolkit is to help city governments in Asia undertake the task of programming and prioritising strategic urban investments, in order to make a priority investment package ready to be presented to financiers and project developers. The process is composed of 3 steps: i) Analysis of the city/local government's financial condition and capacity to finance future capital projects (It comprises a (quantitative) assessment of the municipality's fiscal data as well as a (qualitative) assessment of the financial management capacity). The data are used to make a projection of the local budget available for investment; ii) Assessment of the quality of proposed projects. Uses both qualitative and quantitative data. It requires input from a variety of people and agencies within the city administration; and iii) Based on the outcomes of Steps 1 and 2, develop investment packages with a 5-year horizon. The second step starts with a wish list of projects of city administrators, and is not based on a review of the performance of the city in different sectors. The prioritisation in step 2 is based on 40 questions grouped in 5 filters: project purpose, public response, environmental impact, socio-economic impacts, and feasibility of implementation. Each filter is given a score from 0 to 10; each filter has an equal weight (20%) in the final score.	The methodology is not very specific to green cities, despite the mandate of CDIA. But the principles can also be applied to environmental projects. The methodology is relatively different from ADB and IADB as it starts with an assessment of financial capacity, and not of environmental issues. CDIA's methodology is less thorough and scientific than IADB's ESCI. The initial identification of projects is subjective (a wish list of city administrators) and there is no room in the process for the integration of "needs" based on indicators (the "impacts" aspect is given more importance).
Centre for Low Carbon	The approach of the CLCF has been to develop a robust model for	This is a study meant to prioritise low carbon city

Cities' *Economics of Low Carbon Cities*	assessing the costs and carbon effectiveness of a wide range of the low carbon options that could be applied at the local level in households, industry, commerce and transport. It then explores the scope for their deployment, the associated investment needs, financial returns and carbon savings, and the implications for the economy and employment. Completed case studies to date include Leeds, Sheffield, Birmingham, Johor Bahru, Palembang, and Lima/Callao. Each study follows a similar step-by-step process: • Listing a series of low carbon measures in the domestic, commercial, industrial and transport sectors. • Understanding the potential for the deployment of different measures in the context of the studied city • Understanding background trends, developing baselines and scenarios for deployment • Identifying investment needs, financial returns and carbon savings for different levels of decarbonisation • Developing league tables and marginal abatement cost (MAC) curves • Calculating employment and wider effects on GVA	actions. It is therefore focused on CO_2 emissions and does not address green city sectors comprehensively. There is no benchmarking aspect. The methodology is very technical and scientific. It may be time-consuming and requires certain quantitative skills for cities to replicate themselves. It is also data-intensive and studies in developing countries have shown the difficulty of applying the methodology in such context. The calculations are not explained in details.
Siemens' Green Cities Index	Siemens' European Green City Index scores cities across eight categories and gives an overall score to green performance (see Annex 2). The objective is to compare cities' environmental performance and rank them accordingly. The Index is composed of 16 quantitative indicators measuring how a city is currently performing and 14 qualitative indicators assessing the cities' aspirations to reduce their future environmental impacts. In order to make the gathered data comparable, the quantitative indicators were "normalised" on a scale of 0 to 10, where 10 points were assigned to cities that met or exceeded certain criteria on environmental performance. Cities were scored either against an upper benchmark or lower benchmark. Benchmark targets were chosen from international or European directives. For example, an upper benchmark of 50% was set for the amount of waste cities should aim to recycle, which is in line with the EU's 2020 target for recycling waste. Cities that met or exceeded this benchmark scored 10 points, and the rest received a score between 0 and 10, based on their distance away from the target. Where no targets existed, the cities were scored instead using a min-max calculation, where the score is the standard deviation from the mean, with the best city scoring 10 points and the worst scoring 0 points.	This is a benchmarking study and is not about prioritisation. The Index is slightly different from one country to another, so cities are only compared within one continent. However the methodology is the same – only indicators differ. The benchmarking methodology could be replicated for EBRD's green cities. However there may be no point in assigning an overall score to the city. Instead assigning a score by sector of investment would be more meaningful. The benchmarking methodology is based on both environmental performance and aspirations (i.e. efforts or response). Scoring and benchmarking aspirations may be risky as cities do not share the same environmental priorities and needs. Any organisation attempting to replicate this

	Qualitative indicators were scored by Economist Intelligence Unit analysts with expertise in the city in question, based on objective scoring criteria that considered concrete actions, strategies and targets being taken and set by cities. The index is composed of aggregate scores of all of the underlying indicators. The index is first aggregated by category — creating a score for each area of infrastructure and policy (for example, energy) — and finally. Overall, based on the composite of the underlying category scores. To create the category scores, each underlying indicator was aggregated according to an assigned weighting. To build the overall index scores, the Economist Intelligence Unit assigned even weightings on each category score, and the index is essentially the sum of all category scores, rebased out of 100. A performance "web' is also displayed to see the performance of each city by sector.	methodology must bear in mind that it requires some significant quantitative skills.
European Green Capital Award	The European Green Capital Award assesses cities according to 12 environmental indicator areas. Each applicant cities is asked to provide data in each of the 12 areas. An expert panel from EDCA then provides a ranking of cities' green performance. This ranking is derived as a result of primary expert assessment, clarification from the cities and peer review from another expert. This information is now presented to the Jury in the form of this report together with a number of proposed shortlisted cities. The number and list of shortlisted cities chosen to proceed to the next stage will be the ultimate decision of the Jury. The Jury will assess the shortlisted cities based on the following evaluation criteria: i) The city's overall commitment, vision and enthusiasm as conveyed through the presentation; ii) The city's capacity to act as a role model to inspire other cities, promote best practices and spread the EGC model further – bearing in mind city size and location; and iii) The city's communication actions. Experts use a defined ranking system. Under this ranking system a position of 1st, 2nd, 3rd etc. is applied to each city per indicator. Since there are 12 applications to be evaluated then each city must be ranked from 1st as the best to 12th the weakest. These are not quantitative scores but rankings. The overall ranking of the city is calculated computing the 12 scores.	This is a benchmarking study and is not about prioritisation. EGCA is less scientific and thorough than Siemens' Green Cities Index. There is no absolute scoring but rather a comparative ranking of cities. Required indicators are sometimes quantitative but there is no clear link between the data and the ranking of applicant cities in each of the 12 environmental areas. The ranking is therefore largely left to experts' appraisal. This methodology clearly shows the difficulty of basing benchmarking on scientific procedures. The lack of comparative data is also mentioned as an issue.
City Blueprints	The City Blueprints study covers 24 key indicators divided over eight broad categories: water security, water quality, drinking water, sanitation, infrastructure, climate robustness, biodiversity and attractiveness as well as governance. The indicators are scored on a scale between 0 (very poor	This is a benchmarking study and is not about prioritisation.

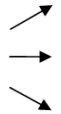
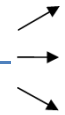
	performance) to 10 (excellent performance). The overall score of the sustainability of UWCS of the city is expressed as Blue City Index (BCI). The BCI is the arithmetic mean of the 24 indicators comprising the City Blueprint and has a theoretical minimum and maximum of 0 and 10, respectively. The BCI is represented as a performance web to visualise the performance of the city with regard to each of the 24 indicators.	City Blueprints is also less scientific and thorough than Siemens' Green Cities Index. Required indicators are sometimes quantitative but there is no clear link between the data and the 0-10 score applied to each indicator. The benchmarking methodology is therefore not very accurate.

Source: Authors

ANNEX 5. PRESSURE-STATE-RESPONSE INDICATORS FOR GREEN CITIES

Green City indicators are structured along the Pressure-State-Response framework laid out in Section 3.2. An additional sub-classification between "core" indicators (highlighted in blue-coloured cells) and "elective" or "optional" indicators (white-coloured cells) is proposed for the "state" and "pressure" categories only, so as to narrow down the number of indicators to be used for the benchmarking and prioritisation process. The "optional" indicators corresponding to each "core" indicator are listed in terms of priority (i.e. if Indicator 1 is not available, Indicator 1.1 should be the first choice to replace it, then 1.2 etc.). In total, there are **70** proposed indicators (9 in the "state" category; 26 in the "pressure" category; and 35 in the "response" category). Adding optional indicators, there are 114 proposed indicators (20 in the "state" category; 59 in the "pressure" category; 35 in the response category).

State indicators[12]

Topic		Indicator	Unit	Benchmarks			Source of benchmark	Trend	Additional indicator (example)
QUALITY OF ENVIRONMENTAL ASSETS									
AIR	1	Average annual concentration of $PM_{2.5}$	$\mu g/m^3$	< 10 (annual)	10–20 (annual)	> 20 (annual)	Based on WHO		• Sources of air pollution (in %) for each particle (PM_{10}, $PM_{2.5}$, SO_2, NO_x)
	1.1	Average annual concentration of PM_{10}	$\mu g/m^3$	< 20 (annual)	20–50 (annual)	> 50 (annual)			
	1.2	Average daily concentration of SO_2	$\mu g/m^3$	< 20 (24 hour)	20–50 (24 hour)	> 50 (24 hour)			
	1.3	Average annual concentration of NO_x	$\mu g/m^3$	< 40 (annual)	40–80 (annual)	> 80 (annual)			
WATER BODIES	2	Biochemical Oxygen Demand (BOD) in rivers and lakes	mg/L	< 2	2–4	> 4	Based on EEA		• Sources of water pollution (in surface and ground water)
	2.1	Ammonium (NH_4) concentration in rivers and lakes	µg/L	< 150	150–200	> 200			

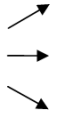
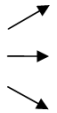
[12] Blue-coloured cells refer to core indicators; white-coloured cells refer to elective (or optional) indicators

DRINKING WATER	3	Percentage of water samples in a year that comply with national potable water quality standards	%	> 97	90–97	< 90	IADB		
SOIL	4	Number of contaminated sites	CSs / 1000 inh.(or km^2)	< 10	10–20	> 20	Based on EEA	↗ → ↘	• Sources of soil contamination
	4.1 a	Concentration of mercury in soil	mg/kg	< 0.3	0.3 – 10	> 10	Dutch Values		
	4.1 b	Concentration of cadmium in soil	mg/kg	< 0.8	0.8 – 12	> 12	Dutch Values		
	4.1 c	Concentration of zinc in soil	mg/kg	< 140	140 – 720	> 720	Dutch Values		
	4.2	Concentration of mineral oil in soil (using infrared spectroscopy)	mg/kg	< 50	50 – 5000	> 5000	Dutch Values		
AVAILABILITY OF RESOURCES									
WATER USE	5	Water Exploitation Index	%	< 20	20–40	> 40	Based on EEA	↗ → ↘	• Total water consumption • Water consumption by sector (domestic, commercial, industrial, agriculture)
LAND USE	6	Open green space area ratio per 100 000 inhabitant	Hectares	> 10	7–10	< 7	IADB	↗ → ↘	• Share of population within 15 minutes of open green space by foot
	6.1	Share of green space areas within urban limits	%	> 50	30–50	< 30	OECD/ICLEI		
BIODIVERSITY AND ECOSYSTEMS	7	Abundance of bird species (all species)	Annual % of change	Positive or stable	Slight decline (of 0%-2%)	Strong decline (> 2%)	OECD / ICLEI		• Sources of biodiversity degradation Biodiversity index
	7.1	Abundance of other	Annual	Positive or	Slight decline	Strong decline	OECD /		

		species	% of change	stable			ICLEI		of specific species
CLIMATE CHANGE RISKS									
MITIGATION (GHG EMISSIONS)	8	Annual CO_2 equivalent emissions per capita	Tonne / year / capita	< 5	5–10	>10	IADB	↗ → ↘	• Total CO_2 emissions • CO_2 emissions by sector
	8.1	Annual CO_2 emissions per unit of GDP	Tonne / USD of GDP	< 0.35	0.35–0.8	> 0.8	IADB		
ADAPTATION (RESILIENCE TO NATURAL DISASTER RISKS)	9	Estimated economic damage from natural disasters (floods, droughts, earthquakes etc.) as a share of GDP	%	< 0.5	0.5–1	> 1	OECD / ICLEI	↗ → ↘	• Human casualties • Main type of disaster that hit the city
	9.1	Percentage of public infrastructure at risk	%	< 10%	10–20%	> 20%	IADB		• Type of infrastructure at risk
	9.2	Percentage of households at risk	%	< 10%	10–20%	> 20%	IADB		• Type of household at risk (by income level and by location)

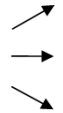
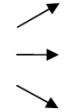
Pressure indicators

Sector	Source of pressure	Indicator	Unit	Benchmarks	Source	Trend

TRANSPORT	Energy efficiency and type of energy used	10	Average age of car fleet (total and by type)	Years	< 6	6–12	> 12	IADB	
		10.1	Percentage of diesel cars in total vehicle fleet	%	< 20	20–30	> 30	Based on EEA	
		10.2	Fuel standards 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 electric, hybrid fuel cell, Liquified Petroleum Gas (LPG) and Compressed Natural Gas (CNG) energy (total and by type)	%	> 3	1–3	< 1	Based on EEA	
	Choice of transport mode	11	Transport modal share in commuting (cars, motorcycles, taxi, bus, metro, tram, bicycle, pedestrian)	%	Private transport < 30%	Private transport = 30–50%	Private transport > 50%	OECD / ICLEI	
		11.1	Transport modal share in total trips	%	Private transport < 30%	Private transport = 30–50%	Private transport > 50%	OECD / ICLEI	
		11.2	Motorisation rate	Number of vehicles per capita	< 0.3	0.3-0.4	> 0.4	IADB	
		11.3	Average number of vehicles (cars and motorbikes) per household	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	km	> 40	10–40	< 10	IADB	
		11.5	Kilometres of bicycle path per 100 000 population	km	> 25	15–25	< 15	IADB	
		11.6	Share of population having access to public transport within 15 min by foot	%	> 80	60–80	< 80	OECD / ICLEI	
		11.7	Frequency of bus service	Average number of passage at station	> 30	30–6	< 6	OECD / ICLEI	

				per hour, in total bus network				
	Road congestion	12	Average travel speed on primary thoroughfares during peak hour	Km/h	> 30	15-30	< 15	IADB
		12.1	Travel speed of bus service on major thoroughfares (daily average)	Km/h	> 25	15-25	<15	EBRD
	Resilience of transport systems	13	Interruption of public transport systems in case of disaster	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	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
BUILDINGS	Electricity consumption	14	Electricity consumption in buildings	kWh / m2	< 47	47 – 75	> 75	Odyssee, CIBSE, IEA
		14.1	Electricity consumption in residential building	kWh / m^2	< 21	21 – 26	> 26	
		14.2	Electricity consumption in non-residential buildings	kWh / m^2	< 122	122 – 213	> 213	
	Heat / fossil fuel consumption	15	Heating / cooling consumption in buildings, fossil fuels	kWh / m^2	< 104	104 – 148	> 148	Odyssee, CIBSE, IEA
		15.1	Heating / cooling consumption in residential buildings, fossil fuels	kWh / m^2	< 96	96 – 126	> 126	
		15.2	Heating / cooling consumption in non-residential buildings, fossil fuels	kWh / m^2	< 127	127 – 210	> 210	

	Building standards	15.3	Share of city enterprises with ISO50001/EMAS certification or similar	%	NA	NA	NA		
		15.4	Total value of projects with green building certification as a share of the total value of projects granted a building permit per year	%	> 50	25-50	< 25	OECD / ICLEI	
INDUSTRIES	Electricity consumption	16	Electricity consumption in industries, per unit of industrial GDP	kWh / 2010 USD	< 0.3	0.3 - 0.4	> 0.4	OECD / ICLEI	
	Heat consumption	17	Heat consumption in industries, per unit of industrial GDP	MJ / 2010 USD	< 0.1	0.1 – 0.25	> 0.25	OECD / ICLEI	
	Consumption of fossil fuels in industrial processes	18	Heavy metals (Pb) emission intensity of manufacturing industries	kg heavy metals equivalent released per million USD GVA	< 0.02	0.02-0.04	> 0.04	Based on EEA	
		18.1	Fossil fuel combustion in industrial processes, per unit of industrial GDP	MJ / USD	< 1.4	1.4 – 2.2	> 2.2	OECD / ICLEI	↗
		18.2	Share of industrial energy consumption from renewable energy	%	> 20	10–20	< 10	OECD / ICLEI	→
	Industrial waste treatment	19	Share of industrial waste recycled as a share of total industrial waste produced	%	> 95% (90%)	80 – 95% (90%)	< 80%	OECD / ICLEI	↘
	Industrial wastewater	20	Percentage of industrial wastewater that is treated according to applicable national standards	%	> 60	40–60	< 40	OECD / ICLEI	
ENERGY	Electricity provision	21	Share of population with an authorised connection to electricity	%	> 90	70–90	< 70	IADB	
		21.1	Annual average number of electrical interruptions per year, per customer	# / year / customer	< 10	10–13	> 13	IADB	

	Thermal comfort provision	22	Share of population with access to heating / cooling	%	> 90	70–90	< 70	OECD / ICLEI	
	Renewable energy provision	23	Proportion of total energy derived from RES as a share of total city energy consumption (in TJ; compared to benchmark of 20% (links to EU target)	%	> 20	10–20	< 10	Based on EEA	
	Resilience of the electricity network to climatic extremes	24	Average share of population undergoing prolonged power outage in case of climatic extremes over the past 5 years	%	< 10	10–25	> 25	OECD / ICLEI	
WATER (SUPPLY, SANITATION, DRAINAGE)	Water consumption	25	Water consumption per capita	L / day / capita	120-200	80–200 or 200-250	< 80; > 250	IADB	
		25.1	Water consumption per unit of city GDP	L / day / USD	< 0.022	0.022 – 0.055	> 0.055		
		25.2	Unit of water consumed in power plants, per unit of primary energy generated	l / MW / h	See Annex 9	See Annex 9	See Annex 9	NREL	
		25.3	Industrial water consumption as percent of total urban water consumption	%	< 17%	17 – 50%	50%	EBRD	
	Efficiency of water supply networks	26	Non-revenue water	%	0–30	30–45	> 45	IADB	
		26.1	Annual average of daily number of hours of continuous water supply per household	%	> 20 h/day	12–20 h/day	< 12 h/day	IADB	
	Wastewater treatment	27	Percentage of residential and commercial wastewater that is treated according to applicable national standards	%	> 60	40–60	< 40	IADB	
		27.1	Percentage of buildings (non-industrial) equipped to reuse grey water	%	> 80	60–80	< 60	OECD / ICLEI	
		27.2	Percentage of wastewater from energy generation activities that is treated according to applicable national standards	%	> 60	40–60	< 40	OECD / ICLEI	

	Resilience to floods	28	Percentage of dwellings damaged by the most intense flooding in the last 10 years	%	< 0.5	0.5–3	> 3	IADB	
		28.1	Annual number of storm water/sewerage overflows per 100km of network length	Number of events per year	< 20	20–50	> 50	OECD / ICLEI	
		28.2	Awareness and preparedness to natural disasters	n.a.	Citizens are well aware of natural disaster risk and know how to react	Citizens are aware of natural disaster risk but do not have resilient attitudes	Citizens are not aware of natural disaster risks and do not have resilient attitudes	OECD / ICLEI	
SOLID WASTE	Solid waste generation	29	Total solid waste generation per capita	Kg / year / capita	< 300	300–500	> 500	OECD/ ICLEI	
		29.1	GDP per domestic material consumption	USD / kg	< 1	1-2.5	> 2.5	Based on OECD (2014)	
	Collection of solid waste	30	Share of the population with weekly municipal solid waste (MSW) collection	%	90–100	80–90	< 80	IADB	
	Treatment of solid waste	31	Proportion of MSW that is sorted and recycled (total and by type of waste e.g. paper, glass, batteries, PVC, bottles, metals)	%	> 25	15–25	< 15	IADB	↗
		31.1	Percentage of MSW which is disposed of in open dumps, controlled dumps, or bodies of water or is burnt	%	< 10	10–20	> 20	IADB	→
		31.2	Percentage of MSW landfilled disposed of in EU-compliant sanitary landfills	%	90–100	80–90	< 80	IADB	↘
		31.3	Percentage of collected MSW composted	%	> 20	5–20	< 5	IADB	
	Landfill efficiency / capacity	32	Remaining life of current landfill(s)	Years	> 8	5–8	< 5	IADB	

LAND-USE	Density / Integrated land-use	33	Population density on urban land	Residents / km^2	7000–20000	4000-7000; 20000-25000	<4000; >25000	IADB	
		33.1	Average commuting distance	km	> 5	5–10	<10	OECD / ICLEI	
		33.2	Average commuting time	min	< 30	30–60	> 60	OECD / ICLEI	
		33.3	Proportion of the population living within 20 minutes to everyday services (grocery stores, clinics, etc.)	%	> 75	50–75	< 50	OECD / ICLEI	
	Urban sprawl	34	Average annual growth rate of built-up areas	%	< 3	3–5	> 5	IADB	
		34.1	Percentage of urban development that occurs on existing urban land rather than on greenfield land	%	> 40	20-40	< 20	OECD / ICLEI	
	Use of existing built-up areas	35	Vacancy rates of offices	%	< 6%	6 – 10%	> 10%	OECD / ICLEI	
		35.1	Share of multi-family houses in total housing units	%	NA	NA	NA	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			
BUILDINGS	Electricity and heat consumption	41	Green building is promoted through standards and fiscal incentives	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
		42	Public and private investment in energy efficiency in buildings			
		43	Metering and billing for personal energy use is regulated			
INDUSTRIES	Electricity and heat consumption / energy efficient industrial processes	44	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
		45	Energy efficient industrial technologies (electricity, heat, industrial processes) is supported through private investment			
	Industrial waste / material consumption	46	Material efficiency of new built industrial facilities and waste recycling is regulated and incentivised through fiscal instruments			
	Industrial wastewater	47	Industrial wastewater treatment / reuse / recycle is promoted through regulations and fiscal incentives			
ENERGY	Electricity and heat provision	48	Coverage and quality of electricity and heat supply is improved through investment	Existing and well implemented,	Existing, but implementation challenges have	Not existing
	Renewable	49	Renewable energy facilities in private buildings are incentivised			

	energy development		through fiscal instruments	and there is no significant need to further expand this type of response	been observed, and/or existing policies are not sufficient to solve the issue at stake	
		50	Renewable energy technologies are developed and supported through public and private investment			
		51	Renewable energy facilities are incentivised through awareness campaigns			
	Resilience of the electricity network	52	The resilience of electricity networks in case of disaster is tested and enhanced through investment			
WATER (SUPPLY, SANITATION, DRAINAGE)	Water consumption	53	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
		54	Water saving / reuse is encouraged through awareness campaigns			
	Efficiency of water supply networks	55	Coverage and efficiency of water supply networks is improved through plans and investment			
	Wastewater treatment	56	Buildings' access to wastewater collection and treatment systems is improved through plans and investment			
		57	Wastewater treatment is promoted through regulations and fiscal incentives			
		58	Wastewater billing is regulated			
	Drinking water pre-treatment	59	Drinking water pre-treatment is enhanced through plans and investment			
	Resilience to floods	60	Drainage facilities are developed through plans and investment			
		61	Business and community resilience is encouraged through awareness campaigns			
SOLID WASTE	Solid waste generation	62	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	63	Coverage of solid waste collection system is improved through plans and investment			
		64	Littering and non-compliance to sorting systems is dis-incentivised through fines and penalties			
	Treatment of solid waste	65	Composting, recycling and waste-to-energy facilities are developed through plans and investment			
		66	Solid waste reuse, sorting and recycling is promoted through information and awareness campaigns			
	Landfill efficiency and overcapacity	67	Overcapacity issues in landfills are tackled through plans and investment			

LAND-USE	Density / Integrated land-use / urban sprawl	68	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
		69	Transit-Oriented Development is promoted			
	Use of existing built-up areas	70	Mixed-use development is promoted through zoning regulations / incentives			

ANNEX 6. DEFINITION OF GREEN CITY INDICATORS

Topic	Indicator		Unit	Definition / Description	Source
AIR	1	Average annual concentration of $PM_{2.5}$	$\mu g/m^3$	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.)	http://www.who.int/mediacentre/factsheets/fs313/en/
	1.1	Average annual concentration of PM_{10}	$\mu g/m^3$	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.)	
	1.2	Average daily concentration of SO_2	$\mu g/m^3$	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.)	
	1.3	Average annual concentration of NO_2	$\mu g/m^3$	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.)	
WATER BODIES	2	Biochemical Oxygen Demand (BOD) in rivers and lakes	mg/L	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	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	µg/L	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.	

DRINKING WATER	3	Percentage of water samples in a year that comply with national potable water quality standards	%	The data should be collected in several locations the water supply network. Ideally the quality of water should be frequently measured to avoid health hazards (once a week)	IADB's ESCI
SOIL	4	Number of contaminated sites	CSs / 1000 inh.	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.	http://www.eea.europa.eu/data-and-maps/indicators/progress-in-management-of-contaminated-sites-3/assessment
	4.1a – 4.1c	Concentration of heavy metals (Pb) in soil	mg/kg	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 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.	
	4.2	Concentration of mineral oil in soil	mg/kg	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.	
WATER	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.	http://www.eea.europa.eu/data-and-maps/indicators/use-of-freshwater-resources-2/assessment-1
GREEN SPACES	6	Open green space area ratio per 100 000 inhabitant	Hectares	Hectares of permanent green space per 100,000 city residents. The data should be compiled bi-annually.	IADB's ESCI
	6.1	Share of non-built-up 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.	OECD / ICLEI
BIODIVERSITY AND	7	Abundance of bird species	Annual % of change	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	http://www.eea.europa.eu/data-and-maps/indicators/abundance

ECOSYSTEMS				given area. The data should be compiled once a year	-and-distribution-of-selected-species/abundance-and-distribution-of-selected-2
	7.1	Abundance of other species	Annual % of change	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	
MITIGATION (GHG EMISSIONS)	8	Annual CO_2 emissions per capita	Tonne / year / 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.	IADB's ESCI
	8.1	Annual CO_2 emissions per unit of GDP	Tonne / USD of GDP	CO_2 emissions, divided by the GDP of the city. The data should be compiled once a month.	IADB's ESCI
ADAPTATION (RESILIENCE TO NATURAL DISASTER RISKS)	9	Estimated economic damage from natural disasters (floods, droughts, earthquakes etc.) as a share of GDP	%	This indicator should measure overall losses (not only uninsured losses). 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).	http://www.eea.europa.eu/data-and-maps/indicators/direct-losses-from-weather-disasters-1/assessment
	9.1	Percentage of public infrastructure at risk of natural disaster	%	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.	IADB's ESCI
	9.2	Percentage of households at risk of natural disaster	%	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.	IADB's ESCI

Pressure Indicators

Sector	Indicator		Unit	Definition / Description	URL
TRANSPORT	10	Average age of car fleet (total and by type)	Years	The data can be compiled from the vehicle registration database of the municipality, once a year.	IADB's ESCI
	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.	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	n.a.	Adoption of latest EURO standards or equivalent for light passenger and commercial vehicles.	http://ec.europa.eu/environment/air/transport/road.htm
	10.3	Share of total passenger car fleet run by alternative energy (total and by type)	%	Alternative energy here refers to LPG, natural gas and electric. The data can be compiled from the vehicle registration database of the municipality, once a year.	http://www.eea.europa.eu/data-and-maps/indicators/proportion-of-vehicle-fleet-meeting-4/assessment
	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.	IADB's ESCI
	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. Surveys are a common data collection method. The data can be collected bi-annually.	OECD / ICLEI
	11.2	Motorisation rate	Number of vehicles per capita	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.	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 vehicles per	Number of private vehicles (cars, motorcycles) per household. This can be calculated by dividing the total number of	OECD / ICLEI

		household	vehicles (obtained from the vehicle registration database) by the number of households. The data should be collected bi-annually.	
11.4	Kilometers of road dedicated exclusively to public transit per 100 000 population	km	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.	IADB's ESCI
11.5	Kilometers of bicycle path per 100 000 population	km	The total centreline kilometres dedicated to bicycle path, divided by 100,000 of city population. The data should be collected once a year.	IADB's ESCI
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.	OECD / ICLEI
11.7	Frequency of bus service	Average number of service at station per hour in total bus network	The data can be calculated from the timetable of each bus line, once a year.	OECD / ICLEI
12	Average travel speed on primary thoroughfares during peak hour	Km/h	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)	IADB's ESCI
12.1	Travel speed of bus service on major thoroughfares (daily average)	Km/h	The data should be collected continuously.	OECD / ICLEI
13	Interruption of public transport systems in case of disaster	n.a.	A qualitative assessment of the ability of public transport systems to run efficiently during a natural disaster (flood, earthquake, storm…)	OECD / ICLEI
13.1	Efficiency of transport emergency systems in case of disaster	n.a.	A qualitative assessment of the ability of emergency transport systems (firefighters, police, ambulance…) to run efficiently during a natural disaster (flood, earthquake, storm…)	OECD / ICLEI

BUILDINGS	14	Electricity consumption in buildings	kWh / m2	Electricity consumption in urban built environment per square meter	IEA Energy Efficiency Market Report 2015, Odyssee-Mure database, CISBE Guides 19, 72, 286
	14.1	Electricity consumption in residential building	kWh / m^2	Electricity consumption in urban residential buildings per square meter	
	14.2	Electricity consumption in non-residential buildings	kWh / m^2	Electricity consumption in urban non-residential buildings per square meter	
	15	Heating / cooling consumption in buildings, fossil fuels	kWh / m^2	Heat (fossil fuel) consumption in urban built environment per square meter	IEA Energy Efficiency Market Report 2015, Odyssee-Mure database, CISBE Guides 19, 72, 286
	15.1	Heating / cooling consumption in residential buildings, fossil fuels	kWh / m^2	Heat (fossil fuel) consumption in urban residential buildings per square meter	
	15.2	Heating / cooling consumption in non-residential buildings, fossil fuels	kWh / m^2	Heat (fossil fuel) consumption in urban non-residential buildings per square meter	
	15.3	Share of city enterprises with ISO14001/EMAS certification or similar	%	EMAS and ISO 14001 are the two most recognised and widely applied certification systems for environmental management applicable to both private companies and public institutions. EMAS is completely compatible with ISO 14001, but goes further in its requirements for performance improvement, employee involvement, legal compliance and communication with stakeholders.	http://www.eea.europa.eu/data-and-maps/indicators/number-of-organisations-with-registered/assessment
	15.4	Total value of projects with green building certification as a share of the total value of projects granted a building permit per year	%	-	OECD (2013) Green growth in cities
INDUSTRIES	16	Electricity consumption in industries, per unit of industrial GDP	kWh / 2010 USD	This indicator measures the electricity productivity of industries.	OECD / ICLEI
	17	Heat consumption in industries, per unit of industrial GDP	kJ / 2010 USD	This indicator measures the heat productivity of industries.	OECD / ICLEI

	18	Heavy metals (e.g. Pb) emission intensity of manufacturing industries	kg of heavy metals equivalent released per million USD GVA	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).	http://www.eea.europa.eu/data-and-maps/indicators/emission-intensity-of-manufacturing-industries-1/assessment
	18.1	Fossil fuel combustion in industrial processes, per unit of industrial GDP	MJ / 2010 USD	This indicator measures the fossil fuel use productivity of industries	OECD / ICLEI
	18.2	Share of industrial energy consumption from renewable energy	%	-	OECD / ICLEI
	19	Share of industrial waste recycled as a share of total industrial waste produced	%	Green benchmark to be set as 90% or 95% with GCAP iterations	OECD / ICLEI
	20	Percentage of industrial wastewater that is treated according to applicable national standards	%	The data should be collected every month.	OECD / ICLEI
ENERGY	21	Share of population with an authorised connection to electricity	%	Percentage of the city's households with a legal connection to sources of electrical energy	IADB's ESCI
	21.1	Annual average number of electrical interruptions per year, per customer	# / year / customer	Average number of electrical interruptions per year, per customer	IADB's ESCI
	22	Share of population with access to district heating / cooling	%	Percentage of the city's households with a legal connection to sources of district centralised heating	OECD / ICLEI
	23	Proportion of total energy derived from RES as a share of total city energy consumption (in TJ; compared to benchmark of 20% (links to EU target)	%	The amount of renewable energy consumed for electricity, heating and cooling, and transport, and expressed as a share against gross final energy consumption	http://www.eea.europa.eu/data-and-maps/indicators/renewable-gross-final-energy-consumption-4/assessment
	24	Average share of population undergoing	%	-	OECD / ICLEI

		power outage in case of climatic extremes over the past 5 years			
WATER (SUPPLY, SANITATION, DRAINAGE)	25	Water consumption per capita	L / day / 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.	IADB's ESCI
	25.1	Water consumption per unit of city GDP	L / day / USD	This indicator measures water resource productivity. See remarks above on the sampling method.	OECD (2014), Green Growth Indicators 2014
	25.2	Unit of water consumed in power plants, per unit of primary energy generated	l / MW / h	This indicator measures the productivity of water use in energy generation. The data should be obtained from the water supply utility of the municipality. Best practice benchmarks are based on IPCC and NREL standards.	OECD / ICLEI, NREL
	25.3	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.	EBRD
	26	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. 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.	IADB's ESCI
	26.1	Annual average of daily number of hours of	%	The data should be collected through surveys, twice a year.	IADB's ESCI

		continuous water supply per household			
	27	Percentage of residential and commercial wastewater that is treated according to applicable national standards	%	The data should be collected by analysing the quality of treatment in wastewater treatment facilities.	OECD / ICLEI
	27.1	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.	OECD (2013) Green Growth in Cities
	27.2	Percentage of wastewater from energy generation activities that is treated according to applicable national standards	%	-	OECD / ICLEI
	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.)	OECD / ICLEI
	28.1	Annual number of storm water/sewerage overflows per 100km of network length	Number of events per year	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.	OECD (2013) Green Growth in Cities
	28.2	Awareness and preparedness to natural disasters	n.a.	This is a qualitative assessment of citizens' awareness about the threats of natural disasters and means to minimise damages (e.g. insurance, knowledge of shelters, measures to take at the building level etc.)	OECD / ICLEI
SOLID WASTE	29	Total solid waste generation per capita	Kg / year / capita	The data can be collected once a year.	http://www.eea.europa.eu/soer-2015/countries-comparison/waste
	29.1	GDP per domestic material consumption	USD / kg	This indicator measures material resource productivity.	OECD (2014), Green Growth Indicators 2014

	30	Share of the population with weekly municipal solid waste (MSW) collection	%	Percentage of the population whose solid waste is collected at least once a week. The data can be collected through surveys, once a year.	IADB's ESCI
	31	Proportion of MSW that is sorted and recycled (total and by type of waste e.g. paper, glass, batteries, PVC, bottles, metals)	%	Formally and informally recycled materials are those diverted from the waste stream, recovered, and sent for processing into new products, following local government permits and regulations.	IADB's ESCI
	31.1	Percentage of MSW which is disposed of in open dumps, controlled dumps, or bodies of water or is burnt	%	-	OECD / ICLEI
	31.2	Percentage of MSW landfilled disposed of in EU-compliant sanitary landfills	%	Percentage of the city's municipal solid waste disposed of 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.	IADB's ESCI
	31.3	Percentage of collected MSW composted	%	Percentage of the city's solid waste that is treated by composting (in terms of weight). The data on weight of solid waste composted can be produced at composting stations. Several measurements over the year and an averaged mean may be necessary to obtain data representative of long-term patterns.	IADB's ESCI
	32	Remaining life of current landfill(s)	Years	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.	IADB's ESCI
LAND-USE	33	Population density on urban land	Residents / km^2	People who live in the urbanised area of the municipality, per km^2 of urbanised area	IADB's ESCI

			of the municipality. The data can be collected bi-annually.	
33.1	Average commuting distance	km	Average distance travelled by all commuters to work. The data should be collected through surveys, once a year.	OECD / ICLEI
33.2	Average commuting time	min	Average time spent in commuting by all commuters. The data should be collected through surveys, once a year.	OECD / ICLEI
33.3	Proportion of the population living within 20 minutes to everyday services (grocery stores, clinics, etc.)	%	Proportion of the population living within 20 minutes by any mode of transport to everyday services. The data should be collected through surveys, once a year.	OECD / ICLEI
34	Average annual 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.	IADB's ESCI
34.1	Percentage of urban development that occurs on existing urban land rather than on greenfield land	%	Ratio 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.	OECD / ICLEI
35	Vacancy rates of offices	%	Percentage of offices that are vacant out of the total office stock. The data can be collected through surveys once a year.	OECD / ICLEI
35.1	Share of multi-family houses in total housing units	%	A multi-family house is defined as a building that contains multiple separate housing units. The data can be collected from land-use database, once a year.	OECD / ICLEI

Response Indicators

Sector	Indicator		Examples of response
TRANSPORT	36	High-polluting vehicles are regulated / Energy-efficient vehicles are incentivised through fiscal instruments	- Interdiction of circulation and fines for high-emitting vehicles - Subsidies to replace vehicles older than 2000 or diesel-powered vehicles - Fuel standards (EURO 6, EURO 5…)
	37	Extension and improvement of public and non-motorised transport is planned and supported through investment in place	- Sustainable Transport Development Plan
	38	Public and non-motorised transport is promoted through Information and awareness campaigns	- Car-free days
	39	Traffic demand is managed (congestion charges, smart technologies)	- Congestion charges - Smart automated traffic regulation - Parking management
	40	Public transport emergency management (in publicly and/or privately run networks) is planned and tested	- Transport resilience action plan - Tests for road transport evacuation - Tests on efficiency of emergency transport systems
BUILDINGS	41	Green building is promoted through standards and fiscal incentives	- Green buildings standards - Subsidies for installation of energy efficient building infrastructure
	42	Public and private investment in energy efficiency in buildings	- Public and private investment in retrofitting
	43	Metering and billing for personal energy use is regulated	- Billing based on actual consumption - Smart metering technologies in households
INDUSTRIES	44	Energy efficient industrial machinery is regulated and incentivised through fiscal instruments (electricity, heat, industrial processes)	- Penalties for high-emitting industrial technologies - Subsidies for the purchase of energy efficient industrial technologies
	45	Energy efficient industrial technologies (electricity, heat, industrial processes) is supported through private investment	
	46	Material efficiency of new built industrial facilities and waste recycling is regulated and incentivised through fiscal instruments	- Penalties for low recycling rate of industrial waste - Subsidies for material efficient technologies and recycling facilities - Mandatory recycling rates
ENERGY	47	Industrial wastewater treatment / reuse / recycle is promoted through regulations and fiscal incentives	- Energy (Electricity / Heating) Master Plan

	48	Coverage and quality of electricity and heat supply is improved through investment	- Subsidies for the development of solar panels on rooftops - Subsidies for the development of solar water heaters
	49	Renewable energy facilities in private buildings are incentivised through fiscal instruments	
	50	Renewable energy technologies are developed and supported through public and private investment	- Renewable energy education programmes in schools
	51	Renewable energy facilities are incentivised through awareness campaigns	- Energy resilience action plan - Tests on the resilience of the energy supply network - Smart technologies to detect power breakdown
WATER (SUPPLY, SANITATION, DRAINAGE)	52	The resilience of electricity networks in case of disaster is tested and enhanced through investment	
	53	Metering and billing for water use is regulated	- Billing based on actual consumption - Smart metering technologies in households
	54	Water saving / reuse is encouraged through awareness campaigns	- Water saving education programmes schools
	55	Coverage and efficiency of water supply networks is improved through plans and investment	- Water Master Plan - Investment to reduce leakage in water pipes - Investment to provide more continuous water supply in households
	56	Buildings' access to wastewater collection and treatment systems is improved through plans and investment	- Investment to equip buildings with individual or communal grey and black water treatment facilities - Investment to connect buildings to wastewater treatment plants - Construction of new wastewater treatment facilities
	57	Wastewater treatment is promoted through regulations and fiscal incentives	- Mandatory wastewater collection facilities for new buildings
	58	Wastewater billing is regulated	- Wastewater collected is charged to households
	59	Drinking water pre-treatment is enhanced through plans and investment	- Construction / upgrading of drinking water treatment facilities
	60	Drainage facilities are developed through plans and investment	- Resilience Master Plan - Construction of drainage tunnels - Construction of dykes - Construction of retention ponds
	61	Business and community resilience is encouraged through awareness campaigns	- Information on business continuity plans on the City Hall's website - Education programmes on resilience to natural disasters (floods, earthquakes etc.) in schools

SOLID WASTE	62	Reduction of material consumption / solid waste generation is promoted through awareness campaigns	- Education programmes on solid waste reuse / recycling in schools and in companies
	63	Coverage of solid waste collection system is improved through plans and investment	- Action plan to reduce amounts of solid waste dumped in the streets
	64	Littering and non-compliance to sorting systems is dis-incentivised through fines and penalties	
	65	Composting, recycling and waste-to-energy facilities are developed through plans and investment	- Construction of recycling facilities - Construction of waste-to-energy facilities - Construction of composting facilities
	66	Solid waste reuse, sorting and recycling is promoted through information and awareness campaigns	- Education programmes on solid waste reuse / recycling in schools and in companies
	67	Overcapacity issues in landfills are tackled through plans and investment	- Construction of new landfills
LAND-USE	68	Density is regulated	- Density targets - Incentives for higher densities (e.g. Floor-Area-Ratio bonus)
	69	Transit-Oriented Development is promoted	- TOD is promoted in Transport and Land-Use Master Plans - Higher density regulations near public transport lines
	70	Mixed-use development is promoted through zoning regulations / incentives	- Zoning regulations promote mixed-use development - Fiscal incentives for mixed-use development for developers

ANNEX 7. GREEN CITY ACTION PLAN METHODOLOGY

Step	Sub-step	Description
Step 1 Green City Baseline **Key question of step 1:** - **What is the current state of the environment?** **Aim:** - **The "Green City Baseline" aims to inform policy and strategic decision-making at the start of the process (or the review phase for advanced local governments) and provide the reference scenario for the business-as-usual against the Green City approach and action.** **Primary outcomes:** - **Commitment to Green City development for the local community.** - **Process initiated within local government and community.** - **Overview of status quo (understanding situation, constraints and capabilities).** - **Priorities identified to address environmental challenges most effectively and in an integrated manner.** **Indicative timeline:** - **1st (introductory) period: 6 months** - **Following (regular) period: 1-3 months**		
1.1 Prepare & organise	Deliverables	Detailed project plan Kick-Off Meeting Presentation Inception Report GCAP Approval Process
	1.1.1 Secure initial commitment - agreement with the Council	By committing to Green City Action Plan in the community, a local government sets a priority for high environmental performance. It is vital to ensure senior political buy-in to kick-start the process and provide clear leadership. The mayor and/or Council should give the official go-ahead to legitimise action by municipal staff. Municipal staff needs to be informed and engaged early on in the process, as they will institutionalise and implement the process and monitor developments. If the local government has already kicked off a Green City Action Plan, it is necessary to re-commit to a new phase of action.
	1.1.2 Confirm approval process	Alongside with the official go-ahead, the City should provide a summary of the legal process for approving the GCAP that is drafted through consultation with a city's legal department. This should include a summary of major upcoming milestones that could impact the timeline of deliverables, under the ultimate target of GCAP approval.

		Additionally, confirmation on whether a SEA or similar documentation is necessary and what the requirements may be should be provided at this stage. If a SEA is required, it shall be included into the GCAP development as indicated further.
	1.1.3 Set up team & institutional structures	The formation of governance arrangements are needed to ensure buy-in, effective decision-making, planning and implementation throughout the whole process. Ideally, the structure established (steering committee or task force), is an internal coordination body working with a wide number of municipal departments (including Finance, Sectoral departments and Communications) to provide input into and steer the process. It should also include external participation of essential actors representing the various environmental and socio-economic dimensions to address in the Green City Action Plan (e.g. organisations responsible for municipal services such as infrastructures, energy, water, waste and transport utilities). The committee's coordination tasks and mandates, communication mechanisms and relations to other groups within the local government should all be clearly defined and give the body appropriate strength and ability to drive forward the development of the Green City Action Plan. At this stage it is also critical to identify an individual or individuals who have the capacity and expertise to support the GCAP throughout its development. The person or persons will function as the key contact and party responsible for the GCAP within the city. The city contact should be reporting directly to the Mayor.
	1.1.4 Identify & engage stakeholder group(s)	An integrated and effective Green City Action Plan requires the involvement of essential partners and stakeholders. Good involvement doesn't mean involving all the stakeholders in every development step, though. A stakeholder mapping (or analysis) should be conducted to identify key individuals / representatives and stakeholder groups (including private sector representatives, such as utility firms, local academia, community groups, other NGO's), also gaining a better understanding of their interests and sphere of influence. Such mapping should be conducted using the PSR framework, in particular the "pressure" indicators. Furthermore, the involvement of all relevant stakeholders, including the community, can facilitate the implementation of the Green City Action Plan, removing oppositions to the implementation of the action (e.g. NIMBY) and exploring innovative financing mechanisms. This step includes mapping out the local Green City champions and involving them in the process – responsible political leaders, key persons in the political parties, specialised committees. There are basically three settings, which in reality will be a certain, very locally determined, mixture that can influence the political agenda: ▪ Political champions: The best conditions are in local governments where the Mayor or key Councillors are already the drivers and champions of the Green City agenda. More difficult settings are hardly accepted from the majority of the Council as the driver. ▪ Administrative champions: Key persons in the administration could adopt the Green City issue or respond to a legal requirement. Being close to the politicians, they may have the influence needed to drive Green City issues into political discussions. ▪ Community champions: Key persons and organisations in the community sphere could act as Green City champions and challenge the elected politicians by requesting a response to their concerns. Focus is to develop 'ownership' of the Green City Action Plan with all identified Green City Champions in Council and elsewhere. Actions may include: ▪ Inform and involve the local Green City champions and the key decision-makers in all steps.

		▪ Get advice from champions on how to best carry on the upcoming liaison and information efforts and make them contribute to these with their own contacts and influence. Experience shows that an invitation signed by the Mayor gives much more relevance to official papers. Steps 1.1.3 and 1.1.4 should build towards a GCAP Kick Off Meeting, where local stakeholders and the GCAP team officially launch the GCAP process. This event is an initial opportunity to raise local awareness and visibility for the plan, and to begin to build local ownership for the initiative.
	1.1.5 Consider formal requirements	In preparation of developing the GCAP and the ultimate Council resolution, the formal requirements and corner-stones in terms of timing, due-dates, and format need to thoroughly be considered and respected. At best, agreement with the Mayor and Council of Elders or analogous body (usually responsible for the political calendar) will be sought on the appropriate time to present the draft Council resolution to the political bodies. Additionally, the official approval mechanism and potential requirements will be finalised and confirmed by the relevant City authorities This should be a legal analysis to understand the legal procedure and timeline for approval of the GCAP. Last, the City should clarify their desired level of public disclosure for the ultimate GCAP draft concerning the amount of information made publically available.
1.2 Map local situation (preparation phase in the prioritisation process elaborated in Section 3)	Deliverables	Political Framework Report Indicators Database
	1.2.1 Map external framework conditions – including financial status , governance and management inventory and analysis	It is valuable for a local government to understand external issues impacting its Green City Action Plan. This requires exploring the international / regional / national and sub-national contexts, including policy / legal, economic, social and environmental relevant contexts, emerging issues, trends and forthcoming policies. Previous strategic planning or sectoral studies conducted for or by the City should be of particular focus in developing this framework. The GCAP should be informed by these plans, strategies and reports to ensure that the targets or actions identified through previous efforts are considered and potentially integrated into the GCAP.
	1.2.2 Map environmental and infrastructure challenges (Collection and assessment of state and pressure indicators)	This is the part of the Green City Baseline where environmental pressure and state indicators are collected, compiled and assessed through the benchmarking methodology (traffic light screening), the trend analysis and legal compliance check. Indicators targeted include the three environmental dimensions (quality of environmental assets, use of resources, and climate change risks) developed in 3.2, and economic activities and services that can be identified as environmental pressure levers – thus target sectors, which include transport, energy, water supply and wastewater (WSS), solid waste, and land-use.
	1.2.3 Map local policy framework (Collection and assessment of response indicators)	This is the part of the Green City Baseline where indicators of response to environmental challenges, including policy instruments (such as plans, programmes), investment, behaviour and organisational set-up (incl. roles and responsibilities, procedures, reporting routines), are collected and assessed using a traffic light screening. Also, a consideration of stakeholder groups specific for the identified environmental challenges based on 1.1.4 will be conducted. At this stage it is also important to take a first look into financial status and available resources.
1.3 Assess & prioritize	Deliverables	Technical Assessment

(green city *challenges* prioritisation process elaborated in Section 3)		Prioritisation Report
	1.3.1 Technical analysis of green city challenges	The city identifies priority green city challenges by using the PSR indicators and their traffic light assessment carried out in the previous step. The result can be a green city problem tree linking red-flagged state, pressure and response indicators. See Section 3.3 (Proposed green city action prioritisation methodology) for details.
	1.3.2 Stakeholder-based prioritisation	The green city challenges identified as a result of the technical analysis within the city administration will be checked and complemented through a stakeholder consultation. External experts and citizens representatives will confirm or reject the relevance of identified green city challenges. See Section 3.3 (Proposed green city action prioritisation methodology) for more details.
	1.3.3 Political assessment & Green City Baseline	The step concluding the Green City Baseline includes a formal assessment of the results of all previous steps in order to politically determine priorities to address in the Green City Action Plan. This step will also provide the mandate for elaborating the Plan itself.
If a SEA for the GCAP is required, the outcomes of the Step 1 form the basis for the relevant SEA Stage, namely ' Setting the context and objectives, establishing the baseline'		
Step 2 Green City Action Plan **Key question of step 2:** - **Where do we want to go and how do we get there?** **Aim:** - **The "Green City Action Plan" compiles and presents the agreed development vision and objectives for a period of 10-15 years, the targets to towards in a period of 3-10 years, and the scope of actions and targets proposed.** **Primary outcomes:** - **Visions for Green City development drafted in line with priority environmental challenges identified** - **Strategic objectives outlined according to environmental and socio-economic dimensions** - **Medium-term targets for the long-term strategic objectives identified** - **Priority Green City actions defined** - **Draft Green City Action Plan compiled** **Indicative timeline:** - **1st (introductory) period: 6 months** - **Following (regular periods): 3 months**		
2.1 Develop a vision (10-15 years)	Deliverables	Vision and Strategic Objectives
	2.1.1 Develop visions for priority areas	Where do we go from here? This is the question that follows, when the Green City Baseline has given clarification to the question 'Where do we stand?' To guide the city's development and provide a framework for the Green City Action Plan, a Green City strategy statement outlines the vision for a period of 10-15 years, both for the Green City in general and each priority area. These visions will address the priority areas identified in steps 1.3.2 and 1.3.3, and present a qualitative vision of the desired development and achievements considering environmental and socio-economic dimensions. It will be an advantage to develop a positive connotation to the long-term ambition: a vision – an image of the city and general principle that leads development of a strategy and its implementation. This will help to create ownership and backing for the Council's Green City Action Plan. To achieve this, the Green City Baseline is used as a starting point for a 'visioning workshop' to define or modify the city's strategic development, with clear links to its socio-economic development and clear

		indication of co-benefits (green growth).
	2.1.2 Determine strategic objectives based on priority areas	Given limited resources, not all environmental challenges can be addressed at a time. Agreement is needed on the strategic objectives that set goals, on a 10 to 15 year time scale, to contribute to the visions outlined. These strategic objectives will form the scope of the Council's more immediate work for implementing the Green City Action Plan. The objectives should be selected from the priority areas and policy gaps identified in the technical assessment. There should be at least one strategic objective for every vision developed for the city. These objectives will set the basis for a distance to goal comparison over a 10 to 15 year period. Objectives can relate to "avoidance", "reduction" or "improvements", but also to socio-economic aspects based on indicators as provided in task 3.3. Indicators in the pressure-state-response categories can be used to assess cities' green performance along with additional indicators deemed appropriate. As a note, only the state and pressure indicators should be used to compare cities based on environmental performance. Response indicators are difficult to benchmark because they are entirely qualitative and "respond" to existing problems. A city does not need to respond to a problem that does not exist (for instance, a city does not need a disaster risk master plan if it scientifically proven that it is safe from all type of natural disasters). Instead, response indicators should be used in a second screening step to identify policy options that should be considered in order to tackle the state and pressure issues initially identified (cf. prioritisation methodology).
	2.1.3 Determine medium-term targets for strategic objectives	For each strategic objective, medium-term target(s) will be determined to operationalise the Green City Action Plan. These targets will set benchmarks for the city on the 3 - 10 year timescale and build towards the strategic objectives. Targets should be developed with the intention that the GCAP actions will contribute to their realisation.
	2.1.4 Consider scope incl. territory and stakeholders	For appropriate and effective objectives and targets, it is important to clearly consider their scope in terms of territory and stakeholders. The territorial scope depends very much on priority issues. Often, environmental challenges and issues cannot be just treated as local issues. The territorial scope should therefore represent the local responsibility of each environmental dimension, not at least to identify and consider the stakeholders (or partners) involved and relevant for implementing the action. Key stakeholders for the strategic objectives and medium-term targets should be identified to assess the feasibility for the city to effectively address urban issues within each area covered by the strategic objectives and targets. 'Scope' may refer to different (environmental) dimensions and aspects and include a thorough consideration of territory and stakeholders as well as urban activities and services (e.g. solid waste management, water and wastewater treatment, etc.), but also resources and budgets available to act with.
If SEA for the GCAP is required, the outcomes of the Step 2.1 form the basis for the relevant SEA stage, namely deciding on scope and setting the appraisal framework (SEA objectives). SEA objectives in this case will coincide with the strategic objectives of the GCAP. Additional consultations on the scope and objectives may be needed to comply with the SEA requirements.		
2.2 Select and prioritise Green City actions (process elaborated in Section 3)	Deliverables	Policy Options and Actions
	2.2.1 Review of existing Green City initiatives and responses	The selection and prioritisation of Green City actions is composed of five steps, with the first step being a review of existing green city initiatives and responses: Strategic objectives and medium-term targets will be transformed in actions. The first step in this process is a

		consideration of the existing responses and initiatives addressing Green City challenges (resulting from step 1.2.2 and 1.2.3). As a result, applied instruments and procedures will be confirmed or adapted to more efficiently and effectively perform to achieve the objectives and targets of the Green City Action Plan. Details are provided in Section 3.3.
	2.2.2 Select Green City actions	Following from the identification of priority environmental challenges and policy gaps and drafting the strategic objectives, new actions and measures will be reviewed, considered and adopted by relevant bodies including stakeholders. Actions can be categorised as policy, investments and other initiatives, where policy is concerned with legislative or regulatory measures, investments focus on Green City infrastructure projects, and other initiatives offer partnerships that contribute to the strategic objectives. There should be at least one action for each medium-term target. The investments identified through this process will form a list of indicative investments, which the city can pursue to meet its objectives and Green City development visions. These investments, like all Green City actions, should address the priority environmental challenges identified and prioritised through step 1.3.
	2.2.3 First prioritisation of Green City actions – prioritisation filters	Once the Green City action options are selected, the city should apply prioritisation filters in order to identify those with potentially highest impact in terms of environment (in particular with regard to the state indicators) but also with regard to economic and social objectives described in Section 3.2 and 3.3.
	2.2.4. Derive budget implications, environmental impacts, andindicative investment needs to address priority areas	Impacts on the City's annual expenditure and capital expenditure (capex) budgets should be estimated and presented in the Green City Action Plan for each selected action separately. This will help to further prioritise selected green city measures according to their cost. In addition, benefits and savings in terms of relevant environmental and socio-economic metrics should be estimated to provide a comprehensive picture and allow for a thorough political consideration of the plan's actions. In particular, the investment's benefits in terms of climate mitigation and resilience should be quantified (See p.35, Section 2.2.4 for list of metrics). The level of analysis for the indicative investments depends on the requirements of the City; however, as a minimum, the estimated capital cost and operating costs should be provided for each indicative investment. Relevant stakeholders for each action should be presented along with an indicative timeline for the implementation period of each action. See Appendix 1 to this Annex for information on quantifying the climate benefits of identified measures.
	2.2.5. Second prioritisation of Green City actions - Stakeholder-based assessment and final prioritisation	The Green City policies, investments and programmes identified as a result of steps 2.2.1 – 2.2.4 within the city administration should be checked and complemented through additional stakeholder consultation. External experts and citizen representatives will confirm or dispute the relevance of identified green city policies. Simultaneously, a formal assessment of the actions selected should be carried out. A political assessment could help to select some policy and investment options which meet the political agenda of the city, the national government or the international community (climate change). This step would help to ensure final leadership from the Mayor and Council.
2.3 Draft Green City Action Plan (3-5 years)	Deliverables	Green City Action Plan
	2.3.1 Draft Green City Action Plan	The Green City Action Plan presents the findings of all above-mentioned activities and defines the long-term Green City vision and strategic objectives for each priority area. It is structured according to affected

		environmental dimensions and significant aspects, using indicators and time-related targets and measures for the Council's operations related to the environmental dimensions. The Green City Action Plan also outlines the scope of actions, the targets set and the major actions developed, and the initial steps of implementing the Plan for a period of 1-5 years. It is an overarching strategic document which contains the guiding principles offering orientation for the Council's decision-making and the administration's implementation work in the mid-long term. The Green City Action plan triggers or links to sectoral-focus action plans for different sectors (for example Sustainable Energy Action Plans (SEAPs), which define short-term operational targets and suitable measures that serve as stepping stones to reach the medium targets and long-term objectives. This is to allow an estimation of what is realistically possible in light of available resources and efforts needed. Fine-tuning of the Green City Action Plan is to follow after Council approval at the start of the step Implementation & Monitoring. The language of the GCAP should reflect that it is a city's document, and should be written as such including first person pronouns.
	2.3.2 Present Green City Action Plan	It is to be emphasised that communication and involvement are crucial parts for ensuring partnership agreements to implement actions that lead to the fulfilment of targets. Equally important is to inform the wide public about the Green City Action Plan, its objectives, targets and priority actions in an easy and attractive to receive format. This may include written information as well as more interactive methods. If SEA for the GCAP is required, GCAP communication plan should be developed in line with standard SEA consultation requirements. There will be no need to carry out separate GCAP and SEA consultation processes; unified consultation approach shall be designed, and the possibility to adapt both GCAP and SEA recommendations basing on stakeholder consultations shall be envisaged.
If a SEA for the GCAP is required, the outcomes of the Step 2.3 form the basis for the relevant SEA stage, namely 'Environmental report'. It is recommended that the stand-alone SEA Environmental Report is produced, summarizing the above SEA stages. SEA Environmental Report shall be used for public consultations on the GCAP Plan. It is important to distinguish SEA Environmental Report and Green City Report, at the former is a part of planning process and should inform the GCAP decision-making, while the latter is an implementation report		

Step 3 Green City Implementation

Key question of step 3:

- **How do we operationalise the plan, and what are resources available to assist?**

Aim:

- **The "Green City Implementation" will operationalise the Green City Action Plan, break it down into concrete tasks, allocate budget, time and staff, and monitor the contribution of each measure to the objectives and targets established in the Plan. This will include building political support for the Plan's targets and actions by linking to municipal budget resources and reaching out to key government members.**

Primary outcomes:

- **Initiating and running projects as part of a comprehensive Green City Action Plan.**
- **Monitoring of implementation of actions and progress towards objectives and targets.**
- **Political Commitment to Green City Action Plan.**
- **Mitigation of environmental challenges and risks / environmental improvements started.**
- **Consideration of financial resources in municipal budget.**
- **Established implementation partnerships.**

Indicative timeline: - **12 - 36 months**		
3.1 Engage politicians and their bodies	3.1.1 Prepare political framework	Developing and maintaining political Green City commitment will remain a long-term activity involving major political groups, including the Mayor, other high-level politicians, different stakeholders and the general public at all steps of the Green City planning and management cycle. However, before the actual Council debate, it will be important to inform major political groups inside and outside the City Council about process, results and draft Green Action Plan. This will allow collecting views, frequently asked questions and (counter) arguments to take on board prior to the actual council decision, but also to provide supplementary information. This follows two purposes: ▪ Firstly, it prepares the political groups and councillors to have a meaningful debate on the contents of the Green City Action Plan. ▪ Secondly, it prepares the ground for the approval of the Green City Action Plan in the council. It also helps to create political support later on, during the implementation of the Green City Action Plan. The results of step 1.2.1 will thoroughly be reviewed in light of priority areas strategic objectives of the draft Green City Action Plan. From this, activities will be scheduled and sequenced to inform the political debate.
	3.1.2 Inform political debate	Debate is required and it leads, finally, to the formal political approval of the Green City Action Plan by the city council gaining legitimacy. This step will implement the information of political groups and champions in preparation of the Council's decision. Actions may include: ▪ Inform the major political groups and specialised committees. ▪ Organise informal briefings and discussions with the responsible political leaders, mayors or deputy mayors, key persons in the political parties and involve, if appropriate, presentations from external experts and politicians. Organise informal visits from politicians, key decision makers or specialised committees to front-runner cities that have implemented lighthouse projects and Green City Action Plans. Concluding from the implementation of these activities, questions, views and (counter) arguments will be considered to prepare for the draft Council resolution and presentation of the draft Green City Action Plan.
3.2 Prepare council resolution	3.2.1 Consider formal requirements	In preparation of the Council resolution, the formal requirements and corner-stones in terms of timing, due-dates, and format need to thoroughly be considered and respected. At best, agreement with the Mayor and council of elders (usually responsible for the political calendar) will be sought on the appropriate time to present the draft Council resolution to the political bodies.
	3.2.2 Draft council resolution	The Green City Action Plan establishes the Council's commitment by quantitative strategic medium-term and operational short-term targets related to environmental dimensions, serving to guide the implementation of related measures. Thus, a formal political approval is requested to officially launch the Green City Action Plan and mandate related measures and management activities. With its approval the Council will establish the Green City Action Plan as the city's development vision, and legitimisation, mandate and resource the plan's implementation. Further to this, it is deemed essential to also make the organisational setup – roles, responsibilities and procedures – part of a formal council resolution. Finally, budgetary considerations must not be ignored when formulating the draft council resolution. The draft Council resolution should: ▪ make clear references to the original decision to implement the Green City Action Plan and the related management procedures;

		▪ give reference to general background (laws, programmes, strategies and charters related to sustainable development and Green City dimensions); ▪ refer to the main decisions taken and commitments signed up to by the city council related to the environmental dimensions addressed in the Green City Plan; ▪ include the draft Green City Action Plan proposal and the Green City Baseline as annexes.
	3.2.3 Prepare presentation and council meeting	The Council meeting will be a peculiar and decisive moment. Most of the Councillors may not have been involved in the process. Complex information needs to be understood and digested and far reaching commitments made in a relatively short period within one meeting. This needs thorough preparation and a presentation that will allow catering for the above mentioned requirements. At best, potential counter-arguments and frequently asked questions could be collected in advance and responses included in the presentation. In support of this, in the run-up to the council meeting, the draft Council resolution could be presented at both specialised committees and political party meetings to prepare grounds for the decisive meeting of the Council.
If a SEA for the GCAP is required, outcomes of the Steps 3.2.2 and 3.2.3 should include the SEA statement showing how the assessment was undertaken, how public views and stakeholder consultation was taken in to account, and the draft monitoring regime		
3.3 Establish implementation partnerships	3.3.1 Publish Green City Action Plan	Publication of the Green City Action plan is not only a formal requirement following the Council resolution, but should be implemented as a particular activity of stakeholder engagement to develop ownership of the plan beyond the Council. This may include proactive presentation at meetings of the stakeholder groups or – even better – a public Green City launch event to motivate engagement of stakeholders in and launch implementation partners for the implementation of the plan. If a SEA for the GCAP is required, SEA Environmental report should be disclosed in parallel with the Green City Action plan
	3.3.2 Engage stakeholders and form alliances	Due to the many environmental dimensions included in the Green City Action Plan, a number of different actors are being involved and responsible for carrying out particular actions. The latter is of particular importance as budgetary limitations as well as limits to competence and power will require contributions of all parts of society to implementing appropriate and high-level performance Green City Action. Thus, partnerships are key to the successful preparation and delivery of specific projects and solutions. While engagement with various possible partners is an on-going activity, it is especially important to find and set-up arrangements with partners that can help to deliver on identified priorities and projects. This also helps to spread the responsibilities and risks. Indeed, cooperation across the administration as well as with various stakeholders that take responsibility for implementing projects assures buy-in to the implementation process.
	3.3.3 Formalise action and implementation partnerships	Joint activities and implementation partnerships should be formalised for the sake of trust and reliability and provide a secure platform for implementing key measures of the Green City Action Plan and deliver on identified priorities.
3.4 Implementation Plan for key measures	3.4.1 Refine generic Green City Action Plan and mobilise investment	Refinement of the action plan is a two-tier exercise: the 1st tier involves the overall coordination of the generic action plan, the 2nd tier the implementation of individual projects, thus, the step from an action number in the generic action plan to a particular project. Measures earmarked in the generic Green City Action Plan will turn into fine-tuned project plans that include proper assignment of roles and responsibilities incl. lead actors, planning of work-flow and time for delivery, technical and spatial planning, project impact assessment, financing and resourcing options as well as stakeholder involvement. This detailed planning could relate equally to large infrastructural projects, for example in the transport

		sector, but also to smaller, lower-cost but equally valuable measures such as internal municipal energy reduction initiatives or engagement campaigns. The 1st tier remains in the immediate responsibility of the Green City Plan coordinator or task force. The scope of activities will include the entire municipal territory and all areas of urban development addressed. Activities involve the following steps: 1. Assignment of roles & responsibilities 2. Communication and involvement strategy and staff training programme 3. Refined implementation plan including: work- / time-plan for the implementation of the generic action plan Allocation of resources / Planning overall finances Programme impact assessment: estimating possible effects/side effects (environment, economy, society, institution) 4. Action Plan implementation 5. Monitoring of Action Plan implementation An integrated element of good management and planning is the assessment of potential impacts, side-effects, and rebound effects of planned programmes or projects. To this end, Strategic Environmental Appraisal (SEA) at tier 1 – level, i.e. programmes and plans, and Environmental Impact Assessment (EIA) at tier 2 – level are required by EU legislation and could be used as reference to proactively facilitate the assessment of potential impacts of any measure in all respects.
	3.4.2 Plan implementation of selected key measures	The existing overall action plan is further developed, including timelines for delivery, lead actor, and financing options for a range of short, medium and long-term measures, across and beyond sectors. Priority measures are subject of detailed implementation planning, including the assignment of and roles and responsibilities, preparation and implementation of tendering processes, development of financial model options that would ascertain the actual outflow of funds, payback periods, etc. This is conducted with experts, making a clear business case per project. The 2nd tier responsibility will be assigned to a project coordinator or team. It involves similar steps as previously described above in the 1st tier. However, the scope of activities is limited to one particular project and often even to one particular site. Tasks will therefore be more specifically connected to a certain thematic area (e.g. transport, energy, or green infrastructure). Individual steps of project implementation employed will include: 1. Assignment of roles & responsibilities for project implementation; 2. Project communication and involvement process; 3. Project planning including work- / time-plan, allocation of project resources and planning project finances and assessing risks, technical planning, project impact assessment: estimating possible effects/side effects (environment, economy, society, institution); 4. Project implementation; 5. Project monitoring: Measuring project impact; 6. Project documentation and reporting. To generate full support by decision makers and investors, it is important to present a comprehensive business plan that both in short and long-term perspective and over the full life-cycle of a project.
	3.4.3 Execute measures	Measures will be executed and monitored according to the established implementation plan and monitoring scheme.

3.5 Monitor implementation and progress	Deliverables	Monitoring Plan
	3.5.1 Set up monitoring scheme	All measures and projects of the Green City Action Plan ultimately contribute to the Council's agreed objectives and targets. Thus, continuous monitoring of progress is integral to the implementation phase oriented at preparing the ground for appropriate evaluation of process and performance as well as targeted reporting in the final stage of the management cycle. Each individual project also needs to be monitored, which requires monitoring of implementation of actions (defining what data needs to be captured, who will capture, what stages need to be reviewed and also to set milestones), and related environmental improvements. Last, improvements to a city's environmental performance should be monitored in line with the Green City baseline indicators and priority environmental challenges identified. As the GCAP seeks to address the challenges identified by the indicators, the Plan's success in doing so should be tracked.
	3.5.2 Implementation monitoring	Monitoring is not an "event" that occurs at the end of a project, but rather is an ongoing process that helps decision-makers better understand the effectiveness of actions. An effective monitoring programme requires collecting and assessing important data on a continuous or periodic basis throughout the management period and also when implementing a project. The monitoring programme employs a mechanism to track the status of implementing projects (started/not started, done/not done). However, 'action tracking' would need to be accompanied as far as possible by monitoring impacts of projects according to the Green City Indicators and in regard of progress made towards the agreed targets. Various impacts – of course, can only be detected long-term (e.g. improved air quality, GHG emissions). Others, however, can be monitored immediately and continuously (e.g. energy consumption).
	3.5.3 Control progress	Good management practices include regular monitoring on both a short- and long-term basis. The monitoring programme provides ongoing, systematic information that strengthens project implementation and prepares for appropriate reporting and evaluation. It also provides an opportunity for assessing the implementation process continuously and periodically by: 1. Comparing implementation efforts with original goals and targets ("Are actions being implemented?"), 2. Determining whether sufficient progress is being made towards achieving expected results and ("Will targets be achieved?"), 3. Determining whether the time schedule is respected.
3.6 Implement corrective measures	3.6.1 Consider monitoring results	For the purpose of targeted evaluation, it is therefore suggested to follow the "pressure – state – response" model (PSR) as analytical and systematic framework to monitoring. Applying PSR, it becomes obvious that all of the three areas need to be considered. To take a concrete example, if you want to consider the effectiveness of an action included in the Green City Action Plan, say extending the local bus system in order to reduce GHG emissions from the transport sector, you would measure and consider: ▪ How many buses and new connections have been introduced (response); ▪ whether number of passengers in public transport has increased as a result of the extension of public transport (state); ▪ or if individual transport has decreased (independently of this action, maybe due to related measures in the action plan, like e.g. higher parking fees in the inner city) (pressure). Duly and accurately documented monitoring also involves reporting on progress concerning your local

		capability and capacity to respond to environmental improvements at agreed intermediate stages (e.g. after six months). This provides interim information for senior management and political committees. Monitoring reports, therefore, also serve to keep senior managers and Council informed with regard to state of implementing the Green City Action Plan on a regular basis.
	3.6.2 Plan and implement corrective measures	It might be the case that the monitoring detects deviations from the set targets, deficiencies with regard to the implementation of the Green City Action Plan and needs to correct, strengthen and improve activities. Also, unexpected events might change framework conditions for implementing the plan: a new investor is interested in developing an area, an extreme weather event puts emergency on upgrading an infrastructure. In this case, corrective measures can be taken as soon as possible, and damages or losses minimised.
	3.6.3 Monitor impact of corrective measures	All corrective measures will need to be closely monitored and impacts duly and accurately documented.
If a SEA for the GCAP is required, Steps 3.4 – 3.6 should include relevant provisions for environmental, social, and health impacts/mitigation/enhancement measures		
Step 4 Green City Reporting **Key question of step 4:** - **What have we been able to achieve – and how?** **Aim:** - **The "Green City Report" will analyse successes and failures during the implementation period, provide the basis for taking further political decisions and inform Council, stakeholders & the public on what the city has done and achieved** **Primary outcomes:** - **Institutionalised evaluation, audit and reporting system in use.** - **Green City Report reflecting achievements based on objectives and targets established in the Green City Action Plan.** - **On-going and increasing environmental improvements.** - **New policy options identified to accelerate Green City development.** **Indicative timeline:** - **Suggested to implement as annual report, i.e. 12 months from Council decision** - **Duration of phase ca. 3 months**		
4.1 Evaluate process and achievements	4.1.1 Evaluate effectiveness of process	Evaluation commences the last step of the cycle, but also provides the basis for starting a new year with a new cycle. It analyses what has happened during the year in order to understand why things happened or failed to succeed. Whilst monitoring provides response to the question 'what is happening?', evaluation rather looks at 'why is it happening', 'are the changes significant' and 'are the changes in line with commitments and requirements'. The first step would be an evaluation of the GCAP process, its applied procedures, capacities, roles & responsibilities, partners and actions, will be implemented. It will also help to identify successes, challenges, gaps and barriers in meeting the overall objectives set out in the Green City Action Plan, especially analysing the degree to which the process has been institutionalised and integrated into city planning. In this regard, a multitude of international organisations can provide support for specific parts of the evaluation process (4.1), or the entire process. The OECD, for instance, has several initiatives for reviews and evaluations (cf. Annex 1).
	4.1.2 Green City	This second step is an evaluation of the implementation of the Green City Action Plan and specific

	Benchmarking	projects / actions, using results from the monitoring process. Effectively, a benchmarking will be conducted. Benchmarking is the process of comparing one's organisational processes and performance to bests and/or best practices from others. Benchmarking has become a major element of cities' evaluation. Green City Benchmarking is supported by particular benchmarking instruments developed in accordance with this methodology. A **traffic light screening** is applied to each indicator to simplify the assessment (green light = high performance; amber light = medium performance; red light = low performance) and compare cities' performance against established benchmarks or proposed indicative benchmarks. The boundaries between each of the three "lights" will be determined on a case-by-case basis, following existing standards or by default data ranges extracted from the literature for quantitative indicators, and subjective boundaries for qualitative indicators. Cities can identify the most urgent area of action thanks to indicators classified as "red".
	4.1.3 Evaluate effectiveness of measures/investments to address environmental challenges and risks	The third evaluation step of the Green City Action Plan will pitch the evaluation results by considering modifications of the framework conditions compared to their outline in the Green City Baseline. This consideration is relevant to avoid misleading conclusions and recommendations. To do so, modifications in framework conditions and socio-economic impacts will be reviewed and potential impacts considered on conclusions drawn from the first two evaluation steps. A number of tools are available to support carrying out the evaluation exercise. These tools usually follow different commitments and / or requirements and serve different purposes, incl. surveys, written feed-back by stakeholders (e.g. based on guiding questions or a feed-back grid, a questionnaire or alike), and evaluation workshops.
4.2 Implement audit	4.2.1 Implement internal audit	The internal audit is an important means of verification of both process and results. Whereas an evaluation usually is coordinated and facilitated by persons involved with the implementation of the Green City Action Plan, the 'internal auditor' is not. The auditor is usually a person from within the administration, but not directly implied in the implementation process. An efficient way of performing the internal audit is by connecting it to the governments' controlling system. Particularly advanced local governments tend to integrate their management systems. Green City targets, for instance, are being made part of internal performance agreements with departments and staff and integrated in the annual controlling of municipal spending and accomplishment of municipal budgeting and performance target. These, however, have to be approved as key performance target by the Council. Another possibility to conduct an internal audit is a peer review: a colleague or team from another city realises the audit in your city and vice versa. Either way, the auditor follows a given scheme and evaluates all elements of the Green City Action Plan at a given point in the cycle.
	4.2.2 Implement external audit	An external audit is usually an assessment by an independent, certified environmental verifier - often referred to as third-party's audit. An external audit is for example required to obtain an EMAS registration or an ISO 14001 certification. In future, ISO 37101 might provide a basis for audits of management systems for sustainable development of communities, as well. It is only after the auditor has "validated" the management system that it may be termed an approved standard management system according to the resp. standard's criteria. But also, audit requirements may arise from voluntary engagements and need to be respected in order to comply with the commitment. Non-compliance might lead to exclusion from the commitment. The auditor carries out the validation in two steps: a review of the documents and an on-site visit. In light of the results of the audit as well as necessary corrections the evaluation results will be updated as a basis to draft the Green City Report.

	4.2.3 Audit response action	The audit may lead to further demand and requests regarding both process and performance. For instance, the auditor might detect deficiencies in the organisational set-up or deviations from the agreed key actions and implementation plans that need explanation. Findings of the audit report may be due to immediate response to the audit report or to further considerations for the subsequently following Green City Action Plan period. Both, audit results and response options should be documented and included in the Green City Report.
4.3 Report results	4.3.1 Draft Green City report	The Green City Report has essentially two key goals: to inform the decision makers about the consequences - successes and failures - of their actions and to inform the public about the progress of the city towards environmental performance. Concluding the management period, the administration will prepare a report presenting the City Council's achievements compared to the targets established and approved in the Green City Action Plan, and analyse both procedures and measures in regard of their contributions to the results. This report serves as a balance of the Council's Green City commitments and targets, as foundation for reconsidering political strategies and priorities, and as guidance for decisions regarding the forthcoming management period. Content-wise, the public report should do an effort to reward and recognise those activities that involved implementation partnerships between the Council and local stakeholders. It should be understood that the report not only is to present achievements but also to increase ownership of the community of the Council's Green City Action Plan and, most importantly, community's own contribution to their implementation. As an example, the report could include effective private initiatives, e.g. energy efficiency measures, solar panels or green roofs on private buildings, citizens' transport and mobility efforts. A specific reporting purpose might be connected to investments into infrastructure projects following environmental criteria, e.g. financing programmes from the European Regional Development Bank usually depend on requirements in regard of targeted action following long-term strategy and well established monitoring and documentation of project impacts. These, however, may be most important to implement measures and projects from the Green City Action Plan. The reporting, once established, can serve as the main mechanism to comply with such requirements, as well.
	4.3.2 Present Green City report and ensure sufficient public disclosure and communication of achievements aimed at maximising citizens' engagement and buy-in for subsequent GCAP cycles.	The Green City Evaluation Report must be presented differently to different target audiences. It implies a different format, different language and various modes of distribution. An important consideration is who is actually to present the report. As the report ultimately is presenting achievements according to a Council commitment on targets in the Green City Action Plan, it should be presented as a 'Report of the Lord Mayor', being him or her the highest representative of Council and administration. This perspective impacts 'tone' and form of the report. But more importantly, political ownership and commitment is both strengthened and presented to the public. The language and style of reports may change depending on the audience; however, the information conveyed needs to be consistent and accurate. It is important to keep the public informed of the progress toward achieving the targets set in the Green City Action Plan. This will require an effective communication programme to provide regular information, but also to report citizens' reactions to implementing institutions (collect feedback!).
	4.3.3 Draw conclusions and prepare for subsequent cycle	Based on the evaluation, the Council is now in a position to identify new sector areas, as well as revised priorities and actions (based on an assessment of needs, challenges and opportunities). These should reflect enhanced ambitions for scaling-up action towards Green City development and optimise the institutionalisation process. This will also take into account any changes in the national and international

	contexts. Essentially this step prepares for starting off the subsequent management cycle and to update the Green City Baseline.

Appendix 1, Annex 7 – Quantifying Climate Impacts of Green City Measures

Category	Intended Outcome	Description	Measurement unit
Climate Change Mitigation	Reduction in greenhouse gas emissions	Reduction in the emission of greenhouse gases through more efficient energy usage or cleaner energy generation	Δ tonnes of CO_2 equivalent/year
Climate Resilience	Increased water availability	Additional water made available as a result of the project, either through water savings or through the provision of additional useable water	Δ m^3 / year Δ km^3 / year
	Increased energy availability	Additional energy made available as a result of the project, either through energy savings or through increased energy generation	Δ kWh / year Δ MWh / year
	Increased agricultural potential	Additional capacity for agricultural potential achieved through improvements in soil quality as a result of the project, e.g. reduced soil erosion, increased soil carbon content or reduced soil salinity	Δ tonnes/hectare/year (soil erosion) Δ %age (soil carbon content) Δ deciSiemens (soil salinity)
	Increased human health and/or productivity	Improvements in human productivity due to improved health and well-being as a result of the project	Δ Quality Adjusted Life Years (QALYs)
	Reduced weather-related disruption	Reduction in the amount of time that a system or elements of a system are rendered inoperable (i.e. lost OPEX) due to extreme weather events	Δ hours/year Δ days/year
	Reduced weather-related damage	Reduction in the damage to assets (i.e. lost CAPEX) due to extreme weather events	Δ risk frequency (of a damaging weather/climate event)

ANNEX 8. Indicative template structure for documenting GCAP objectives, targets & actions

Vision ID	Strategic Objective (2030)	Medium-Term Target (2025)	Short-term action	Timeline	CAPEX (EUR)	OPEX (EUR/a)	Owner & Key parties	Key measures for tracking…
Transport (TV)	TSO1	TMT1	TA1					
	TSO2	TM2	TA2					
		TM3	TA3					

ANNEX 9. REFERENCES USED FOR THE GREEN CITY ACTION PLAN METHODOLOGY

Name of reference	URL
ISO 37101: Sustainable Development, Smartness and Resilience of communities — General principles and requirements — Management system standard	-
IDB, Methodological Guide, Emerging and Sustainable Cities Initiative, 2014	https://drive.google.com/a/iclei.org/file/d/0B93Bl6qR3zQ_OXgyN3lwMURqNE0/view, last download 18.04.2016
ICLEI (Cristina Garzillo, Holger Robrecht et.al.): Managing environment and poverty in Asian cities: An ecoBudget Guidance, 2013	http://dreams.ecobudget.org/fileadmin/dreams/files/dreams_pdms_publications/LF_ecoBudget_webversion.pdf, last download 18.04.2016
Holger Robrecht, Pamela Mühlmann, Claudia Kiso et.al., Integrated Management for Local Climate Change Response. Online Capacity Development Package, Developed in the Framework of the Project CHAMP-Local Response to Climate Change, 2012	www.localmanagement.eu
UNEP et. al.: TEEB – The Economics of Ecosystem Services and biodiversity for Local and Regional Policy Makers (2010)	http://www.teebweb.org/media/2010/09/TEEB_D2_Local_Policy-Makers_Report-Eng.pdf, last download 18.04.2016
Union of Baltic Cities, ICLEI – Local Governments for Sustainability, Bodensee-Stiftung, UNEP/GRID Arendal (editors): Integrated Management for Cities and Regions, Turku 2008,	(http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.showFile&rep=file&fil=CHAMP_intro.pdf, last download 18.04.2016; ; http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.showFile&rep=file&fil=CHAMP_guide_1.pdf, last download 18.04.2016
Bedroshruti Sadhukan, Emani Kumar, Andrea Burzacchini, Holger Robrecht et.al: ecoBudget Guide for Asian Local Authorities, 2008	
European Commission: Integrated Environmental Management. Guidance in relation to the Thematic Strategy on the Urban Environment, Technical Report 2007-013,	http://www.ccre.org/docs/guide_environment_mangement.pdf, last download 18.04.2016
UN HABITAT, UNEP, ICLEI, ecoBUDGET . Introduction for Mayors and Municipal Councillors,	http://www.unep.org/Urban_Environment/PDFs/ICLEI_Ecobudget.pdf, last download 18.04.2016
ICLEI et.al: The Aalborg Commitment Implementation Guide. A 5-step approach, Aalborg 2007	http://www.sustainablecities.eu/fileadmin/content/JOIN/The_Aalborg_Commitments_Implementation_website.pdf, last download 18.04.2016
Holger Robrecht, Henrik Frijs, Andrea Burzacchini: The ecoBudget Guide, Växjö 2004	http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.showFile&rep=file&fil=ecoBUDGET_Manual.pdf, last download 18.04.2016
UNEP, ICLEI, FIDIC (editors): Urban Environmental Management Training Resource Kit, Osaka 2001	-

ANNEX 10. WATER CONSUMPTION FACTORS FOR RENEWABLE TECHNOLOGIES (LITRE MW^{-1} H^{-1})

Fuel Type	Cooling	Technology	Min	Median	Range	Max	n	Macknick 2012
PV	N/A	Utility scale PV	0	1	1-5	5	3	(Aspen 2011a, 2011b, DOE 2012)
Wind	N/A	Wind turbine	0	0	0-0	0	2	(Inhaber 2004, DOE 2006)
CSP	Tower	Trough	725	906	906-1109	1109	18	(Gleick 1993, Cohen et al 1999, Leitner 2002, Sargent and Lundy 2003, Kelly 2006, Kutscher and Buys 2006, Stoddard et al 2006, Viebahn et al 2008, Worley Parsons 2009b, 2009a, 2010a, 2010b, Burkhardt et al 2011)
		Power Tower	751	786	786-912	912	4	(Leitner 2002, Sargent and Lundy 2003, Stoddard et al 2006, Viebahn et al 2008)
		Fresnel	1000	1000	1000-1000	1000	1	(DOE 2009)
	Dry	Trough	43	78	78-79	79	11	(Kelly 2006, WorleyParsons 2009b, 2009a, 2010a, Burkhardt et al 2011)
		Power Tower	26	26	26-26	26	1	(Brightsource Energy 2007)
	Hybrid	Trough	117	338	338-397	397	3	(DOE 2009, WorleyParsons 2009b)
		Power Tower	102	170	170-302	302	2	(DOE 2009)
	N/A	Stirling	4	5	5-6	6	2	(Leitner 2002, CEC 2008)
Biopower	Tower	Steam	480	553	553-965	965	4	(EPRI and DOE 1997, EPRI 2002, CEC 2008)
		Biogas	235	235	235-235	235	1	(Mann and Spath 1997)

	Once-through	Steam	300	300	300-300	300	1	(EPRI 2002)
	Pond	Steam	300	390	390-480	480	1	(EPRI 2002)
	Dry	Biogas	35	35	35-35	35	1	(EPRI and DOE 1997)
Geothermal	Tower	Flash	5	15	15-361	361	4	(Kagel et al 2007, CEC 2008, Adee and Moore 2010, Clark et al 2011)
		Dry Flash	5	5	5-5	5	1	(Clark et al 2011)
		Binary	270	270	270-270	270	1	(Clark et al 2011)
		EGS	290	505	505-720	720	1	(Clark et al 2011)
	Hybrid	Binary	221	461	461-700	700	2	(Kutscher and Costenaro 2002, Kozubal and Kutscher 2003)
Hydropower	N/A	In-stream and reservoir	1425	4491	4491-18000	18000	3	(Gleick 1992, Torcellini et al 2003)
Nuclear	Tower	Generic	581	672	672-845	845	6	(Gleick 1993, EPRI 2002, Dziegielewski and Bik 2006, WRA 2008, NETL 2009a)
	Once-through	Generic	100	269	269-400	400	4	(EPRI 2002, Hoffmann et al 2004, Dziegielewski and Bik 2006, NETL 2009a)
	Pond	Generic	560	610	610-720	720	2	(EPRI 2002, Dziegielewski and Bik 2006)
Natural Gas	Tower	Combined Cycle	130	205	205-300	300	6	(EPRI 2002, Leitner 2002, NETL 2007c, 2009a, 2010a, 2010c)
		Steam	662	826	826-1170	1170	4	(Gleick 1993, Feeley et al 2005, CEC 2008, WRA 2008)
		Combined Cycle w/ CCS	378	393	393-407	407	2	(NETL 2010a, 2010c)
	Once-through	Combined Cycle	20	100	100-100	100	3	(EPRI 2002, Feeley et al 2005, NETL 2009a)
		Steam	95	240	240-291	291	2	(Gleick 1993, CEC 2008)
	Pond	Combined Cycle	240	240	240-240	240	1	(NETL 2009a)
	Dry	Combined Cycle	0	2	2-4	4	2	(EPRI 2002, NETL 2009a)

Coal	Tower	Generic	480	687	687-1100	1100	5	(Gleick 1993, EPRI 2002, Hoffmann et al 2004, Dziegielewski and Bik 2006, WRA 2008)
		Subcritical	394	479	479-664	664	7	(NETL 2007c, 2009a, 2009b, 2010a, 2010b)
		Supercritical	445	493	493-594	594	8	(NETL 2007c, 2009a, 2009b, 2010a, 2010c, Zhai et al 2011)
		IGCC	318	380	380-439	439	8	(NETL 2007c, 2010a, 2010c)
		Subcritical with CCS	394	479	479-664	664	7	(NETL 2010a, 2010c)
		Supercritical with CCS	445	493	493-594	594	8	(NETL 2010a, 2010c, Zhai et al 2011)
		IGCC with CCS	318	380	380-439	439	8	(NETL 2010a, 2010c)
	Once-through	Generic	100	250	250-317	317	4	(Gleick 1993, EPRI 2002, Hoffmann et al 2004, Dziegielewski and Bik 2006)
		Subcritical	71	113	113-138	138	3	(NETL 2009a)
		Supercritical	64	103	103-124	124	3	(NETL 2009a)
	Pond	Generic	300	545	545-700	700	2	(EPRI 2002, Dziegielewski and Bik 2006)
		Subcritical	737	779	779-804	804	3	(NETL 2009a)
		Supercritical	4	42	42-64	64	3	(NETL 2009a)