Comprehensive ClimateResilient CITIES Methodology
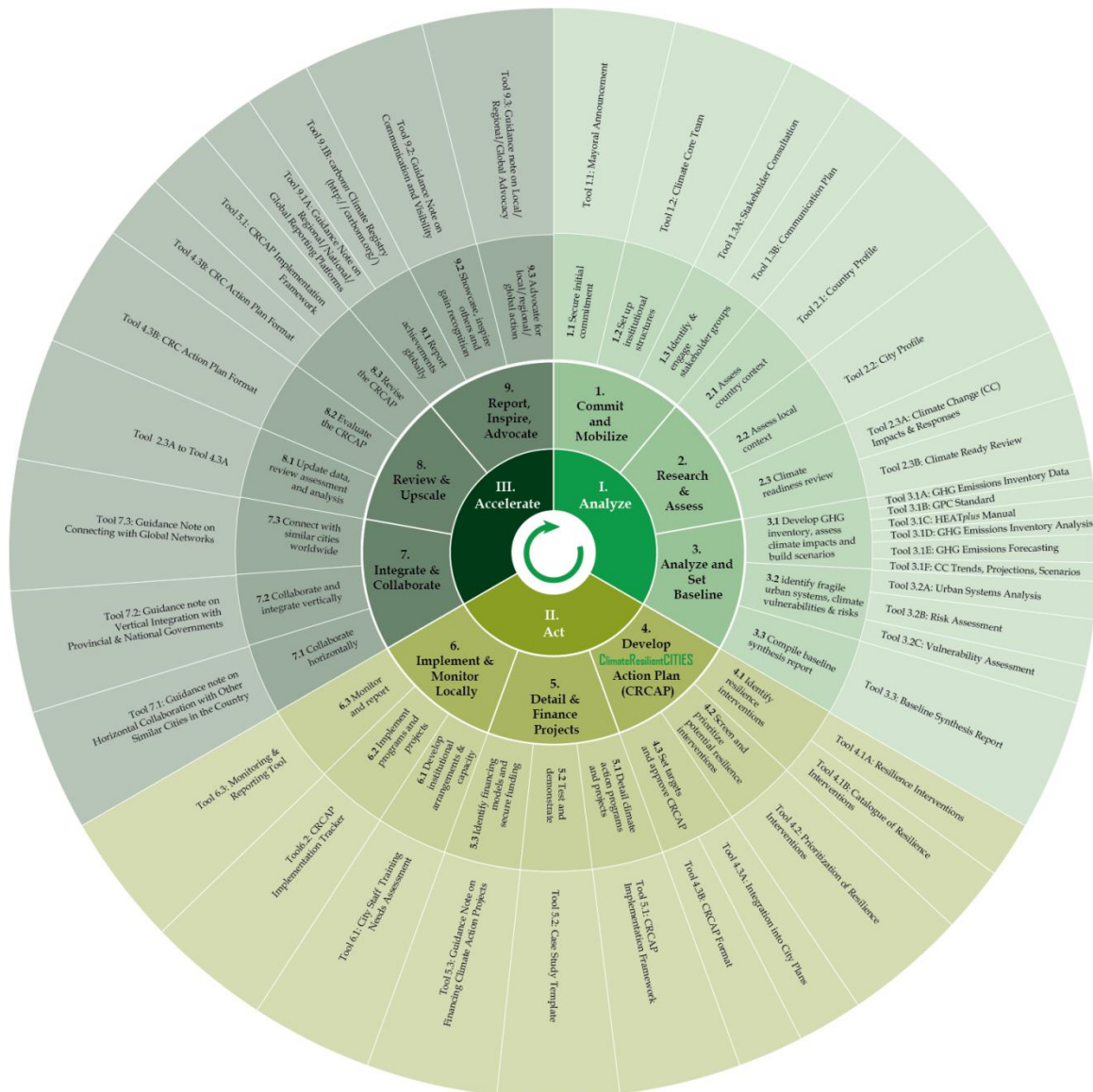
ClimateResilientCITIES

The ClimateResilientCITIES Action Plan process is tailor made for Local Governments (LGs), providing **step by step guidance for the development of a climate resilient city action plan** that addresses both, climate change adaptation and climate change mitigation. This planning process is based on the premise that **climate resilience refers to both climate change mitigation (reduction of GHG emission) and adaptation (addressing climate change impacts such as sea level rise, precipitation changes, temperature changes and extreme events), and linkages therein**.

This process equips LGs to estimate the GHG intensity of city activities, assess the climate risks of various systems in the city in the context of urbanization and poverty, identify actions to address existing and forecasted climate fragility and develop an implementation and monitoring plan, which will help the city to adapt to existing and impending climate change impacts and will also steer the city's focus to climate change mitigation measures.

This process builds on ICLEI's Cities for Climate Protection (CCP) Campaign, ICLEI's flagship mitigation program; the GreenClimateCities (GCC) program and ICLEI's adaptation toolkit, the ICLEI Asian Cities Climate Change Resilience Network (ACCCRN) Process or IAP toolkit.

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The ClimateResilientCITIES **Action Plan Process** is a 9-step process in 3 phases: *Analyze, Act and Accelerate -* each unfolding into three steps - outlining how **climate fragility** can be assessed and **climate resilient options (to achieve low emissions development and climate adaptive development)** can be identified and integrated into urban development policies, plans and processes. It consists of a wide **range of tools and guidance notes** to support LGs to deliver **effective local climate action**.

The ClimateResilientCITIES **Methodology**

Phase One: ANALYZE

AIM: The "Analyze" Phase informs policy and strategic decision-making at the start of the process (or the review phase for advanced local governments). It includes setting up of institutional mechanisms to carry out the process and review of baseline information regarding the city as well as the climate scenarios including both GHG emissions as well as city level climate projections that impact the urban systems.

PRIMARY OUTCOMES:

- Declaration of commitment of LG to climate resilient development for the local community
- Climate Action Planning Process initiated within the LG and community
- Overview of baseline status regarding urban systems, emissions in the city, climate projections and scenarios (understanding situation, constraints and capabilities)
- Urban systems analysis and preparation of risks and vulnerability assessment

Step 1: Commit and mobilize

1.1 Secure initial commitment

- This phase is vital to ensure senior political and local government buy-in to kick-start the process for climate resilient development in the community and provide clear leadership.
- Consensus should be built within the LG and aspects of operationalizing the climate action planning process should be discussed and firmed-up.
- Political, executive and administrative support is required for successful planning and implementation of climate action plans.
- A Mayoral Announcement may be made, clearly stating the intent of the LG to address climate change through mitigation and adaptation measures. If already determined, the target and period of implementation of the City's climate action plan may also be included in the Mayoral Announcement. (*Tool 1.1: Mayoral Announcement*)

1.2 Set up institutional structures

- The formation of governance structures can ensure buy-in, effective decision-making, planning and implementation.
- At a minimum, a Climate Core Team should be setup, including representatives from all municipal departments (including Finance, all major municipal services and the communication/PR department), which will act as a task force to prepare and implement the Climate Resilient City Action Plan. (*Tool 1.2: Climate Core Team*)

> ### *Guidance and tools offered*
>
> *Sign the Mexico City Pact, Durban Adaptation Charter and other relevant regional commitments*
> - *Tool 1.1: Mayoral Announcement*
> - *Tool 1.2: Climate Core Team*
> - *Tool 1.3A: Stakeholder Consultation*
> - *Tool 1.3B: Communications Plan*

1.3 Identify & engage stakeholder group(s)

- This involves identifying and involving key individuals/community representatives and special focus groups, as a starting point. The intention is to foster crucial partnerships, work with external groups and promote ownership of the Action Plan within the LG as well as the community. Ideally the stakeholder committee, once nominated, is officially notified by either the administrative or political head of the LG. (*Tool 1.3A: Stakeholder Consultation*).

A Communication Plan also needs to be developed to communicate within the core team, with other departments of the LG and with the external stakeholder committee and the community at large. Depending on the stage of plan preparation or implementation, communication needs vary and therefore it is useful to prepare a Communication Plan in advance and update it regularly. (*Tool 1.3B: Communications Plan*)

Step 2: Research & Assess

2.1 Assess country context

- It is valuable for a LG to understand external issues impacting local climate resilient development. LGs, being the governance entity closest to action, are required to respond to and act on the different mandates put forth by international agreements, national laws, regional directives and sub-national laws and rules.
- The international/regional/national and sub-national contexts, including the policy/legal, economic, social and environmental relevant contexts are explored and their impacts on the LG unit, specifically in the context of climate resilient development, are assessed in this step. (Tool 2.1: Country Profile)

2.2 Assess local context

This step includes exploring local policy/legal, governance, economic, social and environmental contexts at the local level, which would impact climate resilient development in the City.

- A self-assessment of the local context is conducted by the LG to establish the local policy/regulatory context. Also local issues with respect to the environment and urban development (socio-economic status, demography, municipal services, energy consumption (electricity and fuel) within the city limit) are also identified and discussed. A baseline assessment of the urban systems is conducted to help further assessment (in further steps) of how climate change impacts (if any) influence urban development activities, and to identify the kind of support required by the LG to address such impacts. A city profile template is provided to steer the collection and assessment of requisite information (Tool 2.2: City Profile Template).
- Further analysis in subsequent steps will result in an assessment of climate vulnerable urban systems and carbon intensive activities.

2.3 Climate readiness review

- The observed impacts of climate change on the City and its activities are assessed. The response of the City to past events is also noted to understand the efficacy of existing response mechanisms and further needs (*Tool 2.3A: Climate Change Impacts & Responses*). A climate readiness review helps assess the city's capacities and readiness to tackle climate change (*Tool 2.3B: Climate Ready Review*). It is based on six aspects :
  - Strategies, Policies, Plans and Procedures
  - Information, Data, Tools and Processes
  - Budget Allocation and Financing Processes
  - Staff Participation
  - Existing Initiatives
  - Community Engagement

> ### *Guidance and tools offered*
>
> - *Tool 2.1: Country Profile*
> - *Tool 2.2A : City Profile*
> - *Tool 2.3A: Climate Change Impacts and Responses*
> - *Tool 2.3B: Climate Ready Review*

Step 3: Analyze and Set Baseline

3.1 Develop GHG emissions inventory, assess climate impacts & build scenarios

- A GHG emissions inventory is developed to determine sources of GHG emissions in local government operations and the whole community using the HEAT*plus* GHG inventory online software tool (http://heat.iclei.org - please email to heat@iclei.org for access to the software) and protocols *(Tool 3.1A: Energy & GHG Emission Inventory - Data Format, Tool 3.1B: Global Protocol for Community Scale GHG Emission Inventories, Tool 3.1C: HEATplus Manual, Tool 3.1D: GHG Emissions Inventory Analysis).* This necessitates relevant data collection from internal (LG) sources of information and external agencies which have the required information (utilities), as well as determining data gaps.
- The **Community inventory** includes emissions from community/city-wide activities within the local government's jurisdiction, including emissions from local government activities and use. This includes emissions from sources and/or activities from **stationary units (residential, commercial/institutional facilities, industrial, agricultural), mobile transportation units, waste, industrial processes and product use, and agriculture, forestry and land-use**. This is a useful planning tool in developing mitigation actions for the entire community.
- The **Local Government operations inventory** includes emissions from all of the operations that a local government owns or controls. Sectors included in a local government operations inventory include **local government buildings, facilities such as street lighting and traffic lighting, water, waste and sewage facilities, municipal vehicle fleet**.
- Based on the baseline inventory, the local government can demonstrate leadership by pursuing mitigation actions.
- This step can help to set up a system for periodic review of GHG emissions and report internally and externally, by creating and formalizing a team, identifying review periods and reporting structures.

- GHG emissions are forecasted for the plan period in consideration.
- Climate Resilient Cities Action Plans are typically prepared every 3-5 years, with a long term vision for 15-20 years that is determined by the local authority. (Tool 3.1E: GHG Emissions Forecasting). Based on a forecast of the energy consumption, the corresponding GHG emissions are calculated using the HEAT*plus* software.
- Impacts of climate change faced by city are examined through Shared Learning Dialogues (SLDs) with the Climate Core Team and Stakeholder Team. An assessment of the past climate trends and future climate projections are conducted through secondary research. Basic information regarding past weather data (temperature and precipitation data) for the city is collected, which will help to understand the trends and patterns in temperature and precipitation. Local perceptions from city stakeholders are used to validate identified trends derived from an analysis of city level data. Climate projections for the city are defined based on secondary data. Where city level projections are not available, regional projections are used as a basis. Phenomena such as increased precipitation, heat stress, floods and other extreme weather events, referred to as *climate exposures*, are increasingly having an impact on people, infrastructure and systems within cities. Based on an analysis of the climate change trends and projections, climate exposure scenarios are defined.
- Climate change scenarios are defined based on an analysis of the climate change projection data at the local and regional level. These scenario statements delineate the type of anticipated change, the probability of the anticipated change and the impact on vulnerable populations.   *(Tool 3.1F: Climate Change Trends, Projections & Scenarios)*

3.2 Identify fragile urban systems, climate vulnerabilities & risks

- Core and secondary urban systems are examined to identify fragile urban systems and to examine the impact of climate change on these fragile urban systems. *(Tool 3.2A: Urban Systems Analysis).* For each fragile urban system, key vulnerable areas (geographical areas) and the vulnerable population for each system are assessed and identified. This information is gathered in consultation with the stakeholder group through SLD.
- The adaptive capacities of the urban systems are also assessed in this phase.
- A risk assessment is conducted for fragile urban systems based on the likelihood and consequence of the climate risk statements for those systems. Information from tools 3.2A, 3.2B, and 3.2C are used in this step.

3.3 Compile Baseline Synthesis Report

- Combining the information generated in steps 2.3, 3.1 and 3.2, a synthesis report is created (Tool 3.3: Baseline Synthesis report). Against each of the identified climate fragility statements, specifics of the location and people impacted are identified.
- From a mitigation perspective, a summary of the carbon intensity of city activities is prepared. Overlaps in critical sectors, from a mitigation and adaptation perspective, are noted.

Phase Two: ACT

AIM: The "Act" Phase outlines the planning and implementation approach taken

PRIMARY OUTCOMES:
- Initiating and running projects as part of a comprehensive action plan
- Information flow to stakeholders
- Demonstration projects undertaken and climate resilience measures initiated (adaptation and mitigation)
- Monitoring & Reporting on CRCAP implementation

Step 4: Develop Climate Resilient Cities Action Plan

4.1 Identify Resilience Interventions

- The LG uses the information and analysis from the previous phases to identify the priority resilience interventions (Tool 4.1A Resilience Interventions).
- A "basket of Solutions" is available to guide the selection of interventions which will address relevant resilience priorities of the city, both from an adaptation and mitigation perspective (Tool 4.1B Catalogue of Resilience Interventions).

Guidance and tools offered

- *Tool 4.1A: Resilience interventions*
- *Tool 4.1B: Catalogue of Resilience Interventions*
- *Tool 4.2: Prioritization of Resilience Interventions*
- *Tool 4.3A: Integration into City Plans*
- *Tool 4.3B: Climate Resilient City Action Plan format*

4.2 Screen and prioritize potential resilience interventions

- These interventions are prioritized on the basis of their feasibility and applicability to the city. This involves identifying potential solutions and exploring if these would help to meet development and climate priorities (Tool 4.2 Prioritisation of Resilience Interventions).
- A SWOT analysis is conducted to explore the feasibility from a cost and financing perspective, as well as their relevance to addressing specific other priority areas (e.g. poverty reduction/climate resilience) and whether these can be delivered from an institutional perspective ("reality check").

4.3 Set targets and approve CRCAP

- The resilience interventions need to be linked to existing/ongoing/planned initiatives within the city to assess possibilities of leveraging existing funding opportunities to implement the action plan (Tool 4.3 A Integration into city plans). This involves making conceptual and practical links between socio-economic development and climate change – to form the initial basis of priority setting, in conjunction with key stakeholders (all relevant line functions and departments) through a major workshop. This will identify strategic priorities (through a "climate lens") and possible changes to existing development strategies.
- The Climate Resilient City Action Plan is then developed and ratified through political support (Tool 4.3 B Climate Resilient City Action Plan format).
- Targets are set to move towards outcomes. These can relate to GHG "avoidance" or "reduction" and/or achievement of adaptation measures and also to socio-economic indicators (e.g. 40% improvement of access to energy by 2020). Key performance indicators (KPIs) are positioned underneath the main targets and are used to monitor progress (i.e. must be quantifiable).
- A formal Council approval is required at this stage, which offers an opportunity for political review, recommendations and adoption of the Action Plan.

Step 5: Detail & Finance Projects

5.1 Detail climate action programs and projects

- Priority and approved projects are subjected to detailed planning, including the development of various 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. (Tool 5.1: Climate Resilient City Action Plan Implementation Framework)
- This detailed planning could relate equally to large infrastructural projects but also to smaller, low-cost interventions such as internal municipal energy reduction initiatives or community engagement campaigns. Additional details are added for each project/program, including timelines for delivery, lead actor, and financing options for a range of short, medium and long-term measures.

Guidance and tools offered

- *Tool 5.1: CRCAP Implementation Framework*
- *Tool 5.2: Case Study Template*
- *Tool 5.3: Guidance Note on Financing Climate Action Projects*

5.2 Test and demonstrate

- Select projects from the climate action plan could be implemented on a pilot scale, especially if new technologies and/or approaches are being tested.
- Pilot project implementation is an efficient mechanism to test the effectiveness and efficiency of proposed interventions, especially when they have not been implemented in local conditions before.
- The city benefits from the lessons learnt during implementation of small scale projects, before scaling them up to the city level. Case studies from other cities may be used for guidance on selection of appropriate pilots. Once the pilots are implemented, it is important to note the key aspects of

implementation, specifically focusing on challenges of implementation, to enable further scale-up. A template for case studies is provided in the tool-kit. *(Tool 5.2: Case Study Template)*

5.3 Identify financing models and secure funding

- A wide variety of funding sources, innovations and ideas are explored to successfully implement the wide range of actions identified in the strategy and action plan. (*Tool 5.3: Guidance Note on Financing Climate Action Project)*
- As a first step, regular municipal budgets, state and national level grants and/or mission funds are to be screened for potential financing opportunities.
- External grant or donor funding as well as Private sector partner funding opportunities are also explored for specific projects.
- The mobilization of finances is an on-going process, requiring efforts to justify internal financial allocation of funds (started in tool 5.1) and seeking sustainable external sources of funds.

Step 6: Implement and Monitor Locally

6.1 Develop institutional arrangements & capacity

- New internal capacity building measures and governance arrangements required are identified and addressed to enable implementation of the action plan. (*Tool 6.1: City Staff Training Needs Assessment*)
- Identification and set-up of arrangements with partners to help deliver on identified priorities and projects. This could include local expertise, and also helps to spread the responsibilities and risks

6.2 Implement programs and projects

- Projects and programs identified and ratified in the action plan are to be implemented according to time lines in the project, always making adjustments for changing ground situation, especially in cases of a delay in start of implementation or time over-run during implementation.
- Key milestones are defined at the start of implementation of the project/program. The CRCAP Implementation Tracker tool aids in the monitoring of the achievement of individual projects vis-à-vis the initial plan. (*Tool 6.2: CRCAP Implementation Tracker)*

6.3 Monitor and report

- This involves development and adoption of a monitoring and evaluation (M&E) system for internal monitoring of implementation of all elements of the CRCAP – tracking progress against overall objectives and specific targets, during implementation.
- A Measurable, Reportable and Verifiable (MRV) system is to be developed which will specifically address emissions reductions arising from project implementation. The MRV will include

> ### *Guidance and tools offered*
>
> - *Tool 6.1: City Staff Training Needs Assessment*
> - *Tool6.2: CRCAP Implementation Tracker*
> - *Tool 6.3: Monitoring & Reporting Tool*

  - 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)
  - Reporting: of emissions reduction, changes in adaptive capacity and funds utilization *(Tool 6.3: Monitoring & Reporting Tool)*
  - Verification system: City voluntary verification of emissions and/or third party verification - after identification of verifiers and acceptance of MRV system by the national/local government.
- Project specific M&E system will be developed for each of the adaptation oriented projects.

Phase Three: ACCELERATE

AIM: The "Accelerate" Phase outlines how to determine progress and achieve results

PRIMARY OUTCOMES:

- Increasing ambition of the CRCAP and
- Completing on-going and increasing GHG reductions and increased climate adaptive capacities
- Revising the CRCAP
- New policy and projects identified to accelerate action, reflecting increased city ambitions
- Reporting locally/regionally & globally
- Advocating for local/regional/global climate action

Step 7: Integrate & Collaborate

7.1 Collaborate horizontally

- Horizontal collaboration refers to cooperation and coordination between different local governments in an area (e.g. a province or a region).
- This has the potential to significantly contribute to systems efficiency, specifically coherence and sustainability for vital urban infrastructure that does not end at administrative borders, such as transportation. Here the coordination of interfaces, timetables, ticketing and operators is necessary to increase the use of public transport, non-motorized modes and even car sharing.
- Horizontal collaboration with neighboring municipalities may also enable a local government to achieve the necessary scale for a strategy which might not be viable for a city, e.g. regional waste management facility, bulk purchasing consortium for renewable energy, or sustainable public transport networks.
(Tool 7.1: Guidance note on Horizontal Collaboration with other Similar Cities in the Country)

7.2 Collaborate and integrate vertically

- Vertical integration, also referred to as sub-national integration or multi-level governance, means that different levels of government regularly exchange, plan and coordinate activities that relate to planning, implementation and reporting to increase the effectiveness of policies and programs. This helps identify gaps in resources and capacity, to address local needs and to build-on local strengths, structuring an overarching coherent approach that is locally adequate. Conversely, local governments can play a crucial role for the achievement of national low emission development targets and commitments.
- Vertical integration also has the potential to contribute significantly to coherence and sustainability for vital urban infrastructure that does not end at local administrative borders.
- Because local governments operate within the national/regional policy and infrastructure frameworks, it is to their advantage to use available opportunities and channels for vertical communication and coordination, or require that these are created. By doing so, local governments may be able to address issues around enabling framework conditions and access external financing. It may also provide additional technical, financial and political support for leader cities testing innovative strategies, technologies, systems and practices – for national up-scaling should these be successful.
(Tool 7.2: Guidance note on Vertical integration with Provincial & National Governments)

> **Guidance and tools offered**
>
> - *Tool 7.1: Guidance Note on Horizontal Collaboration with other Similar Cities In the Country*
> - *Tool 7.2: Guidance Note on Vertical Integration with Provincial & National Governments*
> - *Tool 7.3: Guidance Note on Connecting with Global Networks*

7.3 Connect with similar cities worldwide

- Joining city networks or associations within a country, region or internationally and thematic groups such as the Global 100% Renewable Energy Cities and Regions Network can bring multiple benefits to the local government and its city.
- Networking can create opportunities to share information and knowledge on approaches to tackling challenges and finding suitable solutions, connecting to peers and mobilizing colleagues in new areas of work.
- Differing contexts influence how concepts are applied, but an exchange on successful (and not so successful) approaches is valuable for political leaders and for technical staff. It can provide confidence when a local government is exploring new technologies and innovative practices. It can help identify pitfalls and problem areas in time. Sharing offers an opportunity not only to communicate experience and expertise that can help other cities, but can also position the local government as a leader in the respective field.

- Local government networks can help connect cities with similar characteristics, with shared needs or challenges.
- Participation in global networks give local governments access to peers whom they may not have been aware of, also exposing new ideas, novel directions and innovative approaches that can open new avenues of development.
- Emerging resources for local governments include new online solutions and marketplace sites – offering a neutral space where guidance on potential solutions and tools are centralized for ease of access *(Tool 7.3: Guidance Note on Connecting with Global Networks)*

Step 8 – Review & Upscale

8.1 Update data, review assessment and analysis

- This involves a systematic and comprehensive review process of systems, processes, capacities, partners and actions and an assessment of targets vs. results, in accordance with developed M&E process.
- This helps identify successes, challenges, and barriers and the degree to which the process has been institutionalized and integrated into city planning.
- An annual or bi-annual review of the GHG inventory is conducted to improve data collection sources and coverage to optimize the inventory. This can subsequently be used to identify further GHG reduction opportunities.
- Several tools that are used in steps 2.3 to 5.1 (mentioned in the text-box on the side) are also used in this phase to secure additional and new information, update baselines, analyze the new information and assess new and emerging climate change challenges

8.2 Evaluate the Climate Resilient City Action Plan

- Based on the evaluation at step 8.1 and the optimized inventory at step 8.1 (including new GHG forecast scenarios); the LG can 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 new emerging priorities and adaptation challenges.
- The institutionalization process identified at step 6.1 may need to be appropriately modified, also based on outcomes of the analysis in step 8.1.

8.3 Revise the Climate Resilient City Action Plan

- To ensure continued commitment, the LG should strategically update the CRCAP for the subsequent action plan period.
- This could include new priority sectors, reflect changes in national/ sub-national guidelines and programmes, and increase the scale (extent and number) of projects.

Guidance and tools offered

- *Tool-2.3A: Climate Change Impacts and Responses*
- *Tool-2.3B: Climate Ready Review*
- *Tool 3.1A: GHG Emission Inventory Data*
- *Tool 3.1B: GPC Standard*
- *Tool 3.1C:* HEAT*plus Manual*
- *Tool 3.1D: GHG Emissions Inventory Analysis*
- *Tool 3.2A: Urban Systems Analysis*
- *Tool 3.2B: Risk Assessment*
- *Tool 3.2C: Vulnerability Assessment*
- *Tool 3.3: Baseline Synthesis Report*
- *Tool 4.1 A: Resilience interventions*
- *Tool 4.1 B: Catalogue of Resilience Interventions*
- *Tool 4.2: Prioritization of Resilience Interventions*
- *Tool 4.3A: Integration into city plans*
- *Tool 4.3B: Climate Resilient Cities Action Plan Format*
- *Tool 5.1: CRCAP Implementation Framework*

Step 9: Report, Inspire, Advocate[1]

- LEDS achievements reported globally with best practices contributing to global climate advocacy in recognition of the role and engagement of local governments.
- City is nominated for relevant national and/or international awards, and becomes renowned for its leadership.
- City leaders meet with global partners, international organizations and financial institutions to call for enabling framework conditions and support for local action.

9.1 Report achievements globally

- City leadership should meet directly with international organizations, agencies and financial institutions to advocate for the importance of local action and improved enabling framework conditions for local governments.
- There are many processes and frameworks started at the global level that impact on the local level, notably the Paris Agreement and the Sustainable Development Goals (SDGs).

By undergoing a process of self- reflection and assessment, and making progress in an area of crucial importance, this is a good time to show where further improvements may be done within existing national and international frameworks. (Tool 9.1A: Guidance Note on Regional/ National/ Global Reporting Platforms)

9.2 Showcase, inspire others and gain recognition

- This step focuses on gaining national and international recognition for achievements through the city's CRCAP process.
- Various national and international awards exist for cities pursuing climate resilient city development. Being awarded can have multiple benefits for the local government and its city, as these acknowledge the work and impacts, raising the profile of the community and key actors in the process (e.g. recognition of the "champion").
- Further, it can help to keep climate resilience on the agenda, but also to help justify it should there be political opposition or unsupportive constituencies. By becoming more known, the city may be able to attract a wider scope and better caliber of partnerships.
- Participation in city networks may be helpful when pursuing awards and other forms of recognition, as these typically communicate opportunities and can also nominate members for appropriate awards. *(Tool 9.2: Guidance Note on Communication and Visibility)*
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> ### *Guidance and tools offered*
>
> - *Tool 9.1 A: Guidance Note on Regional/ National/Global Reporting Platforms*
> - *Tool 9.1 B: carbonn Climate Registry*
> - *Tool 9.2: Guidance Note on Communication and Visibility*
> - *Tool 9.3: Guidance Note on Local / Regional / Global Advocacy*

9.3 Advocate for local / regional / global action

- It is observed that the learning curve in cities is substantially shortened when cities learn from each other. The multiple benefits of this cross learning cannot be replicated in other knowledge sharing initiatives.
- Sub-national and national goals are met faster when cities share knowledge with peers in the region.

Participation in sub-national/regional and or national programs provides opportune avenues for showcasing climate leadership locally. (Tool 9.3: Guidance Note on Local/Regional and Global Advocacy)

A list of main tools and guidance documents is given below and draft tools that are prepared (still work-in-progress) are annexed to this document as Annexure 1.

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[1] ICLEI's GCC Handbook

Main Tools and Resources

Climate Resilient City Action Plan Process		Resources/Tools/Guidance
Steps	Sub-Steps	
1. Commit and Mobilize	1.1 Secure initial commitment	• **Tool 1.1: Mayoral Announcement**
	1.2 Set up institutional structures	• **Tool 1.2: Climate Core Team**
	1.3 Identify & engage stakeholder groups	• **Tool1.3A: Stakeholder Consultation** • **Tool 1.3B: Communications Plan**
2. Research &Assess	2.1 Assess country context	• **Tool 2.1: Country Profile**
	2.2 Assess local context	• **Tool 2.2 : City Profile**
	2.3 Climate readiness review	• **Tool-2.3A: Climate Change Impacts and responses** • **Tool-2.3B: Climate Ready Review**
3. Analyze and Set Baseline	3.1 Develop GHG inventory, assess climate impacts and build scenarios	• **Tool 3.1A: GHG Emission Inventory Data** • **Tool 3.1B: GPC Standard** • **Tool 3.1C: HEAT***plus* **Manual** • **Tool 3.1D: GHG Emissions Inventory Analysis** • **Tool 3.1E: GHG Emissions Forecasting** • **Tool 3.1F: CC Trends, Projections, Scenarios**

Climate Resilient City Action Plan Process		Resources/Tools/Guidance
Steps	**Sub-Steps**	
	3.2 Identify Fragile Urban Systems, Climate Vulnerabilities & Risks	• **Tool 3.2A: Urban Systems Analysis** • **Tool 3.2B: Risk Assessment** • **Tool 3.2C: Vulnerability Assessment**
	3.3 Compile baseline synthesis report	• **Tool 3.3: Baseline Synthesis Report**
4. Develop Climate Resilient City Action Plan	4.1 Identify resilience interventions	• **Tool 4.1A: Resilience Interventions** • **Tool 4.1 B: Catalogue of Resilience Interventions**
	4.2 Screen and prioritize potential resilience interventions	• **Tool 4.2: Prioritization of Resilience Interventions**
	4.3 Set targets and approve CRCAP	• **Tool 4.3A: Integration into the city plan** • **Tool 4.3B: Climate Resilient Cities Action Plan Format**
5. Detail & Finance Projects	5.1 Detail Climate Action programs and projects	• **Tool 5.1: CRCAP Implementation Framework**
	5.2 Test and demonstrate	• **Tool 5.2: Case Study Template**
	5.3 Identify financing model and secure funding	• **Tool 5.3: Guidance Note on Financing Climate Action Projects**

Climate Resilient City Action Plan Process		Resources/Tools/Guidance
Steps	Sub-Steps	
6. Implement & monitor locally	6.1 Develop institutional arrangements & capacity	● **Tool 6.1: City Staff Training Needs Assessment**
	6.2 Implement programs and projects	● **Tool 6.2: CRCAP Implementation Tracker**
	6.3 Monitor and report	● **Tool 6.3: Monitoring & Reporting Tool**
7. Integrate & Collaborate	7.1 Collaborate horizontally	● **Tool 7.1: Guidance Note on Horizontal Collaboration with Other Similar Cities in the Country**
	7.2 Collaborate and integrate vertically	● **Tool 7.2: Guidance Note on Vertical Collaboration with Provincial & National Governments**
	7.3 Connect with similar cities worldwide	● **Tool 7.3: Guidance Note on Connecting with Global Networks**
8. Review & Upscale	8.1 Update data, review assessment and analysis	● **Tool 2.3A: Climate Change Impacts and responses** ● **Tool 2.3B: Climate ready Review** ● **Tool 3.1A: GHG Emission Inventory Data** ● **Tool 3.1B: GPC Standard**

Climate Resilient City Action Plan Process		Resources/Tools/Guidance
Steps	**Sub-Steps**	
		- **Tool 3.1C: HEAT*plus* Manual** - **Tool 3.1D: GHG Emissions Inventory Analysis** - **Tool 3.2A: Urban Systems Analysis** - **Tool 3.2B: Risk Assessment** - **Tool 3.2C: Vulnerability Assessment** - **Tool 3.3: Baseline Synthesis Report** - **Tool 4.1 A: Resilience interventions** - **Tool 4.1 B: Catalogue of Resilience Interventions** - **Tool 4.2: Prioritization of Resilience Interventions** - **Tool 4.3A: Integration into city plans**
	8.2 Evaluate the CRCAP	- **Tool 4.3B: Climate Resilient Cities Action Plan Format**
	8.3 Revise the CRCAP	- **Tool 4.3B: Climate Resilient Cities Action Plan Format** - **Tool 5.1: CRCAP Implementation Framework**
9. Report, Inspire, Advocat	9.1 Report achievements globally	- **Tool 9.1A: Guidance Note on Regional / National / Global Reporting Platforms:** - **Tool 9.1B: carbon*n* Climate**

Climate Resilient City Action Plan Process		Resources/Tools/Guidance
Steps	Sub-Steps	
e		**Registry (http://carbonn.org)**
	9.2 Showcase, inspire others and gain recognition	● **Tool 9.2: Guidance Note on Communication and Visibility**
	9.3 Advocate for local / global / regional action	● **Tool 9.3: Guidance note on Local / Regional / Global Advocacy**

Tool 1.1: Mayoral Announcement

[INSERT CITY LOGO]

MAYOR/CITY [NAME] COMMITS TO DEVELOPMENT OF

A CLIMATE ACTION PLAN FOR THE CITY

Today, Mayor [NAME] committed to taking action to address climate change by planning for and implementing actions to reduce greenhouse gas (GHG) emissions and increase resilience of communities to impacts of climate change and regularly report progress publicly.

The Mayor [NAME] will reinforce his / her commitment to climate action by compiling an inventory of greenhouse emissions, reporting on the current impacts of climate change on the city, creating an action plan including clear and ambitious GHG reduction and climate adaptation targets, and implementing a common system of measuring those emissions and monitoring climate risks.

With this commitment, the city will continue to work to make [CITY] a community where people want to live, where businesses want to invest and where other cities look to for leadership on climate change. Taking stronger local action will improve the quality and livability of [CITY], and we proudly join fellow cities around the world to foster a global climate impact and help successfully implement the Paris Agreement.

Tool 1.2: Climate Core Team

This tool helps cities form a Climate Core Team (otherwise referred to as Core Team) responsible for coordinating the implementation of the Climate Action Planning process. The tool will provide support in identifying core team members, establishing terms of reference, and listing the team's activities and responsibilities.

Political & Senior Management Support

Gaining Mayoral, political and senior management support for climate action and participation in the taskforce is critical to formalising and giving the requisite power to the core team.

Membership

Climate Action Planning is not linked only to the environment, so an effective Core Team will draw on staff from a range of departments. Engaging staff from different areas of city operations, with different points of view and areas of expertise, in the Climate Action Planning Process is an important early step.

The Core Team may consist of representatives from city departments who have responsibilities for, or an impact on,development planning, energy use, pollution, waste, food security, water security, public health, local economic development, infrastructure, and transportation. It is important to identify a Project Nodal Officer for the core team who can be the focal point for the process in the city.

It is also important to include senior decision makers, such as heads of department, as well as specialist and operational personnel, to ensure that staff members are directly supported in their day-to-day work by management and that resulting recommendations from the core team will be supported by senior management.

In case a similar committee / working group already exists within the city you could choose to consider this body as the 'Climate Core Team' as long as it adopts the ToR (mentioned in Exercise 1 below).

Core Team, Roles and Responsibilities

The identification of the Core Team members is a very crucial process as the Core Team will be responsible for driving the process in your city. However, it should be noted that the Core Team is not a fixed body and new members can be added as and when

required. Given below are a set of suggested responsibilities that the Core Team should commit to:

- Serve as representatives for their city government's divisions or sectors
- Attend and participate in the workshops to guide the climate action planning and expected outputs (tools, materials, reports)
- Lead the city government's efforts to participate in the programme
- Ensure the Climate Action Planning Process is followed in its entirety
- Make sure that deadlines for each Phase are met
- Secure the participation of multiple contacts across the city government in the programme
- Organise and deliver workshops and stakeholder consultations with the stakeholder group at different stages of the project, to gather relevant information from them and incorporate their suggestions and inputs as appropriate
- Coordinate the necessary communication and collaboration with all relevant departments of the city and other stakeholders
- Support internal institutional capacity building to effectively fulfil the long-term climate resilience plan requirements
- Prepare a City Resilience Strategy and facilitate effective integration of planned initiatives into the city's developmental plans

A **Project Nodal Officer** for the Core Team also needs to be identified who may act as the focal point for the process in the city. The main responsibilities of the Project Nodal Officer would be the coordination and smooth implementation of the tasks of the Core Team in implementing the Climate Action Planning Process. Responsibilities may include:

- Organise meetings of the Core Team as per the agreed schedule
- Facilitate communication and consultation with the stakeholder group
- Track the city's progress through the Climate Action Planning Process and inform the Core Team regarding completed and upcoming tasks as laid out in the toolkit
- Facilitate data collection from various departments and other sources

EXERCISE 1: IDENTIFICATION OF CLIMATE CORE TEAM MEMBERS

In Table 1 below please list the members of the Climate Core Team, their position, and proposed responsibilities

Table 1: Members of the Climate Core Team - Example

Name	Position	Responsibility
Ms. Jane Dev Khan	Chairperson	Supervising the working of the Core Team and providing management support
Mr. Ibrahim	Project Nodal Officer	Coordinating all the activities of the Core Team and ensuring its smooth functioning
Ms. Gayatri Devi	Member	Coordinating activities with the

		Water Resources department

EXERCISE 2: TERMS OF REFERENCE

Once you have identified your Climate Core Team members, you will need to consider and decide an organisational framework for your Core Team. Suggested below are some key elements that you should consider:

Step 1: Vision

The Core Team should develop a vision and timeframe, which states how it would like its city to be in the future (e.g. in 5 – 10 or 20 years).The Vision could be guided by an existing vision statement of the city and the team would need to identify and elaborate on its climate change related elements that can be noted in the table below.

First, note the various elements of the desired vision in the table below. Examples of potential elements of the vision are also provided. Please note: *keep the focus on the desired outcomes.*

Table 2: Elements of the City Vision - Example

	Elements of the Vision Statement
1	*e.g. The city government routinely considers climate impacts in project planning*
2	*e.g. Basic services of water, sanitation, energy supply are provided equally to all citizens*
3	....
4	
5	

Step 2 – Vision Statement

Now, considering the various elements listed in Table 2, discuss and formulate the **Vision Statement** for your city. For example:

"By 2030 the City of …….. would have climate resilient infrastructure and systems that ensure the equitable provision of basic service to all citizens…….."

Step 3 – Monitoring and Reporting

It is important that the Core Team decides on the monitoring and reporting process for the execution of the activities. The Project Nodal Officer can be in-charge for ensuring the reporting and thereby monitoring the project.

Step 4 – Terms of office for members

The term of office for the Core Team members needs to be discussed. In case any official is completing his/her official term before the conclusion of the process, then the Core Team needs to be informed and a substitute official needs to be appointed at the end of the term.

Step 5 – Frequency of meetings

Frequency of meetings should be based on the process guide or adopted project plan. If possible, determine beforehand the schedule for the meetings, time of day, location and maximum length of meetings.

Step 6 – Decision making process

It will be helpful to decide the decision making process for the Core Team in advance. This will ensure clarity and avoid last minute confusions.

Tool 1.3 A: Stakeholder Consultation

This tool helps local governments identify and work effectively with stakeholders to define and implement the climate action plan process. It guides the LG through the participatory process of forming a stakeholder group and developing a terms of reference for stakeholder consultation.

Consultation in the City Climate Action Plan development process should be a two-way process of dialogue and deliberation between government teams leading the planning process (e.g. Climate Core Team) and different stakeholders including government agencies, local NGOs, community groups, university partners and private sector organizations. Stakeholder consultation, through workshops and other tools, should be a participatory process that can effectively engage different groups, especially in situations where there is controversy or complexity and a need to build consensus around possible solutions.

The local government needs to determine what form(s) of stakeholder consultations it will conduct. Most likely the City will already have a consultation system which it uses. It may even have existing stakeholder meetings which can be used for the City Climate Action Plan development & implementation.

There are two steps involved in setting up the City's Stakeholder and Consultation system:

● Forming a Stakeholder Group
● Developing Terms of Reference for Stakeholder Consultation

SECTION A: FORMING A STAKEHOLDER COMMITTEE

The Core Team may choose to involve other key individuals (from within or outside the local Government) as it may consider necessary to complete this task

Similar to the Climate Core Team, stakeholders should be invited to cover the range of sectors and issues which need to be considered when developing a comprehensive City Climate Action Plan - **energy use, pollution, waste, food security, water security, public health, local economic development, infrastructure, transportation, and development planning.**

Using this list of potential sectors, along with your understanding of the major groups and influential actors in your city, you can start identifying potential stakeholders to be invited to participate. You can also ask:

1. Which groups may be able to provide information that would contribute to the development of the City Climate Action Planning Process? (e.g. para-statal departments for ground water, transport, fuel supply agencies, meteorological department, etc.)

2. Which groups would be involved in the implementation of the City Climate Action Plan? (e.g. Local builders associations, Resident Welfare Associations, para-statal departments, etc.)
3. Which groups would be able to support the implementation of the City Climate Action Plan? (e.g. Local builders associations, Resident Welfare Associations, Para-statal entities, Provincial government representatives, financial institutions, etc.)
4. Which groups are most likely to be affected by the implementation of the proposed City Climate Action Plan? (e.g. informal sector workers, low income group dwellers along surface water channels, residents of the City, intermediate public transport service providers, etc.)

Stakeholders may be individuals and organizations, levels of government, NGOs, research institutions, private sector, community leaders etc.

Sphere of Influence

The following diagram may also help you to identify all important groups.
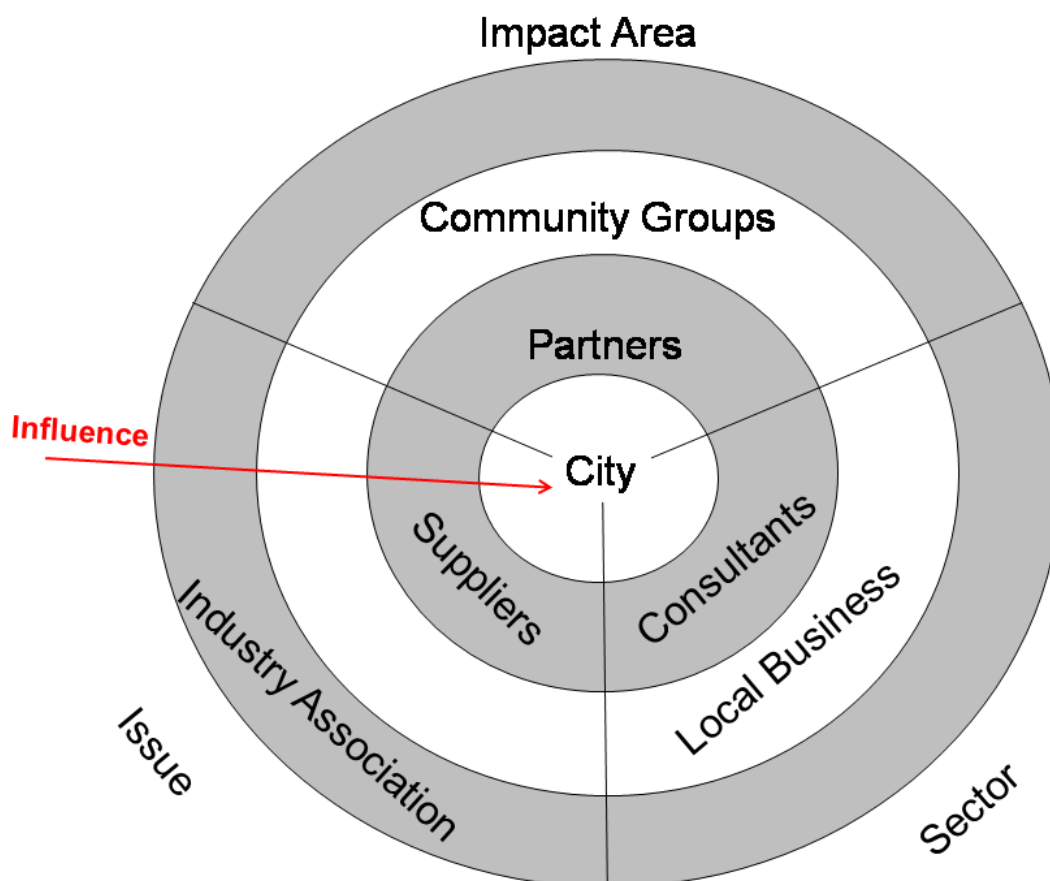
The circle at the centre of the diagram is what you consider to be yourself. You can set that as your entire local government, or you could term that as a subset, for instance a project team or taskforce that you sit on. The centre is generally what you have the most control, responsibility and authority over.

The next layer out would be people or organisations that you have a close relationship/partnership with and common goals or a shared purpose with, but over which you don't have direct control.

The next layer includes those who have some effect on the work you do, perhaps indirect relationships or ad hoc relationships, but where you have even less control.

The outer layer is the general macro environment in which you live, but over which you have minimal control.

	Government (local, national)	Local NGOs	Research Institutions	Community Representatives	Private Sector
Potentially provide information contributing to the development of the CRCAP					
Potentially be involved in the implementation of the CRCAP					
Whose support will be essential to implement the CRCAP					
Most affected by proposed CRCAP actions developed or supported by other groups					

Once the Stakeholder Committee is identified and finalised, the committee needs to be officially nominated or notified by either the administrative head of the LG or the political head of the LG.

SECTION B: DEVELOPING A TERMS OF REFERENCE

FOR STAKEHOLDER CONSULTATION

Developing a Terms of Reference for the stakeholder consultations will help streamline the process and develop greater clarity on *why*, *for what*, *how* and *when* such consultations should be organized. Provided below are indicative headings with supporting questions and examples that you could use to develop a Terms of Reference for the Stakeholder Consultations that your local government will organize.

Vision

What will be the guiding vision for the consultations? This may be generated by the Climate Core Team and adopted or amended at the first stakeholder meeting.

Composition

Who should attend each meeting? Fixed membership or varying according to the topics and tasks? Who should attend from the community?

Rationale
Stakeholder concerns and feedback are a valuable source of information that can improve the design and outcome of your City's City Climate Action Plan, and can help your Core Team to identify actions. For stakeholders, consultations are an opportunity to:
- Learn about and contribute information to the local government's CCAP development process
- Discover potential connections to their own programs, planning and funding mechanisms
- Raise issues and concerns, potentially helping to shape the City Climate Action Plan by making suggestions to the Climate Core Team.

Roles & Functions

The roles may vary as the process progresses – from information sharing to problem solving and strategy design. Define the roles and functions of the stakeholder consultation.

Principles, Rules of Operation

It is very important to spell out the rules and expectations on members. What should the principles and rules of operation be?

<table>
<tr><td>

Key   **Principles:**

- Relevant stakeholders will be identified based on a systematic stakeholder analysis process
- Meetings will be held in an open and transparent process/environment that gives ALL stakeholders an opportunity to participate
- Explain clearly the scope of the process from the beginning
- Avoid generating unrealistic expectations
- Promote gender inclusiveness through awareness that men and women have differing views and needs that are equally valid and may have different levels of comfort presenting their opinions in public.

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</table>

Facilitation / Chairing of Stakeholder Consultations

Stakeholder meetings should be well structured and may best be conducted by skilled, independent facilitators. However it may also be desirable to have a formal Chairperson, whose responsibility will be to report back to the local government.

<table>
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Some   important   features   of   consultation:

- Information sharing is multi-dimensional. Everyone contributes information and experience, everyone learns from the exchanges. This helps to break down traditional boundaries between government, academic and community actors.
- The process is conducted in an open manner and allows time for participants to absorb and use climate information
- The process is iterative, with several opportunities for members to meet and take their thinking to the next level

</td></tr>
</table>

Recording, Reporting & Communications

It is important to be clear about the status of the outcomes of stakeholder consultation, how these are fed into the planning process. It should also be determined who is able to make public statements about the meeting proceedings and outcomes.

Timing and Logistics of Meetings

During the CRCAP preparation phase or plan implementation phase, stakeholder meetings should be scheduled after ensuring relevance to the ongoing planning/implementation phase. If possible, determine in advance at what points in the planning/implementation process, stakeholder meetings will be required. Also determine time of day and location in a manner as to ensure maximum participation. Maximum length of meetings should also be determined prior to the consultation meetings.

Finally, careful planning for the Stakeholder Consultation is important. The example below provides an indicative checklist that could be used to ensure that all necessary preparations have been made.

Preparation Checklist:

- List of participants, based on Section A, and invitations
- Determine the day and date
- Prepare agenda and time tables
- Will a government institution be the host? Determine the venue
- Form and lay out tables – Round tables are recommended to facilitate discussion
- Responsibilities: Determine who is responsible for what activities

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Tool 1.3B: Communications Plan

What is the purpose of this tool?

To assist local governments to agree upon and convey common messages regarding their vision and ambitions for low-emission development, and to effectively communicate these to stakeholders.

What does it do?

It guides through the key requirements and considerations in order to develop a communications plan

Who should use it?

The Climate Core Team.

WRITING THE COMMUNICATION PLAN

RATIONALE AND OBJECTIVES

It is recommended to develop a Communications Plan for the project at the start of the process. Climate resilience and low emissions development may be new topics for some people, it may raise anxiety levels or even negative reactions among stakeholders unless the rationale is carefully explained.

It is important to develop some clear messages at the start about why the local government is undertaking this work and what it hopes to achieve. There will also be other points through the process where clear messaging will be important e.g. after the initial emissions and opportunities analysis has been undertaken.

Further, for your local government to effectively plan and promote the implementation of actions which promote climate resilient development while reducing emissions, you would need to adopt a truly participatory approach that allows for dialogue and interactions between staff, citizens, civil society groups, research institutions and the private sector. This requires an open sharing of information and transfer of knowledge between these stakeholders that could lead to mutually agreed allocation of roles and responsibilities as well as the development of beneficial partnerships for developing an effective Climate Resilient Cities Action Plan.

Some possible objectives:

i. Build awareness among local communities regarding the benefits of moving to a climate resilience and low carbon economy
ii. Inform the community about opportunities and proposed actions to build resilience and reduce emissions and develop a Green Economy
iii. Invite the involvement of citizens in the decision making processes by soliciting their ideas and inputs
iv. Suggest how actions taken by individuals and groups can contribute towards the CapaCITIES

Care should be taken in the kind of terminology chosen: the use of complicated and technical terms should be avoided, and risks and proposed actions that the community can relate to should be used (i.e. securing the health and well being in the event of heat stresses).

Communications Plan may contain (sections 1-5 below in more detail):

1. Target audiences
2. Objective and key messages
3. Activities
4. Communication medium
5. Resources and coordination
6. Time Line

Please Note: The communication plan is not a one-time document and should be updated from time to time. For example, the key messages emerging from each phase of the process can be used to update the plan.

Finalise the Communication Plan

The following table can be used to summarise and track your communication.

Target Audience	Activity	Objective, Message	Communication Medium	Timing		Achieved yes/no
				Timeline of a larger project	**Duration of Activities**	
City Departments	Internal Launch	Inform all city departments that the city government is participating in CapaCITIES project	Newsletter, staff meetings	2nd Quarter	October	
Residents, Local Business	External Launch	Inform citizens that the City is participating in the CapaCITIES project	Media release	4th Quarter	October	

Activities and Media: *What are the key activities of your communication plan?* Identify key activities, the objectives of each activity, preferred communications medium, target audience and timeline for completion. Assess if the communication plan and approach be the same for each stakeholder group or will you have a different plan and approach for each group.

Resources and coordination

What resources – staff time, financial, in-kind support – do you have to develop a communications plan?

Consider staff availability, financial resources and budget, and opportunities for in-kind support from within the local government and community.

Who will be responsible for developing and managing the communication plan and its activities?

Will the communication plan and activities become part of their work plan and normal work activity?

Which stakeholders will be involved in supporting, developing and implementing the communication plan and its activities?

Tool 2.1: Country Profile

Country Profile		
COUNTRY CONTEXT	**Please fill in**	
Country		
Continent		
% of pop. living in urban areas		%
Human Development Index (HDI)		
GDP/Capita (Please select currency)		(Currency)
year of figure:		
GINI index (Inequality, by World Bank)		
year of figure:		
% of pop. living in poverty (use official definition)		%
Regional/Local Government Structure - 1st Level — Number of Cities:		
Number of Counties:		
Number of Districts:		
Year of figures:		
Regional/Local Government Structure - 2nd level — Number of Metropolitan Cities:		
Number of Provinces:		
Year of figures:		
Key governmental institutes for Local Governments (separate with semicolons):		
National local government association or network		
UNFCCC/Paris Agreement status or standing		
Total National GHG emissions:		tCO2e
year of figure:		
Ranking of the country as GHG emitter:		
year of figure:		
Country's percentage of worlds emissions:		%
year of figure:		
Main legislation and national guidelines for Local Climate Action and Energy issues in all sectors:		

Climate related Local Government initiatives at national level	Programs:		
	Funding:		
Primary Energy Sources Distribution	Coal		%
	Oil		%
	Gas		%
	Nuclear		%
	Hydroelectric		%
	Other renewables		%
	Other (Specify energy source and then percent):		%
	Other (Specify energy source and then percent):		%
	Year of figures:		
	Total final energy consumption		MJ/year
	year of figure:		

National GHG Mitigation Commitments

Commitment 1	Please fill in	
Type of Commitment		
Base Year		
Target Year		
Target Reduction		%
Method		
Conventions		

Commitment 2	Please fill in	
Type of Commitment		
Base Year		
Target Year		

Target Reduction		%
Method		
Conventions		

Commitment 3	**Please fill in**	
Type of Commitment		
Base Year		
Target Year		
Target Reduction		%
Method		
Conventions		

Commitment 4	**Please fill in**	
Type of Commitment		
Base Year		
Target Year		
Target Reduction		%
Method		
Conventions		

National Adaptation Commitments

Commitment 1	**Please fill in**	
Type of Commitment		
Base Year		
Target Year		
Priority Actions		

Commitment 2	**Please fill in**	
Type of Commitment		
Base Year		
Target Year		
Priority Actions		

Commitment 3	Please fill in	
Type of Commitment		
Base Year		
Target Year		
Priority Actions		

Commitment 4	Please fill in	
Type of Commitment		
Base Year		
Target Year		
Priority Actions		

Tool 2.2: City Profile

1.　　Brief Introduction

Description of city, nature of city, location of city with map

2.　　Demography

Census details of population as per 2011 Census

Male and female population

Growth rate of city

Population density

3.　　Economic Activities

Primary industries

Secondary industries

4.　　Local Government Body

Local government body

Area

Number of wards

Other agencies involved

Role of agencies

Municipal Corporation structure – administrative divisions, governance structure, main responsibility

5. Major Urban Systems

Water Supply – basic status details – infrastructural information and service level information

Sewerage – basic status details – infrastructural information and service level information

Solid Waste Management – basic status details – infrastructural information and service level information

Drainage – basic status details – infrastructural information and service level information

Transportation– basic status details – infrastructural information and service level information

Housing – basic status details – infrastructural information and service level information

Electricity and energy – basic status details – infrastructural information and service level information

6. Sustainability Journey of the city

Major initiatives undertaken on sustainability, energy, climate, resource management

Major projects on water supply, sewerage, drainage, solid waste, transportation, housing – name, duration, date of starting, funded by, budget, main beneficiaries, main aims and objectives.

On-going government schemes housing –name, duration, date of starting, funded by, budget, main beneficiaries, main aims and objectives.

7. Availability of Data

The purpose of this exercise is to identify what data is already available to assist the climate change resilience analysis. You are asked to provide the actual data wherever possible at this stage and indicate **availability** of information which is Readily Not Available Along With Relevant Department Details**.**

City Name	
Local Government Name	

Annual government operational budget	
Number of government employees	
Baseline Year	

Category	Unit	Data/ information/ file name(please mention NA for data that is not available)	Source of Data/ Relevant department	Time period for which data available
Ecosystems/ Biodiversity				
Category and Type of soil	Type			
Area under green cover	Sq. km			
Types of ecosystems available (wetlands, riverine, forest etc.)	Number / area			
Agricultural resources				
Total area of agricultural land	Sq. km			
Regional crop seasons	Months			
Primary crop	Names			
Secondary crop	Names			
Contribution to local	Percentage of			

Category	Unit	Data/ information/ file name(please mention NA for data that is not available)	Source of Data/ Relevant department	Time period for which data available
economy	total GDP			
Contribution to local food requirement	Percentage			
Water resources				
Number of water bodies	Number, sq km, Distance from city (in kilometers),Capacity (in MLD)			
Classification of water bodies	Number, sq. km, type			
Rain water harvesting	cumulative capacity, technology used, use of water			
Depth of ground water table	Meters			
Surface and Ground Water quality	As per pollution control board categories			
Area of city regularly subject to flooding	Sq. km			
Demographics				

Category	Unit	Data/ information/ file name(please mention NA for data that is not available)	Source of Data/ Relevant department	Time period for which data available
Population				
Total population	Number			
Sex Ratio	Number			
Population break up: age	Number (in categories)			
Population density: average	Number/ Sq. km (Ward /zone level)			
Population distribution: ward/zone/area wise	Number/ Sq. km			
No of households	Number (in categories i.e. EWS, LIG, MIG, HIG)			
Average size of household	Number			
Floating/itinerant population	Number			
Rate of annual inward migration	Persons/ year			
Rate of annual outbound migration	Persons/ year			
Employment and Economy				

Category	Unit	Data/ information/ file name(please mention NA for data that is not available)	Source of Data/ Relevant department	Time period for which data available
Employment rates (%)	Percentage			
Main economic activities	List most important to less important			
Primary occupation/economic activity	Percentage from list			
Secondary occupation/economic activity	Percentage from list			
Informal sector: numbers, categories				
Literacy				
Average literacy rate	Percentage			
Literacy distribution (M/F)	Percentage			
Vulnerable groups				
Population living in slums/ informal settlements/ EWS housing	Number (Gender wise)			
Population of minority groups	Number			

Category	Unit	Data/ information/ file name(please mention NA for data that is not available)	Source of Data/ Relevant department	Time period for which data available
Population considered vulnerable to climate change (temperature, precipitation, sea level rise, extreme weather)	Number, gender			
Health				
Morbidity				
Infant mortality rate	Number/ year			
Maternal mortality rate	Number/ year			
Disease				
Prominent diseases list	List, gender wise numbers, data from public health centers			
Seasonality of diseases	List, months, gender wise numbers, data from public health centers			

Category	Unit	Data/ information/ file name(please mention NA for data that is not available)	Source of Data/ Relevant department	Time period for which data available
Land				
Total city area	Sq. km			
Zoning/ land use	Area of different land uses, with map			
Informal or unauthorized settlements	Number and area			
Slum areas (for both 'officially recognized / classified' & 'not officially recognized / classified)	Number and area			
Topography	Topographic map with ward/zone/area			
Housing				
Apartments	Number of properties, ward/zone/area wise distribution			
Number of affordable housing units in city	Number of dwelling units, ward/zone/area wise			

Category	Unit	Data/ information/ file name(please mention NA for data that is not available)	Source of Data/ Relevant department	Time period for which data available
	distribution			
Number of affordable housing units in planning stage	Number of dwelling units, ward/zone/area wise distribution			
Single-family dwelling	Number of properties, ward/zone/area wise distribution			
Huts, temporary houses and slums	Number of properties, ward/zone/area wise distribution			
Housing units considered at risk of flood or storm damage	Number of. properties, locations			
Tourism				
No. of tourist places in or around city limit	List, location			
No. of tourists/ floating population per year	Peak season and off-peak season			
No. of hotels and guest houses in city	Numbers, cumulative accommodatio			

Category	Unit	Data/ information/ file name(please mention NA for data that is not available)	Source of Data/ Relevant department	Time period for which data available
limit	n capacity			

Infrastructure		Year 1	Year 2	Year 3	Comments/ source
Water supply					
Concerned Department Name - Name of contact person/ head of department - Contact number - Email ID -					
Note: All data in this datasheet pertains to Water Supply Facilities and Infrastructure supplying water to the city only Please add additional data fields based on the number of water supply/treatment stations as applicable Please provide supporting data sheets as and where available					
Water supply distribution network	Maps to scale, with ward/zone/area wise breakup; % coverage of network				
Water supply zone	Name, boundary, map, area covered				
Per capita supply of water	Litres per capita per day				

Infrastructure		Year 1	Year 2	Year 3	Comments/ source
Number of service connections by diameters	Number per water supply zone/ category/ area wise				
Number of authorized connections	Categories, Number of ward/zone/area wise distribution				
Households with piped water supply	Number, percent				
Continuity of water supply	Time				
Households having water meters	Number, percent				
Category wise Number of connections and Water Charges	Number of connections/ Charges in INR				
Public Taps, hand pumps, tube wells, tankers	Number				
Total amount of water supply	MLD				
Total amount of water demand	MLD				
Total non-revenue water (NRW) / unaccounted for water (UFW)	MLD				

Infrastructure		Year 1	Year 2	Year 3	Comments/ source
Quality of water supplied	As per pollution control board categories				
Cost recovery in water supply services	Number (INR) or Percentage per year				
Efficiency in collection of water supply related charges	Number (INR) or Percentage per year				
Sources of fresh water in the city	Name, capacity in ML				
Water treatment plant	Number, capacity, location, ward/zone/area covered				
Water pumping stations	Number, Name, capacity, location, ward/zone/area covered				
Description of Future Plans in next five years(if any)					
Details of project	**budget allocation**	**Capacity and cost**	**Current status**	**starting and ending dates**	**Comments/ Sources**

Infrastructure		Year 1	Year 2	Year 3	Comments/ source

Infrastructure		Year 1	Year 2	Year 3	Comments/ source
Waste water					
Concerned Department Name - Name of contact person/ head of department - Contact number - Email ID -					
Note: All data in this datasheet pertains to Wastewater treatment Facilities and Infrastructure for the city only Please add additional data fields based on the number of wastewater treatment stations as applicable Please provide supporting data sheets as and where available					
Sewage distribution network	Map and % coverage				
Total coverage of toilets	% coverage				
Population covered with pit latrines	% coverage				
Population covered with septic tank	% coverage				
Total length of sewage network pipes	Ward/zone/area wise distribution				

Infrastructure		Year 1	Year 2	Year 3	Comments/ source
Households connected to sewage	Number, percent				
Total length of underground sewage pipes	Kilometers				
Average age of network pipes	Years				
Collection efficiency of sewage network	%				
Volume of waste water generated per day	MLD				
Volume of waste water collected	MLD				
Volume of Uncollected waste water	MLD				
Existing sewage treatment capacity	MLD				
Sewage treatment plant	Number, capacity, location, ward/zone/area covered				
Wastewater pumping stations	Number, capacity, location, ward/zone/area covered				

Infrastructure		Year 1	Year 2	Year 3	Comments/ source
Adequacy of sewage treatment capacity	%				
Volume of waste water treated	MLD				
Quality of sewage treatment	As per pollution control board categories				
Average BOD (Before treatment)	mg/L				
Average BOD (after treatment)	mg/L				
Waste water discharge into natural drain/water body	MLD or %				
Volume of treated water reused/ recycled	MLD				
Extent of cost recovery in sewage management	Number (INR) or Percentage per year				
Efficiency in collection of sewage charges	Number (INR) or Percentage per year				
Total recovery of wastewater tax	Number (INR) or Percentage per year				
Description of Future Plans in next five years(if any)					

Infrastructure		Year 1	Year 2	Year 3	Comments/ source
Details of project	**budget allocation**	**Capacity and cost**	**Current status**	**Starting and ending dates**	**Comments/ Source**
Solid Waste Management					
Concerned Department Name - Name of contact person/ head of department - Contact number - Email ID -					
Note: All data in this datasheet pertains to solid waste management Facilities and Infrastructure for the city only Please add data fields for additional disposal sites, composting plants, waste to energy facilities as applicable Please provide supporting data sheets as and where available					
Solid waste generated per day	TPD				
Household level coverage of SWM services	%				
Amount of waste collected	TPD				
Efficiency of collection of	%				

Infrastructure		Year 1	Year 2	Year 3	Comments/ source
municipal solid waste					
Extent of segregation of municipal solid waste	%				
Amount of waste treated	TPD				
Categorization/ physical composition of solid waste	Waste component wise percentage of total solid waste generated				
Source-wise contribution to solid waste generation	Source wise percentage of total solid waste generated				
Extent of scientific disposal of municipal solid waste	%				
Number of vehicles for waste collection and transfer	List, Numbers, Managed by corporation/contractor				
Cost of solid waste collection, transportation, treatment and disposal	Cost per MT				
Category wise solid waste management charges	Cost based on category				

Infrastructure		Year 1	Year 2	Year 3	Comments/ source
Extent of cost recovery in SWM services	%				
HH level coverage of SWM services in slum settlements	%				
Electricity consumption in solid waste management (i.e. at transfer stations/ waste to composting plant)	kWh per year				
Details of waste transfer stations	Number, Name, Capacity, location, ward/zone/area covered, distance from landfill/ dumping site				
Details of waste disposal/ scientific landfill sites	Number, Name, Type, Capacity, location, ward/zone/area covered, start date of operation, design period, in/ outside city limit				
Leachate generation and treatment	KL per day, treatment technology				
Details of waste to	Number , name, Type of				

Infrastructure		Year 1	Year 2	Year 3	Comments/ source
biological treatment	composting process/technology, location, Capacity, in/ outside city limit, waste processed per day				
Details of waste to energy plant	Number , name, Type of process/technology, location, Capacity, in/ outside city limit, waste processed per day				
Details of solid waste collection vehicles	Type, Number, Year of passing, managed by private contractor/ Corporation				
Fuel consumption in waste collection and transportation	KL per year				
Description of Future Plans in next five years(if any)					
Details of project	**budget allocation**	**Capacity and cost**	**Current status**	**Starting and ending dates**	**Comments/ Source**

Infrastructure		Year 1	Year 2	Year 3	Comments/ source
Street Lights					
Concerned Department Name - Name of contact person/ head of department - Contact number - Email ID -					
Note: All data in this datasheet pertains to public street lighting owned/controlled by the Municipal Corporation Please add data fields for additional disposal sites, composting plants, waste to energy facilities as applicable Please provide supporting data sheets as and where available					
Type & Number of street lights in the city					
Description of Future Plans in next five years (if any)					
Details of project	**budget allocation**	**Capacity and cost**	**Current status**	**Starting and ending dates**	**Comments/ source**

Roads			Data/ information/ file name(Please mention NA for data that is not available)	Source of Data?	Time period for which data available
Total length of road network by road types	type of roads, ROW in meters, Length in Kilometers., percentage of length, average lanes, average speeding km/hr				
Total length of concrete/sealed/made roads	Kilometers				

Storm water drainage		Yes/No	Data/ information/ file name (Please mention NA for data that is not available)	Source of Data?	Time period for which data available
Drainage distribution network	Map with ward/zone/area				
Total length of covered network	Kilometers				

		Year 1	Year 2	Year 3	Comments/ Source
Total length of uncovered network	Kilometers				
Average diameter of pipes	Use appropriate unit				
Transportation		**Year 1**	**Year 2**	**Year 3**	**Comments/ Source**
Concerned Department Name - Name of contact person/ head of department - Contact number - Email ID -					
Note: Please provide data for registered vehicles on-road by type of vehicle and by type of fuel Please add data fields for vehicle category and fuel type as applicable Please provide supporting data sheets as and where available					
Registered vehicles population by vehicle type	List and numbers by category				
Registered vehicles population by fuel type	List and numbers by category by fuel types				
Access to the City					
Port/ Harbour, etc	Yes / No				
Airport	Yes / No				
Road network	Yes / No				

Rail	Yes / No				
Economy			**Data/ information/ file name(Ple ase mention NA for data that is not available)**	**Source of Data?**	**Time period for which data available**
Industry/commerce					
Main types of industry and services	List				
Total number of work force employed in each type	Number/ Percentage of total workforce				
Percentage contribution to total economy for each type	Percentage				
Polluting industries	Number, location and list				
Industrial waste water generated and treated within city limits	yes/ no, treatment technology, quality of inlet and outlet waste water, quantity in MLD				

Energy					
Energy generation in city limit	Yes / No, capacity, technology used, use of energy , benefits				
Electricity		**Year 1**	**Year 2**	**Year 3**	**Comments/ source**
Concerned Department Name - Name of contact person/ head of department - Contact number - Email ID -					
Note: The electricity consumption in this datasheet is to be limited to the city limits i.e. for the urban distribution circle Please add consumer categories with definitions as applicable Please provide supporting data sheets as and where available					
Power plant with in city limit	Yes/No				
Electricity generation capacity	Million kWh per year				
Fuel used for Electricity generation	fuel used per year				
Total annual supply	Million kWh per year				
Main source of supply	Percentage share, types				

Total annual energy demand	Million kWh				
RE and EE share		**Year 1**	**Year 2**	**Year 3**	**Comments/ Source**
Rooftop SPVs					
Total units generated	kWh/ Year				
Total cost of generation	Currency/ year				
Solar Water Heaters					
Number of Solar Water Heating systems	Numbers				
Cumulative Capacity	Kiloliters/ year				
Solar Cookers					
Total number of solar cookers	Numbers				
Cumulative Capacity					
Wind energy					
Total units generated	kWh/ Year				

Total cost of generation	Currency/ year				
Biogas plants					
Cumulative Capacity	cubic meter				
Total biogas generated	cubic meter				
Utilization of biogas generated	Use				
Energy efficient appliances					
Energy efficient lights	Numbers, annual cumulative electricity savings				
Energy efficient fans	Numbers, annual cumulative electricity savings				
Energy efficient pumps	Numbers, annual cumulative electricity savings				
Energy efficient buildings	Numbers, annual cumulative electricity savings				

Tool 2.3A: Climate Change Impacts & Responses

The purpose of this tool is to identify whether the impacts of climate change have been recognised in the city, how those impacts (if any) influence activities in development sectors, and what kind of support the city government needs to respond effectively. The tool will help to create baseline of infrastructure services in the city, socio-economic information available for the city, energy consumption (electricity and fuel) within the city limit (Community[2] and Government[3] sectors), demography and ecosystems.

The questionnaire below is designed around five primary aspects of climate change:

- temperature change
- precipitation change
- sea level rise
- extreme weather events
- greenhouse gases (GHGs) emission

Once filled out, this questionnaire will provide data and information to be used at various points in the following phases of the toolkit.

EXERCISE 1 – OVERVIEW OF SECTORAL IMPACTS OF CLIMATE CHANGE

The purpose of this table is to help provide an overview of the perceived climate threats, which main sectors are currently impacted and whether there are any ongoing plans or programmes to address these impacts.

No.	QUESTIONS	STATUS			INSTANCES/RESPONSES ACTIONS/PLANS/STRATEGIES (IF MARKED 'YES' – PLEASE ELABORATE)
		Yes	No	Not known	

---

[2] Community covers energy consumption from activities across the community in a city

[3] Government covers energy consumption from operations of the local government

1.	Compared to a decade ago, have these conditions occurred in the city?				
	Temperature change				
	Precipitation change				
	Sea level rise				
	Extreme weather events				
2.	Are each of the sectors below being affected by these changes and events? If so, how and what plans or actions are already in place to respond? Mention any existing or proposed projects or local policies for each sector.				
	Industry (SME, tourism etc.)				
	Food supply (supply and demand, availability)				
	Water supply services				
	Waste water management				
	Solid waste management				
	Transportation (e.g. public transport, number of private vehicles etc)				
	Health (public health and health services)				
	Energy (electricity, fossil fuels, cooking fuels etc)				
	Building (design, energy use)				
	Education (schooling days)				
	Development funds (public and private funds available for developmental activities)				

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and Cooperation SDC**

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No.	QUESTIONS	STATUS			INSTANCES/RESPONSES ACTIONS/PLANS/STRATEGIES (IF MARKED 'YES' – PLEASE ELABORATE)
		Yes	No	Not known	
1.	Compared to a decade ago, have these conditions occurred in the city?				
7.	What does your city need to do to improve resilience to climate change?				
	Capacity development				*(Please elaborate)*
	Technical assistance				*(Please elaborate)*
	Funding/Finances				*(Please elaborate)*

EXERCISE 2 – OVERVIEW OF CITY RESPONSES TO CLIMATE CHANGE

Weather anomalies and extreme weather events (flooding, heat waves, cyclones, and tidal surges), strain private (homes), commercial (businesses and enterprises) and public infrastructure (buildings, roads and bridges), place stress on society and can temporarily shut down parts of the local economy (transport of goods and service provision).

The ability of city governments to anticipate and be prepared for weather anomalies and extreme weather events will help to mitigate the potential social and economic consequences associated with extreme weather events and anomalies in the future.

What three weather anomalies or extreme weather events has your city responded to in the past (last 30 years)? Consider weather anomalies or extreme weather events such as flooding, heat waves, drought (water stress), cyclones, storms, tidal surges. Mention name and year

Event 1	
Event 2	
Event 3	

For one of the events listed above (e.g. the most severe one or the most recent one), describe the event in detail. *In describing the event, consider the following:*

What was the event?	
When did it happen?	
What was the duration of the event/how many days/months did it persist?	
What geographical area was affected?	
Who was impacted and how?	
Has this event occurred before? If so, was the earlier event more or less severe than the last event?	

What were the social, economic and environmental impacts of this event?

Urban systems impacted	Consider the urban systems that were impacted by this event, e.g. water supply, drainage, health
Social impacts	Consider the social impacts of this event, e.g. people's homes were flooded, people were displaced, there was an increase in water-borne diseases, water and food supply was disrupted.
Economic impacts	Consider the economic impacts, e.g. shops were closed, transportation links were disrupted, production was stopped.
Environmental impacts	Consider the environmental impacts, e.g. land quality was affected by flooding, saltwater intruded into ground and surface

	waters, trees were blown down, animals died.

Which city departments were involved in the response?

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Which stakeholders (beyond the local government) were involved in the response?
Indicate what type of relationship, if any, each stakeholder has with the city (e.g. partner, collaborator, adviser…).

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Did the city government have a policy and response plan in place that anticipated the event? Did the city government incorporate weather anomalies into its planning and decision-making? If so, please list the various policy and response plans.

1. _____

2. _____

3. _____
___

4. _____
___

5. _____
___

6. _____
___

Tool 2.2B: Climate Ready Review

The Climate Ready Review is a self-assessment tool that will help gauge the city's capacities and readiness to tackle climate change. It is based on six aspects:

- Strategies, Policies, Plans and Procedures
- Information, Data, Tools and Processes
- Budget Allocation and Financing Processes
- Staff Participation
- Existing Initiatives
- Community Engagement

The tool uses a questionnaire-based approach in each of these six areas to highlight a city's success, identify where there is room for improvement and encourage cities to foster a cycle of continuous improvement within the city's culture.

The questions of the Climate Ready Review are not exhaustive and are intended to provide a guide to assist cities to develop an internal benchmark by which to measure its functioning and improve upon.

Instructions

The Climate Ready Review comprises a series of questions broken up into six key areas. Record your response to each question in the appropriate box, including supporting information in the Comments box. This information is important for a full understanding and assessment of your city's current situation. *Hints are in green*.

How to undertake the Climate Ready Review:

The Climate Core Team should meet to discuss and collectively undertake this exercise.

The exercise should be carried out in consultations with all relevant staff, including senior management and external parties where required, to ensure that the Climate Ready Review provides a benchmark assessment as accurate as possible.

Strategies, Policies, Plans, Procedures

This section refers to existing city strategies, policies, plans, and organisational procedures currently in place (or any proposed changes). This review enables the city to identify if climate considerations are part of the current strategic direction and organisational frameworks. Including climate change considerations into the strategic direction of the city government is crucial to building internal support and mobilising resources (time, human resources, skills) necessary for the city to respond to anticipated climate change impacts in a measured and productive manner.

Strategies	Yes	No	Comments	Hints
What are the medium to long term strategic priorities / goals of your city?				Summarise the social, economic and environmental goals of the city. Refer to Plan documents
Are climate change issues (current and/or future) identified in the city's strategic priorities / goals?				List issues and concerns, such as conservation of natural resources, protecting natural environments, water conservation, extreme weather events – flooding, droughts, heat waves.
Plans and Policies	**Yes**	**No**	**Comments**	**Hints**
Which plans or policies integrate social, environment, economic elements?				Name the policies
Does your city have an environmental plan or policy?				Name the policy. State when the policy was established.
Does your city have a disaster management plan or policy?				Name the policy. State when the policy was established
Does your city have a climate change policy or plan?				Name the policy. State when the policy was established.

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Does your city have any policies, plans, guiding statements or other city directives that are used to direct actions to reduce energy use and pollution?				Name the policy. State when the policy was established.
Please detail other ways in which your city could integrate climate change considerations into existing city policies and plans.				Consider energy use, pollution and emerging and future climate change issues.
Does your city use environmental and/or disaster risk reduction criteria in its decision-making? If yes, what types of projects typically assess environmental and/or disaster risk reduction criteria?				List the environmental and/or disaster risk reduction criteria. Has your city developed these criteria? For example, criteria for contracts to industries, building work or other development activities.

Information, Data, Tools and Processes

Climate and energy-related information and systems that process and manage that information are crucial to help city staff make better and more informed decisions about climate change issues in their day-to-day work, in implementing the city's environment and climate-related policies, and in tracking and reviewing progress of plans and individual actions.

Information, data, tools and processes	Yes	No	Comments	Hints
Does your city use any information-based geographical tools (maps, geographical information systems)?				*Examples of tools are institutional maps, zoning maps, socio-economic profile maps, hazard maps, future growth maps, GIS based*

				planning tools
Does your city have access to local or regional climate projections or climate impact scenarios? If not, which national or state agencies are responsible for holding weather and climate-related information?				*National agencies are using global climate change projections to inform local climate change projections that estimate environmental changes over the long term.*
Please detail other ways in which your city may improve access to environment and climate information.				

Budget Allocation and Financing Processes

Allocated budget and financial resources are paramount to implementing climate change, disaster risk reduction and environmental actions. City governments can, and do, implement a suite of innovative climate change projects with very limited financial and human resources, e.g. implementing energy saving measures - these actions are commonly referred to as 'low-hanging fruit'. However, city governments commonly encounter problems in accessing financial resources necessary to move beyond the 'low-hanging fruit'. City governments are therefore encouraged to develop sufficient budgets for climate change projects and to seek external funding opportunities to supplement city budgets.

Budget allocation and financing proces	Yes	No	Comments	Hints
Does your city have a specific budget allocation for disaster risk reduction, environmental or climate change projects?				*Describe the climate change, disaster risk reduction, or environmental projects covered by specific budgets.*

Please detail other ways in which your city may access funding for its disaster risk reduction, environmental or climate change projects.			

Staff Participation, Training and Support

Educating and raising the awareness of staff helps to build staff capacity and skills to incorporate climate change considerations as part of their decision-making, both in their role at the city government and in their role as a citizen. This, in turn, can improve organisational performance and can build further internal support for climate change initiatives.

Staff Participation, Training and Support	Yes	No	Comments	Hints
Does the city offer staff training on climate change, disaster risk reduction, environmental/energy/climate-related initiatives?				*Training could be provided as part of specific projects, or other training events.*

Existing Initiatives

This section covers specific climate change related initiatives that the city has implemented. In this section, city staff must identify initiatives that have helped the city to manage current climate change issues (e.g. such as conserving energy, improving access to clean water) as well as to prepare for emerging and future climate change issues (such as extreme weather events, higher temperatures, intense storms and rainfall, flooding, and sea level rise). *Please also include any Disaster Risk Reduction (DRR) initiatives*.

Ongoing Projects					
Sector	Project	Project		Duration of the project	Achievements
		Benefits	Costs		

Water supply	Description of intended/unintended action.	Project benefits (cost savings, reduced energy use)	Project costs (higher capital costs)	Start and end dates	
Is your city a member of UNISDR's "Making My City Disaster Resilient" Campaign?					
Any DRR initiatives?					

Stakeholder Engagement

City government facilitated programmes are crucial to educating and raising the awareness on environmental issues in the community. In this section, the city must identify programmes and initiatives that demonstrate the city is engaging the community on climate change, disaster risk reduction, and environmental matters, such as disaster preparedness, energy and water conservation, and pollution.

Community	Yes	No	Comments	Hints
Does your city work with the community in any way to facilitate disaster risk reduction, environmental or climate initiatives? If so, which sectors of the community? And which projects?				Describe initiatives and sectors involved.
Please detail other ways in which your city could engage the community on climate change				Consider current, emerging and future climate change issues.

issues.			

Next Steps

Following the completion of the Climate Ready Review, your city should write a summary report that:

- Identifies where the city is performing well
- Identifies where there is room for improvement
- Identifies actions to improve performance
- Commits the city to a cycle of continuous improvement
- Commits to completing the Climate Ready Review for developing Climate Resilient Cities Action Plan

Tool 3.1A: Energy and GHG Inventory Data

DETAILS OF WASTEWATER TREATMENT

Particulars	2011-12	2012-13	2013-14	2014-15	2015-16	Unit	Comments
Total electricity consumption						Million kWh	
Total wastewater treatment capacity						MLD	
Number of wastewater pumping stations						Nos.	
Number of wastewater treatment plants						Number	
Fuel consumption for backup generators						litres	

Department details	
Name of Contact person (s)	
Designation	
Contact number	
E-mail	_

Wastewater Pumping Station/Treatment Plant wise details							
1) Station/Plant Name	2011-12	2012-13	2013-14	2014-15	2015-16	Unit	Comments
Plant installed capacity						MLD	
Plant operational capacity						MLD	
No. of Pumps installed						number	
No. of pumps working						number	
No. of pumps on standby						number	
Average Discharge						liters per second (lps)	
Total rating of pumps						kW/hp	
Average energy consumption per MLD						kWh/MLD	
Total electricity consumption						kWh	
Fuel consumption for backup generators						litres	

Guidance Notes

All data in this datasheet pertains to Wastewater treatment Facilities and Infrastructure for the city only

Please add additional data fields based on the number of wastewater treatment stations as applicable

Please provide supporting data sheets as and where available

Please provide concerned department name and contact details

| Any other details | | | | | | - | |

2) Station/Plant Name	2011-12	2012-13	2013-14	2014-15	2015-16	Unit	Comments
Plant installed capacity						MLD	
Plant operational capacity						MLD	
No. of Pumps installed						number	
No. of pumps working						number	
No. of pumps on standby						number	
Average Discharge						liters per second (lps)	
Total rating of pumps						kW/hp	
Average energy consumption per MLD						kWh/MLD	
Total electricity consumption						kWh	
Fuel consumption for backup generators						litres	
Any other details						-	

3) Station/Plant Name	2011-12	2012-13	2013-14	2014-15	2015-16	Unit	Comments
Plant installed capacity						MLD	
Plant operational capacity						MLD	
No. of Pumps installed						number	
No. of pumps working						number	
No. of pumps on standby						number	
Average Discharge						liters per second (lps)	
Total rating of pumps						kW/hp	
Average energy consumption per MLD						kWh/MLD	
Total electricity consumption						kWh	
Fuel consumption for backup generators						litres	
Any other details						-	

4) Station/Plant Name	2011-12	2012-13	2013-14	2014-15	2015-16	Unit	Comments
Plant installed capacity						MLD	
Plant operational capacity						MLD	
No. of Pumps installed						number	
No. of pumps working						number	
No. of pumps on standby						number	
Average Discharge						liters per second (lps)	
Total rating of pumps						kW/hp	
Average energy consumption per MLD						kWh/MLD	
Total electricity consumption						kWh	
Fuel consumption for backup generators						litres	
Any other details						-	

5) Station/Plant Name	2011-12	2012-13	2013-14	2014-15	2015-16	Unit	Comments
Plant installed capacity						MLD	
Plant operational capacity						MLD	
No. of Pumps installed						number	
No. of pumps working						number	
No. of pumps on standby						number	
Average Discharge						liters per second (lps)	
Total rating of pumps						kW/hp	
Average energy consumption per MLD						kWh/MLD	
Total electricity consumption						kWh	
Fuel consumption for backup generators						litres	
Any other details						-	

6) Station/Plant Name	2011-12	2012-13	2013-	2014-	2015-	Unit	Comments

			14	15	16		
Plant installed capacity						MLD	
Plant operational capacity						MLD	
No. of Pumps installed						number	
No. of pumps working						number	
No. of pumps on standby						number	
Average Discharge						liters per second (lps)	
Total rating of pumps						kW/hp	
Average energy consumption per MLD						kWh/ MLD	
Total electricity consumption						kWh	
Fuel consumption for backup generators						litres	
Any other details						-	

Tool 3.1 B_GPC Standard

Tool 3.1C_ HEAT+Manual

Tool 3.1D: GHG Emissions Inventory Analysis

The following document provides a template for a GHG Emissions Inventory Report. The tool gives the suggested structure of the GHG Emissions Inventory Report that covers both community scale (city-wide) emissions and GHG emissions from government operations (which are a sub-set of the community scale emissions). A suggested table of contents and suggested text for the report are included. All text in grey is an example. All graphs and tables and charts are given only to indicate the type of information that is required to be presented.

It is advisable that the GHG emissions inventory be prepared following the Protocol for Community Scale GHG Emissions Inventories (GPC V2.0). The protocol document is made available as Tool It is suggested that the GHG emissions inventory software tool HEAT+ be used to prepare the inventory. The software tool is available at http://heat.iclei.org. City specific access to the tool may be obtained by writing an email to heat@iclei.org.

WHILE WRITING THE REPORT FOR YOUR CITY PLEASE CONTEXTUALISE THE INFORMATION TO BE PRESENTED – TEXT WITHIN THIS REPORT IS ONLY SUGGESTED AND NOT TO BE REPLICATED AS IS.

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Annexures:

1. HEAT+ Software Generated GHG Emissions Inventory Reports
2. Community scale GHG Emissions Inventory Report – Summary
3. Community scale GHG Emissions Inventory Report – Detailed
4. Community scale GHG Emissions Inventory Report – Scope Report

5. Community scale GHG Emissions Inventory Report – Trend Analysis
6. Government scale GHG Emissions Inventory Report – Summary
7. Government scale GHG Emissions Inventory Report – Detailed
8. Government scale GHG Emissions Inventory Report – Scope Report
9. Government scale GHG Emissions Inventory Report – Trend Analysis

GHG Emissions Inventory Report

Regional Carbon Footprint or GHG Inventory is the accounting of GHG emissions, resulting directly or indirectly from consumption of fossil fuels in various sectors such as fuel combustion for industrial or residential purpose, electricity use, mobile combustion in transport, and degradation of municipal solid waste. It is a measure of the impact that human activities have on the environment in terms of the GHG emission over the entire range of activities taking place within the community's geopolitical boundary.

Assessing the GHG emissions inventory is the *first step in developing a plan to reduce the energy use and GHG emissions in the city*. The GHG inventory provides the necessary baseline data to understand the existing trend of energy consumption and GHG emissions across sectors and identify priority sectors where mitigation actions are required to lower the overall GHG emissions from the city. The baseline GHG emissions inventory provides a basis to set targets, and assess progress in achieving set mitigation targets.

The GHG inventory for <City> reported in this document is for the baseline year of <2012-13> and has been developed at the community-level within the RMC jurisdiction area, following the GPC guidance (V2.0).

Green House Gas (GHG) Inventory Methodology
The GHG Inventory was prepared in accordance with the approved principles and standards of the **Global Protocol for Community-Scale Greenhouse Gas Emissions** (GPC). This protocol provides internationally agreed methodologies and guidelines to assist local governments in quantifying GHG emissions from activities within the administrative boundaries of cities.

Figure 1 Community scale GHG Emissions Inventory in City
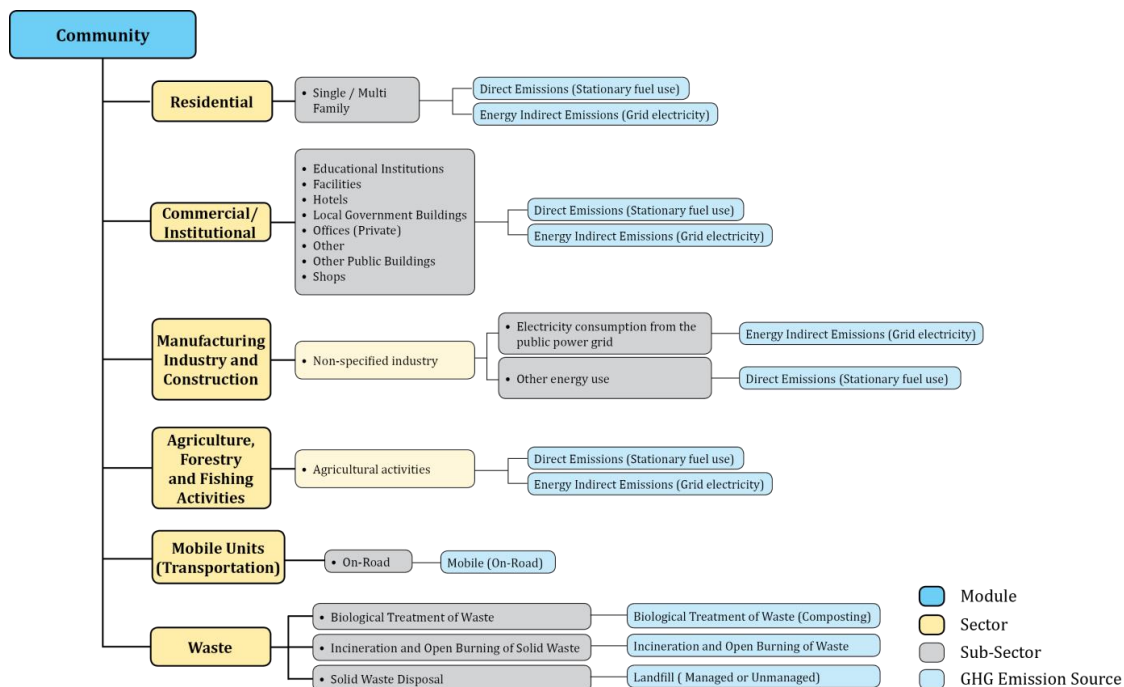
Secondary data has been collected from relevant departments for the preceding 4 years, from <2009-10 until 2012-13>, to understand trends in energy consumption and GHG emissions for different end uses and sectors.

The chosen baseline year <2012-13> represents the reporting period which the city would like to consider as a baseline for developing the Low Emissions Development Strategy for City.

Community Level Energy Consumption and GHG Emissions

City Profile

State	
Local Government	
Country	
Estimated Resident Population (2012-13)	
Area (2012-13)	
Population Density (2012-13)	
Estimated Households (2012-13)	
Registered Vehicles (2012-13)	
Daily Solid Waste Generation (2012-13)	
Annual Electricity Consumption (2012-13)	

City Level Energy Consumption and GHG Emission for City (2012-13)

Total Energy Consumption[4]	
Total GHG Emission	
Energy Consumption per capita: Rajkot city	
Energy Consumption per capita: India's National Average	
GHG Emission per capita: Rajkot City	
GHG Emission per capita: India's National Average	

Energy Consumption and Resultant GHG Emissions by Sector

Figure 2 Energy consumption and resultant GHG emissions by Sectors, 2012-13
EXAMPLE:
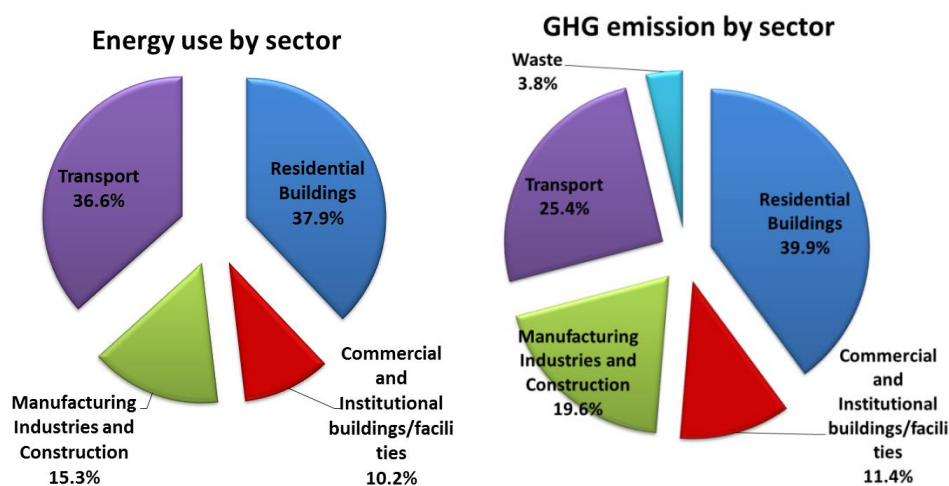
Energy Consumption by Sector

Sector	Energy Use (GJ)
Residential Buildings	
Commercial and Institutional buildings/facilities	
Manufacturing Industries and Construction	
Mobile Units (On-Road Transportation)	

GHG emissions by Sector

Sector	GHG emission (tonnes of CO_2e)
Residential Buildings	
Commercial and Institutional buildings/facilities	
Manufacturing Industries and Construction	

---

[4] Includes direct energy use (from combustion of fuels such as kerosene, LPG, petrol, diesel) and indirect energy use (due to consumption of grid electricity)

Mobile Units (On-Road Transportation)	
Waste	

- Total Community scale Energy use in 2012-13: 16,694,598 Giga Joules
- Largest Energy consumers: Residential Building Sector (37.9%); On road mobile units (Transportation) Sector (36.6%); Manufacturing Industries and Construction (15.3%); and Commercial/Institutional Building Sector (10.2%)
- Trend of Energy use: Rise of 27% since 2009-10 (at annual growth rate of 7%)
- Total community scale GHG emission in 2012-13: 1,704,376 tonnes of CO2e
- Largest GHG emitters: Residential Building Sector (39.9%); On road mobile units (Transport) Sector (25.3%); Manufacturing Industries and Construction (19.6%); Commercial/Institutional Building Sector (11.4%); and Waste (3.8%)

Energy Consumption and Resultant GHG Emissions by Energy Source

Figure 3 Energy consumption and resultant GHG emissions by energy source, 2012-13
EXAMPLE:
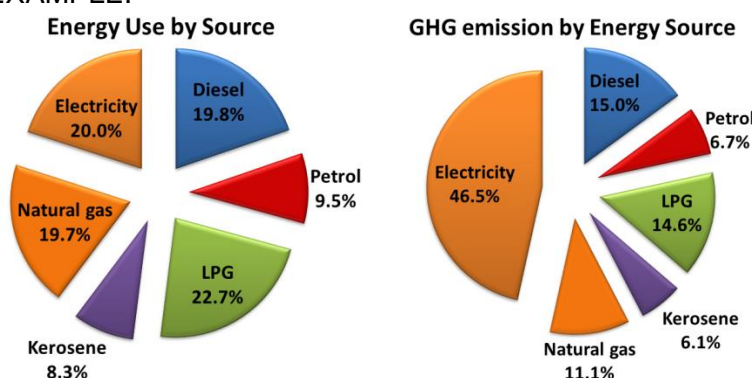
Energy Consumption by Energy Source

Fuel/Energy Source	Energy Use (GJ)
Diesel	
Petrol	
Natural Gas	
LPG	
Kerosene	
Electricity	

GHG emissions by Energy Source

Fuel/Energy Source	GHG emission (tonnes of CO_2e)
Diesel	
Petrol	
Natural Gas	
LPG	
Kerosene	
Electricity	

- Total Community scale Energy use in 2012-13: *16,694,599 Giga Joules*
- Prominently used Energy sources: LPG (23%); Electricity (27.7%); Diesel (20%); Natural gas (20%); Petrol (9%); and Kerosene (8%)

- Total community scale GHG emission in 2012-13: *1,640,342 tonnes of CO2e*
- Largest GHG emitting Energy sources: Electricity (47%); LPG (15%); Diesel (15%); Natural gas (11%); Petrol (7%); and Kerosene (6%)

Electricity Consumption and Resultant Indirect GHG Emissions by Sectors

Figure 4 Share of Electricity consumption and resultant indirect GHG emissions by Sectors, 2012-13
EXAMPLE:
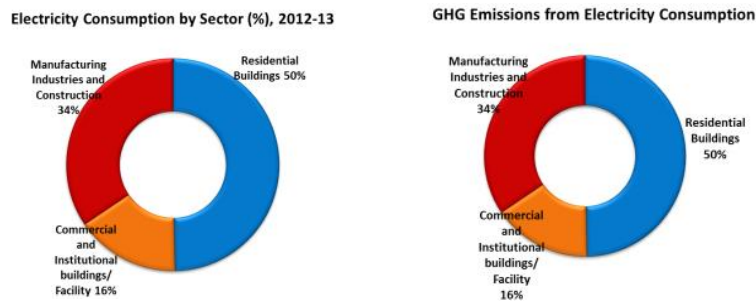
Figure 5 Trend of electricity consumption by Sectors
EXAMPLE:
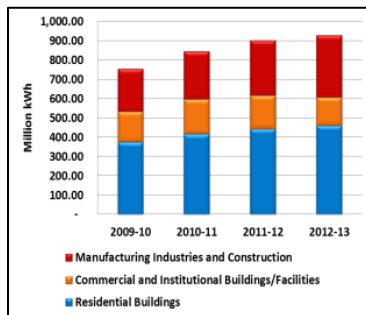
Annual Sector-wise Electricity Consumption

Sector	Annual Electricity Consumption (Million kWh)				Average Annual Growth Rate (%)
	2009-10	2010-11	2011-12	2012-13	
Residential Buildings					
Commercial and Institutional Buildings/Facilities					
Manufacturing Industries and Construction					
Total					

- Total Electricity consumption in 2012-13:
- Electricity consumption per capita:
- Largest Electricity consumers:
- Trend of Electricity consumption:
  Total GHG emission from electricity consumption in 2012-13:

Stationary Fuel Consumption and Resultant Direct GHG Emissions – Residential Building sector

Figure 6 Share of stationary fuel consumption and resultant direct GHG emissions – Residential Building Sector, 2012-13
EXAMPLE:
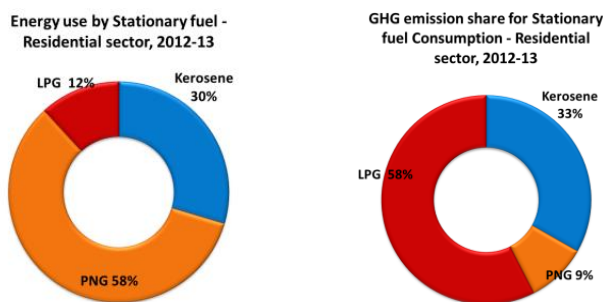
Figure 7 Trend of fuel consumption in Residential Building Sector
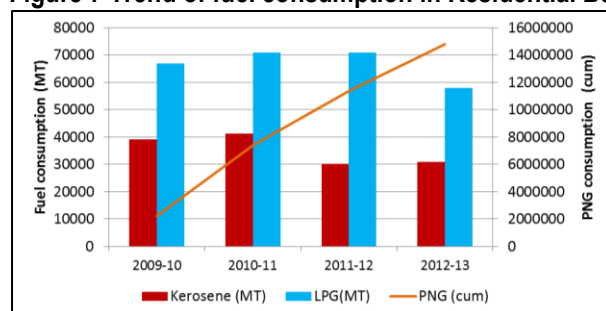
Annual stationary fuel Consumption by Residential Building Sector

Fuel	Unit	2009-10	2010-11	2011-12	2012-13
Kerosene					
LPG					
PNG					

- Share of Stationary Energy use:
- Trend of fuel Consumption:
- Total GHG emission from Stationary fuel combustion in the Residential Sector in 2012-13:

Stationary Fuel Consumption and Resultant Direct GHG Emissions – Commercial and Institutional Buildings Sector/ Facilities and Manufacturing Industries/Construction Sector

Figure 8 Stationary fuel consumption and resultant direct GHG emissions – Commercial and Institutional Buildings/ Facilities Sector, 2012-13

Figure 9 Trend of stationary fuel consumption by Commercial and Institutional Buildings/ Facilities Sector, 2012-13

Figure 10 Trend of Stationary fuel consumption in Manufacturing industries and construction sector, 2012-13

Annual stationary fuel Consumption by Commercial and Institutional Buildings Sector/ Facilities and Manufacturing Industries/Construction Sector in Rajkot City

Fuel	Unit	2009-10	2010-11	2011-12	2012-13
LPG (Commercial and Institutional Buildings)					
PNG (Commercial and Institutional Buildings)					
PNG (Manufacturing Industries/Construction Sector)					

- Share of Stationary Energy use:
- Trend of fuel Consumption:
- Total GHG emission from Stationary fuel combustion in the Commercial and Institutional Buildings sector Sector in 2012 -13:
- Total GHG emission from Stationary fuel combustion in the Manufacturing Industries/Construction Sector in 2012 -13:

Fuel Consumption in On Road Mobile Units (Transportation) Sector and Resultant Direct GHG Emissions

Figure 11 Fuel consumption and resultant direct GHG emissions – On Road Mobile Units (Transportation) Sector, 2012-13

Figure 12 Fuel consumption by On Road Mobile Units (transportation) Sector, 2012-13

Annual Fuel Consumption by On-Road Mobile Units (Transportation) Sector at the Community Level

Fuel	Unit	2009-2010	2010-2011	2011-2012	2012-2013	Average annual growth rate (%)
Petrol	kilolitres					
Diesel	kilolitres					
CNG	Cubic meter					

- Share of Energy Use in On-Road Mobile Units (Transportation) Sector: Diesel (54%); Petrol (30%); and CNG (16%)
- Trend of Fuel Consumption: Rise in Petrol consumption at annual growth rate of 4%;, rise in Diesel consumption at annual growth rate of 9.4% and Rise in Petrol consumption at annual growth rate of 41.5%
- Total GHG emission from On Road Mobile Units (Transportation) Sector in 2012-13: 432,153 tonnes of CO_2e

GHG Emissions from Solid Waste Treatment and Disposal

Figure 13 Physical composition of Municipal Solid Waste generated, 2012-13
EXAMPLE:
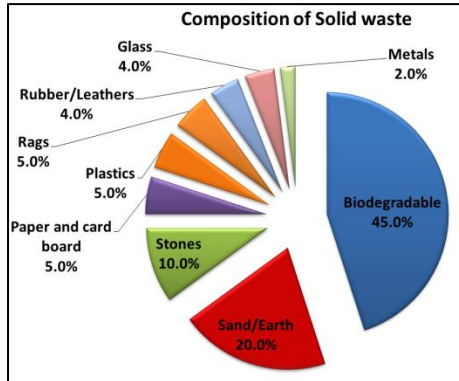
Projected Energy Consumption and GHG Emission in 2019-20

Figure 14 Projected share of energy consumption by sector, 2019-20 (BAU)
EXAMPLE:
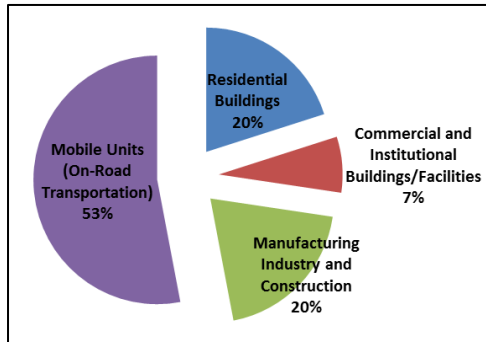
Figure 15 Projected energy use by sector, 2019-20 (BAU)
EXAMPLE:
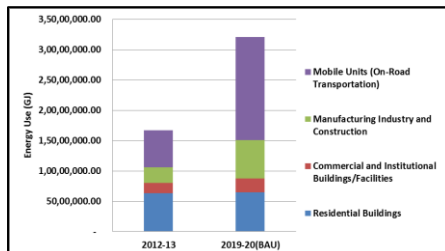
Figure 16 Projected GHG emission by sectors, 2019-20 (BAU)
EXAMPLE:
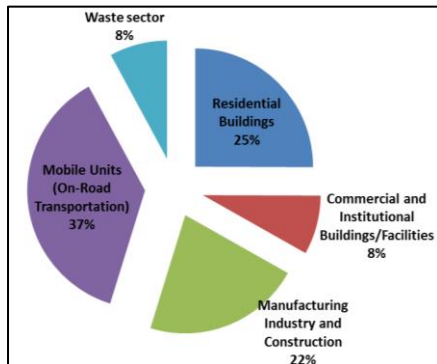
Figure 17 Comparison of projected GHG emission by sectors in year 2012-13 and 2019-20 under BAU scenario
EXAMPLE:
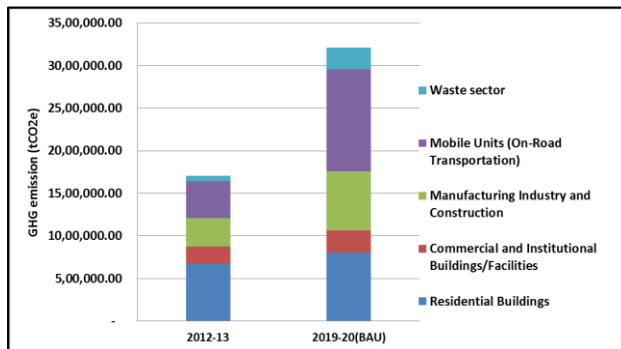
Methodology for Energy demand forecasting and GHG emission

Tool 3.1F: CC Trends, Projections and Scenarios

Existing Weather Data and Climate Scenario Statements

This section aims to help gather and analyse some basic information regarding past weather data for the city. This will help to understand some trends and patterns in temperature and precipitation. This analysis can be substantiated with inputs from an expert, but even the preliminary results will help provide a broad understanding on whether there have been any significant changes in weather patterns. Please record the data for the longest period for which it is available (minimum of past 30 years is recommended).

A. Climate Data

Table 3: Temperature Data

Years	Annual Minimum Temperature	Annual Maximum Temperature	Annual Average Temperature

Source: Please insert the source of the information			

Table 4: Precipitation Data

Years	Average Annual Rainfall (mm)	Seasons (please define the seasons for your region/country)			
		eg. Jan-Mar	*Apr-Jun*	*Jul-Sep*	*Oct-Nov*
Source: Please insert the source of information					

The temperature and precipitation data can be plotted on a graph and a trendline for each of the various parameters i.e. annual minimum temperature; annual maximum temperature; average annual rainfall etc. can be assessed. These trendlines will provide an *indication* of the change in these parameters over time.

B. Climate Exposure: Projections & Scenarios

Phenomena such as increased precipitation, heat stress, floods and other extreme weather events, referred to as *climate exposures*, are increasingly having an impact on people, infrastructure and systems within cities.

This exercise aims to collate and analyse climate change data and generate at least one climate exposure scenario, or projection. Ideally, the city will be able to use local climate data, however if this is not available, the tool suggests other sources for conducting the analysis.

The tool is divided into two sections. **Section A** suggests sources of climate data and the process of collating and documenting this data. **Section B** gives guidance for a preliminary analysis of the data and for writing a Climate Scenario Summary Statement.

Section I - Climate Change Projection

Local climate data and trends that are identified in the previous step are used in this exercise. Climate projections are defined for the city. Climate projections may be available from the city's own records, universities or research institutes, NGOs or other bodies. If there is no local level assessment available, look for a regional assessment. For example, the Indian Network for Climate Change Assessment's (INCCA) Report gives projections for 2030 for some regions in India. Regional data will provide a good base level of data; even if it is generalised to a wider area than the city boundaries, it may still be sufficient to initiate discussions on anticipated climate changes at the city level.

You will be using the *trends* of the higher scale projections (e.g. increase in average annual temperatures can be expected by 2030) for both average annual figures as well as for seasonal variations. Stakeholder meetings may be used to check and validate the general trends, particularly if there is a degree of uncertainty in the available information.

Exercise 1

Try to collect as much of the following information as possible, then summarise it in the template provided in Table 1 (an example is given to facilitate this process):

- **Name of changing climate condition** [e.g. increase or decrease in temperature, precipitation, extreme weather events]
- **Amount of expected change** (expressed as a range) including baseline year(s) from which change is measured and the planning horizon year by which change will have occurred
- **Geographical area** for which climate projection is relevant *[e.g. a specific region or location]*
- **Greenhouse gas emissions scenario** for which the projection is relevant *[e.g. high and/or low emission scenarios]*
- **Extent of variability** (seasonal, El Nino, La Nina etc) [expected variations across seasons e.g. between summer and winter, and/or events e.g. high precipitation followed by drought]
- **Level of confidence** [degree of certainty (less certain / more certain) of the projected change]
- **Source of information** [this would need to be specified for the supplementary local assessments]

Table 5: Summary of Climate Change Data

Changing Climate Condition	Assessments	Amount of Expected Change (include baseline and planning horizon years)	Geographical Area	Greenhouse Gas Emissions Scenario	Extent of Variability	Level of Confidence	Source(s)
Precipitation change	Regional Assessments	e.g. 1268±225.2 mm to 1604±175.2 mm Baseline year: 1970 Horizon year: 2030	Himalayan Region (Western Himalayas constituting of Jammu and Kashmir, Uttarakhand and Himachal Pradesh)	A1B scenario, IPCC	Overall increase in rainfall. June, July, August, September - 12mm January, February - 5mm October, November and December	High	4x4 Assessment report by Government of India (GoI)
	Supplementary Local Assessments						
Temperature change	Regional Assessments						
	Supplementary Local Assessments						
Extreme events (please specify the event)	Regional Assessments						
	Supplementary Local Assessments						

	Regional Assessments						
Sea Level Rise	Supplementary Local Assessments						

Section II Analysis and scenario(s)

Exercise 2: Climate Scenario Statements

Step 1

Analyse the climate change projection data to determine whether there is a consistent set of projections, particularly around the most significant direct climate impacts e.g. precipitation patterns, temperature rise, sea level rise, extreme weather events.

If the results for a particular 'changing climate condition' are quite consistent for both the regional and local assessments, a single Climate Scenario Summary Statement can be written for that climate condition. However, if there are significant variations in the projections, you may need to develop two separate Climate Scenario Summary Statements for each of the assessments. Some specialist assistance may also be required for this process.

Note that it is critical to ensure that the time horizons for the projections are similar. If the time horizons from the various data sources are different, it will be necessary to interpolate or extrapolate some of the data to a consistent year in order to assess the consistency or inconsistency of the projections.

Step 2

Now, write one or more Climate Scenario Statements for the changing climate conditions identified in the table above. A Scenario Statements can be framed in the following manner:

"There is a... **<**insert information from **'level of confidence'** i.e. degree of certainty**>**... of a...**<**insert information from **'amount of expected change'** i.e. the range**>**...in the...**<**insert information from **'changing climate condition'>**...in the...**<**insert information from **'geographical area'>**...by the year...**<**insert information on the **planning horizon year** from **'amount of expected change'** column**>**. The projected change is expected to...**<**insert information from **'extent of variability'>**."

Table 6: Climate Scenario Statement

Changing Climate Conditions	Assessments	Climate Scenario Summary Statements
Precipitation change	Regional Assessments (4x4 Assessment report by GoI)	*e.g. There is a high level of confidence of an expected change of 1268±225.2 mm to 1604±175.2 mm in the precipitation in the Himalayan Region by the year 2030. The projected change is expected to be*

		maximum in monsoon months - June, July, August and September, and minimum in October, November and December.
	Supplementary Local Assessments	
Temperature change	Regional Assessments	
	Supplementary Local Assessments	
Extreme events (please specify the event)	Regional Assessments	
	Supplementary Local Assessments	
Sea Level Rise	Regional Assessments	
	Supplementary Local Assessments	

Tool 3.2A: Urban Systems Analysis

This tool examines urban systems to identify fragile systems and how they would be impacted by climate change.

This tool provides guidance for working through two exercises:

1. Identification of "fragile urban systems" i.e. the systems or services in your city which are already weak or under great pressure.
2. Assessment of the impact of climate change on these fragile systems.

Urban systems may include 'core systems', such as water and food, essential for the survival of the city, and 'secondary systems' such as education and social services, which rely on the core services. The table below provides an indicative menu of both core and higher level urban systems to assist your thinking. Note that this list is not complete, so please do not be limited by it and add and/or select systems that you feel are appropriate for your city.

Example 1: Indicative checklist of core and secondary urban systems:

Some Core Urban Systems	Some Secondary Urban Systems
Ecosystems	Health care
Land	Tourism
Energy	Education
Water	Finance
Food	Markets
Shelter	Sanitation
Transport	Community services
Communications	Public security
	Taxation

Source: Adapted from ISET, 2011

EXERCISE 1: Fragile Urban Systems
In order to identify the fragile urban systems in your city complete the Exercise 1 Matrix by following these steps:

Step 1
First, identify the systems or services in your city which are already failing or are under great pressure and contributing more to city's total energy consumption and Greenhouse Gases (GHGs) emission.

To help identify fragile systems you could refer to:

The sectors that are perceived as being impacted by climate change and have already been discussed and listed by the Core Team in Tool 1.2. This can provide a very useful starting point for discussions on identifying the fragile urban systems in the city

Tool 3.1A in which the data on energy consumption by various sectors and urban services has already been collected and the GHG emissions which are an output of the HEAT+ tool[5] and are reported in Tool 3.1D.

The highest priorities in your city's development / master plan. If your city has a City Development Plan (CDP), use this as a reference document

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[5] HEAT+ tool is an online software application/tool application designed by ICLEI – Local Governments for Sustainability to help local governments to assess activity level Greenhouse Gases (GHG) emissions as well as air pollution and create comprehensive GHG inventory

Your city's /district's disaster management plan
The key concerns raised with the city administration by the community and private sector

Step 2
Define your reasons for rating them as fragile. You can use your own reasons for this assessment, and can also refer to some "resilience characteristics" as follows:

Achieving *resilience* is the desired outcome of developing and maintaining urban systems. Resilience is defined as:

"The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change (IPCC, 2007)."

Therefore, resilient urban systems would be those urban systems that are able to maintain their functions and linkages in the face of climate stresses and changes. Characteristics of resilient systems include:

Flexibility and diversity - mix of multiple options, key assets and functions are distributed or decentralised, not all affected by a single event

Example: A network of hospitals rather than a single, central hospital

Energy consumption and GHG emissions – consumes less energy than traditional means and leads to GHG emission mitigation.

Example: Hospitals that use energy efficient electrical fixtures and/or use back up from solar/wind (or other RE) power.

Redundancy - alternatives / back-up systems / contingency plans, capacity for contingency situations, multiple pathways and options for service delivery in case one or several options fail

Example: Hospitals and emergency communications facilities have shared or linked backup electrical generators; using renewable energy sources along with energy from the grid for water supply systems

Safe failure – ability to absorb sudden shocks or slow onset stress so as to avoid catastrophic failure

Example: Dikes are designed so that if their capacity is exceeded, they fail in predictable ways, channelling flooding away from populated areas

Step 3
Next, consider the existing and anticipated problems caused by the fragility of the urban systems. The guiding question here is: 'How does the fragility of this urban system impact other functions, systems and services in your city?' This section must identify the major issues in the urban system and its interlinkages with other systems.

Step 4
Now, define who is responsible. Is it part of the city government's function, the responsibility of another entity, or a shared responsibility? This will help define whether the city government will be able to take action to reduce the fragility of this system solely on its own, in collaboration with another department, or will need to approach some other entity with the issue and the proposed action.

Step 5

Finally, based on the information generated in the earlier steps, write a summary 'fragility statement'. (Please see the example in *italics* in Table 1 below)

Table 7: Identifying Fragile Urban Systems

Urban system	Why is it critical or fragile?	What are the existing and anticipated problems caused by the fragility of this system?	Part of city function (Completely / Shared / No)	Fragility statement
e.g. Water supply	*Flexibility & Diversity: Traditional water sources have been lost due to the urbanisation process and the city depends on centralised pumping systems that transport water from significant distances to the city. Supply cannot meet the growing demand.* *HIgh Energy consumption & GHG emission: Transport water from significant distance to the city with old pumping stations consumes around 143 million kWh electricity consumption, which leads to 117,540 tCO$_2$e of GHG emission in city.* *Redundancy: Alternatives usually include water supplied by tankers (trucks). Given the mountainous region this limits access of these trucks in addition to them being an expensive and polluting fallback option* *Safe failure: in case of a disruption in water supply, individual households have to fend for themselves. One of the systems is over a 100 years old*	*Disruption of water supply to citizens* *Additional financial burden on individual households to purchase water from water tankers* *Water shortage adversely impacts the tourism industry* *Increased pollution and emissions from the plying of water tankers*	*Shared with the Irrigation & Public Health Department*	*The water supply system in the city is old and largely dependent on transporting water over large distances which consumes significant energy and leads to GHG emission, whereby even minor disruptions within the distribution network cause significant shortages in the city in the face of an ever growing demand; alternatives are not cost effective or sustainable.*

EXERCISE 2: Climate Impacts on fragile urban systems

To assess the impacts of climate change on the fragile systems identified in the Exercise 1 above, complete the Exercise 2 by following these steps:

Step 1:
Begin with the fragile systems identified in your city and the corresponding fragility statements developed in Exercise 1 above.

Step 2:
Next, consider the Climate Scenario Summaries developed in Tool 3.1F. The question to answer here is: 'How might the projected climate changes impact on the critical / fragile systems that you have identified in Exercise 1?'

For this, each Fragility Statement developed in Table 1 above should be listed. Remember that in most cases climate change may threaten or weaken a system (e.g. already poor drainage systems may be worse off in case of expected increases in precipitation), but in a few others climate change may bring benefits to the system too (e.g. water supply systems that are inadequate due to lack of availability of sufficient water resources could benefit from an expected increase in precipitation).

Step 3:
Finally, based on the information generated in the earlier steps, write a 'climate fragility statement' that identifies the characteristics of the fragile system and the potential climate impacts on this system.

Note: If you have generated a second climate scenario summary, you will need to undertake the Fragile Urban Systems analysis a second time. Then compare the two lists of fragile systems: the systems which feature in both lists will obviously be high priorities for the city. Any system identified as fragile under one climate scenario, but less fragile in the second scenario, may be given a lower priority for action, or may be targeted for further study and analysis. This process of comparing the two lists of fragile systems is illustrated in the flow chart below.

Flow chart Showing Climate Scenario Treatment

Climate Data

Refer to climate scientists to better understand climate projection results especially for different

Inconsistent

Consistent

When the results from assessments and supplementary assessments do not match

When the results from assessments and supplementaryassessments do match

Climate Scenario

Climate Scenario

Urban System Analysis

The results of supplementary assessments

The results of supplementary assessments

Urban System Analysis

Urban System

Fragile Systems

Fragile Systems

Fragile Systems

Reconciliation

Combine the results derived from various scenarios

*There can be more than two scenarios arising from the varied results of the national and supplementary assessment

Table 8: Climate Impacts on Fragile Urban Systems

Urban system	Fragility statement	Climate fragility statement Climate risk 1: *e.g. Increased precipitation*	Climate fragility statement Climate risk 2: *e.g. Increased temperatures*	Climate fragility statement Climate risk 3: *e.g. Sea level rise*	Climate fragility statement Climate risk 4: *e.g. increased extreme weather events*	
e.g. Water Supply	*The water supply system in the city is old and largely dependent on transporting water over large distances, which consumes significant energy and leads to GHG emission, whereby even minor disruptions within the distribution network causes significant shortages in the city in the face of an ever growing demand; alternatives are not cost effective or sustainable*	*Increased precipitation disrupts/ damages water supply infrastructure*	*Increased temperatures will lead to increased demand for water thereby posing additional stress on the supply system*			
		Increased precipitation can cause water to freeze in the pipelines				

Tool 3.2B: Risk Assessment

At the end of Tool 3.2A, you produced a series of Climate Fragility Statements for the Fragile Urban Systems. Tool 3.2B now helps you to prioritize these risks using a Risk Assessment methodology.

Note that this exercise can be quite subjective as it depends on the opinions and personal experiences of participants. Therefore it is recommended to conduct the risk assessment with a broad group of city representatives and preferably with the Stakeholder Group to validate the priorities. The exercise should be jointly undertaken by the Core Team and the Stakeholder Group. This will help generate discussions and build consensus on the final risk prioritisation.

EXERCISE 1: Prioritization Of The Climate Risks

Step 1

In Table 1 below, first transfer the Climate Fragility Statements (from Tool 3.1F) to the first column.

Step 2

Now, assess the likelihood of each risk occurring and assign a score from 1 to 5, using Example 1 for guidance. It is recommended that you refer back to the 'Level of Confidence' that has been assigned to each of the identified climate change conditions in Table 1 of Tool 2.1. For example, if the projected increase in precipitation has a 'high' level of confidence, its likelihood of occurrence is higher.

Example 1: Likelihood Rating and Scoring

Likelihood rating	Description	Score
Almost certain	Is highly likely to occur, could occur several times per year. Likelihood probably greater than 50%	5
Likely	Reasonable likelihood, may arise once per year. Likelihood 50/50 chance	4
Possible	May occur, perhaps once in 10 years Likelihood less than 50% but still quite high	3
Unlikely	Unlikely but should still be considered, may arise once in 10 to 25 years Likelihood probability significantly greater than zero	2
Rare	Unlikely in foreseeable future – negligible probability	1

Step 3

Next, for each climate risk, assess the consequence, or impact, if the risk does occur. Consequences can range from Catastrophic to Moderate to Insignificant. Assign a score from 1 to 5 for each risk where 5 is Catastrophic and 1 is Insignificant. Example 2 shows one way of assessing the different consequence rating, using "Impact on the System" and "Impact on the City Government" as measures. However, you may also write your own Consequence Scale.

A particular focus of this assessment is to identify systems failures which could have direct and serious impacts on the poorest and most vulnerable groups in the city. Therefore it is recommended to consider the impacts on both, the system as well as the poor and vulnerable, while deciding on the Consequence ratings of each of the climate risks.

Example 2: Consequence Rating and Scoring

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

Step 4

Having assigned a 'Likelihood' and 'Consequence' score to each of the identified climate risks, now *multiply* both these values to arrive at the 'Risk Score' for each fragile system.

Step 5

Finally, for each of the climate fragility statement, assess their Risk Status based on their respective Risk Scores. Please refer to the 'Summary of Risk Matrix' in *Example 4* for assessing the risk status.

Example 3: Summary of a Risk Matrix

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

*RS: Risk Score

Please note: if more than one climate scenarios were used in Exercise 1 then this risk assessment would need to be repeated.

Please see the example provided in the Exercise 1 table below. The climate fragility statements are taken from Tool 3.1F.

Table 9: Prioritisation of Climate Risks

Climate Fragility Statements	Likelihood	Consequence	Risk score (Likelihood x Consequence)	Risk Status
Increased precipitation disrupts/ damages water supply infrastructure	*4*	*4*	*16*	*High*
Increased precipitation can cause water to freeze in the pipelines	*4*	*4*	*16*	*High*
Increased temperatures will lead to increased demand for water thereby posing additional stress on the supply system	*3*	*3*	*9*	*Medium*

Process.

Tool 3.2C: Vulnerability Assessment

Vulnerable Places and People

Introduction

In this Tool you will produce maps showing the distribution of the high priority climate risks across the city area. You will then assess which social groups are most vulnerable to the impact of these climate risks.

The climate Core Team and Stakeholder Group can have a joint workshop to discuss the vulnerable areas and actors and conduct the vulnerability assessment. The tool will produce the following outputs:
1. Vulnerable areas in the city that are impacted by the climate risks.
2. Vulnerable people or actors in the city that are most impacted by the climate risks.
3. Adaptive capacity of the vulnerable actors.

EXERCISE 1: Mapping Of Existing Vulnerable Areas

In this exercise, the vulnerable areas under each fragile urban system in the city are identified. This can be done using hard copies of the city ward map and different colours representing different climate risk statements. For example, for the climate risk statement: '*Increased precipitation disrupts/ damages water supply infrastructure'*, the areas (or wards) most likely to be affected by can be coloured blue (instead of colours, symbols can be used) on a map of the city that shows the boundaries of the smaller administrative units that the city is divided into (e.g. a Ward Map). Similarly other areas / wards within the city affected by each of the other identified climate risks can be marked by using a different colour for each one. This will help develop a fair idea of the wards/areas where the identified climate risks, and therefore the corresponding fragile urban systems, are most critical.

It is recommended that before undertaking this exercise, that wards / areas that are have higher populations of poor or marginalised groups (e.g. slums, temporary settlements) be identified and that the impacts on these areas be also considered during the mapping exercise.

Below you find some further steps to follow:

Step 1:

Refer to the climate fragility statements (and fragile urban systems) that were prioritised in Tool 3.2B, i.e. those that have been allotted an *Extreme*, *High* (or in some cases *Medium)* risk score. However, the City may choose to include climate fragility statements from sectors which are identified to have Low Risk associated with them, where such

sectors are a priority for the City from the urban service/development perspective. List these on a sheet of paper and assign a colour to each of these climate risk statements.

Step 2:

For the first climate risk, identify the areas/wards of your city that will be most affected and mark them with the appropriate colour. Then repeat this process for each climate risk. You may want to use separate maps for each of the fragile urban systems for clarity.
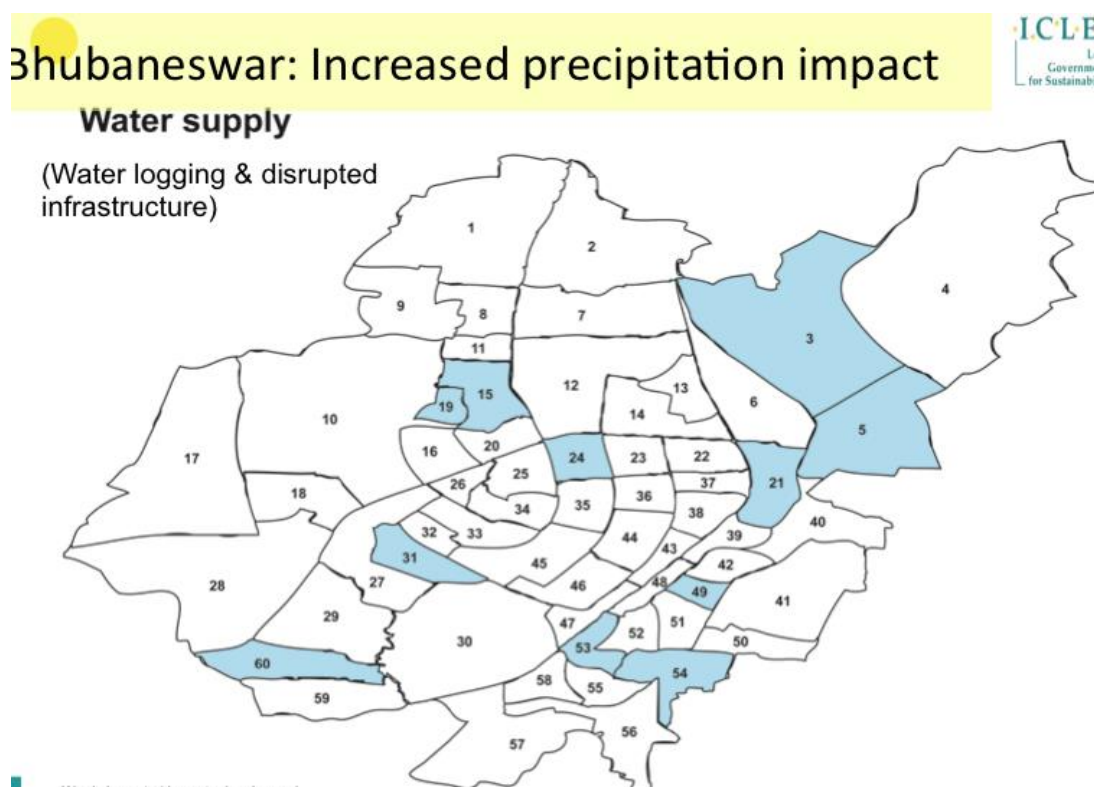
Step 3:

In this step you will identify which areas of the cities are impacted by the greatest number of high climate risks. These areas will represent the **Vulnerability Hotspots** in the city. To identify the vulnerability hotspots, overlay each of the climate risk maps.

For example, assume that the city has identified 5 high climate risks. If an area of the city is impacted by *all 5* high *climate* risks, it would be a vulnerability hotspot of the city. Next, the affected areas can be ranked according to the number of risks it is exposed to.

This mapping of the 'vulnerability hotspots' of the city will help easily (and visually) determine the areas within the city that are most vulnerable and which would probably require immediate attention.

Mapping Example:

Vulnerability Hotspots

Wards impacted by all four fragile urban systems

Wards impacted by three fragile urban systems

Wards impacted by two fragile urban systems

Wards impacted by one fragile urban systems
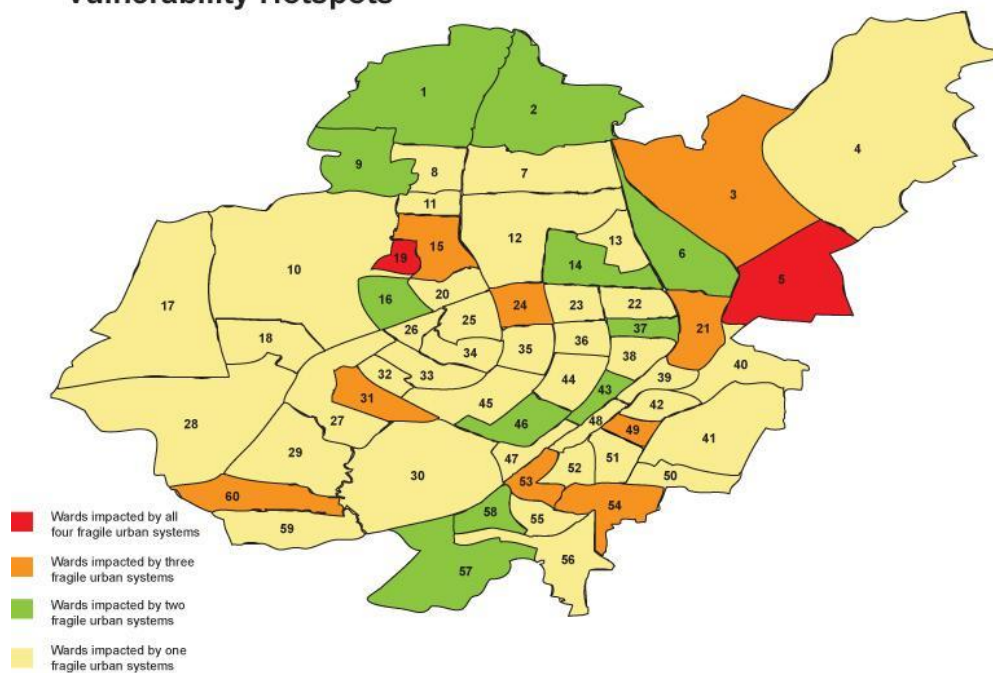
EXERCISE 2: Analysis Of Adaptive Capacity Of Urban Actors

Actors (i.e. individuals, households and public/private sector organisations), play a critical role towards building urban resilience. Their ability to contribute to resilience and adaptation is broadly dependent on the following three key capacities:

Capacity to organise and respond - the capacity to organise and re-organise in response to threat or disruption

Example: slum communities residing in a flood prone area have received training on how to purify water for drinking and maintaining hygienic conditions to prevent the outbreak of post flood diseases. Or, trained Search and Rescue Teams exist within the community that can respond effectively during floods

Resources – access to the resources necessary to respond (manpower, technology, funds)

Example: slum communities residing in a flood prone area have been provided with water filters that will ensure that they have safe drinking water even during flood situations. Or, the Search and Rescue Teams have the necessary equipment and medicines

Access to information – availability of data and information necessary to develop effective plans and actions and to improve responses to disruptions

Example: slum communities residing in a flood prone area have access to improved information that can be locally managed e.g. Early Warning Systems, which would enable them to respond more effectively. Or, regular refresher and updating training courses for the members of the Search and Rescue Teams

The combination of these three characteristics would help determine the adaptive capacity of each of the urban actors.

Exercise 2 helps to identify the specific key actors in the identified vulnerable areas. In Exercise 1, you have identified the most vulnerable areas/wards in your city. Now you will identify the key groups of people in each high risk locality.

The Actors analysis can be used to identify:

1. How different categories of actors relate to different systems (who, what, where, why)
2. What categories of actors may be missing
3. Groups of actors that may be disempowered, lacking in capacities or otherwise marginalised

Please follow the steps below to complete Exercise 2.

Step 1:

Select the Climate Risk Hotspots from the maps in Exercise 1 above

Step 2:

For each Hotspot and Climate Risk, list the key actors involved – *those affected   by, and those who have control over, the system*.

For example, Ward XY is vulnerable to flooding, so the specific actors **affected** could be
● the residents, specifically the poor households in the area
● a hospital
● a NGO working on education in this ward
● street vendors

And the specific actors who may **have control** may be the Department of Water Resources or the Department of Sewerage and Drainage.

When defining the actors, you are encouraged to be as specific as possible. Therefore, rather than mentioning 'residents of Ward XY' you should try and specify 'women, children and elderly in *Slum 22*'. The more precise you are in determining the actors, the simpler it would be to target and organise an effective response.

Step 3:

We now need to double-check that we have not overlooked any groups of poor or vulnerable people who may not be located in the Hotspots identified in Exercise 1. This is very important as there may be groups which could be affected by a particular climate risk which has not been identified through the urban systems analysis in Phase 2. Look particularly for poor communities, or groups which may already be struggling and for whom a small change in temperature, rainfall, flooding could be a tipping point which causes high vulnerability.

Any groups identified in this step should be added to *Table 1* below.

Step 4:

Using *Table 1* below, rate the actors against the three criteria - Capacity to Organise and Respond, Resources, and Access to Information. For each of the criteria you need to determine whether the capacity of a particular actor is Low, Medium or High, and accordingly assign the corresponding score as indicated in the table.

Table 10: Actors' Capacities Rating and Scoring

Key Capacities of Actors	Score
Capacity to Organise and Respond	
Low capacity to organise and re-organise in response to threat or disruption	1
Medium capacity to organise and re-organise in response to threat or disruption	2
High capacity to organise and re-organise in response to threat or disruption	3
Resources	
Low access to the resources necessary to respond (manpower, technology, funds)	1
Medium access to the resources necessary to respond (manpower, technology, funds)	2

High access to the resources necessary to respond (manpower, technology, funds)	3
Access to Information	
Low availability of data and information necessary to develop effective plans and actions and to improve responses to disruptions	1
Medium availability of data and information necessary to develop effective plans and actions and to improve responses to disruptions	2
High availability of data and information necessary to develop effective plans and actions and to improve responses to disruptions	3

Step 5:

Finally, for each actor calculate their 'Adaptive Capacity Score' by multiplying the scores allocated to each of the 3 characteristics.

Step 6:

Based on the Adaptive Capacity Scores of each of the actors, for a particular fragile system, you can determine which actors have a High, Medium and Low adaptive capacity. Refer to Table 2 to help you assess the level of adaptive capacity of each of the actors.

Table 11: Levels of Adaptive Capacity of Urban Actors

Adaptive Capacity Score	Level of Adaptive Capacity
1 – 8	Low
9 – 17	Medium
18 – 27	High

Actors having a **'Low'** level of adaptive capacity would be those that would need to be *specifically targeted* in the *actions* (or resilience strategies) that are undertaken to reduce the fragility of the identified urban system.

Actors with a **'High'** level of adaptive capacity can be engaged in the proposed actions as they have the capacity to effectively respond to the impacts of the fragile systems. Similarly, those falling in the **'Medium'** category might also need to be specifically targeted *or* can also be engaged in the proposed actions, depending on which end of the range they are on i.e. closer to the 'low' category or closer to the 'high' category..

EXERCISE 2: Actors Analysis

Climate Fragility Statements	Area/ward	Actors	Capacity to Organise & Respond (A)	Resources (B)	Access to Information (C)	Adaptive Capacity Score (A)*(B)*(C)	Supporting Notes
e.g.: Contamination of water supply due to flooding made worse by lack of alternative sources	*Ward 5*	*Slum dwellers*	1	1	1	1 (Low)	*Dependent on shallow aquifers that are easily contaminated; access to water tankers too expensive; no information on water purification techniques*
		Private Sector	2	3	2	12 (Medium)	
		Resident Welfare Association	2	2	1	4 (Low)	
		Water authority	2	3	3	18 (High)	
		NGO	2	1	3	6 (Low)	

Tool 3.3: Baseline Synthesis Report

EXERCISE 1: Bringing It All Together

Combining the information generated in steps 2.3, 3.2A, 3.2 B and 3.2 C, a synthesis report is created. Against each of the identified climate fragility statements, specifics of the location, people impacted and the capacity for resilience in the existing system are identified.

From a mitigation perspective, a summary of the carbon intensity of city activities is prepared. Overlaps in critical sectors, from a mitigation and adaptation perspective, are noted.

Table 1 below provides a summary of the analysis till now and can be used as a progress report for the city decision makers.

Step 1

Note the fragile urban system and the corresponding climate fragility statements in your city which have been identified in previous tools. .

Step 2

Sum up the information documented in Tools of steps 2.3, 3.2A, 3.2 B and 3.2 C for these climate fragilities. This information includes identification of vulnerable areas and of urban actors..

Table 1: Bringing It All Together

Fragile Urban System	Climate Fragility Statements	Sector GHG Emission Profile		Vulnerable Areas	Urban Actors	
					Vulnerable Actors	Potential Supporting Actor
	e.g.: Contamination of water supply due to flooding made worse by lack of alternative sources			*Ward 5*	• *Slum Dwellers* • *Resident Welfare Association* • *NGOs*	• *Private sector* • *Water Authority*

Tool 4.1A: Resilience Interventions

This tool will help to develop a list of possible "interventions" to address the climate risks, vulnerabilities and identified in previous phases.

We will use the term "intervention", but you will also see "actions" and "measures" at times in the text. This is distinct from the term "strategy", which will be used to mean the overall collection of interventions.

EXERCISE 1: Developing Climate Resilience Interventions

Each locality or community experiences climate change in unique ways, depending upon topography, geographic location, features of the local ecosystem, along with social, urban and economic factors. Therefore the adaptive responses of each community will be individual. However, collectively, many communities have already identified responses to particular climate exposures, and this can be useful information for a city which is starting out on the process.

Resilience means the ability to withstand or accommodate stresses and shocks to a system while still maintaining the system's function (ISET, 2011). It is the capacity and ability of a community to withstand stress, survive, adapt, bounce back from a crisis or disaster and rapidly move on. Urban resilience building is more than just successful climate change adaptation - water, energy, food security, greenhouse gas reductions, ecosystem protection, disaster risk reduction, must all be integrated into City Development Planning. Urban resilience should integrate climate change strategies with all the other key sectors and priorities.

Proposals for resilience actions or interventions can be developed in several ways:

Approach 1

In some cases an action or response is obvious, has already been identified or observed in another locality. Stakeholder Group and City Core Team members will typically already have a number of ideas quite early in the process – these are legitimate and should be listed.

Approach 2

Research into case studies and best practices from other areas can provide a rich source of possible interventions. ICLEI can provide a large number of case studies from

all over the world; there are also several websites which will provide a useful starting point for research.

Approach 3

The limitations with Approaches 1 and 2 is that you are not moving beyond the predictable, already known responses. Each city context is unique so it is important that you undertake an analysis which can uncover some of the underlying causes. One way of doing this is through an Intervention Mapping process, developed by ICLEI, where you identify the target condition you want to reach, the key city functions associated with it, the direct and indirect causes that contribute to the target conditions and any other specific issue in achieving those targets.

Step 1

Review the baseline synthesis report, looking particularly for underlying causes of vulnerabilities, and groups of actors who should be involved in resilience responses and start generating responses by one or more of the approaches listed above for each of the Climate Fragility Statements.

Step 2

Consult stakeholders and sectoral agencies affected. It is recommended that the city Climate Core Team conduct a workshop with the Stakeholder Group in which the tool can be implemented

Step 3

Remember to:
- Focus on the most vulnerable groups (please make sure to include the poor and marginalized groups), sectors, neighbourhoods
- Develop measures to address current issues and measures to prevent future problems
- Aim for a mix of "hard" (i.e. infrastructure related) and "soft" (i.e. non or minor infrastructure related e.g. policy changes, capacity building) solutions
- Consider links with other existing plans and processes to identify actions which may already be included in city plans

Step 4

For each Climate Fragility Statement, compile a list of possible interventions, specifically keeping in mind the *vulnerable actors and how the intervention would benefit them* and the *adaptive capacity of the urban system under consideration*.

Exercise 1: Identifying Resilience Interventions

Climate Fragility Statements	Vulnerable Areas	Urban Actors		Resilience Capacity of the system			Potential Climate Resilience Interventions
		Vulnerable Actors	Potential supporting actor	Low	Medium	High	
e.g.: Contamination of water supply due to flooding made worse by lack of alternative sources	*Ward 5*	*Slum Dwellers Resident Welfare Association NGOs*	*Private sector Water Authority*	*Economic/ source of finance Ecosystem Services*	*Technology/ infrastructure Governance*	*Social GHG Emissions*	*Rooftop water harvesting and safe storage Capacity building on hygiene and sanitation Provision of low cost, effective water purifiers*
e.g. High GHG Emissions from water pumping sector	*Entire City*	*Local Authority Water Supply Department Residents*	*Water Authority*	*Economic/ source of finance Ecosystem Services*	*Technology/ infrastructure Governance*	*GHG Emissions*	*Improved efficiency of water supply pumps at headworks and secondary distribution points Reduction in water leakage from the distribution system*

Tool 4.1B_Catalogue of Resilience Interventions

Beat Meier, econcept AG

ICCA (Indian Climate City Award) *Working title*
Basket of solutions

The ICCA list based on two main elements: A: The certification/awarding process and B: Climate City Action Plan
The Climate City Action Plan is topically structured according to the Basket of solutions. This document is a draft of the Basket of solutions.

Version: Draft 2.0 / 13 July 2017 / Beat Meier / econcept AG / For internal use within the CapaCITIES project.

Basket with topics and targets

Detailed catalogue

Topic			TARGET and solutions (steps towards the target)	Status (Level achieved)			
Topic	sub-topic		Target status / Top status ("what is the ideal achievement for climate resilient cities?")	first steps	good	very good	excellent
	Nb.	Description of sub-topic		D	C	B	A
1 Committement and overall management (SOUMYA)							
	1.1	Political Committement	Commitment to start a process towards a climate resilient city* is confirmed by the city authorities. (*climate resilience covering mitigation and adaptation measures)	A decision is taken to prepare a climate action plan by the commissioner/mayor and the work is undertaken in-house or through a consultant			A decision is taken to prepare a climate action plan by the mayor/commissioner and an official order or council resolution is passed to that effect
	1.2	Long term targets (e.g. 20 years)	Long term targets for the city's climate policy are set.	The city decides to identify long term climate policy targets - either mitigation or adaptation or both - may or may not be time bound	The city has specific sector level targets for either mitigation or adaptation or both - may or may not be time bound	The city has a time bound comprehensive climate policy addressing all sectors - from a resilience perspective (climate mitigation and adaptation)	The city sets out a policy with specific targets for mitigation and identifying specific adaptation targets and denotes a timeline
	1.3	Climate City core team	An inter-sectoral team for the elaboration and implementation of a climate action plan is formed. The contact person is identified.	The city hires an external consultant to prepare the climate action plan	The city places the responsibility on a single official to prepare/engage with external consultants to prepare climate action plan	The city officially nominates an inter-sectoral team to prepare/liaise with external consultants preparing the climate action plan - as a one time exercise	The city officially nominates a climate core team that is multi-disciplinary and institutionalises the preparation, implementation and review of the climate action plan
	1.4	Climate City Action Plan	A multi-year Climate Action Plan is elaborated and adopted. Core fields are defined, priorities are set and needed ressources are identified.	A climate action plan addressing addressing specific or all sectors and addressing either adaptation or mitigation or both is prepared, but is not adopted by the Council	A climate action plan is prepared for specific sectors and adopted by the city . The climate action plan adresses either adaptation or mitigation or both (e.g.: Low Carbon Mobility Plan)	A climate action plan addressing all sectors and both adaptation and mitigation actions is prepared and adopted by the city. The city ist mainstreaming the implementation through all relevant on-going programmes in the city.	A climate action plan addressing all sectors and both adaptation and mitigation actions is prepared and adopted by the city. The city ist mainstreaming the implementation through all relevant on-going programmes in the city. The ressources needed and measures to assure the availability of the needed ressources are identified.
	1.5	External Stakeholders committee	External stakeholders are identified and integrated in overall management	The city involves external stakeholders in the planning process on an ad-hoc basis	The city identifies specific focus groups and consults with them on an "as-needed" basis	An external stakeholder committee is officially nominated and consulted during the preparation of the climate action plan	An standing external stakeholder committee is officially nominated for the preparation, implementation and regular review of the climate action plan.
	1.6	Membership ICCA-Association (working title)	Membership Indian Climate City Award-Association (working title) adopted	Membership is adopted	Membership is adopted	Membership is adopted	Membership is adopted
	1.7	Medium term targets (e.g. 3-5 years)	Medium term targets are set and level of achievement is monitored for: - energy use (public utilities, enterprises, private households) - greenhouse gas emissions (according to GPC standards...) - water supply, water consumption and recycling - waste flows - traffic (type, quantity, ...) - urban planning (including greening guidelines, building codes, others...)	Medium term targets are set and monitored for only specific sectors - addressing either adaptation or mitigation	Medium term targets are set and monitored for only specific sectors - focusing on both adaptation and mitigation	Medium term targets are set for all sectors - focusing on either adaptation or mitigation	Medium term targets are set for all sectors - focusing on both adaptation and mitigation

Tool 4.2: Prioritisation of Resilience Interventions

In this tool the proposed interventions are first assessed for their contributions to urban resilience using a set of resilience indicators. The higher scoring interventions are then assessed for feasibility and impact. The exercises mentioned in this tool can be undertaken jointly by the Core Team and the Stakeholder Group. Lower scoring interventions can also be assessed for feasibility and impact if the city feels that these are important from the city development perspective.

EXERCISE 1: Prioritising Resilience Interventions

Earlier in the toolkit we used several criteria to assess the resilience of systems and of actors. In this Tool, these criteria have been combined for the following exercise aimed at testing the resilience of interventions based on the characteristics mentioned below:

Redundancy: A resilient system can function and achieve results through multiple paths or nodes when one fails and when performance is critical. In contrast, a "single best solution" is not resilient because if this single option fails, the system collapses. Back-up systems, or decentralised nodes for service delivery in a linked network, are preferable.

Example: Hospitals and emergency communications facilities have shared or linked backup electrical generators

Flexibility and diversity: Essential systems should be able to work under a variety of conditions; they should not be rigid or designed only for one specific situation. Any system will fail if overloaded beyond its capacity, but it should be designed to fail under stress in a *safe* and *predictable* way, rather than suddenly and catastrophically.

Example: Dikes are designed so that if their capacity is exceeded, they fail in predictable ways, channelling flooding away from populated areas

Re-organisation and responsiveness: Under extreme conditions, systems should be able to respond and change to meet unexpected shocks. This requires flexible organisations and access to different kinds of resources (information, skills, equipment,

knowledge and experience). It also means a high level of coordination and flexible organisational structures capable of adjusting to new conditions.

Example: *Houses in flood-prone areas are designed with flat roofs as emergency refuges for family members and possessions above flood water level*

Access to information: Resilient systems have mechanisms to learn from and build on experience, so that past mistakes are not repeated and lessons from other cities can be integrated into planning. This requires procedures for monitoring and evaluating performance under stress, and requires multiple sources of knowledge and documentation (strengthening "corporate memory").

Example: *Different government agencies share a common monitoring and reporting system to track groundwater quality and extraction in the face of more frequent drought or sea level rise*

Energy saving and GHG emission mitigation potential: Resilient systems have potential to reduce energy consumption and mitigate GHG emission, which may be integrated into their regular planning. This requires procedures for periodic monitoring and evaluating performance, which requires multiple sources of knowledge and documentation.

Example: *Providing access to local water sources through rainwater harvesting/ ground water recharge will not only build the resilience of the community but also reduce city's dependency on water transporting from significant distances to the city, leads to reduced power demand for pumping and GHG emission mitigation. Periodic monitoring of energy saving should be maintained and documented by local government*

Step 1

List the resilience interventions from Tool 4.1A.

Step 2

Evaluate them on the basis of the above resilience indicators.

Step 3

Complete Table 1 by determining the overall resilience score for each intervention on the basis of the number of resilience indicators that the intervention is perceived to fulfil.

For example, if an intervention meets the criteria of redundancy, and enhances the urban system's capacity to learn but does not help the system in being responsive and is not flexible or robust or contribute to GHG emission thereby meeting 2 out of the 5 characteristics of resilience – then the overall resilience of the intervention will be 2/5 – 'Average' (see Table 1 below).

Table 12: Prioritising Resilience Interventions

Potential Climate Resilience Interventions	Resilience Indicators						Overall Resilience 5/5: very high 4/5: High 3/5: Medium 2/5: Average 1/5: Low
	Redundancy (yes/no)	Flexibility (yes/no)	Responsiveness/ re-organisation (yes/no)	Access to Information (yes/no)	Energy saving and GHG emission mitigation potential (yes/no)	Quantify the GHG emission mitigation potential	
e.g. Roof top water harvesting to be made mandatory to deal with water stress due to anticipated increasing temperatures and decreasing precipitation	*Yes* *Supports a higher degree of self-sufficiency at the household level*	*Yes* *System allows for water to be channelized towards recharging groundwater as well*	*Yes* *In case of shutdown of the city's water supply system, households have stored rainwater for use*	*No* *City helplines exist, but responsibility lies with individual households*	*Yes* *Reduction in electricity consumption and GHG emission mitigation potential due to reduced pumping requirement*		*High*

EXERCISE 2 : Feasibility and impact

As well as building resilience, interventions should be checked for their feasibility and expected impact.

Feasibility can be assessed using the following criteria:

● Technical – the city has the necessary technical expertise to implement the project, or can access the required skills
● Political – the intervention will be seen as acceptable to city leaders and the community and is consistent with the city's values and vision
● Cost-benefit – the cost is within the capacity of the city, or the city will be able to access required funds, and the anticipated benefits of the action will justify the cost
● Responsibility - An assessment of whether this action falls within the role of the city government, or which other agencies may need to be involved (Please refer back to your responses on 'part of city function' in Table 1 of Tool 2.2)

Impact can be assessed using:

● Timeframe – most actions should be able to be completed within a short or medium timeframe.
● Overall impact - the proposed intervention will have a significant and measurable impact on the targeted climate risk and GHG emission reduction potential.

Step 1

Using Table 2, list the resilience interventions that have been assessed to have either a *High* or *Medium* score in Exercise 1. Low scoring ones can be included as per discretion of the city.

Step *2*

Now, evaluate the interventions in terms of their feasibility and impact.

Table 13: Feasibility and Impact

Potential Climate Resilience Interventions	Feasibility			Time required for the intervention to show impacts on climate change	Overall Impact
	Technically (high/medium/low)	Politically (high/medium /low)	Financially (high/medium /low)	(short/medium/long term)	
e.g. Roof top water harvesting to be made mandatory to deal with water stress due to anticipated increasing temperatures and decreasing precipitation	*High (technology is easily available)*	*Medium (would require a change in building by-laws and building codes)*	*High (not an expensive option to implement with substantial results)*	*Short term*	

Step 3

Use these ratings to develop a final list of recommended interventions. The method for arriving at a recommended list may vary according to the city's way of making decisions. Some options:

1. Apply scores to the Feasibility and Impact ratings and use total scores to prioritise. Keep in mind that this might be over-simplistic as there may be very good reason to choose an intervention which does not score as highly as some others.
2. Conduct discussions with the Climate Core Team and/or the Stakeholder Group to validate the ratings and search for any other reasons which may help with the shortlisting
3. Provide a longer list to city decision makers and allow the city's normal budget prioritisation system to make a final selection.

Tool 4.3 A: Integration into City Plans

In the previous tool, a shortlist of recommended interventions has been developed using Climate resilience, Feasibility and Impact criteria. This Tool will now assist you to align the proposed actions with existing city plans.

A city government will already have a comprehensive set of plans, ongoing programs and projects. Wherever possible, climate resilience interventions should be linked with, or built into, existing departmental work plans. It is far better for the City to **integrate** the CRCAP into existing plans than to adopt another new plan. The CRCAP should be seen as a way of strengthening the resilience of city plans, rather than an additional workload. The exercises mentioned in this tool can be undertaken jointly by the Core Team and the Stakeholder Group

EXERCISE 1: Linking Resilience Interventions to Ongoing Programs

Step 1

Begin with the list of recommended interventions from Tool 4.2.

Step 2

For each of the resilience interventions identify the relevant plans and programs of the city government into which the intervention can possibly be incorporated.

Step 3

Now, check the timeframe of the existing program to ensure it is consistent with the proposed intervention.

Step 4

Finally, determine if the programme can be **leveraged** to include the intervention:

- Can the intervention be included without requiring additional resources?
- Can the intervention be included with minimal extra resources, as compared to undertaking the intervention as a stand-alone initiative?

The following table is a way of summarising the recommended interventions, the target areas and actors, and opportunities to link and leverage interventions to existing city plans.

Table 1: Linking Resilience Interventions to Ongoing Programs

Resilience Interventions	Relevant Programs	Ongoing/upcoming/ planned	Can the program be leveraged – yes/no; if yes how?
e.g. Roof top water harvesting to be made mandatory to deal with water stress due to anticipated increasing temperatures and decreasing precipitation	Housing Scheme for the Urban Poor	Upcoming (following financial year)	Yes. Design of buildings can be modified to include a rooftop water harvesting and safe storage system

Once the linkage of resilience interventions to any upcoming/proposed/ongoing programs/schemes of the City is identified, a summary table of all the resilience actions and their potential/intended impact may be prepared. The following table (Table 2: Summary of Climate Resilient City Action Plan) is just one example of a summary document. You may need to design your own summaries according to local reporting and decision-making requirements.   Interventions which cannot be easily linked to existing city plans are also listed. These may need separate budget decisions, or funding from alternative sources.

Table 2: Summary of Climate Resilience City Action Plan

Resilience Interventions	Mitigation Potential (2022-23)			Adaptation Impact	Cost of interventions (Million INR)	Implementation mode
	Potential Energy Saving (Million kWh)	Potential Fuel Saving (KL)	Potential GHG emission reduction (tCO2e)			
Example: Water Supply Baseline (2015-16) Total Energy consumption – 140,055 Giga Joule (Total Electricity consumption – 38.36 Million kWh) Total GHG emission – 31,549 tCO2e Climate Resilience Potential (2022-23) Total Electricity savings – 95.49 Million kWh Total GHG emission mitigation potential – 78,563 tCO2e Climate Fragility Statement: xxxx Climate Risk Status: xxxx Vulnerable Areas: xxxx Supporting Actors: xxxx Vulnerable Actors: xxxx						
NRW reduction from 28% to 22% (Proposed)	2.33	NA	1916.51	Responsiveness - The intervention will result in an overall reduction in demand for water supply	300	Rajkot Municipal Corporation with ADB funding
Implementation of Rain water harvesting system	NA	NA	--	Redundancy - Intervention will support a higher degree of self-sufficiency at the household level. Flexibility - Rain water is	To be assessed as per scope of action	It is already mandatory as per General Development Control Regulation to implement rainwater harvesting system for

Resilience Interventions	Mitigation Potential (2022-23)			Adaptation Impact	Cost of interventions (Million INR)	Implementation mode
	Potential Energy Saving (Million kWh)	Potential Fuel Saving (KL)	Potential GHG emission reduction (tCO2e)			
				not utilised in absence of required infrastructure, intervention will allow for water to be utilised on site or channelized towards recharging groundwater as well Responsiveness - In case of shutdown of the city's water supply system, households have stored rainwater for use		certain kind of buildings RMC has already implemented rain water harvesting in more than 16 affordable housing schemes

TOOL 4.3B: Climate Resilient City Action Plan

This tool provides a template for the preparation of a City Climate Action Plan document. The contents of this document include the outputs of all the tools in steps 1 to 4 of the City Climate Action Plan Methodology. The detailed content of each section may be guided by the inputs given to and the analysis that is carried out in each of the tools. The contents of this document are only suggestive in nature and the City may contextualize and modify the template of the City Climate Action Plan.

I.   Rajkot City Commitment to Climate Action
1.   Brief Introduction (of the City and the City's intent to develop a Climate Action Plan)
2.   Methodology followed to prepare the City Climate Action Plan (identify the steps of the City Climate Action Plan Methodology that the City followed, since the City may not have followed all the steps and tools)
3.   Mayoral Announcement
4.   Climate Core Committee of the City
5.   Stakeholder Committee for Climate Action
6.   Communication Plan for Climate Action

II.   Background Research
1.   Country Profile
2.   City Profile
    2.1.   Location
    2.2.   Connectivity
    2.3.   Demography
    2.4.   Land Use
    2.6.   Economic Activities
    2.7.   Local Government Body
    2.8.   Major Urban Systems
        2.8.1   Water Supply
            2.8.1.1   Water Sources:
            2.8.1.2   Details of Pumping stations
            2.8.1.3   Water Network
            2.8.1.4   Supervisory Control and Data Acquisition (SCADA) for water supply
            2.8.1.5   Service level information- Water Supply
            2.8.1.6   Upcoming new water projects and plans
        2.8.2   Sewerage
            2.8.2.1   Service level information- Sewerage
            2.8.2.2   Upcoming new drainage projects and plans
        2.8.3   Solid Waste Management
            2.8.3.1   Composition of waste
            2.8.3.2   Service Level Benchmark
            2.8.3.3   Upcoming new SWM projects and plans
        2.8.4   Transportation
            2.8.4.1   Public Transport system
            2.8.4.2   Infrastructure for Private Motorized Vehicles
            2.8.4.3   Registered vehicles in city by vehicle type
            2.8.4.4   Registered vehicles by fuel type