



# ClimateSMART Cities Assessment Framework

## Event Report of Cluster Workshops

08, 09, 10, 15, & 22 April 2019 | Indian Habitat Centre, New Delhi

**PROCEEDINGS**



## IMPRINT

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# 1. INTRODUCTION TO THE WORKSHOP

Government of India's Smart Cities Mission envisages to further drive the economic growth hand in hand with improvement in quality of life of people by enabling local area development and harnessing technology, especially technology that leads to Smart outcomes. Ministry of Housing and Urban Affairs (MoHUA) has hence initiated the "ClimateSMART Cities Assessment Framework" (CSCAF) for the 100 smart cities. This is a first-of-its-kind public assessment framework on climate relevant parameters, including those of the recently launched National Clean Air Programme. The objective is to provide a clear roadmap for the cities and in effect, urban India as a whole, towards combating climate change while planning their actions within the city including investments.

The CSCAF is based on 30 diverse indicators across five categories namely:

- (i) Energy and Green Buildings,
- (ii) Urban Planning, Green Cover & Biodiversity,
- (iii) Mobility and Air Quality,
- (iv) Water Resource Management and
- (v) Waste Management

The ClimateSMART Cities Assessment Framework (CSCAF) is a step to adopt, implement and disseminate the best practices adopted by our cities and further to set standards in comparison to the international efforts towards green, sustainable, and resilient urban habitats.

## About the workshops

In order to disseminate the CSCAF to the 100 smart cities, MoHUA, with support from GIZ and NIUA, organized 4 workshops and 1 webex where 71 cities participated. The workshops were designed is an interactive way to promote exchange of information, and deliberate on the framework in order to make it more robust and actionable by the cities. Each day had similar format with 5 technical sessions, based on the 5 categories as listed above where the participants were given inputs by technical experts on the indicators, progression levels, evidence to be collected, and the respective/tentative data sources for each of the indicators. At the end of each session, questions, comments, and suggestions were collected for clarification and further amendments to the indicators before the online application portal is launched,



*Figure 1: Mr Kunal Kumar, JS&MD (Smart Cities Mission) MoHUA, Gol*



## 2. PROCEEDINGS

### 2.1 INAUGURAL SESSION

The workshop was inaugurated by, Mr. Kunal Kumar, Joint Secretary (Smart Cities) MoHUA, Ms. Archana Mittal, Director, (Smart Cities) MoHUA, Mrs. Vaishali Nandan, “Climate Smart Cities” Project Lead, GIZ India, and Mr. Anand Iyer, Chief Project Manager, NIUA.



Figure 2: Welcome Address by Ms. Vaishali Nandan

In her welcome address, Mrs. Nandan, Project Lead, Climate Smart Cities, thanked the Joint Secretary (JS), Director of Smart Cities, and chief project manager of National Institute of Urban Affairs (NIUA) for participating in the cluster workshop. Mrs. Nandan gave an overview of Climate Smart Cities project and informed how Germany as a country has dealt with climate change through various urban interventions. She also stated that participants would have the opportunity to provide inputs about the climate smart cities framework at the end of the workshop.

In his inaugural address, Mr. Kumar, thanked GIZ and NIUA for their support in organizing the workshops. He then briefed on the importance of climate change and the real challenges in making cities inclusive, sustainable, and liveable. Indian cities have to realize that their role as consumers of resources and their vulnerabilities to climate change. Cities can make a significant contribution to mitigating climate change and increase their resilience to climate-related shocks, if they were aware of the relevant and correct measures that were advised based on an city objective. He stressed that the smart cities are the forerunners in the subject of climate in the country and they should be able to show the way to the rest of the urban centres in India on how climate issues need to be addressed.

Ms. Archana Mittal, Director, (Smart Cities) MoHUA, stated that cities are engines of growth that contribute to 66% of the country's GDP, 90% of tax revenue and around 70% of job opportunities. Government of India's Smart Cities Mission envisages to further drive this economic growth hand in hand with improving the quality of life of people by enabling local area development and harnessing technology, especially that leads to Smart outcomes.

Mr. Anand Iyer, Chief Project Manager, NIUA, gave an overview of the CSCAF and the scheduled activities. He made participants familiar with the technical sessions and explained that climate change is a core development issue and presents risks to the achievement of Sustainable Development Goals (SDG). To fulfill the SDGs, low carbon (renewables, efficiency, and land management for carbon storage) and climate-resilient (adaptation) development is required.



Figure 3: Mrs. Vaishali Nandan, Proceeding the workshop

## 2.2 Technical Sessions: Introduction to Session and Expectations from participants

### 2.2.1 Introduction to Session

Mrs. Nandan explained the agenda and format of the workshop to the participants. She mentioned the main objectives of the workshop, which consisted of five main technical sessions based on the categories of the CSCAF. She stressed that while the significance of climate change is understood, the real challenge lies in operationalising the mitigation measures in daily practice. After that each category was explained by the subject experts and indicators were elaborated. ICLEI – South Asia, that is currently supporting three cities in filling out the online application portal of CSAF, then presented their initial findings of the test run from the cities

Mr. Anand Iyer, who was moderating the technical sessions, reiterated that the main objective of the workshop is to achieve a joint understanding of the indicators of CSCAF. He also introduced each session and the content.



Figure 4 Mr. Anand Iyer & Ms. Friederike Thonke, Briefing about the technical sessions

A template for each category was provided for table discussion and booklet on CSCAF indicators was given to each participant for broader understanding of the indicators. The participants recorded their understanding of the indicators for each category, evidence to be collected and the described data sources for the same. At the end of each session these open questions were discussed and recorded. The sessions were also moderated by table hosts from GIZ and NIUA who facilitated the participants to work on the template and then summarise the critical questions.

Participants were encouraged to freely share knowledge and experiences and engage in teamwork and cross-cities cooperation to contribute to a successful workshop.

## Template:- Air & Mobility

Mobility & Air		City:	Date:
<b>Indicator 1: Low Carbon Mobility</b> Did you understand the evidences to be collected in the indicator? Yes No Are you clear on where to get the data from? Yes No Please list below if you have any specific questions on the indicator		<b>Indicator 2: Green Public Transport</b> Did you understand the evidences to be collected in the indicator? Yes No Are you clear on where to get the data from? Yes No Please list below if you have any specific questions on the indicator	
<b>Indicator 01</b>			
<b>Indicator 3: Public Transport Ridership</b> Did you understand the evidences to be collected in the indicator? Yes No Are you clear on where to get the data from? Yes No Please list below if you have any specific questions on the indicator		<b>Indicator 4: Air Quality (research/ Data, Planning and Implementation) Clean Air Action Plan</b> Did you understand the evidences to be collected in the indicator? Yes No Are you clear on where to get the data from? Yes No Please list below if you have any specific questions on the indicator	
<b>Indicator 5: Level of Air Pollution</b> Did you understand the evidences to be collected in the indicator? Yes No Are you clear on where to get the data from? Yes No Please list below if you have any specific questions on the indicator			

## Indicator 01 :- Air & Mobility

CATEGORY: MOBILITY AND AIR					
Indicator 1: Low Carbon Mobility Plan					
<b>Description:</b> To what extent does the city show preparedness towards low carbon initiatives and climate resilience along with the stakeholders involved?					
<b>Methodology:</b> In order to reduce its emission and control the pollution levels connected to mobility, the city must plan, initiate and implement low carbon mobility actions as per CMP/LCMP/CTTS with focus on low carbon mobility					
Max. Score: 40					
Performance Evaluation Levels:					
Progression Levels	0	1	2	3	4
	No thinking	A citywide assessment/plan for mobility exists	A Plan with specific focus on low carbon mobility exists	Low carbon projects are funded and under implementation	Regular Monitoring & Streamlining
Evidence/Data sources		<ul style="list-style-type: none"> <li>A city supported document with mobility status assessment, CDP, SCP, GIS based Masterplans</li> </ul>	<ul style="list-style-type: none"> <li>CMP/LCMP/CTTS comprising measures like TOD, Multi-Modal Interchanges &amp; Integrated fare proposed, PT Modernization plans, NMT Infrastructure prepared in consultation with relevant stakeholders</li> <li>Clear visions on parking policies</li> </ul>	<ul style="list-style-type: none"> <li>City Budget, Funding approval letter, funds available under Smart city initiatives</li> <li>Initiation of implementation of measures, DPRs with approval</li> <li>Approved parking policies in city.</li> </ul>	<ul style="list-style-type: none"> <li>All projects implemented as per approved DPRs</li> <li>Plans updated periodically</li> <li>Project impact assessment study</li> <li>Public awareness creation events</li> <li>Approved CMP/LCMP integrated in Master Plan to ensure better coordination and development</li> </ul>
Responsible Agency/ Department	Municipal Corporation, Public Transport companies SPV's - , City Development Authority, Smart City SPV's				
Score	0	10	20	30	40

Figure 5: Explanation of Templates & Indicator ( Example : Air & Mobility)

### 2.2.2 Expectations from participants - Group Work for Unpacking Indicators

Following the presentations, the partners voiced their expectations in a lively discussion. During the round of introductions, participants formed small groups (as per State preferably) consisting of table hosts from GIZ and NIUA on each table to work with the participants throughout the day in unpacking the indicators and putting in questions, suggestions, and comments.

As per the agenda of the workshop, each indicator was unpacked in detailed by the technical expert from the category. Each table was provided 10 minutes for internal discussions and presented the outcomes of the dialogues at the end of each session.



Figure 6: Participants from Partner cities sharing their expectations

Objectives:-

- To create sensitivity that different indicator formulations may focus on different aspects and thus measure different dimensions.
- Accountability on the availability of data – Understanding the methodology & the scoring process (in Indicators).
- Q&A – Open forum for the suggestions, queries & further understanding of any indicators.

### 3. UNPACKING INDICATORS

#### 3.1.1 Unpacking Indicators on WASTE MANAGEMENT

##### Q&A and Suggestions

##### Indicators on WASTE MANAGEMENT

- **Indicator 1 (ID – 01)** : City demonstrates reduction of waste generation per capita in last 5 years
- **Indicator 2 (ID – 02)** : Extent of recyclables recovered and SCF/RDF Utilised
- **Indicator 3 (ID – 03)** : City monitors SWM Value Chain through IT interventions and smart monitoring
- **Indicator 4 (ID – 04)** : Recycled Aggregates (RA) and Recycled Concrete Aggregates (RCA) derived from City construction and demolition (C&D) waste are Utilised
- **Indicator 5 (ID – 05)** : Percentage of GHG emission reduced due to improved processing facilities
- **Indicator 6 (ID – 06)** : Scientific Landfill is available with city as per SWM Rules, 2016
- **Indicator 7 (ID – 07)** : Plan prepared and implemented for scientific landfill/dumpsite closure considering GHG emissions



*Figure 7: Waste Management Technical Experts*

Indicator No ( ID)	Q&A	Suggestions
<ul style="list-style-type: none"> <li>• <b>ID – 01</b></li> <li>• <b>ID - 02</b></li> </ul>	<ul style="list-style-type: none"> <li>• What do you mean by quartile? Please specify the system of rating amongst 1 to 4 quartile</li> <li>• How to calculate the reduction in waste?</li> <li>• Does e-waste/biomedical waste count for waste generation?</li> <li>• Trivandrum has policy for decentralised waste management after closure of landfill site. What should we do ?</li> <li>• Why is informal sector considered as acceptable recycling facility?</li> <li>• What is the level of details required for evidence / data sources? (for example sale receipts: quantity, number, period, value)</li> <li>• Why measure RDF itself if it's intention is to reduce RDF?</li> </ul>	<ul style="list-style-type: none"> <li>• The categorization is missing( link to SWM rule could be provided)</li> <li>• Difficult to reduce waste generated with increasing population.</li> <li>• Including rag pickers as informal sector recyclers.</li> <li>• Include time period (one time, annual, 10 years, etc.) for all indicators.</li> <li>• RDF is not necessarily a good/effective solution. Indicator should not specify any technology</li> </ul>

Indicator No ( ID)	Q&A	Suggestions
<ul style="list-style-type: none"> <li>• ID – 03</li> <li>• ID – 04</li> <li>• ID – 05</li> </ul>	<ul style="list-style-type: none"> <li>• We have completed most of the evidences required till Level 3 but one evidence at Level 1 is missing. will be considered for level 3 or level 1?</li> <li>• Our SWM chain is contracted out to 3rd party agency so how can we monitor that?</li> <li>• If the city is not having an ICCC but they are monitoring the SWM system regularly will this be considered?</li> <li>• The source for this data is not clear.</li> <li>• The C&amp;D waste sector is unorganized so how to obtain the data?</li> <li>• How to utilize 100% C&amp;D waste?</li> <li>• In case C&amp;D waste is managed on-site by filling/levelling low lying areas (but not collected), will it be considered as utilized?</li> <li>• If C&amp;D processing land is located in another Municipality, can we still claim for the 4th level?</li> <li>• Data is not available because GHG emission is not maintained by municipality. Where can I find a GHG inventory at the city level?</li> <li>• What do you mean by quantum of product produced monthly?</li> <li>• What will be the unit for quantum?</li> <li>• GHG emission must be calculated from savings in fuel on door-to-door collection</li> <li>• Evidence is not clear</li> <li>• Which facilities are considered in the processing facilities?</li> </ul>	<ul style="list-style-type: none"> <li>• Setting up recycling facility has its own environmental concern and demands energy, is this considered in the framework ?</li> <li>• Safety and health parameters to be added in the indicators. <u>Corrections</u> - No vehicle with separate compartment but segregated waste collection on different days so will this data be considered?</li> <li>• Some examples could be shared on how to achieve the level 4.</li> <li>• E-waste and bio medical wastes are not included.</li> <li>• The type of processing facilities should be included.</li> <li>• Current levels of GHG emissions need to be calculated before proceeding further.</li> </ul>

Indicator No ( ID)	Q&A	Suggestions
<ul style="list-style-type: none"> <li>• ID – 06</li> </ul>	<ul style="list-style-type: none"> <li>• NIL</li> </ul>	<ul style="list-style-type: none"> <li>• Scientific data on other waste category to be included like e-waste rules, plastic waste rules etc.</li> <li>• Why not ban landfills if other process of waste management are efficient?</li> </ul>
<ul style="list-style-type: none"> <li>• ID – 07</li> </ul>	<ul style="list-style-type: none"> <li>• No land is available for scientific landfill since we implement bio-mining in the state</li> </ul>	<ul style="list-style-type: none"> <li>• Include reclamation of landfill sites as an indicator</li> </ul>



### 3.1.2 Unpacking Indicators on WATER RESOURCE MANAGEMENT

#### Q&A and Suggestions

#### Indicators on WATER RESOURCE MANAGEMENT

- **Indicator 1 (ID – 01)** : Has city conducted a water resource assessment?
- **Indicator 2 (ID – 02)** : Trend for NRW over the last three years
- **Indicator 3 (ID – 03)** : Does the city have a storm water drainage plan that considers climate risks
- **Indicator 4 (ID – 04)** : Percentage of wastewater treated to prescribed standards as per CPCB and reused.
- **Indicator 5 (ID – 05)** : Energy efficient wastewater management system in the city
- **Indicator 6 (ID – 06)** : Energy efficient water supply system in the city

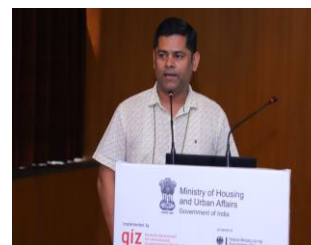


Figure 8: Water Resource Management- Technical Experts

Indicator No ( ID)	Q&A	Suggestions
<ul style="list-style-type: none"> <li>• ID – 01</li> <li>• ID – 02</li> <li>• ID – 03</li> <li>• ID – 04</li> </ul>	<ul style="list-style-type: none"> <li>• NIL</li> <li>• How do we account for the ground water extraction (borewell)</li> <li>• No NRW in Gwalior- indicator not valid</li> <li>• What if there is no Metrological rain gauge station at city level but available at state level?</li> <li>• What sort of plan is supposed here? We have a complete DPR in our city with AMRUT, will this count as evidence?</li> <li>• If 10% of secondary and 10% of tertiary wastewater treatment is achieved, which level will apply?</li> <li>• What kind of reuse will be considered?</li> <li>• Treated waste water is disposed to near by water bodies, does this quality as 'reused' (no buyers) ?</li> </ul>	<ul style="list-style-type: none"> <li>• Rain water harvesting should also be included</li> <li>• Other formula could be: Annual water supplied against annual revenue earned</li> <li>• Alternate sources of data should be specified</li> <li>• INCA report can be considered for rainfall data</li> <li>• Please have combination of STW &amp; TTW in the performance level</li> <li>• Add smart metering as parameter</li> </ul>



Indicator No ( ID)	Q&A	Suggestions
<ul style="list-style-type: none"> <li>• ID – 05</li> </ul>	<ul style="list-style-type: none"> <li>• What is the required periodicity of data: is work order for pump replacement sufficient?</li> <li>• Waste water also include storm water?</li> </ul>	<ul style="list-style-type: none"> <li>• The city tier should be considered in this indicator as well as the number of pumps will depend on the city population</li> <li>• The unit for measuring efficiency of pumps to considered instead of BEE ratings</li> <li>• Lake/river conservation has not ben considered</li> </ul>
<ul style="list-style-type: none"> <li>• ID – 06</li> </ul>	<ul style="list-style-type: none"> <li>• What sort of energy efficient pumps are you supporting here? In cities are we considering gravity flow system – does this count as a data source?</li> </ul>	<ul style="list-style-type: none"> <li>• The city tier should be considered in this indicator as well as the number of pumps will depend on the city population.</li> </ul>

### 3.1.3 Unpacking Indicators on MOBILITY AND AIR

#### Q&A and Suggestions

#### Indicators on MOBILITY AND AIR

- **Indicator 1 (ID – 01)** : Low Carbon Mobility
- **Indicator 2 (ID – 02)** : Green Public Transport
- **Indicator 3 (ID – 03)** : Public Transport Ridership
- **Indicator 4 (ID – 04)** : Air Quality (research/ Data, Planning and Implementation)/ Clean Air Action Plan.
- **Indicator 5 (ID – 05)** : Level of Air Pollution



Figure 9: Mobility and Air - Technical Experts

Indicator No ( ID)	Q&A	Suggestions
<ul style="list-style-type: none"> <li>• <b>ID – 01</b></li> </ul>	<ul style="list-style-type: none"> <li>• The plans of which year will be considered?</li> <li>• We don't have a plan like CMP / LCMP but we are investing in the public transport projects considering TODs and other developments. Will this be considered for evaluation?</li> <li>• Electric autos and electric rickshaws tendered. Will it be considered ?</li> </ul>	<ul style="list-style-type: none"> <li>• NMT should be considered strongly as an indicator or at least an output because when we are looking the GHG emission and climate change</li> <li>• Need definitions for the key-terms addressed in this indicator</li> <li>• CMP study for the city often has limited carbon initiative steps marked. Revised study shall incorporate the LCMP for promising e-mobility and clarifying infrastructure to be done NMT being promoted and public bicycle sharing</li> <li>• How many cities have banned vehicles in city centers can be another indicator.</li> </ul>

Indicator No ( ID)	Q&A	Suggestions
<ul style="list-style-type: none"> <li>• ID – 02</li> </ul>	<ul style="list-style-type: none"> <li>• What is the definition of green fleet? Definition in cities may vary.</li> <li>• Are city buses running on CNG considered as green fleet?</li> <li>• Is electricity generation taken into account for electric buses?</li> <li>• There is no public transport in the city, only private e-rickshaws. What should we do ?</li> <li>• Can battery operated vehicles be considered green transport?</li> <li>• No public transport in the city- most unorganized sector- how do we collect data?</li> <li>• Electric buses are there but insufficient charging points. What should we do ?</li> </ul>	<ul style="list-style-type: none"> <li>• You should also consider other Travel Demand Management techniques like Congestion Pricing, Staggered Work Timings, Odd-even Vehicular Rationing, car-free zoning, etc.</li> <li>• CNG buses should get a better ranking than electric buses.</li> <li>• Definition of green fleet to be included.</li> <li>• Letter to State Transport Department will be helpful.</li> </ul>
<ul style="list-style-type: none"> <li>• ID – 03</li> </ul>	<ul style="list-style-type: none"> <li>• Please specify sources of ridership data in case of absence of any Mobility Plan or study?</li> <li>• Please indicate that only organized/formal public transport is relevant.</li> <li>• Cities that doesn't not have formalized public transport system how will they be considered?</li> <li>• Will IPTs/state transport system in the city considered as public transport?</li> <li>• If we are considering IPTs then how will we get the ridership data?</li> <li>• Transportation is with the State Govt not City authority. What should be done in this context ?</li> </ul>	<ul style="list-style-type: none"> <li>• Accounting for private vehicle growth should also be considered because public transport ridership can increase because of population growth</li> <li>• Need definitions for the key-terms addressed in this indicator</li> <li>• The base year for the calculation of the increase in public transport should be 2010 as JNNURM project buses were introduced in most Indian cities that year.</li> <li>• Increase in public transportation should also coordinate with the increase in number of buses in the fleet, reduction in registration of private vehicles</li> </ul>

Indicator No ( ID)	Q&A	Suggestions
<ul style="list-style-type: none"> <li>• ID – 04</li> <li>• ID – 05</li> </ul>	<ul style="list-style-type: none"> <li>• Data on air quality is only available for the last two years and not five, how do we calculate?</li> <li>• The cities with industries should report the Air quality monitoring of industries also or not?</li> <li>• Can we also use satellite base weather forecast data like Skynet/ weather.com/ accuweather</li> </ul>	<ul style="list-style-type: none"> <li>• Noise pollution should be included</li> <li>• Need to consult with the District level Pollution Control Board</li> <li>• Project impact assessment study can only be done if city has available data for last five years. Our city only has monitoring of last two years.</li> <li>• This indicator should be link to ICC</li> <li>• SPCB should also play an active role in this else it will be difficult to get data.</li> </ul>

### 3.1.4 Unpacking Indicators on ENERGY AND GREEN BUILDINGS

#### Q&A and Suggestions

##### Indicators on ENERGY AND GREEN BUILDINGS

- **Indicator 1 (ID – 01)** : Total electrical power in city derived from renewable energy sources
- **Indicator 2 (ID – 02)** : Per capita and Per area electricity consumption for municipal services\*
- **Indicator 3 (ID – 03)** : Per capita fossil fuel (Diesel, Petrol, CNG, LPG) consumption for municipal services
- **Indicator 4 (ID – 04)** : Energy efficient street lighting in the city
- **Indicator 5 (ID – 05)** : Level of compliance procedures in place for green buildings
- **Indicator 6 (ID – 06)** : Percentage of buildings (commercial & residential) securing green building ratings (ECBC minimum base and additionally /BEE/third party framework)



Figure 10: Energy And Green Buildings Technical Experts

Indicator No ( ID)	Q&A	Suggestions
<ul style="list-style-type: none"> <li>• ID – 01</li> <li>• ID – 02</li> <li>• ID – 03</li> </ul>	<ul style="list-style-type: none"> <li>• Solar energy is generated at household or building level which is not connected to grid, will it be considered?</li> <li>• Net meter data can be accepted?</li> <li>• What about off grid renewable energy sources installed by private buildings?</li> <li>• Would like to have clarity on benchmark for better understanding</li> <li>• 10% of our city in under salt pans and no electricity is supplied to that area but it is included in the total city area. How will this be tackled?</li> <li>• For newly formed cities Census data is not available so which population data to be consider?</li> <li>• Municipality rents out municipal vehicles to other cities. How to account?</li> <li>• LPG is a cleaner fuel though it is a fossil fuel, why it is included in this? Then municipality has to use only electric buses?</li> </ul>	<ul style="list-style-type: none"> <li>• Please include other sources can be State Renewable Energy Agency</li> <li>• NIL</li> <li>• Specify unit for fossil fuel consumption</li> </ul>

Indicator No ( ID)	Q&A	Suggestions
<ul style="list-style-type: none"> <li>• ID – 04</li> <li>• ID – 05</li> <li>• ID – 06</li> </ul>	<ul style="list-style-type: none"> <li>• NIL</li> <li>• EOL index has already shown that data of buildings with certificates are not available</li> <li>• Whether only digital certificates are considered or manual certificate will also be considered for green building certification?</li> <li>• What is green building?</li> <li>• In this regard we have no source of data right now. What should we consider ?</li> <li>• NIL</li> </ul>	<ul style="list-style-type: none"> <li>• NIL</li> <li>• City level data should be collected by National agency and handed to cities (Erode)</li> <li>• Municipal Corporation has no such information in our city. A separate survey is required for collecting detailed information.</li> <li>• Third party certification should not be the benchmark</li> <li>• Rating must be given with 5 years operation as green building</li> </ul>

### 3.1.5 Unpacking Indicators on URBAN PLANNING, GREEN COVER, AND BIODIVERSITY

#### Q&A and Suggestions

#### Indicators on URBAN PLANNING, GREEN COVER, AND BIODIVERSITY

- **Indicator 1 (ID – 01)** : Climate Action Plan (mitigation and adaptation) prepared and implemented by the city
- **Indicator 2 (ID – 02)** : Disaster Risk Preparedness
- **Indicator 3 (ID – 03)** : Change of land-use from water bodies/ forest/ green/ agriculture to built-up/ notified/ developed areas
- **Indicator 4 (ID – 04)** : Proportion of Green Cover
- **Indicator 5 (ID – 05)** : Proportion of native tree species constituting the Green Cover
- **Indicator 6 (ID – 06)** : Urban Biodiversity



Figure 11: Urban Planning, Green Cover, and Biodiversity Technical Experts

Indicator No ( ID)	Q&A	Suggestions
<ul style="list-style-type: none"> <li>• ID – 01</li> </ul>	<ul style="list-style-type: none"> <li>• What are data sources for GHG emissions and related for the inventory?</li> <li>• Climate change action plans are being prepared at the state level as guidelines from MoEFCC. Is it practical to implement and prepare a climate action plan at the district level?</li> <li>• Climate Action Plan established in flood affected areas only. Will it be considered ?</li> <li>• Can SPV funds be utilized for development of plans such as Climate Action Plan, Biodiversity Management Plan?</li> </ul>	<ul style="list-style-type: none"> <li>• ULB is not the responsible agency in many smaller cities</li> </ul>
<ul style="list-style-type: none"> <li>• ID – 02</li> </ul>	<ul style="list-style-type: none"> <li>• Usually the disaster management plan is prepared at state level and there is a state disaster management cell , how will this be considered?</li> </ul>	<ul style="list-style-type: none"> <li>• This hotspots can be integrated with the ICCC</li> </ul>



Indicator No ( ID)	Q&A	Suggestions
<ul style="list-style-type: none"> <li>• <b>ID – 03</b></li> <li>• <b>ID – 04</b></li> <li>• <b>ID – 05</b></li> <li>• <b>ID – 06</b></li> </ul>	<ul style="list-style-type: none"> <li>• Where to get the data? LPR (Land Property Records), State remote sensing institutes can be alternative sources.</li> <li>• What is heat island and how to calculate decreased level of Heat Island?</li> <li>• From where can we get the 10 years satellite image data?</li> <li>• Will town planning authority approval be considered?</li> <li>• What is URDPFI?</li> <li>• What constitutes green cover? Will agricultural land be considered?</li> <li>• Any other evidence other than forest department and satellite image</li> <li>• In our town 10% of area is covered by salt pans and this will affect our green cover. How to increase green cover? (Thoothukudi)</li> <li>• For green cover can master plan be submitted as evidence?</li> <li>• Lidar survey was done for masterplan in 2013- data outdated ?</li> <li>• Who defines native species?</li> <li>• How to calculate the total tree population?</li> <li>• What could be alternate sources to ULB or when Biodiversity Management Committee is not in place? For example educational institutions, universities, scientific journals etc. Please specify.</li> <li>• Where is the biodiversity data available?</li> </ul>	<ul style="list-style-type: none"> <li>• The city boundaries were much smaller 10 years ago. Municipal area 10 years ago should be included in the formula</li> <li>• While changing land use there should be some guideline to restore the natural resources</li> <li><u>Corrections</u> - The indicator title to be “Change of land-use to water bodies/ forest/ green/ agriculture from built-up/ notified/ developed areas “</li> <li><u>Corrections</u> - In level 4 it says “Increase in area/percentage” but how is heat island related to increase in area</li> <li>• There should be level 5 which indicates more than 12% green cover</li> <li>• PWD and horticulture department to be added in sources of data</li> <li>• City wide data isn’t accurate</li> <li>• Data can be obtained from Peoples biodiversity register and tree census data</li> </ul>

### 3.1.6 General Suggestions



- Abbreviations to be provided
- Links to available sources of data
- Best practices/case studies
- Some of the indicator terminologies needs further explanations like green fleet, green cover etc.
- Public outreach and awareness measures taken by the city must be included as an indicator
- A letter from the ministry must go to other departments which will make data collection easy
- To remove ambiguity and data/information manipulation, provide a specific list of documents that are required from cities to support each indicator and their respective levels.
- Additionally reframe indicators into a) Yes b)No c) Underway category supported with documentary evidence therefore making answers objective
- Letters from central government to Mayors, State Mission Directors, Transport corporations will help in data collection



Figure 12 Addressing the suggestions of the workshop

### 3.2 NEXT STEPS AND CLOSING SESSION



*Figure 13: Mr. Anand Iyer, Address the participants : Introducing online portal*

At the end of the day Mr. Anand Iyer, presented the timelines of the CSCAF, how to input the required data, mock-up of the online portal, and described the helpdesk that will be available to support the cities. He also noted the framework is not a “grading” or “ranking” system comparing the cities, nor is it intended as a sub-mission or strategy for funding activities or projects. Majorly, the actions through a set of indicators have a clear climate focus and are more credible when submitted to various sources of funding, national & international.

He focused on the ClimateSMART Cities Assessment Framework will serve as a tool for cities to assess their present situation and will facilitate cities to adopt, implement and disseminating the best practices adopted by our cities.



*Figure 14: Mr. Kunal Kumar, highlighting the way forward & wrapping up the workshop*

Mr. Kumar summed up the workshop by motivating the participants to take the CSCAF as a self-assessment tool and to work proactively towards achieving the benchmarks. He mentioned that this will be a long-term bi-annual process, and the cities have to upgrade their own standards in order to progress to the next levels of each indicator. He also emphasised that the indicators would assist the cities in identifying the actionable steps and projects in their individual contexts bring about the required changes in the administrative structures and policy making processes. He lastly mentioned on the importance of utilising new technologies and digital evolution to achieve the objectives of ClimateSMART Cities.



*Figure 15: Mrs. Vaishali Nandan, “delivering the Vote of Thanks*

Mrs. Nandan thanked the participants for their valuable inputs and active participation. She stressed on the necessity of working together through integration between various departments of the city and the State. She also expressed her happiness that the workshop could bring all participants on the same page and ensured that the sessions were understood and that the exercises could be completed by all participants.

The workshop ended with a vote of thanks to all present.



**CLIMATE SMART CITIES - CLUSTER WORKSHOP**



## ANNEXURE 1: AGENDA FOR THE WORKSHOP

    	
<h3>Agenda for Cluster Workshop on ClimateSMART Cities Assessment Framework</h3> <p><b>Venue:</b> Magnolia Conference Hall, India Habitat Centre, New Delhi <b>Date:</b> 15 April, 2019</p>	
Time	Topic/Details
09:30 – 10:00	<b>Registration</b>
10:00 – 10:05	<b>Welcome and Background</b> <i>Mr. Anand Iyer, Chief Project Manager, NIUA</i>
10:05 - 10:10	<b>Opening Remarks</b> <i>Mrs. Vaishali Nandan, "Climate Smart Cities" Project Manager, GIZ India</i>
10:10 – 10:30	<b>Context setting</b> Introductory remarks and expected results <i>Mr. Kunal Kumar, JS (Smart Cities Mission) MoHUA, GoI</i>
10:30 – 10:40	<b>Presentation on the ClimateSMART Cities Assessment Framework and introduction to table work</b> <i>Mr. Anand Iyer, Chief Project Manager, NIUA</i>
10:40 – 11:00	<b>Tea Break</b>
11:00 –11:40	Unpacking Indicators on Mobility and Air Quality <ul style="list-style-type: none"> <li>- Presentation on indicators and test run feedback (15min)</li> <li>- Table Work to understand the indicators (15 Min)</li> <li>- Q&amp;A Session (10 min)</li> </ul>
11:40 - 12:20	Unpacking Indicators on Urban Planning, Green Cover and Biodiversity <ul style="list-style-type: none"> <li>- Presentation on indicators and test run feedback (15min)</li> <li>- Table Work to understand the indicators (15 Min)</li> <li>- Q&amp;A Session (10 min)</li> </ul>
12:20- 13:00	Unpacking Indicators on Solid Waste Management <ul style="list-style-type: none"> <li>- Presentation on indicators and test run feedback (15min)</li> <li>- Table Work to understand the indicators (15 Min)</li> <li>- Q&amp;A Session (10 min)</li> </ul>
13:00- 14:00	<b>Lunch</b>
14:00-14:40	Unpacking Indicators on Energy and Green Buildings <ul style="list-style-type: none"> <li>- Presentation on indicators and test run feedback (15min)</li> <li>- Table Work to understand the indicators (15 Min)</li> <li>- Q&amp;A Session (10 min)</li> </ul>
14:40 – 15:20	Unpacking Indicators on Water Resource Management <ul style="list-style-type: none"> <li>- Presentation on indicators and test run feedback (15min)</li> <li>- Table Work to understand the indicators (15 Min)</li> <li>- Q&amp;A Session (10 min)</li> </ul>
15:20 – 15:40	<b>Tea Break</b>
15:40 – 15:55	<b>Presentation on the ClimateSMART Cities Assessment Framework- Timelines, Online Portal and Helpdesk</b> <i>Mr. Anand Iyer, Chief Project Manager, NIUA</i>
15:55 – 17:10	Open Discussion on Assessment Framework Chaired by <i>Mr Kunal Kumar, JS (Smart Cities Mission) MoHUA, GoI</i>
17:10 - 17:20	<b>Summary of discussions</b> <i>Mrs. Vaishali Nandan, "Climate Smart Cities" Project Manager, GIZ India</i>
17:20 – 17:30	<b>Concluding remarks and way forward</b> <i>Mrs. Archana Mittal, Director (Smart Cities Mission) MoHUA, GoI</i>

## ANNEXURE 2: CLIMATE SMART CITIES ASSESSMENT FRAMEWORK



Ministry of Housing  
and Urban Affairs  
Government of India

# Climate Smart Cities Assessment Framework

**Cluster Workshops for Smart Cities**

*India Habitat Centre, New Delhi*

*08, 09, 10 & 15 April, 2019*

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### STRUCTURE OF PRESENTATION

- NEED
- OBJECTIVES
- PROCESS FOLLOWED SO FAR
- BROAD SECTORS AND WEIGHTS
- INDICATORS IN EACH SECTOR
- ONWARD PROCESS



## NEED

- Cities accounting for GHG emissions but also at severe risk of climate change
- Need for steps in consonance with the NDCs for India towards SDGs of the UN
- Navigating a plethora of indices, frameworks, terminologies and consequent actions
- Bringing together different departments, plans and data points towards a single aim

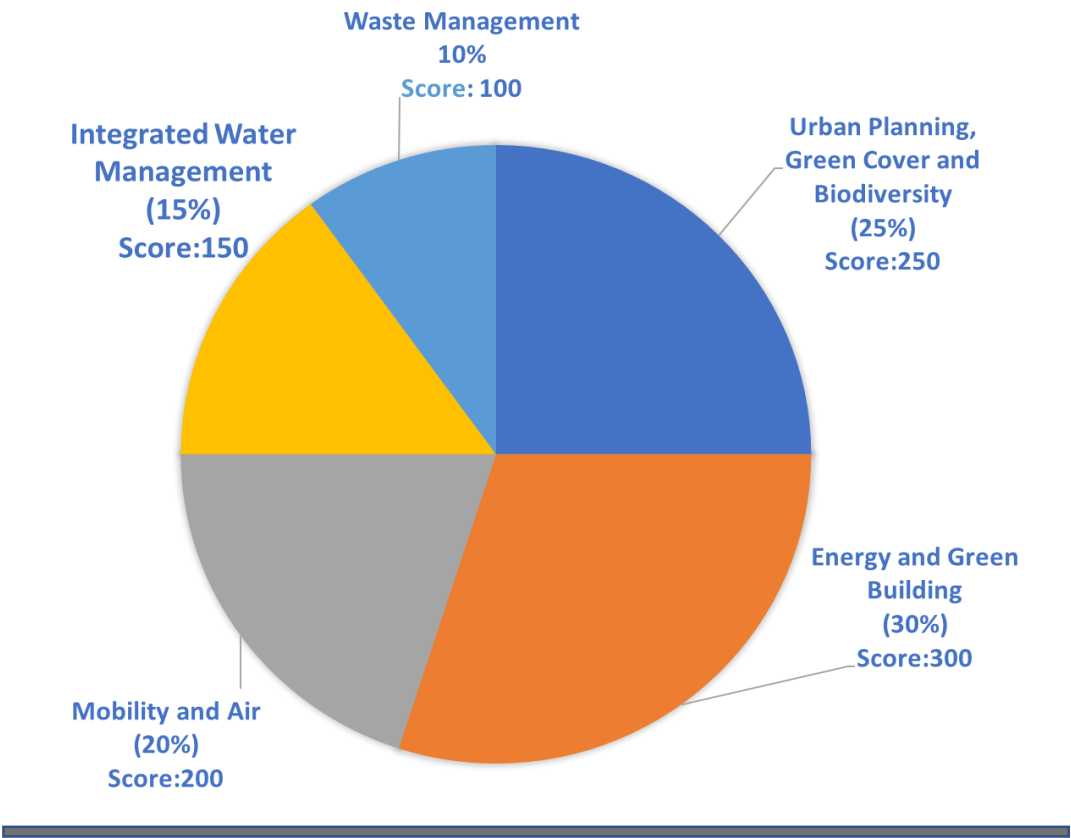
### Existing Frameworks Studied for CSC Framework

Organisation/ Agency	Framework
World Bank	Global City Indicator Ranking Framework
European Union	"CITYkeys indicators" for Smart Cities & Projects
Asian Development Bank	Climate Risk Assessment and Screening Framework
Rockefeller Foundation - Cities Development Initiative Asia	Climate Resilience Project Screening tool
C40	Global Aggregation of City Climate Commitments
U.S. Green Building Council	LEED v4.1; Cities and Communities: Existing; 2018
Siemens and Economist Intelligence Unit	The Green City Index
Germanwatch, Berlin	Climate Risk Index 2019
Confederation of Indian Industry – Indian Green Building Council (CII-IGBC)	"Green Cities" (for existing cities)
The Energy & Resources Institute – Green Rating for Integrated Habitat Assessment (TERI-GRIHA)	GRIHA for Cities
<b>Frameworks and Indices of the MoHUA itself:</b> Liveability / Ease of Living, Swachh Suvakshan, and the Mission monitoring	
<b>Lesson:</b> Each Index is "complete" or congruent in itself based on its main objective, set scope and implementation aspects. For Climate Assessment in the Smart Cities, need	

## OBJECTIVES

- Measurement framework that is objective, contextual, functional & practical
- Mitigation and Adaptation aspects into a single framework
- Tool that is useful for assessment, for guiding action and for planning projects
- Roadmap for action. Not only an assessment, not linked to funding, no comparison





Indicators					
Description					
Methodology					
Benchmark					
Formula / Unit					
Levels					
0	1	2	3	4	
Scores as per weight of each indicator					
Agency / Department to provide data					

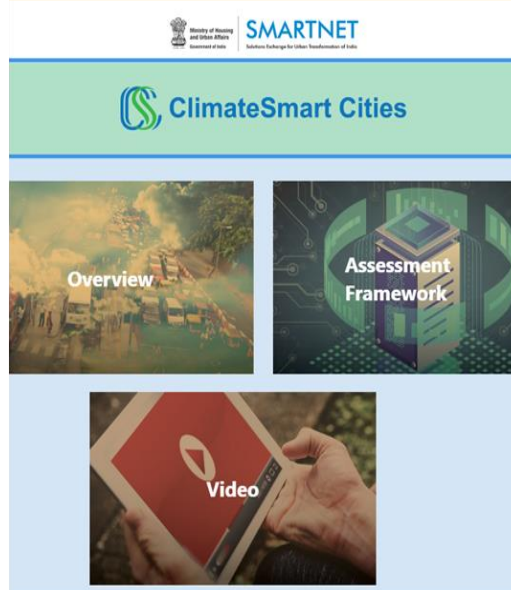
LIST OF AGENCIES FOR DATA COLLECTION AND CONSEQUENT ACTION			
	Thematic Area	No.	Agency
A.	Energy and Green Buildings	1	Public Works Department
		2	Town Planning Department
		3	Power Distribution Companies (DISCOMs)
		4	State Electricity Regulation Commission
		5	State (Renewable) Energy Development Agencies
		6	Building Plan Department of the City Corporation
B.	Mobility and Air Quality	1	Central Pollution Control Board
		2	State Pollution Control Board
		3	India Meteorological Department – Regional Centres
		4	State Environment Department
		5	City Transport Corporation / Transport SPV like BRTS, etc.
		6	State Transport Corporations
C.	Urban Planning, Green Cover and Biodiversity	1	State/District level Revenue Department
		2	State/District level Irrigation Department
		3	State/District level Disaster Management Agency
		4	State/Regional Remote Sensing Agency
		5	State Forest (& Horticulture if relevant) Dept.
		6	City Horticulture Dept.
		7	Biodiversity Management Authority
		8	Town Planning Department
D.	Waste Management	1	Material Recycling Facility Operator Agency
		2	Authorised Waste Collection / Transport / Processing Agency
		3	Building Plan Department of the City Corporation
E.	Water Resource Management	1	Central Water Commission
		2	State/District level Irrigation Department
		3	Port Authority (in coastal cities)
		4	Jal Boards – City level / Water Supply & Sewerage Board / Dept. of WSS

## Process and Timelines

- Launch: 26.02.2019
- Frequency: Bi-annual (presently planned)
- Submissions uploaded online on SmartNet (similar to the SCM Proposal form or CITIIS application)
- Form online by 01 May 2019
- Closed by 01 June 2019
- Helpdesk available for queries / support
- Evaluation by Expert Committee\*
- First round completion: July 2019

### \*Population tier-wise classifications:

- Tier 1: Population higher than 10 lakhs
- Tier 2: Population between 5 lakhs and 10 lakhs
- Tier 3: Population less than 5 lakhs



## INTENTION AND IMPLEMENTATION

- Aspirational step, but backed by sound research
  - Collective responsibility, and SCM as lighthouse mission
  - Honest & conscious self-assessment + evidence AND expert assessment
  - Guidance and onward projectization for the cities
  - Training and capacity building needs across cities
  - Evolution of the framework itself with feedback loops
- 
- Conscious Awareness, Informed Action, Noble Aim –  
*vasudhaiva kutumbakam*



Ministry of Housing  
and Urban Affairs  
Government of India



## Thank You

<https://smartnet.niua.org/csc>

Strategic Unit Led by:



ANNEXURE 3: CLIMATE SMART CITIES – CATEGORIES & INDICATORS



**ClimateSMART CITIES**  
ASSESSMENT FRAMEWORK

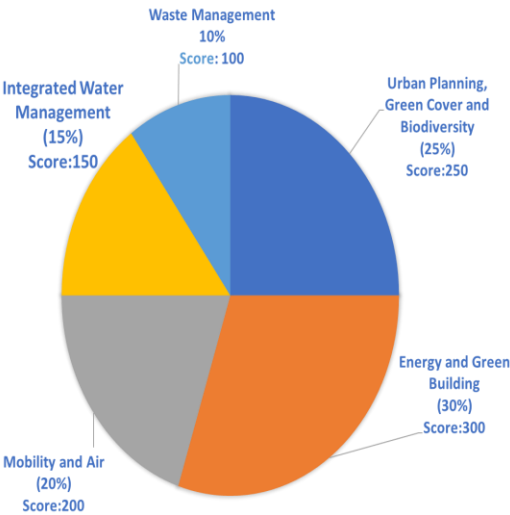
National Workshops for Smart Cities

8, 9, 10, and 15 April 2019 | India Habitat Centre, New Delhi



Weightages for  
CSC Assessment  
Framework

(Total Score:  
1000)





# CATEGORY: MOBILITY AND AIR



## Indicator 1: Low Carbon Mobility

To what extent does the city show preparedness towards low carbon initiatives and climate resilience along with the stakeholders involved?

	0	1	2	3	4
	No thinking	A citywide assessment/plan for mobility exists	A Plan with specific focus on low carbon mobility exists	Low carbon projects are funded and under implementation	Regular Monitoring & Streamlining
<b>Evidence/ Data sources</b>		A city supported document with mobility status assessment, City Development Plan, Smart City Plan, geographic information system (GIS) Based Masterplans	<ul style="list-style-type: none"> <li>➤ City Mobility Plan (CMP)/ Low Carbon Mobility Plan (LCMP)/ CTTS comprising measures like Transit Oriented Development (TOD) proposed, Multi-Modal Interchanges &amp; Integrated fare proposed, Public Transport Modernization plans, Non Motorised Transport (NMT) Infrastructure.</li> <li>➤ Clear visions on parking policies</li> </ul>	<ul style="list-style-type: none"> <li>➤ City Budget, Funding approval letter, funds available under Smart city initiatives</li> <li>➤ DPRs with approval</li> <li>➤ Approved parking policies in city.</li> </ul>	<ul style="list-style-type: none"> <li>➤ All projects implemented as per approved DPRs</li> <li>➤ Plans updated periodically</li> <li>➤ Project impact assessment study</li> <li>➤ Approved CMP/LCMP integrated in Master Plan to ensure better coordination and development</li> </ul>
<b>Responsible Agency/ Department</b>	Municipal Corporation, SPV's - Public Transport companies, City Development Authority, Smart City SPV's and PMC's				
<b>Score</b>	0	10	20	30	40



## Indicator 1: Low Carbon Mobility

Feedback:

	0	1	2	3	4
	No thinking	A citywide assessment/plan for mobility exists	A Plan with specific focus on low carbon mobility exists	Low carbon projects are funded and under implementation	Regular Monitoring & Streamlining
<b>Evidence/ Data sources</b>		➤ City wide mobility plan/transport assessment documentation available	➤ Available mobility plan includes components of low carbon transport such as NMT, parking policies etc.	➤ In some cases cities are funding low carbon mobility such as public bicycles plying on road and operation of e-rickshaws	➤ No update
<b>Responsible Agency/ Department</b>	Municipal Corporation, SPV's - Public Transport companies, City Development Authority, Smart City SPV's and PMC's				

## Indicator 2: Green Public Transport

Percentage of green fleet share versus the total public transport fleet

	0	1	2	3	4
	Green fleet not available	Green Fleet Share (>10%)	Green Fleet Share (>20%)	Green Fleet Share (>35%)	Green Fleet Share (>50%)
<b>Evidence/ Data sources</b>	➤ Annual fleet data from public transport companies				
<b>Responsible Agency/ Department</b>	Municipal Corporation, SPV's - Public Transport companies, City Development Authority, Smart City SPV's and PMC's, State Transport Corporations				
<b>Score</b>	0	5	10	20	30

Formula: 
$$\text{Percentage share of green fleet (\%)} = \frac{\text{Total no. of green public transport fleet operational in city}}{\text{Total no. of fleet under Public Transport operational in city}} \times 100$$

## Indicator 2: Green Public Transport

Feedback:

	0	1	2	3	4
	Green fleet not available	Green Fleet Share (>10%)	Green Fleet Share (>20%)	Green Fleet Share (>35%)	Green Fleet Share (>50%)
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ Data on green fleet and total public transport fleet available</li> <li>➤ In some case only district data might be available</li> <li>➤ Addition of UMTA as an agency</li> </ul>				
<b>Responsible Agency/ Department</b>	Municipal Corporation, SPV's - Public Transport companies, City Development Authority, Smart City SPV's and PMC's, State Transport Corporations				

## Indicator 3: Public Transport Ridership

Percentage increase of total Public Transport Ridership per lakh of city population over period of 5 years

	0	1	2	3	4
	No increase in Public transport ridership over past 5 years	Increase in public transport ridership at CAGR of 5% or more over past 5 years	Increase in public transport ridership at CAGR of 15% or more over past 5 years	Increase in public transport ridership at CAGR of 25% or more over past 5 years	Increase in public transport ridership at CAGR of >40 % or more over past 5 years
<b>Evidence/ Data sources</b>	➤ Annual Boarding data from public transport companies				
<b>Responsible Agency/ Department</b>	SPV's - Public Transport companies, Smart City SPV's and PMC's				
<b>Score</b>	0	5	15	25	40

Formula: input required for calculation:

Population 5 years ago	Population current year	total no of ridership 5 years ago	total no of ridership current year
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$$\text{CAGR (\%)} = \left( \frac{\text{Ridership at the end of 5th Year}}{\text{Ridership at the beginning of first year}} \right)^{(1/5 \text{ years})} - 1$$

### Indicator 3: Public Transport Ridership

Feedback:

	0	1	2	3	4
	No increase in Public transport ridership over past 5 years	Increase in public transport ridership at CAGR of 5% or more over past 5 years	Increase in public transport ridership at CAGR of 15% or more over past 5 years	Increase in public transport ridership at CAGR of 25% or more over past 5 years	Increase in public transport ridership at CAGR of >40 % or more over past 5 years
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ First parameter could be no increase or less than 5% CAGR</li> <li>➤ Ridership data would be "average daily" for the last quarter</li> <li>➤ Ridership for the pass holders? Factor of estimating the trips=2.5</li> </ul>				
<b>Responsible Agency/ Department</b>	SPV's - Public Transport companies, Smart City SPV's, PMC's, educational institutes or Universities				

### Indicator 4: Air Quality (research/ Data, Planning and Implementation)/ Clean Air Action Plan

To what extent the city has made efforts to measure and improve the air quality and reduce air pollution.

Progression Levels	0	1	2	3	4
	Basic Documentation	Scientific capturing of pollutants	Action Plan, Strategy development	Implementation of action plan	Monitoring and Revision
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ Monitoring Stations for measuring Ambient Air Quality (please indicate number of stations, differentiate between manual stations or continuous ambient air quality monitoring stations (CAAQMS))</li> </ul>	<ul style="list-style-type: none"> <li>➤ Method of monitoring air pollutants as specified in CPCB NAMP guidelines, 2003</li> <li>➤ Additional monitoring (Sensor based monitoring for measuring ambient air quality.)</li> <li>➤ Scientific CPCB/SPCB led source Apportionment Studies and Emissions Inventories/ any other study for identification of source of pollution including hot spot identification/ information on Source (based on satellite pictures/ other data)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Clean Air Action Plan (as per NCAP) developed based on scientific data captured</li> </ul>	<ul style="list-style-type: none"> <li>➤ Funding Allocation for identified measures</li> <li>➤ Initiation of implementation of measures</li> </ul>	<ul style="list-style-type: none"> <li>➤ Project impact assessment study</li> <li>➤ Plan updated periodically</li> </ul>
<b>Responsible Agency/ Department</b>	SPCB	SPCB, ULB, SPV,	SPCB, ULB, Transport Dept, Smart city SPV, environment dept		
<b>Score</b>	0	10	25	40	50

#### Indicator 4: Air Quality (research/ Data, Planning and Implementation)/ Clean Air Action Plan

Feedback:

Progression Levels	0	1	2	3	4
	Basic Documentation	Scientific capturing of pollutants	Action Plan, Strategy development	Implementation of action plan	Monitoring and Revision
<b>Evidence/ Data sources</b>	➤ Data available on manual and continuous air quality monitoring stations available in test run cities	➤ In some cases source appropriation studies conducted by technical organisations in partnership with ULB.  ➤ In some cases sensor based monitoring for measuring ambient air quality is being installed by ULB in partnership with technical organisations	➤ No update on city level Clean Air Action Plan	➤ No update	➤ No update
<b>Responsible Agency/ Department</b>	SPCB/ULB	SPCB/ULB	SPCB, ULB, Transport Dept, Smart city SPV, environment dept/technical organisations ((if any))		

#### Indicator 5: Level of Air Pollution

To what extent the city has achieved national and international air quality standards.

	0	1	2	3	4
	No Consideration	Basic Monitoring and Publishing of Data	Advanced Monitoring	Compliance with national pollution targets	Compliance with International pollution targets
<b>Evidence/ Data sources</b>		➤ Make data public- Present levels of criteria pollutants- PM10 PM2.5 NOx SOx (as per CPCB guidelines)	➤ Additional pollutants monitored, CO, O3, VOCs, etc. (WHO standards)  ➤ Hourly city air quality data in relation to national AQI is available in public domain	➤ Reduction according to NCAP target	➤ Achieve WHO Air quality standards
<b>Responsible Agency/ Department</b>		ULB, SPCB, SPV			
<b>Score</b>	0	10	20	30	40

**Indicator 5: Level of Air Pollution**

Feedback:

	0	1	2	3	4
	No Consideration	Basic Monitoring and Publishing of Data	Advanced Monitoring	Compliance with national pollution targets	Compliance with International pollution targets
Evidence/ Data sources		➤ Data is available on public domain (CPCB/SPCB websites)	➤ Not available in the test run cases. However, will be available with expected installation of sensor based monitoring stations	➤ No update	➤ Evaluation of annual average air quality data against WHO standards is possible
Responsible Agency/ Department		ULB, SPCB, SPV and technical organisations (if any)			

**CATEGORY: URBAN PLANNING, GREEN COVER, AND BIODIVERSITY**

**URBAN PLANNING,  
GREEN COVER,  
AND BIODIVERSITY**

- City Climate Action Plan
- Disaster Risk Preparedness
- Change of land-use
- Green Cover
- Proportion of native tree species
- Action Plan for biodiversity

02





### Indicator 1: Climate Action Plan (mitigation and adaptation) prepared and implemented by the city

The Climate Action Plan is developed as a comprehensive implementation plan covering all sectors, namely, waste management, integrated water management, mobility and air pollution, energy and green buildings; biodiversity, green cover, disaster risk preparedness, urban planning and others. It documents and proposes actions for both, climate change mitigation and adaptation based on a GHG emissions inventory and climate change vulnerability assessment, addressing all sectors listed above.

	0	1	2	3	4
	Not available	Baseline information	Plan prepared	Implementation	Regular Monitoring & Streamlining
Evidence/ Data sources		<ul style="list-style-type: none"> <li>➤ GHG emissions inventory</li> <li>➤ Climate Change Vulnerability assessment (see Disaster Risk Preparedness Indicator) including heat island (see Change of land-use Indicator) mapping conducted on city-level</li> </ul>	<ul style="list-style-type: none"> <li>➤ Climate Action Plan (mitigation and adaptation) prepared for the city</li> <li>➤ Framework for MRV system prepared</li> <li>➤ Climate coordination cell established</li> </ul>	<ul style="list-style-type: none"> <li>➤ Municipal budget and other funds allocated</li> <li>➤ Implementation of measures initiated</li> <li>➤ MRV system implemented for the city (GHG emissions)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Regular monitoring (bi-annual) of climate relevant actions indicated in the plan</li> <li>➤ Updated Climate Action Plan available</li> <li>➤ Relevant features from the Climate Action Plan incorporated in master plan to ensure sustainability</li> </ul>
Responsible Agency/ Department	ULB				
Score	0	25	40	65	80

### Indicator 1: Climate Action Plan (mitigation and adaptation) prepared and implemented by the city

Feedback:

	0	1	2	3	4
	Not available	Baseline information	Plan prepared	Implementation	Regular Monitoring & Streamlining
Evidence/ Data sources		<ul style="list-style-type: none"> <li>➤ If any such assessment has been done for the city, the data/information is mostly available at the ULB Level for e.g. Climate Resilient City Action Plan in Coimbatore.</li> <li>➤ In some cases, cities may have done either GHG mitigation or vulnerability assessment</li> <li>➤ GHG inventory and vulnerability assessment to have Pan City scope</li> </ul>	<ul style="list-style-type: none"> <li>➤ Developed climate action plan has includes adoption of MRV and formulation of coordination cell. May not be established</li> </ul>	<ul style="list-style-type: none"> <li>➤ Funds have been allotted in the municipal budget for the priority projects in accordance to the climate action plan</li> </ul>	<ul style="list-style-type: none"> <li>➤ It is not possible for city to incorporate in Master Plan (for some sectors it is possible not all)</li> <li>➤ Therefore approval and ratification of the plan by city council could be used showcase streamlining.</li> </ul>
Responsible Agency/ Department	State Disaster Management Authority Forest and Environment Department, State Government ULB				

## Indicator 2: Disaster Risk Preparedness

To what extent is the city resilient and shows preparedness to tackle natural and manmade disasters

	0	1	2	3	4
	No consideration of Disaster and Risk Reduction	Disaster Risk Reduction - assessment	Disaster Management Plan	Implementation	Monitoring and Updating
Evidence/ Data sources		<ul style="list-style-type: none"> <li>➤ Hazard Risk and Vulnerability Assessment</li> <li>➤ Hotspot are identified and Mapped</li> </ul>	<ul style="list-style-type: none"> <li>➤ Disaster risk reduction/ management Plan, prepared as per NDMA Guidelines; vetted by State DMA</li> <li>➤ Institutionalising and establishing of dedicated Disaster Management Cell/ nodal person within ULB (Not additional Charge to city Officer)</li> <li>➤ Report showing city level loss and damage data</li> </ul>	<ul style="list-style-type: none"> <li>➤ Functioning Early warning systems installed incl. helpline</li> <li>➤ Automated weather stations/ Weather Forecasting System installed</li> <li>➤ Municipal Budget/ Allocation of last financial year shows allocation</li> </ul>	<ul style="list-style-type: none"> <li>➤ Early warning systems / Automated weather stations/ Weather Forecasting System are linked to Integrated Command and Control Centres (ICCC) in Smart Cities for monitoring and managing emergency situations.</li> <li>➤ Updated Disaster risk reduction/ management plan available</li> </ul>
Responsible Agency/ Department		ULB in coordination with State and district level revenue/ irrigation department			
Score	0	10	20	30	40

## Indicator 2: Disaster Risk Preparedness

Feedback:

	0	1	2	3	4
	No consideration of Disaster and Risk Reduction	Disaster Risk Reduction - assessment	Disaster Management Plan	Implementation	Monitoring and Updating
Evidence/ Data sources		<ul style="list-style-type: none"> <li>➤ State level assessment has been done but in cases not available at city level.</li> </ul>	<ul style="list-style-type: none"> <li>➤ State/district level disaster management plans are available.</li> <li>➤ City specific plan may not be available; inclusion of city chapter in the State/district level disaster management plans can be checked.</li> <li>➤ In some cases city level team and department established</li> </ul>	<ul style="list-style-type: none"> <li>➤ Not much information on system installation however awareness workshops (ICT) organized.</li> </ul>	<ul style="list-style-type: none"> <li>➤ No update available</li> </ul>
Responsible Agency/ Department		State Disaster Management Authority Forest and Environment Department, State Government ULB			



### Indicator 3: Change of land-use from water bodies/ forest/ green/ agriculture to built-up/ notified/ developed areas

Percentage and area (acres) of conversion of land-use from water bodies/ forest/ green/ agriculture to built-up/ notified/ developed areas.

	0	1	2	3	4
	No information	Assessment of Land under natural resources (Green and blue area including forests, water bodies, Unbuilt open spaces)	Plan for conservation and rejuvenation of Land under natural resources	Allocation of budget and Implementation	Increase in area/ percentage
Evidence/ Data sources		<ul style="list-style-type: none"> <li>➤ Comparative Map prepared based on satellite images (current status and 10 years ago) + calculated percentage/ area (acres)</li> <li>➤ Comparative map of current status and existing, notified masterplan (focus: Total built-up area vs. Green/ blue area (% and acres).</li> </ul>	<ul style="list-style-type: none"> <li>➤ Identification and mapping of problematic areas in the cities including Heat-islands</li> <li>➤ Plan developed based on comparative analysis, heat island mapping, and all relevant development regulations/ guidelines as per state or national level eg. CRZ (applicable in coastal areas), EIA notification &amp; guidelines, URDPFI, protected areas acts (forests, national parks, water bodies/ wetlands), etc.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Municipal Budget allocated for conservation and rejuvenation of Land under Natural resources</li> <li>➤ Implementation of plan is initiated (utilisation certificate; by-law, notification of the area, constitution of a committee, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Percentage and area Green and blue area increased over 2019 levels</li> <li>➤ heat-island effect is decreased over 2019 level</li> </ul>
<b>Formula:</b> Level 1: $\frac{\text{Green Cover in acres (current year)} + \text{Water Bodies in acres (current year)}}{\text{land within municipal boundary in acres (current year)}} * 100 = \% \text{ (current)}$ , $\frac{\text{Green Cover in acres (10 years ago)} + \text{Water Bodies in acres (10 years ago)}}{\text{land within municipal boundary in acres (10 years ago)}} * 100 = \% \text{ (10 years ago)}$					
Score	0	10	20	30	40

### Indicator 3: Change of land-use from water bodies/ forest/ green/ agriculture to built-up/ notified/ developed areas

Feedback:

	0	1	2	3	4
	No information	Assessment of Land under natural resources (Green and blue area including forests, water bodies, Unbuilt open spaces)	Plan for conservation and rejuvenation of Land under natural resources	Allocation of budget and Implementation	Increase in area/ percentage
Evidence/ Data sources		<ul style="list-style-type: none"> <li>➤ Time Series analysis satellite maps /images may not be available with all the ULBs.</li> <li>➤ Local experts from educational institutions/universities can be checked for data</li> <li>➤ Some information may be available in city development plans and land use section of master plans</li> </ul>	<ul style="list-style-type: none"> <li>➤ Conservation and rejuvenation of green spaces/forests are usually done through central and state policies and plans.</li> <li>➤ City parks are being managed by ULBs.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Budgetary allocation for state managed land is through central and state funds.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Available in terms of park area, not city wide green and blue spaces.</li> <li>➤ It could be increase or decrease in the net area.</li> </ul>
Responsible Agency/ Department		ULB, Town planning department, State Forestry division, Development Authority and educational institutions/universities			

#### Indicator 4: Proportion of Green Cover

To what extent is the city taking action towards developing and increasing its green cover. Sufficiently large and protected greenspaces reduce the impact of anthropogenic pressures. The ecosystem services provided by the urban greenspaces help citizens adapt to the adverse effects of climate change and disasters.

	0	1	2	3	4
	Minimal Presence of green cover (less than 1%)	1-5% Green Cover (EOL 2.0)	5-9% Green Cover	9-12% Green Cover	More than 12% green cover
<b>Evidence/ Data sources</b>	➤ Forest Survey of India Reports ➤ Satellite imagery for the city				
<b>Responsible Agency/ Department</b>	ULB/ Forest Department				
<b>Score</b>	0	10	20	30	40

Formula:  $\frac{\text{Green Cover in acres}}{\text{land within municipal boundary in acres}} * 100$

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#### Indicator 4: Proportion of Green Cover

Feedback:

	0	1	2	3	4
	Minimal Presence of green cover (less than 1%)	1-5% Green Cover (EOL 2.0)	5-9% Green Cover	9-12% Green Cover	More than 12% green cover
<b>Evidence/ Data sources</b>	➤ Forest Survey of India Reports ➤ Satellite imagery for the city ➤ Environmental Status Reports ➤ Research documentations by educational institutions/universities				
<b>Responsible Agency/ Department</b>	ULB/ Forest Department/Town Planning Department				

### Indicator 5: Proportion of native tree species constituting the Green Cover

To what extent is the city acting towards developing and maintaining its green cover using an ecological approach, specifically focusing on native tree species. Native tree species contributing to climate change mitigation and adaptation, such as avoidance of erosion, mitigation of air pollution, reduction of water usage, regulation of microclimate, reducing the risk of disasters.

	0	1	2	3	4
	Minimal proportion of native tree species (less than 5%)	5-20% native tree species	20-50 % native tree species	50 - 70% native tree species	> 70% native tree species
<b>Evidence/ Data sources</b>	➤ Existing documentation of ecosystems and species in the city (including IUCN listed)- all forms of technical reports/ studies done on biodiversity in the city				
<b>Responsible Agency/ Department</b>	ULB/ Forest Department/ Universities				
<b>Score</b>	0	5	10	15	20

Formula:  $\frac{\text{number of trees of native species}}{\text{Total tree population}} * 100$

### Indicator 5: Proportion of native tree species constituting the Green Cover

Feedback:

	0	1	2	3	4
	Minimal proportion of native tree species (less than 5%)	5-20% native tree species	20-50 % native tree species	50 - 70% native tree species	> 70% native tree species
<b>Evidence/ Data sources</b>	➤ Existing documentation of species in the city (including IUCN listed)- all forms of technical reports/ studies done on biodiversity in the city ➤ Environmental Status Reports ➤ Research documentation by educational institutions/Universities ➤ Afforestation plans/DPRs focusing specifically on native vegetation sp.				
<b>Responsible Agency/ Department</b>	ULB/ Forest Department/ Horticulture Dept/Universities				

## Indicator 6: Urban Biodiversity

To what extent is the city taking action towards protection, conservation and management of urban biodiversity. A high urban biodiversity provides significant ecosystem services contributing to climate change mitigation and adaptation, such as carbon sequestration, air and water purification, mitigation of impacts of environmental pollution, noise reduction, and regulation of microclimate.

	0	1	2	3	4
	No consideration of biodiversity takes place	Institutional Set-Up	Documentation	Strategy and Plan	Implementation of action plan
Evidence/ Data sources		<ul style="list-style-type: none"> <li>➤ Baseline assessment is carried out</li> <li>➤ Establishment of City Level Biodiversity Management Committee, as per (as per Biological Diversity Act, 2002; City council resolution; announcement to State Biodiversity Board)</li> </ul>	<ul style="list-style-type: none"> <li>➤ People's Biodiversity Register based on the Biological Diversity Act, 2002</li> <li>➤ Existing documentation of ecosystems and species in the city (including IUCN listed)- all forms of technical reports/ studies done on biodiversity in the city</li> <li>➤ Letter of State Biodiversity Board validating register</li> </ul>	<ul style="list-style-type: none"> <li>➤ Municipal Budget of last financial year shows allocation</li> <li>➤ Native biodiversity is specifically targeted in urban greening plans</li> </ul>	<ul style="list-style-type: none"> <li>➤ Consideration of biodiversity aspects within master plan</li> <li>➤ Native biodiversity is specifically targeted</li> <li>➤ City Biodiversity Index (Report with the calculated index)</li> </ul>
Responsible Agency/ Department		ULB, Biodiversity Management Committee			
Score	0	5	10	20	30

## Indicator 6: Urban Biodiversity

Feedback:

	0	1	2	3	4
	No consideration of biodiversity takes place	Institutional Set-Up	Documentation	Strategy and Plan	Implementation of action plan
Evidence/ Data sources		<ul style="list-style-type: none"> <li>➤ Documentation primarily done by Universities or open source platforms etc.</li> <li>➤ Updated/latest information not available. Only some cities have formed BMC.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Documentation primarily done by Universities or open source platforms etc.</li> <li>➤ Updated/latest information not available. Some cities have initiated PBR document.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Some cases wherein, municipal budgets are allocated for tree plantation, biodiversity conservation and park management</li> <li>➤ Plantation activities promote native tree sp.</li> </ul>	<ul style="list-style-type: none"> <li>➤ No information</li> <li>➤ Some cities have initiated development of Local Biodiversity Strategy Action Plan</li> </ul>
Responsible Agency/ Department		ULB/ Forest Department/ Biodiversity Management Committee			

## CATEGORY: INTEGRATED WASTE MANAGEMENT



### Indicator 1: City demonstrates reduction of waste generation per capita in last 5 years

Source reduction of waste tops the hierarchy of waste management. The city should identify methods and incentives to reduce the waste generation at source.

	0	1	2	3	4
Per capita waste generation (A)	No reduction	4th Quartile	3rd Quartile	2nd Quartile	1st Quartile
Evidence / Data sources	<ul style="list-style-type: none"> <li>• Waste characterisation study report pertaining to 2014 or before and in 2018 or 2019</li> <li>• Per capita waste generation in January 2014</li> <li>• Per capita waste generation in January 2019</li> </ul>				
Responsible Agencies	ULB/educational institutes or Universities/Technical Organisations				
Reduction in per capita waste generation (B)		4th Quartile	3rd Quartile	2nd Quartile	1st Quartile
Total Score= A+B		2	5	8	10



## Indicator 1: City demonstrates reduction of waste generation per capita in last 5 years

Feedback:

	0	1	2	3	4
Per capita waste generation (A)	No reduction	4th Quartile	3rd Quartile	2nd Quartile	1st Quartile
<b>Evidence / Data sources</b>	<ul style="list-style-type: none"> <li>➤ Information can be compiled from Swachh Survekshan input data</li> <li>➤ Data may also be available from either independent assessment or in collaboration with technical organisations</li> <li>➤ Research documentation by educational institutes or universities</li> </ul>				
<b>Reduction in per capita waste generation (B)</b>		4th Quartile	3rd Quartile	2nd Quartile	1st Quartile
<b>Responsible Agency/ Department</b>	ULB/educational institutes or Universities/Technical Organisations				

## Indicator 2: Extent of recyclables recovered and Segregated Combustible Fractions (SCF)/ Refuse Derived Fuel (RDF) Utilized

This indicator assesses the city's commitment towards circular economy and waste hierarchy pyramid.

	0	1	2	3	4
<b>Criteria</b>	No Facility exists	Material recovery with provision for sorting recyclables exists and facility for producing Segregated Combustible Fraction (SCF)/ Refuse Derived Fuel (RDF) exists (in same premises or separate unit)	>20% of total city waste is recycled through the informal/ formal system that is processed in a SPCB approved scientific facility with adequate environmental control and SCF/RDF is sent to cement Kilns / Waste to Energy Plants	>30% of total city waste is recycled through the informal/ formal system that is processed in a SPCB approved scientific facility with adequate environmental control and SCF/RDF is sent to cement Kilns / Waste to Energy Plants	>40% of total city waste is recycled through the informal/ formal system that is processed in a SPCB approved scientific facility with adequate environmental control and SCF/RDF is sent to cement Kilns / Waste to Energy Plants
<b>Evidence/ Data sources</b>		<ul style="list-style-type: none"> <li>➤ Material Recovering Facility (MRF) exists (centralised or Decentralised facility) for paper/board/plastic/glass/ metal)</li> <li>➤ SCF/RDF facility (for high calorific value, non recyclable, non degradable waste) – exists</li> </ul>	<ul style="list-style-type: none"> <li>➤ Consent to Establish Operate</li> <li>➤ List of informal sector involved in recycling (numbers)</li> <li>➤ Sale receipts of recyclables</li> <li>➤ Sale receipt of SCF, RDF</li> </ul>		
<b>Responsible Agency/ Department</b>	ULB/ MRF Operator Agency/ Formal or Informal Recyclers				
<b>Score</b>	0	10	15	20	25
<b>Formula:</b> Waste recovered and recycled (TPD) + SCF/RDF utilised (TPD) / Total Waste generated (TPD) X 100					

## Indicator 2: Extent of recyclables recovered and SCF/RDF Utilised

Feedback:

	0	1	2	3	4
Criteria	No Facility exists	Material recovery with provision for sorting recyclables exists and facility for producing SCF/RDF exists (in same premises or separate unit)	>20% of total city waste is recycled through the informal/ formal system that is processed in a SPCB approved scientific facility with adequate environmental control and SCF/RDF is sent to cement Kilns / Waste to Energy Plants	>30% of total city waste is recycled through the informal/ formal system that is processed in a SPCB approved scientific facility with adequate environmental control and SCF/RDF is sent to cement Kilns / Waste to Energy Plants	>40% of total city waste is recycled through the informal/ formal system that is processed in a SPCB approved scientific facility with adequate environmental control and SCF/RDF is sent to cement Kilns / Waste to Energy Plants
Evidence/ Data sources		<ul style="list-style-type: none"><li>➤ Data on Waste recovered and recycled and SCF/RDF utilised is available with test run cities, where such a facility is in operation.</li><li>➤ Understand the informal sector and ensure linkage to MRF – to ensure processing in scientific facilities</li><li>➤ Capture information on end use of RDF/SCF</li></ul>			
Responsible Agency/ Department	ULB/ MRF Operator Agency/ Formal or Informal Recyclers				

## Indicator 3: City monitors SWM Value Chain through IT interventions and smart monitoring

The monitoring and reporting of the SWM functional elements is essential for sustained and enhanced performance. These measures optimise the efficiency of SWM functional elements and reduction of the GHG emission with reference to the waste management.

	0	1	2	3	4
<b>Criteria</b>	No	Door to Door segregated waste collection is monitored and reported daily	Transport of segregated waste is monitored and reported daily	Quantum of input and output to all waste processing facilities and rejects is monitored and available in public domain	SWM System monitoring is integrated through ICCC
<b>Evidence/ Data sources</b>		<ul style="list-style-type: none"> <li>➤ RFID tags/ Other mechanism for HH level monitoring of segregated waste in public domain</li> <li>➤ Biometric Systems / Mobile App based Attendance system exists</li> <li>➤ Last six-month data of Total segregated waste collected (TPD)</li> </ul>	<ul style="list-style-type: none"> <li>➤ No of vehicles having separate compartment</li> <li>➤ Route plan for separate collection days available in Public Domain</li> <li>➤ GPS enabled vehicle location in Public Domain</li> <li>➤ Last six-month data of Total segregated waste Transported (TPD)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Weighbridge data of segregated incoming waste (TPD)</li> <li>➤ Weighbridge data of rejects to Landfill facility</li> <li>➤ Data records of Last six months</li> </ul>	<ul style="list-style-type: none"> <li>➤ SWM monitoring System is integrated in ICCC for real time monitoring and complaint redressal</li> </ul>
<b>Responsible Agency/ Department</b>		ULB/ other authorised collection agency	ULB/ other authorised Transport agency	ULB/ other authorised Processing Facility	ULB
<b>Score</b>	0	7	10	12	15



### Indicator 3: City monitors SWM Value Chain through IT interventions and smart monitoring

Feedback:

	0	1	2	3	4
<b>Criteria</b>	No	Door to Door segregated waste collection is monitored and reported daily	Transport of segregated waste is monitored and reported daily	Quantum of input and output to all waste processing facilities and rejects is monitored and available in public domain	SWM System monitoring is integrated through ICCC
<b>Evidence/ Data sources</b>		<ul style="list-style-type: none"> <li>➤ Data is available; collected and compiled for Swachh Survekshan survey</li> <li>➤ No update/information on integration of SWM System monitoring in ICCC</li> <li>➤ Integrate monitoring of collection, transport and processing on one platform</li> </ul>			
<b>Responsible Agency/ Department</b>		ULB/ Smart city SPV and other authorised collection agency			

### Indicator 4: Recycled Aggregates (RA) and Recycled Concrete Aggregates (RCA) derived from City construction and demolition (C&D) waste are utilized

	0	1	2	3	4
<b>Criteria</b>	Formal System for C&D Waste Management Exists	Dedicated storage and Collection Mechanism for C&D Waste exists	Dedicated Transport and Management Mechanism for C&D Waste exists	Processing of C&D Waste	Reuse of Recycled Waste
<b>Evidence/ Data sources</b>	No	<ul style="list-style-type: none"> <li>➤ Notification of User Charges</li> <li>➤ Notification of dumping points (Primary &amp; Secondary bins)</li> <li>➤ Private agency/ ULB department assigned (contract copy)</li> <li>➤ Helpline no. exists</li> </ul>	<ul style="list-style-type: none"> <li>➤ Private agency/ ULB department assigned for transport (contract copy)</li> <li>➤ Data Records/Log books</li> <li>➤ Vehicle list meticulously assigned for transportation</li> <li>➤ &gt;70 % of city C&amp;D waste generated is sent for processing facility (ULB owned or tie up with any other agency/ city) or dumped in designated point authorised by ULB</li> </ul>	<ul style="list-style-type: none"> <li>➤ Processing Facility Exists or tie up with C&amp;D waste processing facility (contract copy)</li> <li>➤ Log books of waste Processing for the last three months</li> <li>➤ &gt;70 % of city C&amp;D waste reaching processing Facility is recycled</li> </ul>	<ul style="list-style-type: none"> <li>➤ City mandate on using recycled products (document)</li> <li>➤ 100 % of city recycled C&amp;D waste is reused</li> <li>➤ Sale receipts</li> </ul>
<b>Responsible Agency/ Department</b>		ULB/ Private Agency	ULB/ Private Agency	Private Agency	ULB/ Private Agency
<b>Score</b>	0	5	8	15	20

**Indicator 4: Recycled Aggregates (RA) and Recycled Concrete Aggregates (RCA) derived from City construction and demolition (C&D) waste are utilised**

Feedback:

	0	1	2	3	4
<b>Criteria</b>	Formal System for C&D Waste Management Exists	Dedicated storage and Collection Mechanism for C&D Waste exists	Dedicated Transport and Management Mechanism for C&D Waste exists	Processing of C&D Waste	Reuse of Recycled Waste
<b>Evidence / Data sources</b>		<ul style="list-style-type: none"> <li>➤ No information available from the test run cities</li> <li>➤ If applicable, data can be compiled from Swachh Survekshan input data</li> </ul>			
<b>Responsible Agency/ Department</b>		ULB/ Private Agency/Smart City SPV			

**Indicator 5: Percentage of Green House Gases (GHGs) emission reduced due to improved processing facilities**

This indicator assesses the avoided Green House Gases (GHG) emissions, as a result of waste processing

	0	1	2	3	4
Percentage of GHG emission avoided because of city's processing facilities	No reduction	<25%	>25%	>50%	>75%
<b>Evidence/Data Source:</b>	<ul style="list-style-type: none"> <li>➤ Consent to establish and operate for all processing facilities</li> </ul> <p>For each processing facility:</p> <ul style="list-style-type: none"> <li>➤ Weigh bridge records of waste sent to processing in all processing facilities</li> <li>➤ Records of quantum of product produced monthly</li> <li>➤ Records of quantum of rejects from each processing facility, that are disposed in the dumpsite/sanitary landfill</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB/ Processing Facility Operator				
<b>Score</b>	0	3	5	7	10

**Indicator 5: Percentage of Green House Gases (GHGs) emission reduced due to improved processing facilities**

Feedback:

	0	1	2	3	4
<b>Percentage of GHG emission avoided because of city's processing facilities</b>	No reduction	<25%	>25%	>50%	>75%
<b>Evidence/Data Source:</b>	<ul style="list-style-type: none"> <li>➤ Data on waste generation and processing is available with test run cities</li> <li>➤ Quantification of baseline GHG emissions and emissions avoided as a result of processing are a must</li> <li>➤ Information on methane recovery from landfill can be obtained from Facility Operator (if applicable).</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB/ Processing Facility Operator/Smart city SPV				

**Indicator 6: Scientific Landfill is available with city as per Solid Waste Management Rules, 2016**

The scientific landfill should conform to the Solid Waste Management (SWM) Rules, 2016 and Guidance given in the Solid Waste Management Manual, 2016 and any other updated criteria published by Central Pollution Control Board (CPCB).

	0	4
Scientific Landfill is available as per SWM Rules, 2016	No	Yes
<b>Evidence/Data Source:</b>	Only dumpsite exist	<ul style="list-style-type: none"> <li>➤ Environmental Clearance Certificate form SEIAA</li> <li>➤ Monthly weigh bridge records for quantum of waste disposed in the landfill in 2018</li> </ul>
<b>Score</b>	0	10

**Indicator 6: Scientific Landfill is available with city as per Solid Waste Management Rules, 2016**

Feedback:

	0	4
<b>Scientific Landfill is available as per SWM Rules, 2016</b>	No	Yes
<b>Evidence/Data Source:</b>	<ul style="list-style-type: none"><li>➤ In test run city scientific landfill is available; however not operational</li><li>➤ In another case only dumpsite available</li><li>➤ User can input data and supporting documents as per Swachh Sarvekshan</li></ul>	
<b>Responsible Agency/ Department</b>	ULB/ Processing Facility Operator/Smart city SPV	

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**Indicator 7: Plan prepared and implemented for scientific landfill/dumpsite closure considering Green House Gases (GHG) emissions**

This indicator assesses the city readiness to capture and use a significant energy resource.

	0	2	4
Plan prepared and implemented for scientific landfill/dumpsite closure considering GHG emissions	No	Yes and Gas collected is flared/ no gas is available after flaring	Yes and Gas collected is reused or No gas exists in the landfill after use/ capped area has been converted into green space for public use
<b>Evidence</b>		<ul style="list-style-type: none"><li>➤ Evidence of the scientific closure and gas flaring</li></ul>	<ul style="list-style-type: none"><li>➤ Evidence on the gas reused and Green Space available on public use</li></ul>
<b>Score</b>	0	5	10

**Indicator 7: Plan prepared and implemented for scientific landfill/dumpsite closure considering Green House Gases (GHG) emissions**

Feedback:

	0	2	4
Plan prepared and implemented for scientific landfill/dumpsite closure considering GHG emissions	No	Yes and Gas collected is flared/ no gas is available after flaring	Yes and Gas collected is reused or No gas exists in the landfill after use/ capped area has been converted into green space for public use
Evidence	<ul style="list-style-type: none"><li>➤ In one test run city - Dumpsites are scientifically closed, but no evidence of gas estimation</li><li>➤ Important from a safety and health hazard view point as well</li></ul>		
Responsible Agency/ Department	ULB/ Processing Facility Operator/Smart city SPV		



**CATEGORY: ENERGY AND GREEN BUILDINGS**

01

**ENERGY & GREEN BUILDINGS**

- Green building Ratings
- Level of complaince for green building
- Energy efficient street lights
- Per capita fuel(Diesel, Petrol, CNG, LPG) Consumption
- Per capita and Per area electricity consumption
- Per capita From Renewable Energy Sources



### Indicator 1: Total electrical power in city derived from renewable energy sources

The indicator incentivises the replacement of the existing power demand with renewable energy sources (solar PV, solar thermal, wind energy, hybrid, hydel power, small hydro, geo-thermal energy, tidal energy) to minimize the ill effects of the GH gases.

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	No power generated from renewable sources	upto 5% of the city power demand is from renewable energy	upto 10% of the city power demand is from renewable energy	upto 25% of the city power demand is from renewable energy	50% and above of the city power demand is from renewable energy
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ Data on total power consumption can be obtained from local power distribution companies (DISCOMs)</li> <li>➤ Data on grid-connected renewable energy supplied incl. RPOs, verified by Energy Development Agencies giving any subsidies</li> </ul>				
<b>Responsible Agency/ Department</b>	DISCOMs, ULB	DISCOMs, ULB	DISCOMs, ULB	DISCOMs, ULB	DISCOMs, ULB
<b>Score</b>	0	10	20	30	40

Formula:  $\frac{\text{Cumulative power generated from all grid connected/ renewable energy sources in the city}}{\text{Total power consumption in city from electrical power}} \times 100$

### Indicator 1: Total electrical power in city derived from renewable energy sources

Feedback:

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	No power generated from renewable sources	upto 5% of the city power demand is from renewable energy	upto 10% of the city power demand is from renewable energy	upto 25% of the city power demand is from renewable energy	50% and above of the city power demand is from renewable energy
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ Grid connected renewable energy systems/installation executed or owned ULB is available</li> <li>➤ Information on pan city installations and their respective capacities is available with DISCOMs and State Renewable Energy Development Agency</li> <li>➤ Challenges of data acquisition</li> </ul>				
<b>Responsible Agency/ Department</b>	Apart from DISCOMs, ULB, State Renewable Energy Development Agency also can be contacted				



## Indicator 2: Per capita and Per area electricity consumption for municipal services\*

\*water supply, sewerage, street lights, waste treatment, fire services, municipal schools, parks and gardens, govt. Hospitals/clinics, community halls

To cope with the increasing electricity demand combustion of fossil fuels are increasing, leading to increase in GHG emissions. Per capita electricity consumption signifies the total consumption while per area electricity consumption gives the variation across different geographical area within the city.

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	10*X & above as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Above 4*X & upto 10*X as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Above 2*X & upto 4*X as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Above 1.5*X & upto 2*X as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Upto 1.1*X as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ Municipal Electricity bills</li> <li>➤ Municipal Budget document</li> <li>➤ Total area of the city</li> <li>➤ Census of India population figures indexed with average annual growth rate for the year 2018 as per smart city proposal</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB	ULB	ULB	ULB	ULB
<b>Score</b>	0	5	10	20	30

Formula:  $(0.5 \times \frac{\text{Total electricity consumption for municipal services}}{\text{Total Population of the city}}) + (0.5 \times \frac{\text{Total electricity consumption for municipal services}}{\text{Total area of the city in Sqm}})$

## Indicator 2: Per capita and Per area electricity consumption for municipal services\*

\*water supply, sewerage, street lights, waste treatment, fire services, municipal schools, parks and gardens, govt. Hospitals/clinics, community halls

Feedback:

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	10*X & above as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Above 4*X & upto 10*X as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Above 2*X & upto 4*X as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Above 1.5*X & upto 2*X as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Upto 1.1*X as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ In test run exercise data pertaining to annual municipal electricity consumption, population and area are readily available</li> <li>➤ City with the lowest per capita consumption. Will it be automatically listed in the online form or to be computed by cities ?</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB/ Smart City SPV				

### Indicator 3: per capita fossil fuel (Diesel, Petrol, CNG, LPG) consumption for municipal services

This indicator hopes to incentivise cities with lowest per capita CO2 emission while trying to encourage others to switch to alternative cleaner fuel sources for their municipal service.

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	10x & above as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Above 4X & upto 10X as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Above 2x & upto 4X as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Above 1.5x & upto 2X as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Upto 1.1x as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ Separate Petrol, Diesel, CNG &amp; LPG consumption bill from Municipal budget for each category</li> <li>➤ Census of India population figures indexed with average annual growth rate for the year 2018 as per smart city proposal</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB	ULB	ULB	ULB	ULB
<b>Score</b>	0	15	30	45	60

Formula: 
$$\left( \frac{\text{Total TCO2e of fossil fuel (diesel+petrol+CNG+LPG) consumption by the city for municipal services}}{\text{Total population of the city}} \right)$$

Total TCO2e = (Total diesel consumption\*2.62694 + Total petrol consumption\*2.20307 + Total CNG Consumption \*1.51906 + Total LPG Consumption \*0.48066)

### Indicator 3: per capita fossil fuel (Diesel, Petrol, CNG, LPG) consumption for municipal services

Feedback:

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	10x & above as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Above 4X & upto 10X as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Above 2x & upto 4X as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Above 1.5x & upto 2X as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)	Upto 1.1x as compared to the city with the lowest per capita consumption (amongst Tier I, II & III)
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ In test run exercise data pertaining to annual Petrol, Diesel, CNG &amp; LPG consumption bill and population are readily available</li> <li>➤ City with the lowest per capita consumption. Will it be automatically listed in the online form or to be computed by cities ?</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB/ Smart City SPV				

#### Indicator 4: Energy efficient street lighting in the city

Street lighting is one of the major contributors to the city's electricity consumption. Energy efficient Street Lighting systems will reduce the electricity consumption in the city thus indirectly reducing the GHG emission.

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	0 streets lights in the city are energy efficient	Upto 25% streets lights in the city are energy efficient	Upto 50% streets lights in the city are energy efficient	Upto 75% streets lights in the city are energy efficient	100% streets lights in the city are energy efficient
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"><li>➤ Total number of street lights in the city</li><li>➤ Municipal records/documentary evidence for the number of street lights replaced with energy efficient street lights</li></ul>				
<b>Responsible Agency/ Department</b>	ULB	ULB	ULB	ULB	ULB
<b>Score</b>	0	5	15	30	50

Formula:  $\left( \frac{\text{Total number of energy efficient street lights in the city}}{\text{Total number of street lights in the city}} \right) * 100$

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#### Indicator 4: Energy efficient street lighting in the city

Feedback:

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	0 streets lights in the city are energy efficient	Upto 25% streets lights in the city are energy efficient	Upto 50% streets lights in the city are energy efficient	Upto 75% streets lights in the city are energy efficient	100% streets lights in the city are energy efficient
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"><li>➤ In test run cities data regarding total street lights and energy efficient street lights is available</li></ul>				
<b>Responsible Agency/ Department</b>	ULB/ Smart City SPV				

### Indicator 5: Level of compliance procedures in place for green buildings

Buildings are one of the prime contributors of GHG emissions. The indicator checks the readiness of the city with regard to its compliance procedures in place for promoting green and energy efficient buildings.

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	Compliance procedures only available at state level	Compliance for energy conservation building codes (commercial & residential) and other certified green buildings in city Development Control Regulations (DCRs)	Implementation of NBC and ECBC codes	Third party Certification given to 10% of new buildings sanctioned in city under any green building certification	Third party Certification given to 20% of new buildings sanctioned in city under any green building certification
<b>Evidence/ Data sources</b>	NBC compliance available at state level (Yes/No)	Compliance procedures available at city level % green buildings in the city	Building Byelaw in the city mention ECBC codes compliance requirements	ULB records	ULB records
<b>Responsible Agency/ Department</b>	ULB, Town Planning Dept.	ULB, Town Planning Dept.	ULB, Town Planning Dept.	ULB, Town Planning Dept.	ULB, Town Planning Dept.
<b>Score</b>	0	15	30	50	60

### Indicator 5: Level of compliance procedures in place for green buildings

Feedback:

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	Compliance procedures only available at state level	Compliance for energy conservation building codes (commercial & residential) and other certified green buildings in city Development Control Regulations (DCRs)	Implementation of NBC and ECBC codes	Third party Certification given to 10% of new buildings sanctioned in city under any green building certification	Third party Certification given to 20% of new buildings sanctioned in city under any green building certification
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ In test run cases documentation/information on compliance and implementation of NBC and ECBC through building bye laws are available.</li> <li>➤ Information on third party (such as IGBC, GRIHA etc.) certified buildings are not readily available. However can be compiled in consultation with ULB, Town Planning Department and third party/organisations.</li> <li>➤ Cost of compliance is too high to be considered as a common indicator for all cities</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB, Town Planning Dept., Bureau of Energy Efficiency (BEE) and Third party organisation like IGBC, GRIHA etc.				



**Indicator 6: Percentage of buildings (commercial & residential) securing green building ratings (ECBC minimum base and additionally /BEE/third party framework)**

The indicator checks the Built-up Area (BUA) of “green buildings” with respect to the total BUA as per different existing norms and incentivises the city for promoting green buildings.

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	No green buildings certified	Upto 10% BUA in the base year are certified	Upto 40% BUA in the base year are certified	Upto 60% BUA in the base year are certified	All buildings in the base year are certified
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ List of buildings certified with Green building certificate along with BUA.</li> <li>➤ List of all buildings along with total BUA completed in the base year</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB, Town Planning Dept.	ULB, Town Planning Dept.	ULB, Town Planning Dept.	ULB, Town Planning Dept.	ULB, Town Planning Dept.
<b>Score</b>	0	20	30	40	60

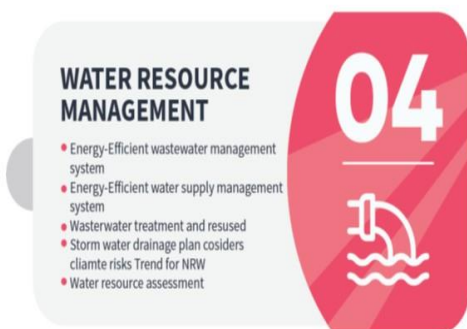
Formula:  $\frac{\text{BUA of Green buildings certified in the base year}}{\text{BUA of all buildings completed in the base year}} * 100$

**Indicator 6: Percentage of buildings (commercial & residential) securing green building ratings (ECBC minimum base and additionally /BEE/third party framework)**

Feedback:

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	No green buildings certified	Upto 10% BUA in the base year are certified	Upto 40% BUA in the base year are certified	Upto 60% BUA in the base year are certified	All buildings in the base year are certified
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ In test run cases information on third party (such as IGBC, GRIHA etc.) certified buildings not readily available. However no. of buildings along with BUA details can be compiled in consultation with ULB, Town Planning Department and third party organisations.</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB, Town Planning Dept., Bureau of Energy Efficiency (BEE) and Third party organisation like IGBC, GRIHA etc.				

## CATEGORY: WATER RESOURCE MANAGEMENT



### Indicator 1: Has city conducted a water resource assessment?

This indicator intends to assess whether the City has planned for a sustained water availability for the future needs. Since the community, and many times the ULB as well, also depend significantly on ground water resources to augment piped water supply. The city should acknowledge ground water availability and other water resources available, both from a resource availability and quality view point.

	0	1	2	3	4
<b>Has city conducted a water resource assessment?</b>	NO	Water resource Assessment Report is Available	Water Resource Management Plan is prepared with Short, Medium and Long Term Actions	Implementation of the Water Resource Management plan	Regular Monitoring & Streamlining of Water Resource Management Plan
<b>Evidence/ Data sources</b>		Water resource assessment report considering a future scenario for next 15 to 20 years	Water Resource Management Plan	<ul style="list-style-type: none"> <li>➤ Evidence of Immediate actions taken e.g. Bye Laws, Differential pricing for Water etc</li> <li>➤ Municipal budget and other funds allocated</li> <li>➤ Implementation of measures initiated</li> </ul>	<ul style="list-style-type: none"> <li>➤ Regular monitoring (bi-annual) of Plan with course correction once in five years</li> </ul>
<b>Responsible Agency/ Department</b>	ULB/ Water Utility				
<b>Score</b>	0	10	15	20	25



**Indicator 1: Has city conducted a water resource assessment?**

Feedback:

	0	1	2	3	4
<b>Has city conducted a water resource assessment?</b>	NO	Water resource Assessment Report is Available	Water Resource Management Plan is prepared with Short, Medium and Long Term Actions	Implementation of the Water Resource Management plan	Regular Monitoring & Streamlining of Water Resource Management Plan
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ Some form of water resource assessments are available with the city. However, information on plan implementation, monitoring and streaming is not available.</li> <li>➤ In some cases catchment level water resources assessment has been done by States, which also includes city boundaries and water sources</li> <li>➤ Water resource assessment should consider ground water resources as well</li> </ul>				
<b>Responsible Agency/ Department</b>	Public Health Engineering Dept/ULB/ Water Utility/Central or State Ground Water Board				

**Indicator 2: Trend for Non Revenue Water (NRW) over the last three years**

Reduction in Non Revenue Water (NRW) will result in enhanced resilience by reduction in water loss as well as decreased in water demand of electricity for pumping, thereby reducing Green House Gases (GHG) emissions.

	0	1	2	3	4
<b>Decrease in NRW over the last three years</b>	No reduction	Non Revenue Water (NRW) 40-50%	Non Revenue Water (NRW) 30-40%	Non Revenue Water (NRW) > 20-30%	Non Revenue Water (NRW) >20%
<b>Evidence/ Data sources</b>	<p>Water metering records at the supply side and the consumption side (as explained in methodology) will provide information on the quantum of water supplied and consumed.</p> <p><i>Documentary evidence in one year over a period of last three years will be considered</i></p>				
<b>Responsible Agency/ Department</b>	ULB/ Water Utility				
<b>Score</b>	0	5	10	20	25

## Indicator 2: Trend for NRW over the last three years

Feedback:

	0	1	2	3	4
<b>Decrease in NRW over the last three years</b>	No reduction	Non Revenue Water (NRW) <50%	Non Revenue Water (NRW) <40%	Non Revenue Water (NRW) <30%	Non Revenue Water (NRW) <20%
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ In test run cities quantification of NRW is usually done through water audits. The data may not be available for one year over a period of last three years.</li> <li>➤ In some cases NRW is estimated through quantum of water supplied and revenue collected from sold water (based on tariff/unit of water sold) – this is to be improved</li> <li>➤ Importance of metering at all levels</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB/ Water Utility				

## Indicator 3: Does the city have a storm water drainage plan that considers climate risks

Short duration and high intensity rainfall induced urban flooding events are observed in many cities. This indicator assesses the preparedness of the city to tackle high rainfall intensity with proper stormwater drainage systems.

	0	4
<b>City have a storm water drainage plan that considers climate risks related to Short duration and high intensity rainfall incidence</b>	NO	Yes
<b>Evidence/ Data sources</b>		<ul style="list-style-type: none"> <li>➤ The design of the city stormwater drainage plan has considered the climate variability of last 40 Years</li> <li>➤ Documented design proof needs to be submitted (DPR etc.)</li> </ul>
<b>Responsible Agency/ Department</b>		ULB/ Water Utility
<b>Score</b>	0	25

### Indicator 3: Does the city have a storm water drainage plan that considers climate risks

Feedback:

	0	4
<b>City have a storm water drainage plan that considers climate risks related to Short duration and high intensity rainfall incidence</b>	NO	Yes
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ In test run cities Storm Water Management Plan available with city, however climate risks are not considered – if data of last 30-40 years is used to</li> <li>➤ Response from test run city - No separate plan for stormwater drainage system, it is included as part of underground drainage: even if this is the case, important to understand if design storm values consider immediate historic data</li> <li>➤ Location specific IDF curves and selection of appropriate “design storm”</li> </ul>	
<b>Responsible Agency/ Department</b>	ULB/ Water Utility	

### Indicator 4: Percentage of wastewater treated to prescribed standards as per Central Pollution Control Board (CPCB) and reused

Secondary and Tertiary treatments are the final stages of wastewater treatment process that improves wastewater quality before it is recycled and reused. The treatment removes remaining inorganic compounds, and substances, such as the nitrogen and phosphorus. Bacteria, viruses and parasites, which are harmful to public health, are also removed at this stage.

	0	1	2	3	4
<b>Criteria</b>	No	<20% Secondary Treated Wastewater recycled and reused*	>20% Secondary Treated Wastewater recycled and reused*	<20% Tertiary Treated Wastewater recycled and reused**	>20% Tertiary Treated Wastewater recycled and reused**
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ Measurements done at treatment plants inlets and reuse outlets</li> <li>➤ Data record on the secondary reuse and recycle meeting CPCB Standards</li> <li>➤ Data records on the Tertiary reuse and recycle meeting CPCB Standards</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB/ Water Utility				
<b>Score</b>	0	10	15	20	25

Formula:  $\frac{\text{Secondary Treated Wastewater recycled and reused}}{\text{Wastewater received at the treatment plants}} \times 100$

\*\* $\frac{\text{Tertiary Treated Wastewater recycled and reused}}{\text{Wastewater received at the treatment plants}} \times 100$

Unit: Million litres per day (or) month

#### Indicator 4: Percentage of wastewater treated to prescribed standards as per Central Pollution Control Board (CPCB) and reused

Feedback:

	0	1	2	3	4
<b>Criteria</b>	No	>10% Secondary Treated Wastewater recycled and reused*	>20% Secondary Treated Wastewater recycled and reused*	>10% Tertiary Treated Wastewater recycled and reused**	>20% Tertiary Treated Wastewater recycled and reused**
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ No reliable information on secondary and tertiary wastewater recycled and reused available</li> <li>➤ Data can be requested from State Pollution Control Board</li> <li>➤ Agreements for reuse are important</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB/ Water Utility/State pollution Control Board				

#### Indicator 5: Energy efficient wastewater management system in the city

Energy efficient measures for wastewater pumping in the city leads to the direct cost saving by reduced electricity bill and indirect savings of CO<sub>2</sub> emissions per Kwh of electricity consumed.

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	No pumps in the city are energy efficient	10-25% pumps in the city are energy efficient	Upto 50% pumps in the city are energy efficient	Upto 75% pumps in the city are energy efficient	100% pumps in the city are energy efficient
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ Energy audit report</li> <li>➤ Data on total number of Pumps</li> <li>➤ Work order for pump replacement</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB/ Water Utility				
<b>Score</b>	0	10	15	20	25

Formula:  $\left( \frac{\text{Total number of BEE} > 2 \text{ Star Rated energy efficient pumps in the city for waste water management}}{\text{Total number of pumps in the city for its waste water management}} \right) * 100$

Unit: %

### Indicator 5: Energy efficient wastewater management system in the city

Feedback:

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	No pumps in the city are energy efficient	10-25% pumps in the city are energy efficient	Upto 50% pumps in the city are energy efficient	Upto 75% pumps in the city are energy efficient	100% pumps in the city are energy efficient
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ Information on pumps and their respective efficiency is documented; however compilation of data is required.</li> <li>➤ First category could be "0 -10% pumps in the city are energy efficient"</li> <li>➤ Maintenance of records at each pump house or shift to SCADA system</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB/ Water Utility				

### Indicator 6: Energy efficient water supply system in the city

Energy efficient measures for water supply pumping system in the city leads to direct cost saving by reduced electricity bill and indirect savings of CO<sub>2</sub> emissions per Kwh of electricity consumed

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	0 pumps in the city are energy efficient	10-25% pumps in the city are energy efficient	Upto 50% pumps in the city are energy efficient	Upto 75% pumps in the city are energy efficient	100% pumps in the city are energy efficient
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ Energy audit report</li> <li>➤ Data on total number of Pumps</li> <li>➤ Work order for pump replacement</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB/ Water Utility				
<b>Score</b>	0	10	15	20	25

**Formula:**  $\left( \frac{\text{Total number of BEE >2 Star Rated energy efficient pumps in the city for water supply}}{\text{Total number of water supply pumps in the city}} \right) * 100$

**Unit :** %



## Indicator 6: Energy efficient water supply system in the city

Feedback:

	0	1	2	3	4
<b>Criteria/ Sub-indicators/ Progression Levels</b>	0 pumps in the city are energy efficient	10-25% pumps in the city are energy efficient	Upto 50% pumps in the city are energy efficient	Upto 75% pumps in the city are energy efficient	100% pumps in the city are energy efficient
<b>Evidence/ Data sources</b>	<ul style="list-style-type: none"> <li>➤ Information on pumps and their respective efficiency is documented; however compilation of data is required.</li> <li>➤ First category could be "0 -10% pumps in the city are energy efficient"</li> <li>➤ SCADA systems are essential for efficient monitoring</li> </ul>				
<b>Responsible Agency/ Department</b>	ULB/ Water Utility				



# ClimateSMART CITIES

## ASSESSMENT FRAMEWORK



ENERGY &  
GREEN  
BUILDINGS



URBAN PLANNING,  
GREEN COVER &  
BIODIVERSITY



MOBILITY &  
AIR



WATER RESOURCE  
MANAGEMENT



WASTE  
MANAGEMENT

# Thank You



## CLIMATE SMART CITIES - ABBREVIATIONS

GENERAL TERMS	
AFLOU	Agriculture, Forestry and other Land-use
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
BEI	Baseline Emissions Inventory
BSI	British Standards Institution
CSCAF	Climate Smart Cities Assessment Framework
CWMI	Composite Water Management Index
EC-CoM	European Commission Covenant of Mayors Initiative
GDP	Gross Domestic Product
GIZ	German Development Agency Headquartered
GoI	Government of India
GRIP	Greenhouse Gas Regional Inventory Protocol
ICLEI	Local Governments for Sustainability
IEA	International Energy Agency
IEAP	International Local Government GHG Emissions Analysis Protocol
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
KPI	Key Performance Indicators
LUCF	Land use change and forestry
MoHUA	Ministry of Housing and Urban Affairs
NATCOM	India's Initial National Communication
NCAP	National Clean Air Programme
NITI Aayog	A policy think tank of the Government of India
NIUA	National Institute of Urban Affairs
PAS 2070	Specification for the assessment of greenhouse gas emissions of a city
SBM	Swachh Bharat Mission
SCM	Smart Cities Mission
SMART	Specific, Measurable, Actionable, Relevant and Time-bound
TERI	The Energy and Resources Institute
UNEP	The United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UN-HABITAT	The United Nations Human Settlements Programme
WRI	World Resources Institute
ENERGY & GREEN BUILDING	
AT&C	Aggregate Technical & Commercial losses
BEE Star	Bureau of Energy Efficiency
BUA	Built-up Area
CNG	Compressed Natural Gas
DCR	Development Control Regulations
DISCOMs	Electricity Distribution Companies of India
ECBC	Energy Conservation Building Code
GBCI	Green Building Certification Inc.
GDCRs	General Development Control Regulations
GH	Green house
GHG	Green House Gas
GRIHA	Green Rating for Integrated Habitat Assessment
IGBC	The Indian Green Building Council
KW	kilowatt
KwH	kilowatt hour
LEED	Leadership in Energy and Environmental Design
LPG	Liquefied Petroleum Gas
NBC	National Building Code
PV	Photovoltaics
RPOs	Renewable Purchase Obligation
SqKm	Square Kilometre
TCO2e	Tons CO2 Equivalent
ULB	Urban Local Bodies

URBAN PLANNING, GREEN COVER, AND BIODIVERSITY	
DM	Disaster Management
EOC	Emergency Operation Centre
GPC	Global Protocol for Community
ICCC	Integrated Command and Control Centres
IUCN	International Union for Conservation of Nature
MRV	Measurement, Reporting and Verification
NDCs	Nationally Determined Contributions'
NDMA	National Disaster Management Authority
NGOs	Non Governmental Organization
NPDM	National Policy on Disaster Management
PWD	Public Work Department
UNFCCC	United Nations Framework Convention on Climate Change
URDPFI	Urban and Regional Development Plans Formulation and Implementation, Guidelines
MOBILITY & AIR	
AQI	Air Quality Index
C&D	Construction and Demolition
CAAQMS	Continuous Ambient Air Quality Monitoring Stations
CAAQMS	Continuous Ambient Air Quality Monitoring Stations
CAGR	Compound Annual Growth Rate
CDP	Comprehensive Development Plan
CEMS	Continuous Emission Monitoring System
CMP	Comprehensive Mobility Plan
CO	Carbon Monoxide
CPCB	Central Pollution Control Board
CPCB NAMP	Central Pollution Control Board National Air Quality Monitoring Programme
CTTS	Comprehensive Traffic & Transportation Plan
DPRs	Detailed Project Reports
LCMP	Low-Carbon Mobility Plan
NCAP	National Clean Air Action Plan
NMT	Non-Motorised Transport
NOx	Nitrogen Oxide
O3	Ozone Molecule
PM10	Particulate Matter (PM10 and PM2.5)   National Pollutant Inventory
PM2.5	Particulate matter (PM10 and PM2.5)   National Pollutant Inventory
PMC	Project Management Consultancy
PT	Public Transportation Plan
RTO	Regional Transport Office
SCP	Specialist Transportation Planning
Sox	Sulphur Oxides
SPCB	State Pollution Control Board
SPV's	Special Purpose Vehicle
TOD	Transit-oriented development
UMTA	Unified Metropolitan Transport Authority
VOCs	Volatile organic compounds
WHO	The World Health Organization
WATER RESOURCE MANAGEMENT	
NRW	Non - Revenue Water
WASTE MANAGEMENT	
C&D	City construction and demolition
GPC	Global Protocol for Community
GPS	Global Positioning System
HH	House Hold
IT	Information Technology
LFG	Landfill Gas
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
RA	Recycled Aggregates
RCA	Recycled Concrete Aggregates
RDF	Refuse-Derived Fuel
RFID	Radio-Frequency Identification

WASTE MANAGEMENT	
RDF	Refuse-Derived Fuel
RFID	Radio-Frequency Identification
SCF	Solid Waste Treatment.
SEAC	State Expert Appraisal Committee
SEAC	State Expert Appraisal Committee
SEIAA	State Environment Impact Assessment Authority
SWDS	Solid Waste Disposal Service
SWM	Solid Waste Management
TPD	Tons Per Day
CPHEEO	Central Public Health and Environmental Engineering Organisation
PCB	Pollution Control Board
MSWM	Municipal solid waste management
EC	Environmental Clearance
PPP	Public Private Partnership

#### ANNEXURE 4: LIST OF CITIES PARTICIPATED

Date: 8 April  Name Of Cities Participated	Date: 9 April  Name Of Cities Participated	Date: 10 April  Name Of Cities Participated	Date: 15 April  Name Of Cities Participated
1. Aligarh 2. Bengaluru 3. Bhagalpur 4. Chennai 5. Coimbatore 6. Erode 7. Imphal 8. Madurai 9. Srinagar 10. Thoothukudi 11. Tirupachalli 12. Tumakuru 13. Vellore 14. Bhopal	1. Belagavi 2. Bhubaneswar 3. Dahod 4. Gauhati 5. Ghandinagar 6. Hubli Dharwad 7. Mangalore 8. Naya Raipur 9. Pune 10. Raipur 11. Rajkot 12. Thiruvananthapuram 13. Vadodara	1. Chandigarh 2. Faridabad 3. Gwalior 4. Jalandhar 5. Karnal 6. Muzaffarpur 7. Patna 8. Sagar 9. Indore 10. Newtown-Kolkata	1. Jabalpur 2. Kota 3. Nagpur 4. Nasik 5. Udaipur 6. Tirupati 7. Aurangabad 8. Agra 9. Amaravati 10. Kanpur 11. Thane 12. Pimpri-chinchwad 13. G.Warnagal 14. Hyderabad 15. Solapur 16. Kalyan 17. Mizoram 18. Ahmedabad 19. Surat 20. Moradabad 21. Varanasi 22. Prayagraj