WRI INDIA

GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY

IUC

ICLEI Local Governments for Sustainability

Webinar Training on

Greenhouse Gas Inventory and Inclusive Climate Action Planning for Urban Local Bodies

Funded by the European Union

This initiative was made feasible with the financial support of the European Union. The contents do not necessarily reflect the views of the European Union.

Webinar objectives

1. Build the capacity of ULBs on the basic science of climate change and role of cities in addressing climate change.

2. Understand principles to develop city-wide Greenhouse Gas (GHG) emissions inventory and its benefits.

3. Build capacities to develop city-level inclusive Climate Action Plans.

In other words:

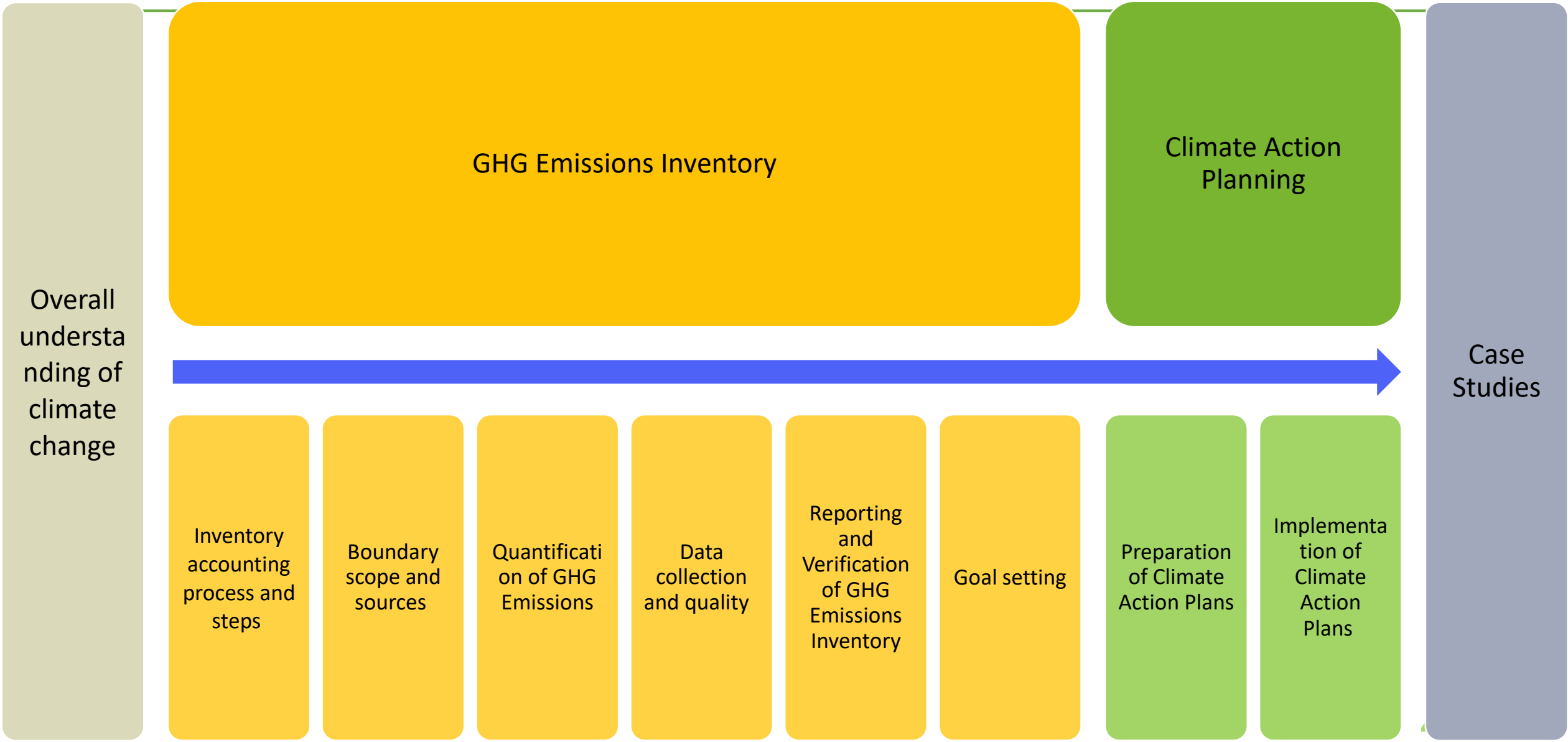
You will be able to create GHG inventories and formulate Climate Action Plans!

The agenda

Time	Day 1
2:30-2:45	Welcome and Introductions
2:45-3:00	Introduction to Climate Change
3:00-3:15	National & International Developments
3:15-3:30	Q&A
3:30-4:00	Inventory Accounting Principles
4:00-4:30	Boundary Scope and Sources
4:30-4:45	Q&A
4:45-5:15	Data Collection
5:15-5:45	Goal Setting, Tracking GHG Emissions over Time and Reporting
5:45-6:00	Q&A

Time	Day 2
2:30-2:40	Recap of day 1
2:40-3:05	Reporting Requirements
3:05-3:15	Q&A
3:15-3:45	Climate Action Planning
3:45-4:15	Hands on exercise
4:15-4:45	Principles of Inclusive Climate Action Planning
4:45-5:15	Hands On Exercise
5:15-5:40	Case Studies
5:40-6:00	Way Forward

Greenhouse Gas Inventory and Inclusive Climate Action Planning for ULBs



Housekeeping guidelines

- Presentations will be shared with the completion of the webinar.
- There are dedicated Q&A sessions, but when needed provide your input in the Questions box or raise your hand.
- Speakers please use camera.
- Listeners please mute yourself, unless you want to speak.
- This is meant to be an interactive webinar, so your contribution is much appreciated.
- At the end of the webinar certificates will be provided to all 2-day participants.
- Technical issues contact: Saransh Bajpai

  (Saransh.Bajpai@wri.org | +91 9425230187)

1. Welcome & introductions

P. Karamanos Team Leader, IUC India

S. Chaturvedula, Deputy Director, ICLEI S. Asia

C. Gajjar, Head - Subnational Climate Action, Climate Program, WRI India

S. Chakrabarty, Senior Manager, Climate Program, WRI India

A. Agarwal, Project Associate, Climate Program, WRI India

K. Yagnik Climate Expert, IUC India

B. Padigala, Manager – Energy & Climate, ICLEI S. Asia

S. Bajpai, Consultant, Climate program, WRI India

F. Solanki, EPP Consultant, Climate Program, WRI India

K Jha, Deputy Manager – Energy & Climate, ICLEI S. Asia

The EU International Urban Cooperation Programme

Activities based on the Global Covenant of Mayors

- City involvement with GCOM
- Climate Action Plans
- Capacity building

Introducing ICLEI-Local Governments for Sustainability

- An international city network established in 1990 that advances **local sustainability**
- ICLEI is the leading **global network of more than 1,750 cities, towns and regions** committed to building a sustainable future
- ICLEI's mission "*to build and serve a worldwide movement of local governments to achieve tangible improvements in global sustainability with special focus on environmental conditions through cumulative local actions*."

ICLEI operates through 23 offices around the world

Support – from process to projects

GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY

ACCCRN Asian Cities Climate Change Resilience Network

carbonn Climate Registry

Kaohsiung Chinese Taipei 1-31 October EcoMobility WorldFestival 2017

Megacities Alliance for Water and Climate

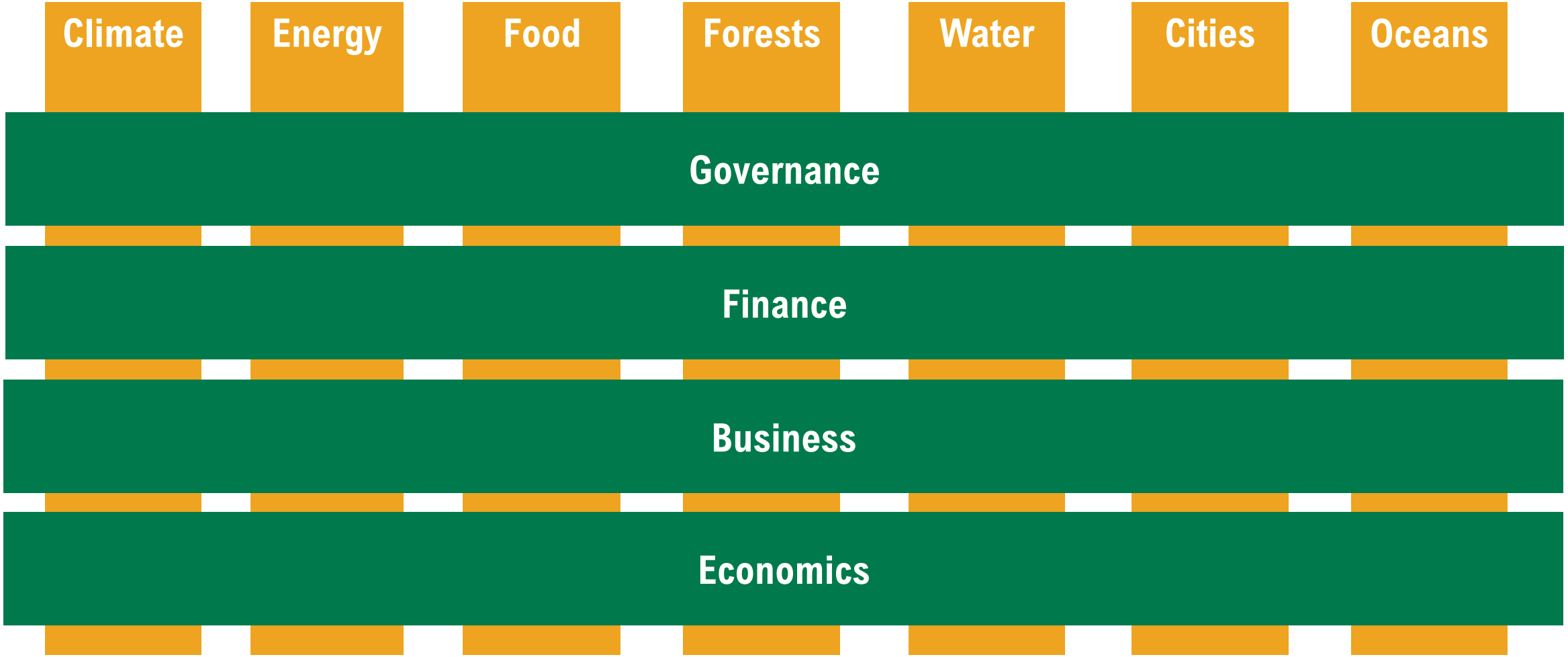
CITIES CLIMATE FINANCE LEADERSHIP ALLIANCE

About WRI India

ABOUT WRI INDIA | WRI India, an independent charity legally registered as the India Resources Trust, provides objective information and practical proposals to foster environmentally sound and socially equitable development.

OUR MISSION | To move human society to live in ways that protect Earth's environment and its capacity to provide for the needs and aspirations of current and future generations.

Seven goals, four centers of excellence



GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY

10,000+ CITIES

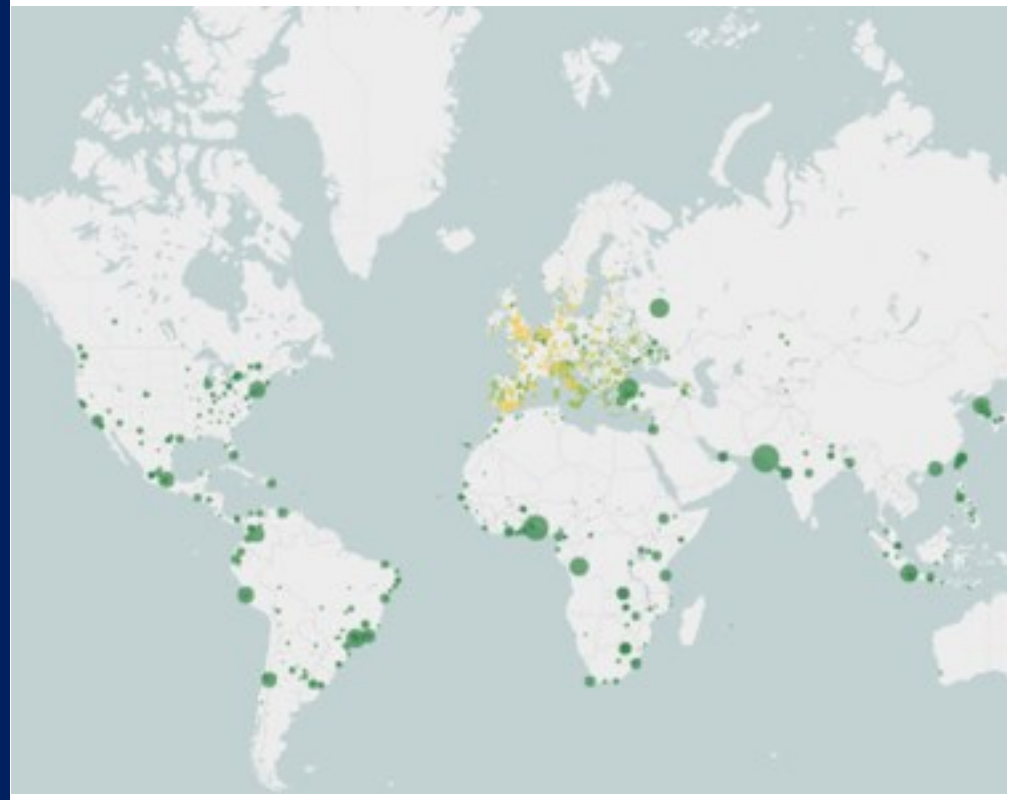
138 COUNTRIES

801+ MILLION PEOPLE

11.42% OF THE GLOBAL POPULATION

CITIES COULD COLLECTIVELY REDUCE 2.3 BILLION TONS PER YEAR IN 2030

NEW GLOBAL COMMON REPORTING FRAMEWORK



In INDIA

22 CITIES

55 MILLION PEOPLE

>4 % OF THE INDIAN POPULATION

CITIES COULD COLLECTIVELY REDUCE 21+ MILLION TONS PER YEAR IN 2030

NEW GLOBAL COMMON REPORTING FRAMEWORK

Introductions

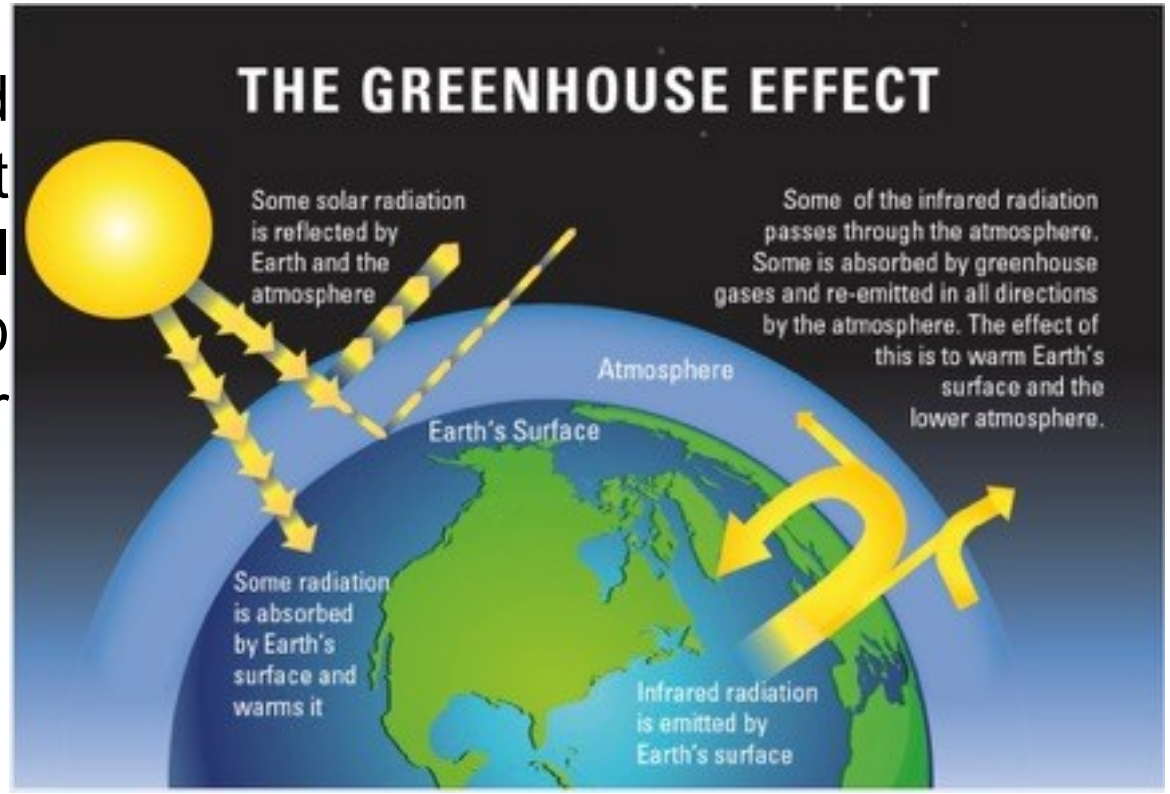
- **Please tell us your name, department and city**
- **1 action that your city is taking to address climate change**

2. Introduction to Climate Change

What is climate change?

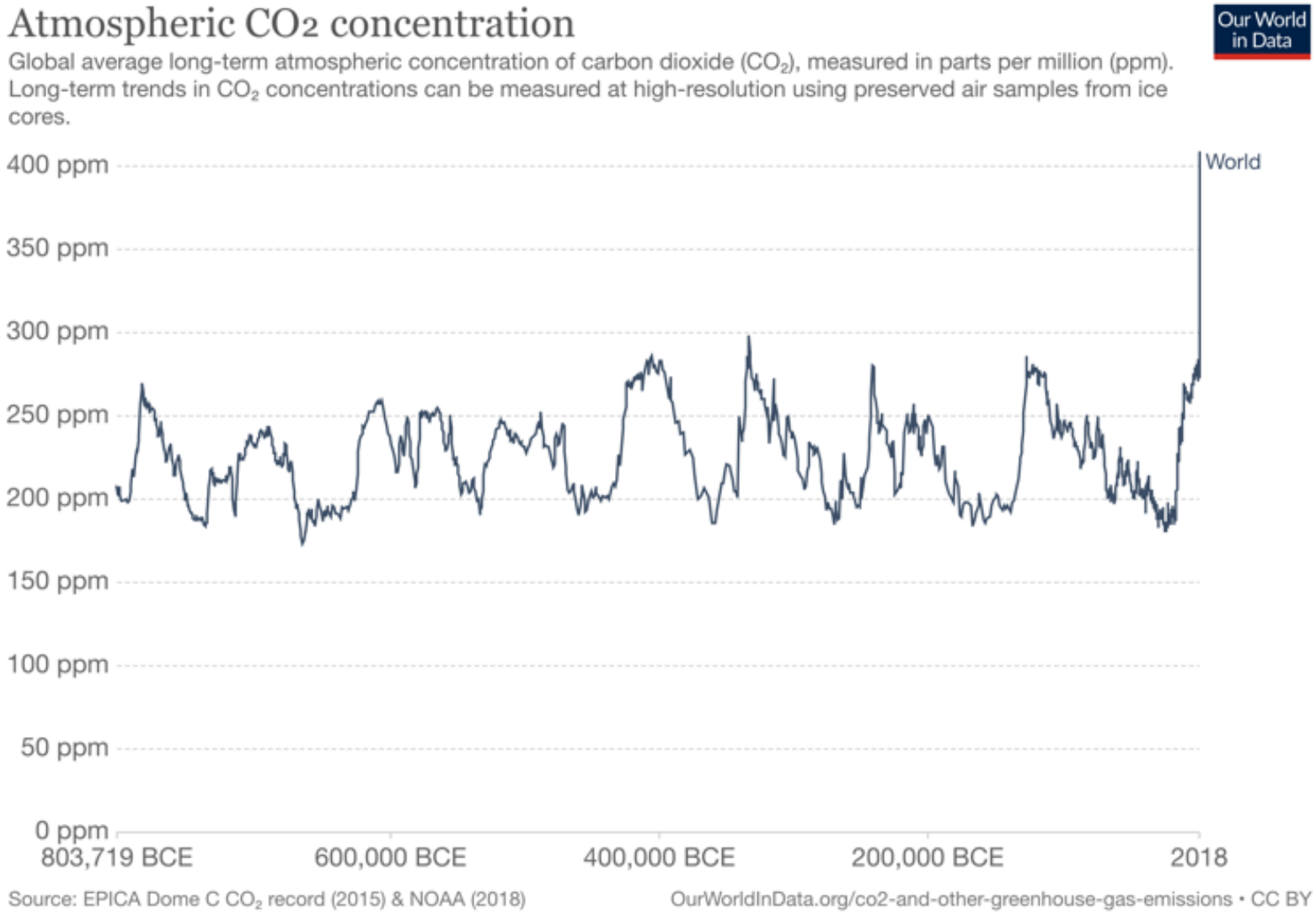
A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

UNFCCC



What is climate change?

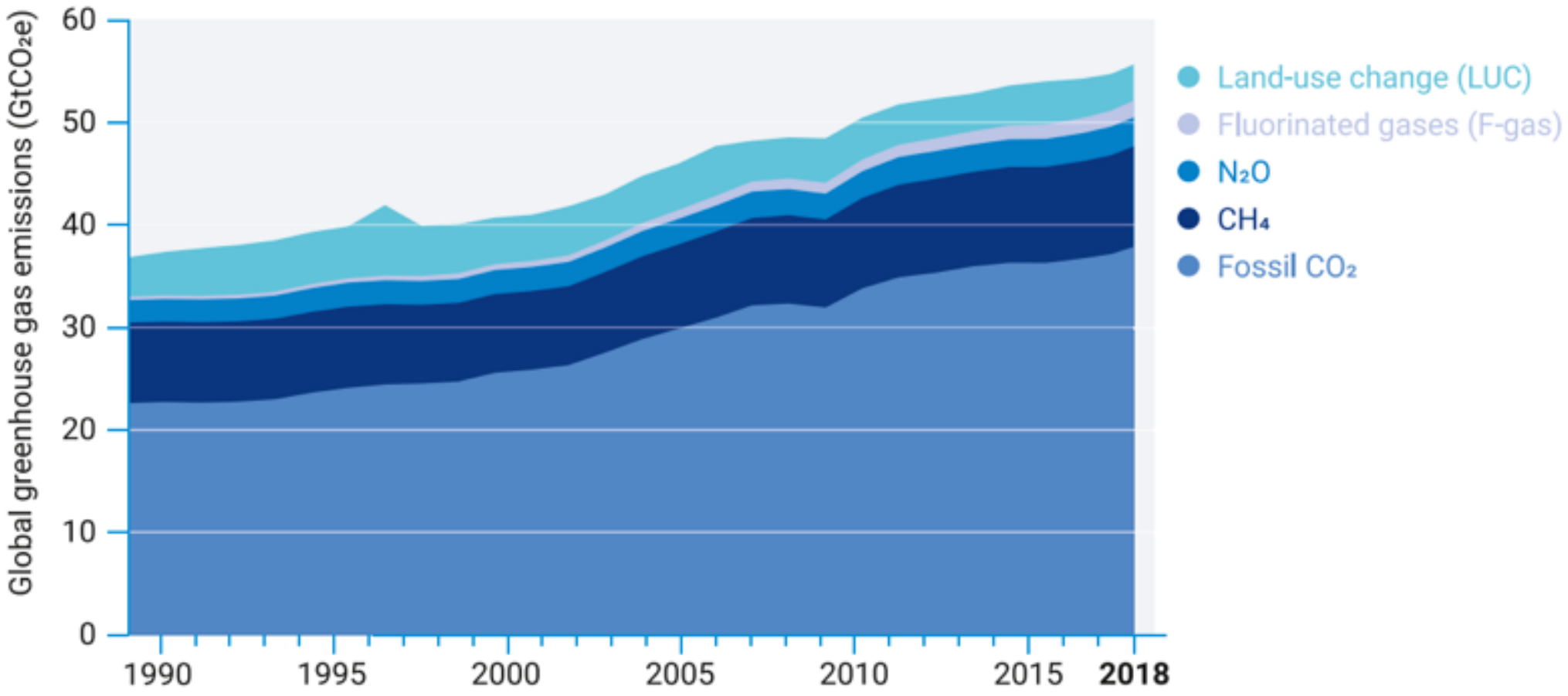
Atmospheric CO_2 concentration



What is the approximate amount of GHG emitted globally on an annual basis by human activities (in billion tonnes of $CO2_e$)?

A. 1
B. 10
C. 50
D. 100

Global greenhouse gas emissions

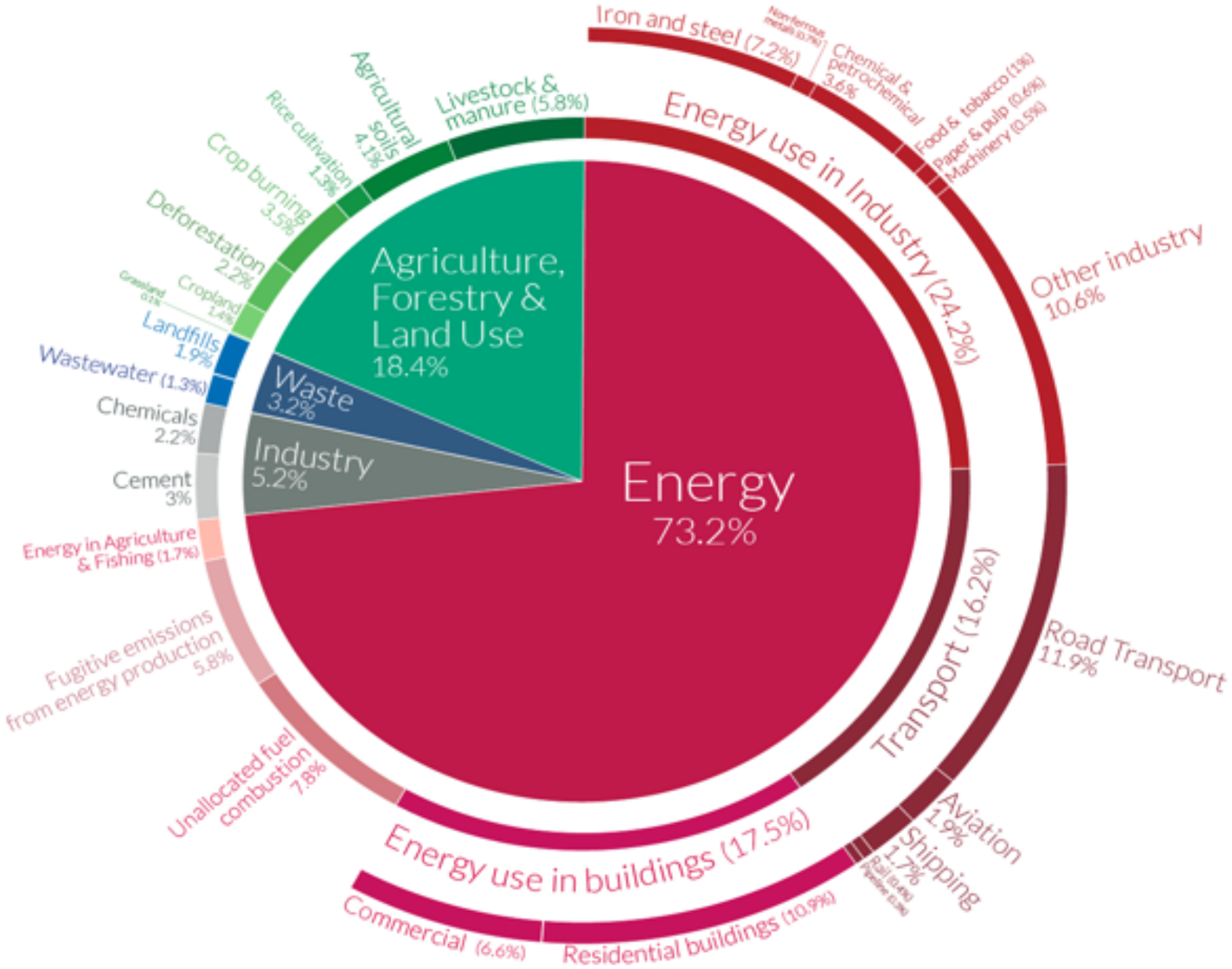


UNEP, 2019

Global greenhouse gas emissions by sector

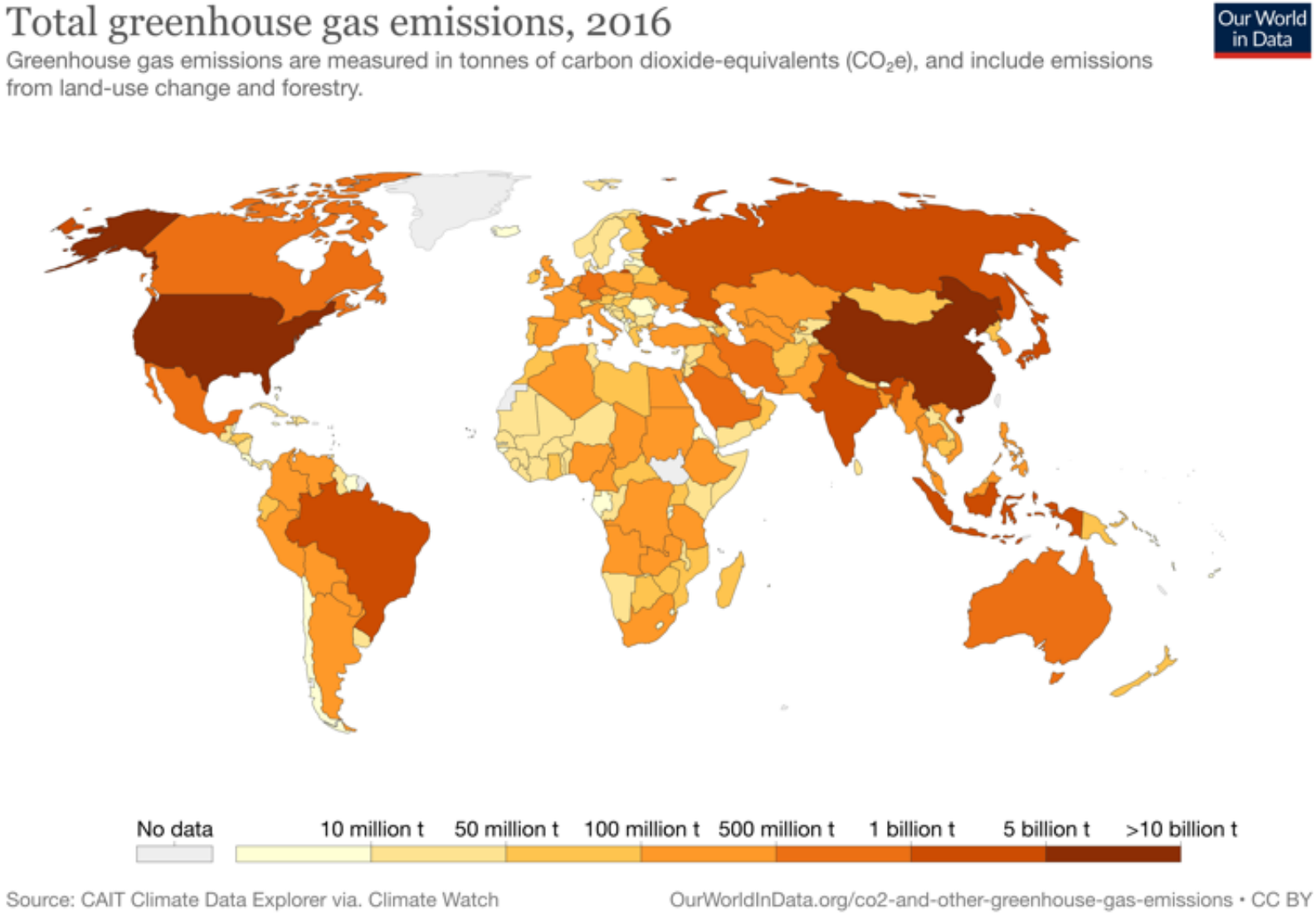
This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO_2eq.

Our World in Data

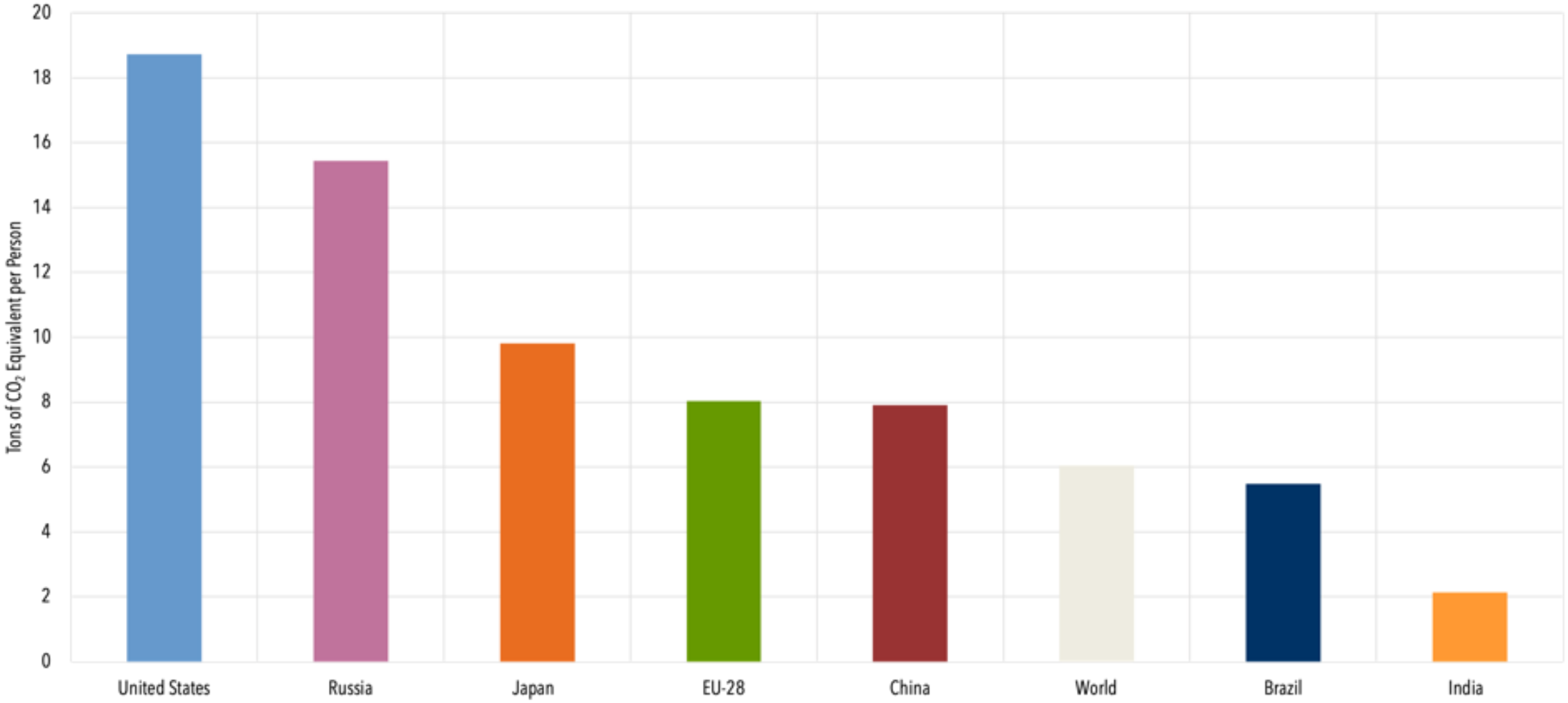


OurWorldinData.org – Research and data to make progress against the world's largest problems.
Source: Climate Watch, the World Resources Institute (2020).

Total greenhouse gas emissions, 2016

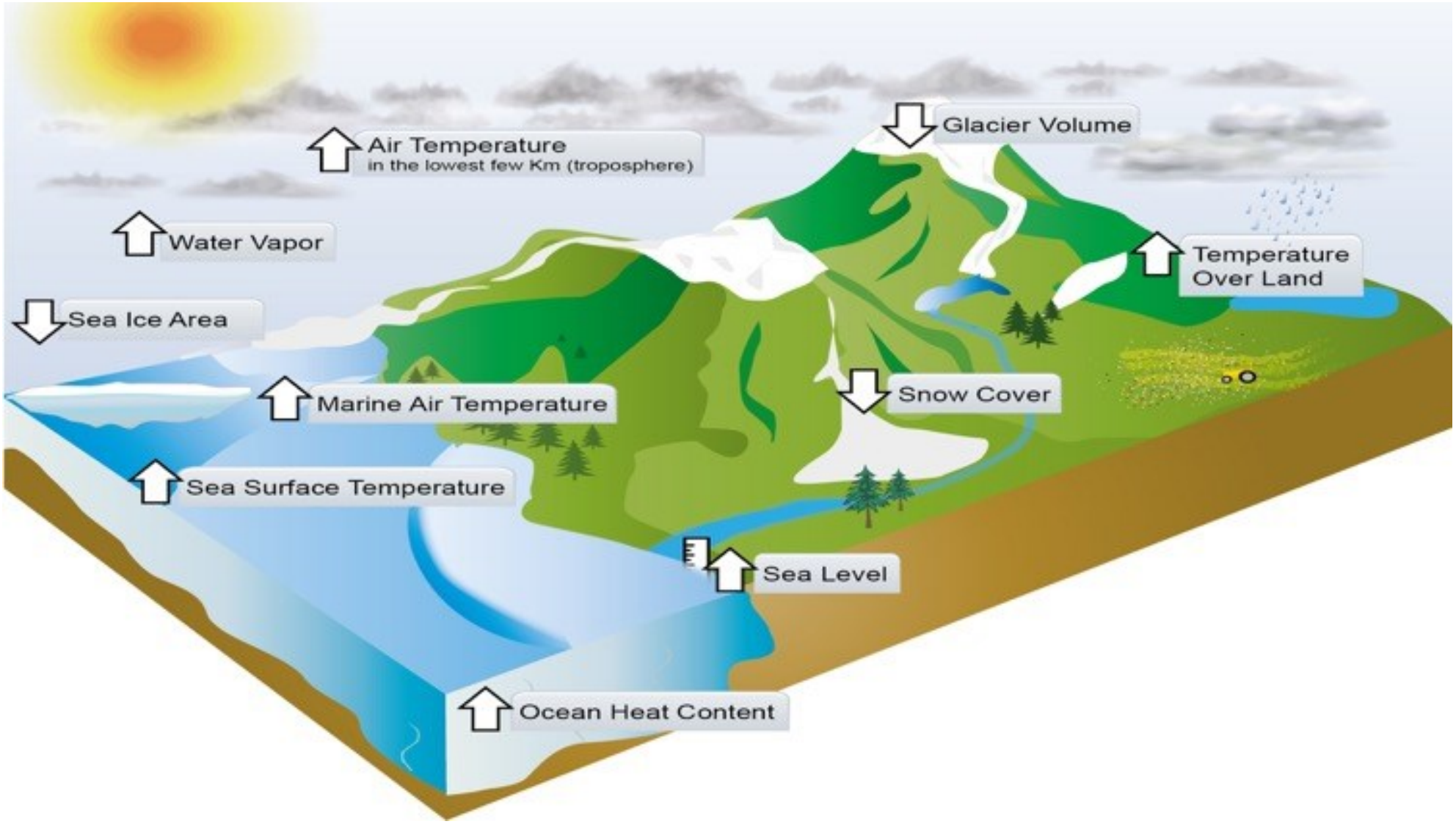


Per capita GHG emissions (2017)

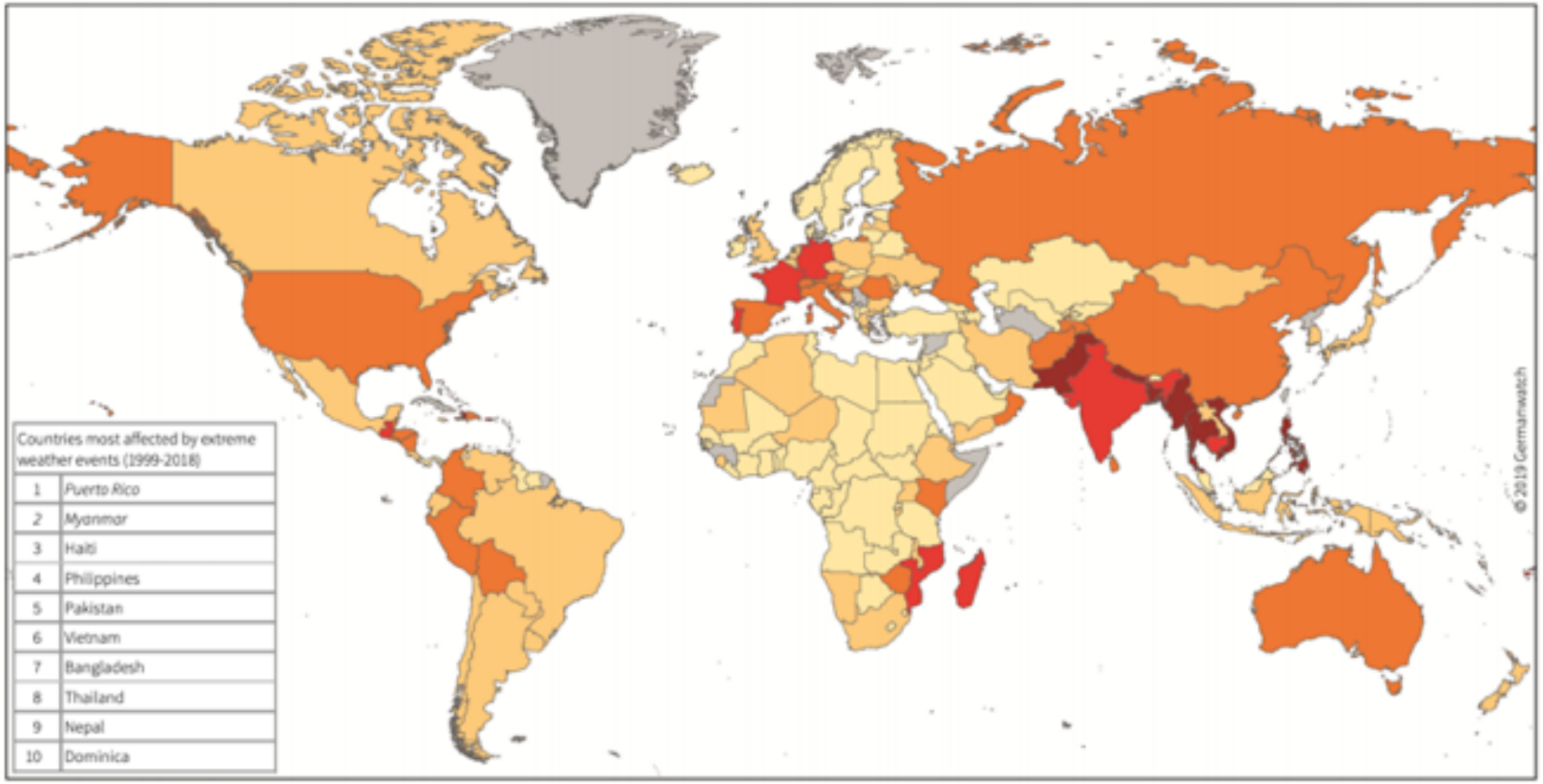


IEA, 2019 & EPA, 2012

Indicators of climate change



India is a country most affected by extreme weather



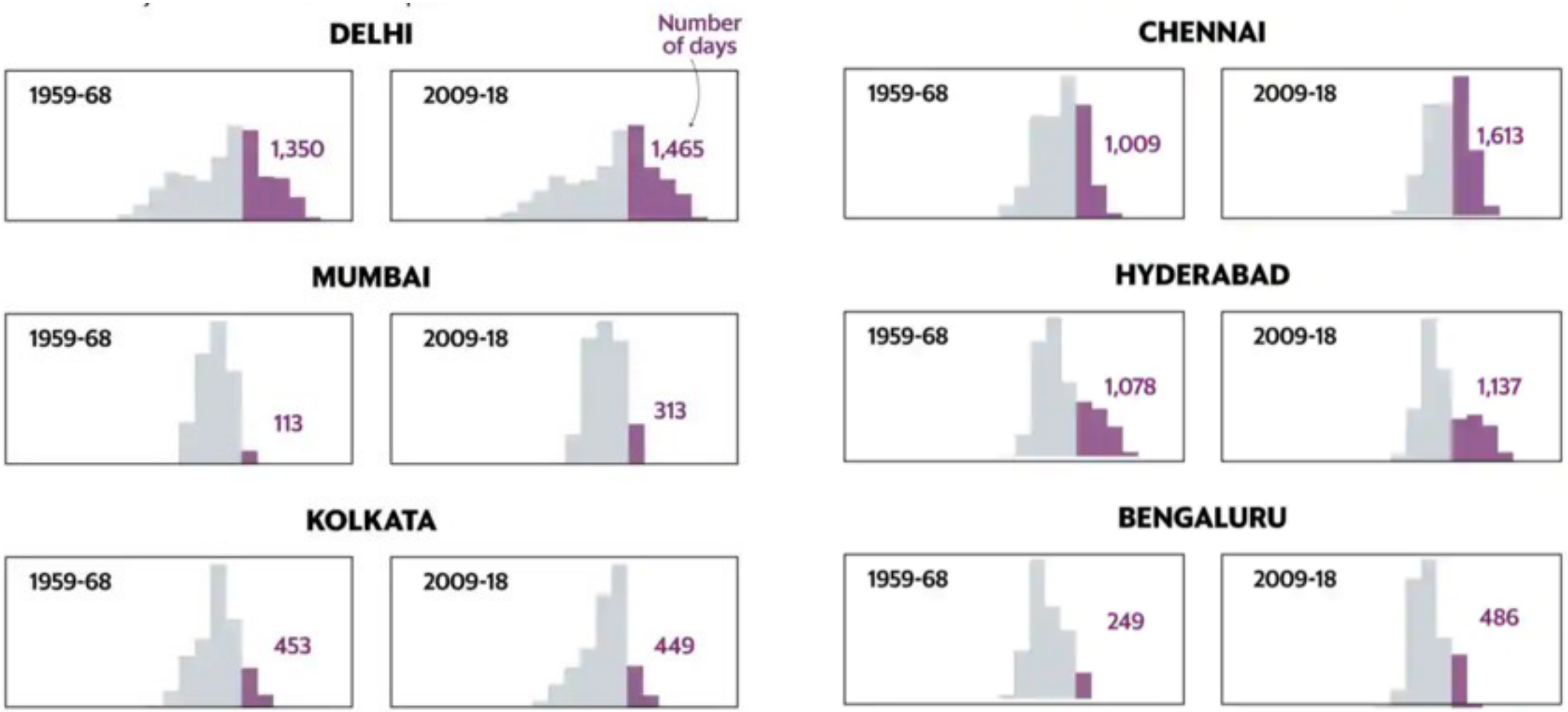
Countries most affected by extreme weather events (1999-2018)	
1	*Puerto Rico*
2	*Myanmar*
3	Haiti
4	Philippines
5	Pakistan
6	Vietnam
7	Bangladesh
8	Thailand
9	Nepal
10	Dominica

Italics: Countries where more than 90% of the losses or deaths occurred in one year or event

Climate Risk Index: Ranking 1999 - 2018 1 - 10 | 11 - 20 | 21 - 50 | 51 - 100 | >100 | No data

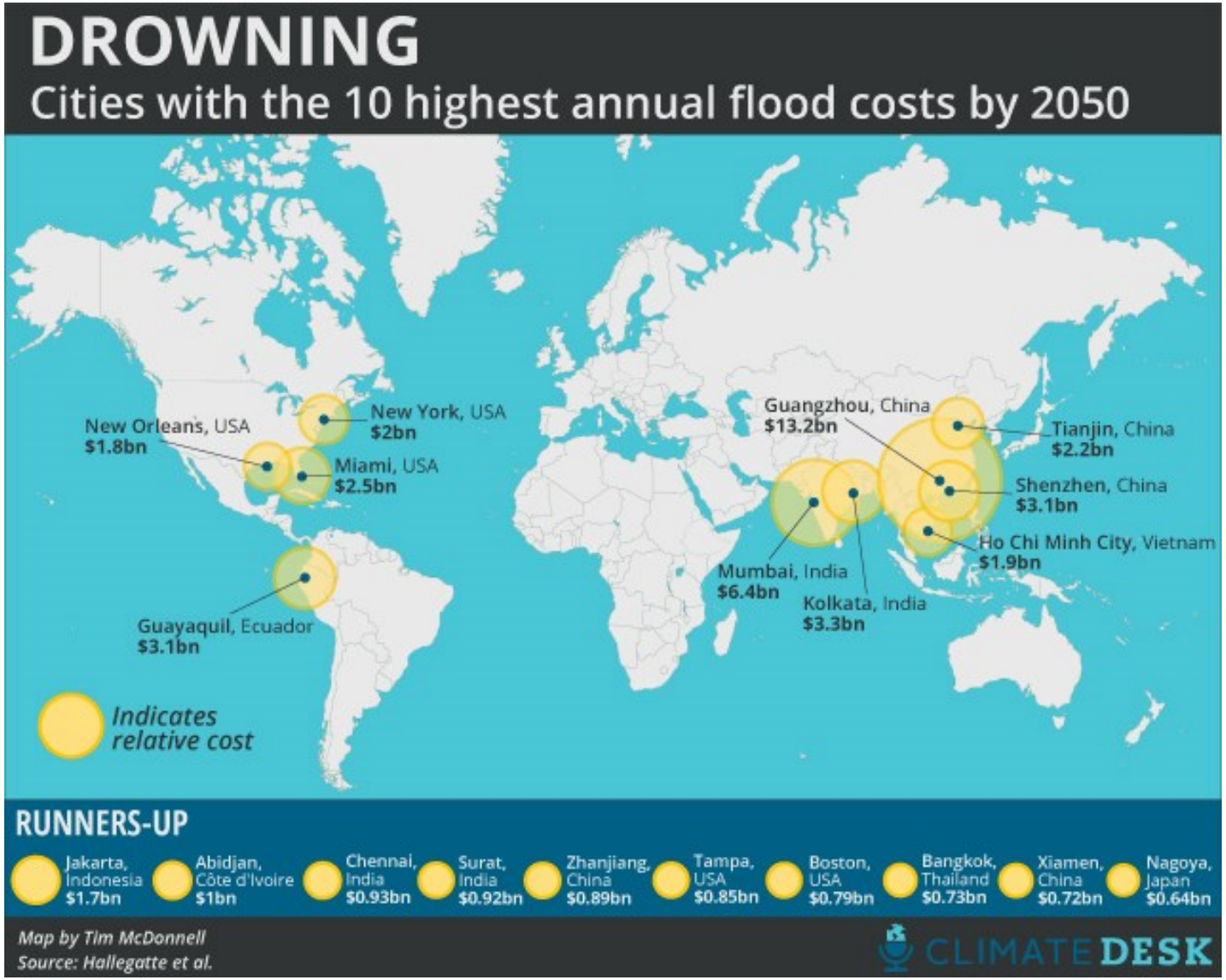
German Watch, 2020

Indian cities are getting hotter



Padmanabhan, 2019

Impacts on urban life in India

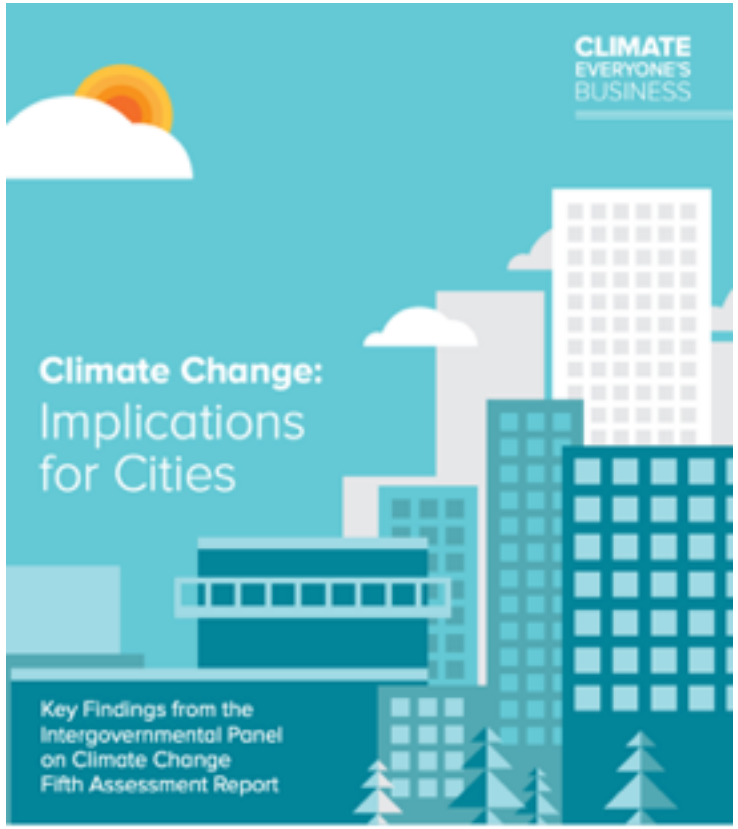


Climate change impacts on urban life

Source: University of Cambridge & ICLEI

Key findings

1. Many emerging climate change risks are concentrated in urban areas.
2. Climate change impacts on cities are increasing.
3. The world's urban population is forecast almost to double by 2050.
4. Steps that build resilience and enable sustainable development in urban areas can accelerate successful climate change adaptation globally.
5. The greatest potential for mitigating greenhouse gas emissions may lie in rapidly developing cities in industrialising countries.



UNIVERSITY OF CAMBRIDGE

ICLEI

The role of Indian cities

1. Cities account for more than 70% of global emissions.
2. Climate change is gradually becoming more prominent in the city policy agenda.
3. Cities are the implementers of key national policies (e.g., 8 core missions on energy efficiency, water).
4. Cities have access to key data.
5. Cities or relevant parties participate in national or international processes (e.g., CSCAF, Talanoa dialogue).

3. National & International Developments

Short history of international developments

- 1988: Intergovernmental Panel on Climate Change
- 1991: United Nations Framework Convention on Climate Change (UNFCCC)
- 1997: Kyoto Protocol
- 2016: Paris Agreement


The Japan Times

Conference adopts Kyoto Protocol

Greenhouse gas emissions to be cut by average of 5.2%

KYOTO COP3

India's Key Intended Nationally Determined Contributions

1. Reduce the emissions intensity of its GDP by 33 to 35 per cent by 2030 from 2005 level.

2. Achieve about 40 per cent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030.

3. Create an additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent through additional forest and tree cover by 2030.

Ministry of Environment, Forest and Climate Change
Government of India

…and many more national and international initiatives

Smart City
MISSION TRANSFORM-NATION

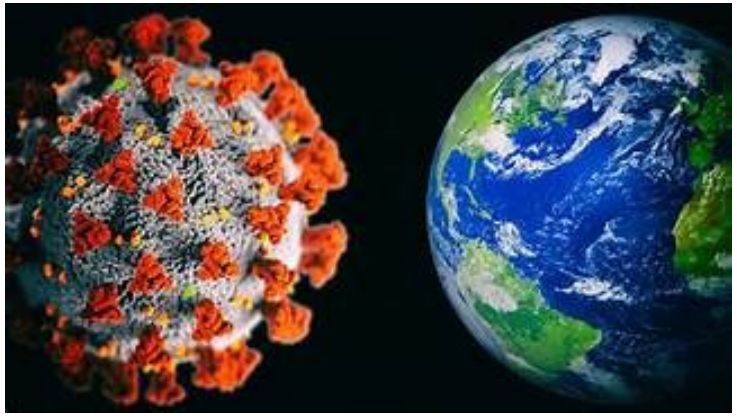
SMART CITIES MISSION

Ministry of Housing and Urban Affairs, Government of India

A message from the United Nations Secretary General, Antonio Guterres

- ***"The climate emergency is like the COVID-19 emergency, just in slow motion and much graver"***

- ***Stern et al., 2020***



Thank you

The agenda

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GLOBAL PROTOCOL FOR COMMUNITY-SCALE GHG EMISSION INVENTORIES

Day 01, Session 03: An Accounting & Reporting Standard for Cities

About the Trainer

Avni Agarwal is a Project Associate with the Climate Program at WRI India. She has been involved in developing an emission estimation tool based on Ministry of Housing & Urban Affair's Climate SMART Cities Assessment Framework. She is currently involved in creating city-level inventories and climate action plans and supporting efforts to build capacity and mainstream climate action at the subnational level.

She also has experience working with Intellecap's Sankalp Forum, where she worked on their 3rd Southeast Asia Conference and covered themes related to entrepreneurship, innovation, investment and impact while working on outreach for the forum.

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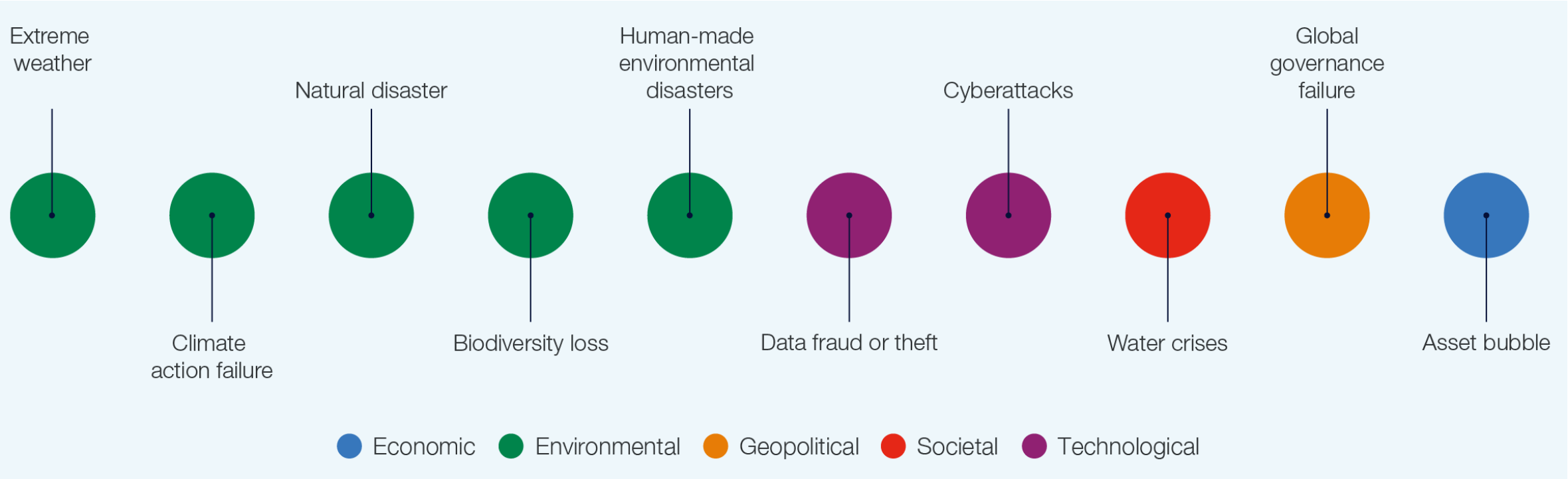
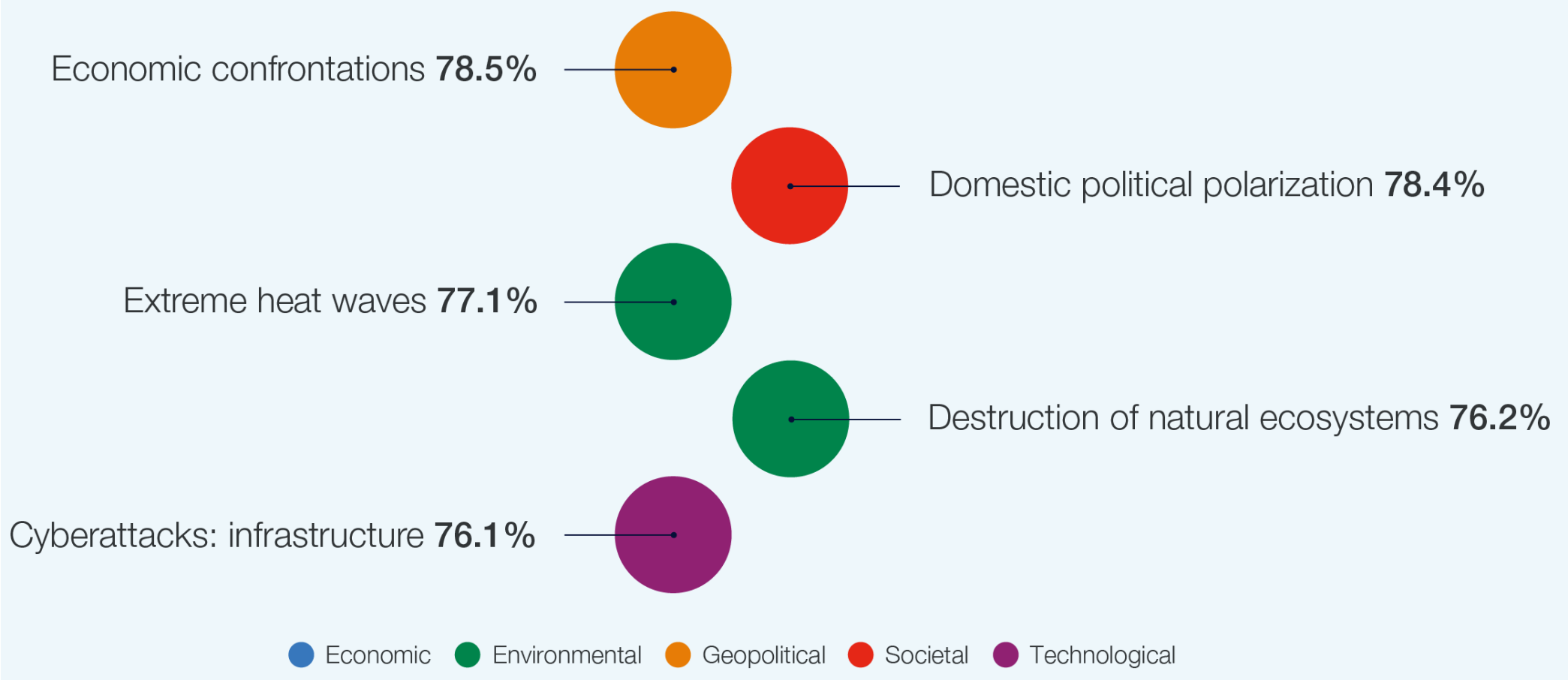
TOP 10 RISKS OVER NEXT 10 YEARS



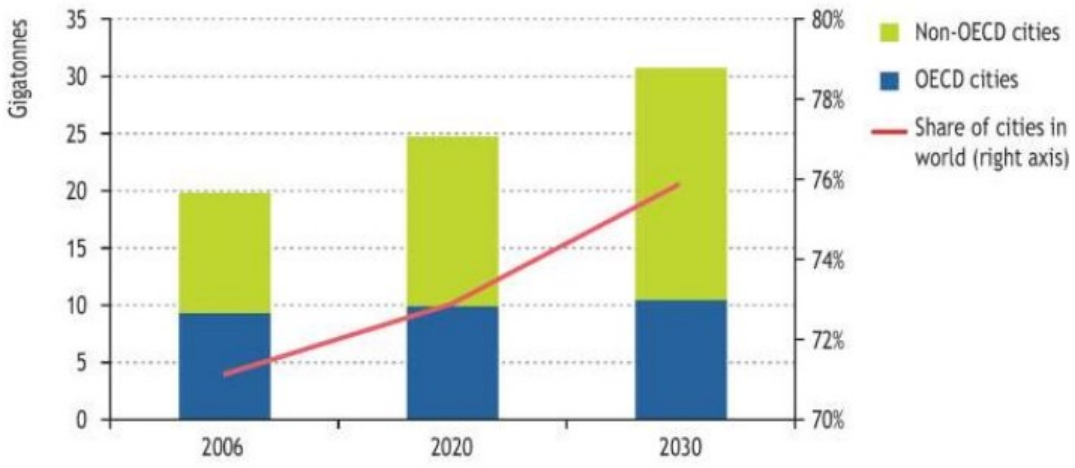
Climate-related issues dominated all of the top-five long-term risks in terms of likelihood

SHORT-TERM RISK OUTLOOK



WHY DO CITIES MATTER?

- Two-thirds of all people are expected to live in urban areas by mid-century
- Cities are integral to tackling the global challenge of climate change, as both a major source of greenhouse gas emissions, and a major source of innovative climate solutions.



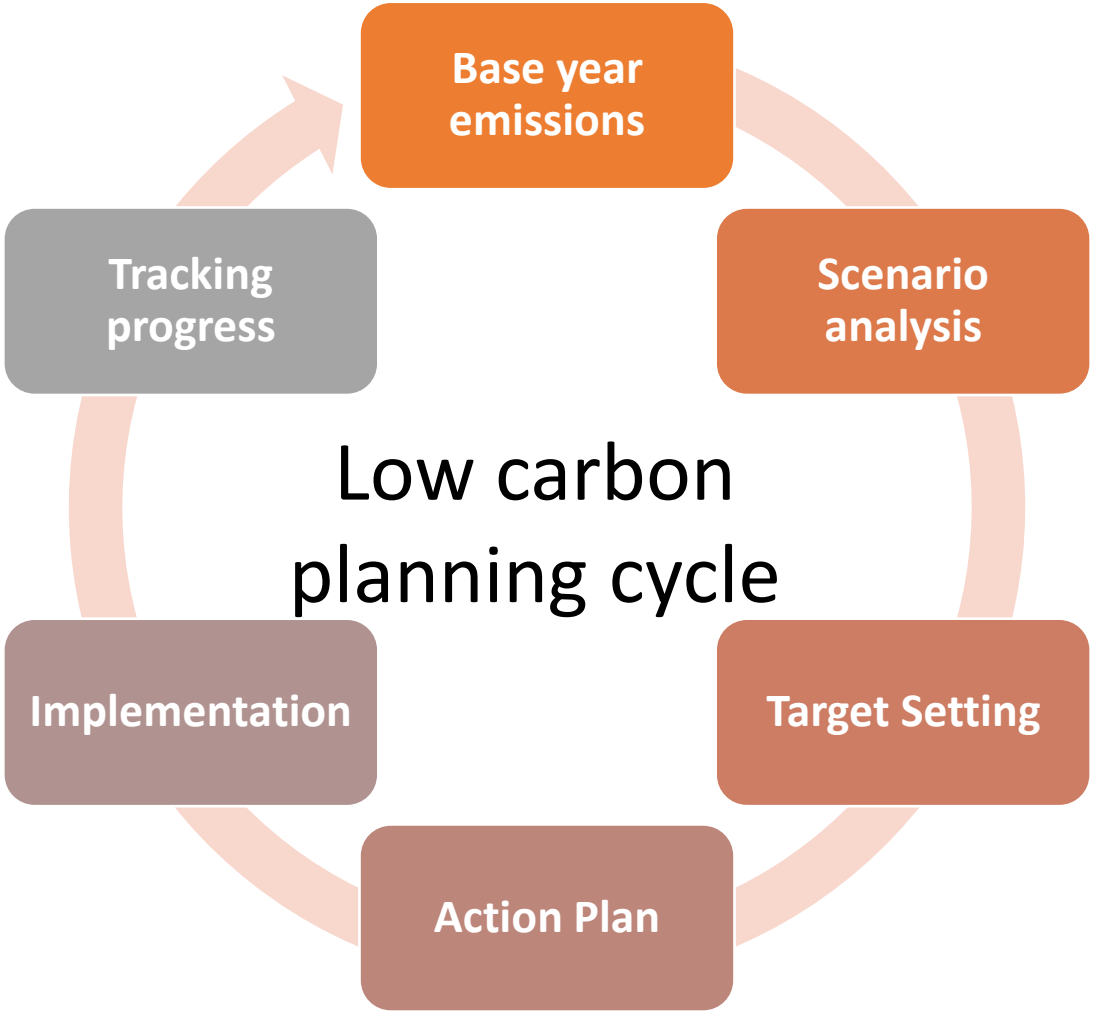
>70% of global energy-related CO_2 emissions are attributable to cities

CITIES ARE LEADING THE WAY TO SOLUTIONS

The GPC offers the first, global standard to consistently measure city-level GHG emissions

WHY MEASURE EMISSIONS?

- Establish base year emissions
- Identify emission sources and reduction opportunities
- Set target and develop action plans
- Track progress
- benchmarking



City-level GHG Inventories in the Indian Context

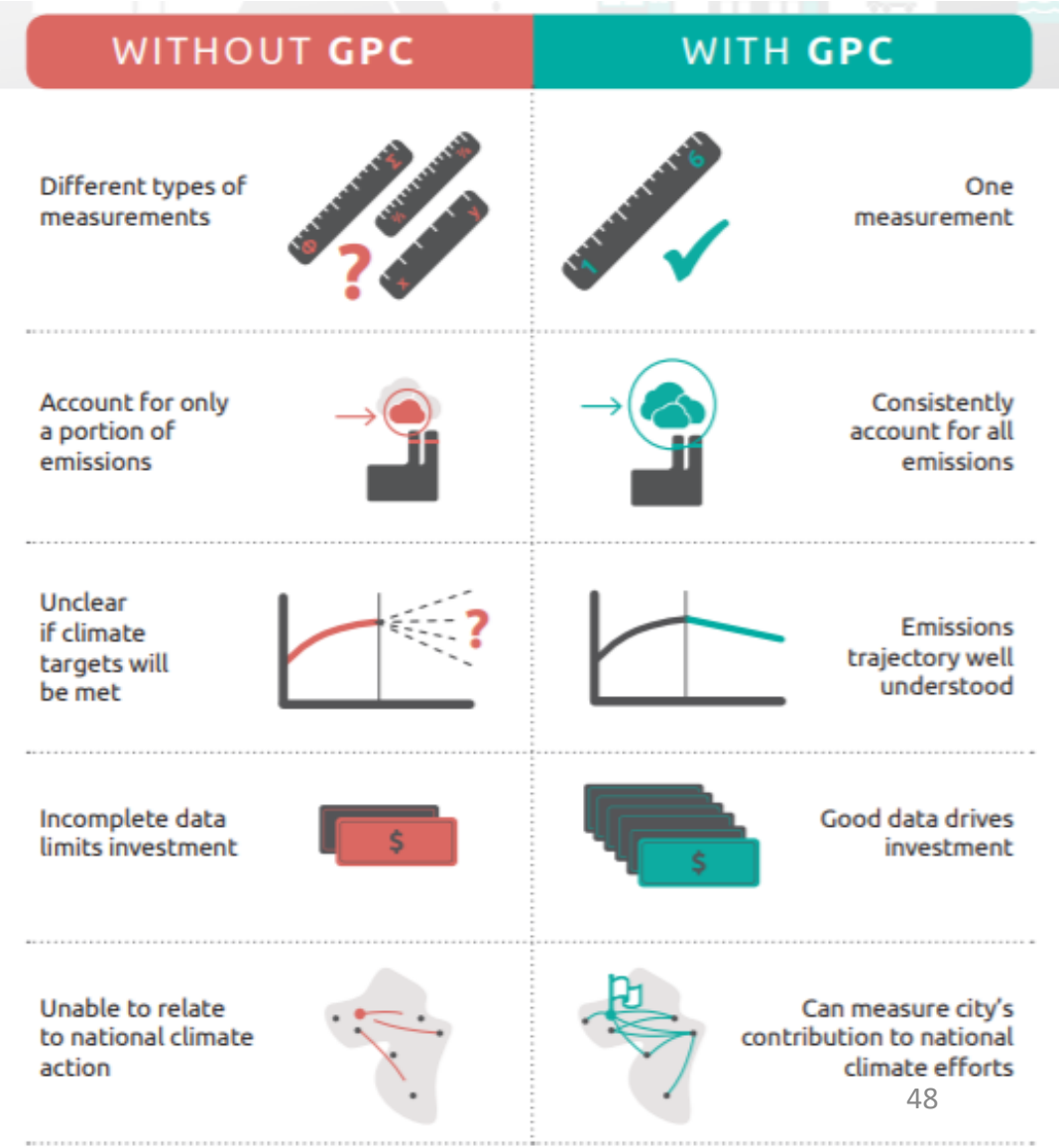
At the international level, India's commitment is primarily driven by the national inventory submitted and recognized by MoEFCC.

However, preparing city-level inventories can help:

- Mainstream climate goals into cities' developmental planning
- Help quantify climate impact of activities taking place in cities
- Identify emission hotspots
- Develop a roadmap to address climate-related concerns in line with CSCAF's Indicator 1 on Climate Action Plan under the Urban Planning, Green Cover & Biodiversity sector
- Establish a mechanism to review and monitor implementation of climate strategies

WHY GPC?

GPC, the world's most widely-endorsed GHG accounting and reporting standard for cities, enables local leaders to build more effective climate strategies and track the performance of actions already underway



PURPOSE OF THE GPC

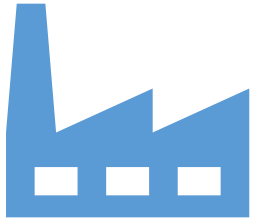
Help cities develop a comprehensive and robust GHG inventory to support climate action planning

Ensure consistent and transparent measurement and reporting of GHG emissions between cities

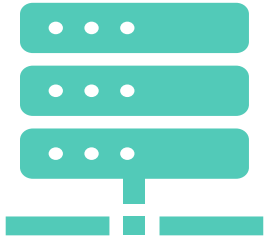
Enable cities to report mitigation performance in national or international framework

Demonstrate the importance of cities in tackling climate change, and facilitate insight through benchmarking, and aggregation, of comparable data

KEY FEATURES OF THE GPC



Emphasis on both production and consumption-based emissions



Emphasis on boundary issues to separate in-boundary & transboundary emissions (enable data aggregation)

Reporting:
- Territorial, compatible with IPCC Guidelines
- Community-driven activities (in-boundary “plus”)

Use of notation keys and indicative data quality assessment

ACCOUNTING AND REPORTING PRINCIPLES

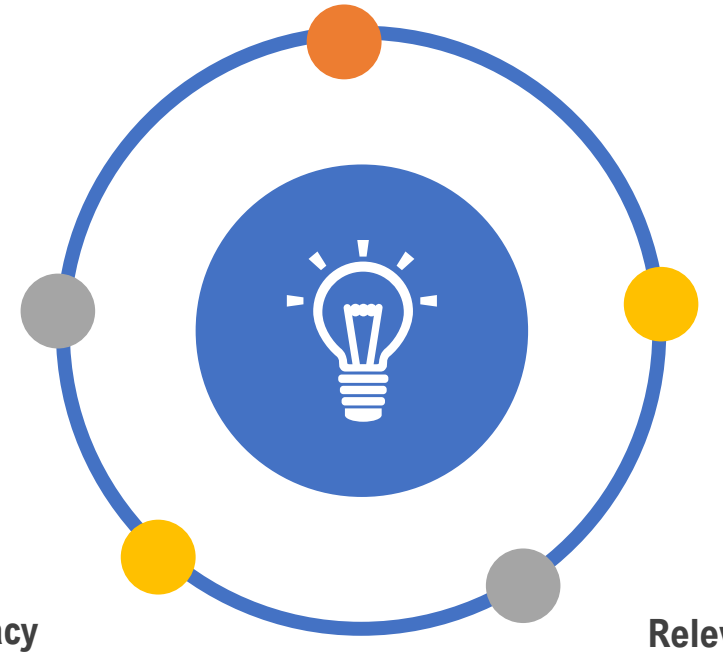
- Based on principles adapted from GHG Protocol Corporate Standard 2004
- Principles adopted in order to represent a fair and true account of emissions

Adopted from GHG Protocol for Cities available here

ACCOUNTING PRINCIPLES

Completeness

Account for all required emissions sources within the inventory boundary. Any exclusion of emission sources shall be justified and clearly explained.



Consistency

Ensuring consistency in approach, boundaries, data sources, assumptions and methodologies, with the standard, and within and between years

Transparency

Clear documentation and disclosure of data sources, assumptions, procedures and methodologies.

Accuracy

Ensuring integrity of data, assumptions, and calculations, so results are neither under- or over-stated.

Relevance

The reported GHG emissions shall appropriately reflect emissions occurring as a result of activity and consumption patterns.

Adopted from GHG Protocol for Cities available here

GUIDANCE ON USING PRINCIPLES

- Trade-offs between the five principles may be required.
  - e.g. Completeness vs. Accuracy: *Completeness is preferred, even if it means using a lower quality or less accurate data source: the IPCC Guidelines emphasise the need for inventory compilers to aim for completeness.*
  - Kampala, Uganda, traded data accuracy for a broader data set covering all sectors. Data from different sources and years were scaled or combined in order to complete the inventory.
- In tradeoffs, cities should strive to achieve appropriate balance among the principles and objectives of conducting a GHG inventory.
- Revisit the accounting principles when clarity is required.

Adopted from GHG Protocol for Cities available here

NOTATION KEYS

- To accommodate limitations in data availability and differences in emission sources between cities, the GPC requires the use of notation keys

Notation Key	Definition	Explanation
IE	Included Elsewhere	GHG emissions for this activity are estimated and presented in another category of the inventory. That category shall be noted in the explanation.
NE	Not Estimated	Emissions occur but have not been estimated or reported; justification for exclusion shall be noted in the explanation.
NO	Not Occurring	An activity or process does not occur or exist within the city.
C	Confidential	GHG emissions which could lead to the disclosure of confidential information and can therefore not be reported.

Adopted from GHG Protocol for Cities available here

Let’s see what we think…

Waste is openly burnt in your city but there is no data or record available on waste burning because it is done discreetly and not monitored.

What notation key will you use for this activity?

Included elsewhere (IE)

Not estimated (NE)

Confidential (C)

Not occurring (NO)

Let’s see what we think…

Grid-supplied energy data is available for your city, but it is disaggregated by residential and non-residential buildings. So emissions from the use of grid-supplied energy in manufacturing industry and construction are included in the total use of grid-supplied energy in commercial and institutional buildings and facilities.

What notation key would the city use to indicate this?

Included elsewhere (IE)

Not estimated (NE)

Confidential (C)

Not occurring (NO)

Thank You

Avni Agarwal
Avni.agarwal@wri.org

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SETTING THE INVENTORY BOUNDARY

Day 01, Session 04: Geographic boundary, Temporal coverage, Greenhouse gases (GHG), GHG emission sources, Categorizing emissions by scope

About the Trainer

Avni Agarwal is a Project Associate with the Climate Program at WRI India. She has been involved in developing an emission estimation tool based on Ministry of Housing & Urban Affair's Climate SMART Cities Assessment Framework. She is currently involved in creating city-level inventories and climate action plans and supporting efforts to build capacity and mainstream climate action at the subnational level.

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INTRODUCTION

- An inventory boundary identifies the gases, emission sources, geographic area, and time span covered by a GHG inventory.

- This helps us know where emissions are coming from and gives an indication of where it can take action or influence change.

The assessment boundary should include all seven Kyoto Protocol greenhouse gases occurring within the geographic boundary of the city, as well as specified emissions occurring out-of-boundary as a result of city activities. The inventory should cover a continuous 12-month period.

Adopted from GHG Protocol for Cities available here

GEOGRAPHIC BOUNDARY

- Establish a geographic boundary that identifies the spatial dimension or physical perimeter of the inventory's boundary.

- Maintain the same boundary for consistent inventory comparison over time

- Align the boundary with the administrative boundary of a local government or a ward within a city, a combination of administrative divisions, a metropolitan area, or another geographically identifiable entity.

Adopted from GHG Protocol for Cities available here

TIME PERIOD

- Account for city GHG emissions within a single reporting year
- Inventory must cover a continuous period of 12 months
- Align inventory time period to either a calendar year or financial year consistent with the time periods generally used by the city

Adopted from GHG Protocol for Cities available here

GREENHOUSE GASES

Cities shall account for emissions of the following seven gases:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur hexafluoride (SF_6)
- Nitrogen trifluoride (NF_3)

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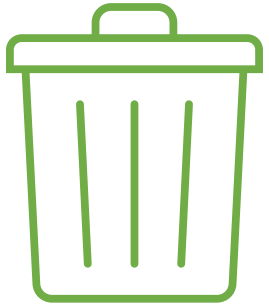
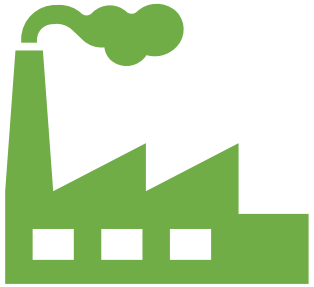
GHG EMISSION SOURCES

Stationary Energy

Transportation



Waste



Industrial processes and product use (IPPU)

Agriculture, forestry and other land use (AFOLU)

Other Scope 3

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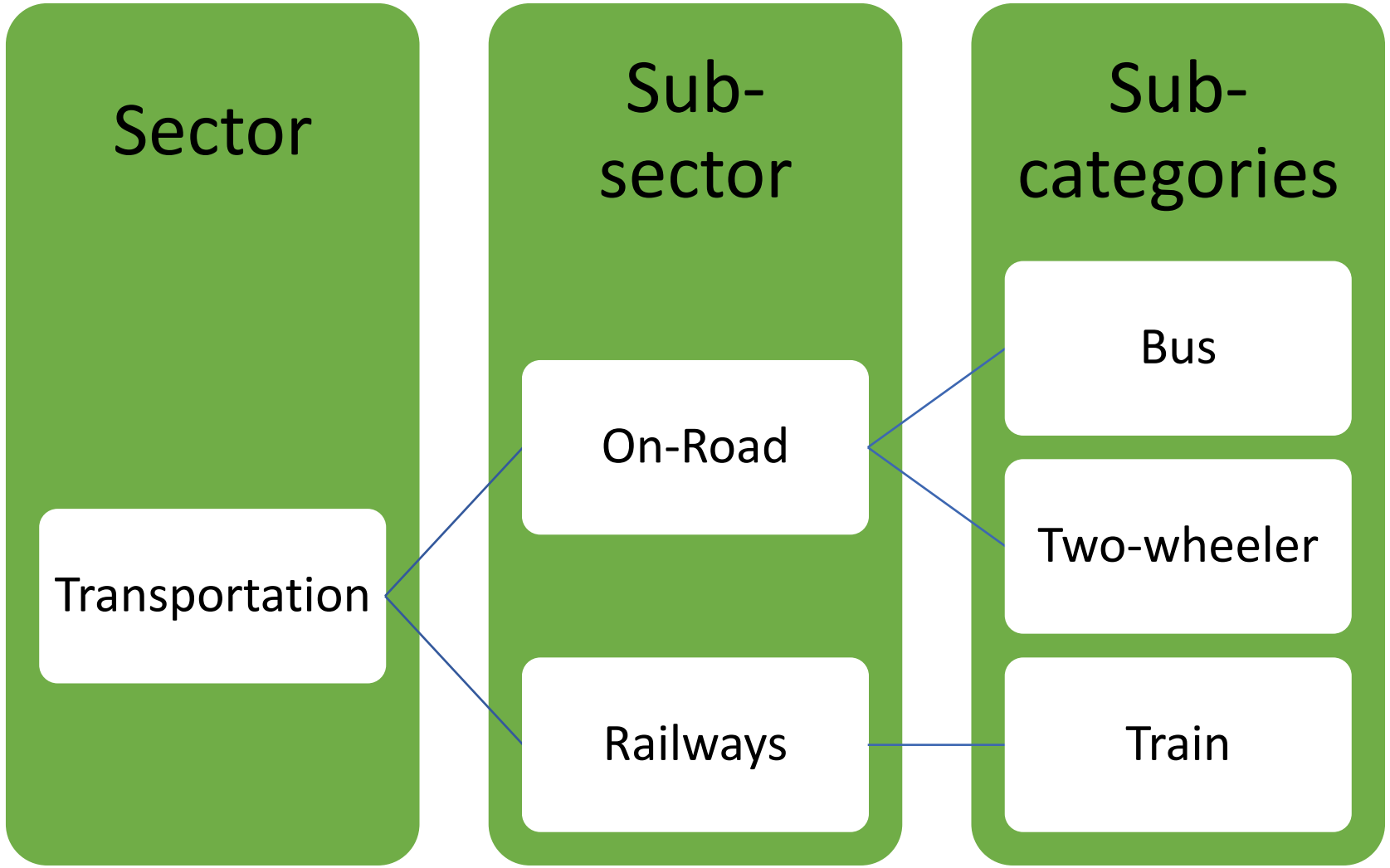
CATEGORISATION



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GHG EMISSION SOURCES (CONTINUED)

Stationary Energy
Residential buildings
Commercial & Institutional buildings and facilities
Manufacturing industries and construction
Energy industries
Agriculture, forestry and fishing activities
Non-specified sources
Fugitive emissions from mining, processing, storage, and transportation of coal
Fugitive emissions from oil and natural gas systems

Transportation
On-road
Railways
Waterborne navigation
Aviation
Off-road

Waste
Solid waste disposal
Biological treatment of waste
Incineration and open burning
Wastewater treatment and discharge

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GHG EMISSION SOURCES (CONTINUED)

Industrial Processes and Product Use (IPPU)
Industrial Processes
Product Use

Agriculture, Forestry and Other Land Use (AFOLU)
Livestock
Land
Aggregate sources and non-CO_2 emission sources on land

Other Scope 3

Adopted from GHG Protocol for Cities available here

CATEGORIZING EMISSIONS BY SCOPE

Understanding "Scope"

Activities taking place within a city can generate GHG emissions that occur within the city boundary as well as outside the city boundary.

To distinguish between these, the GPC groups emissions into three categories based on where they occur:

- Scope 1
- Scope 2
- Scope 3

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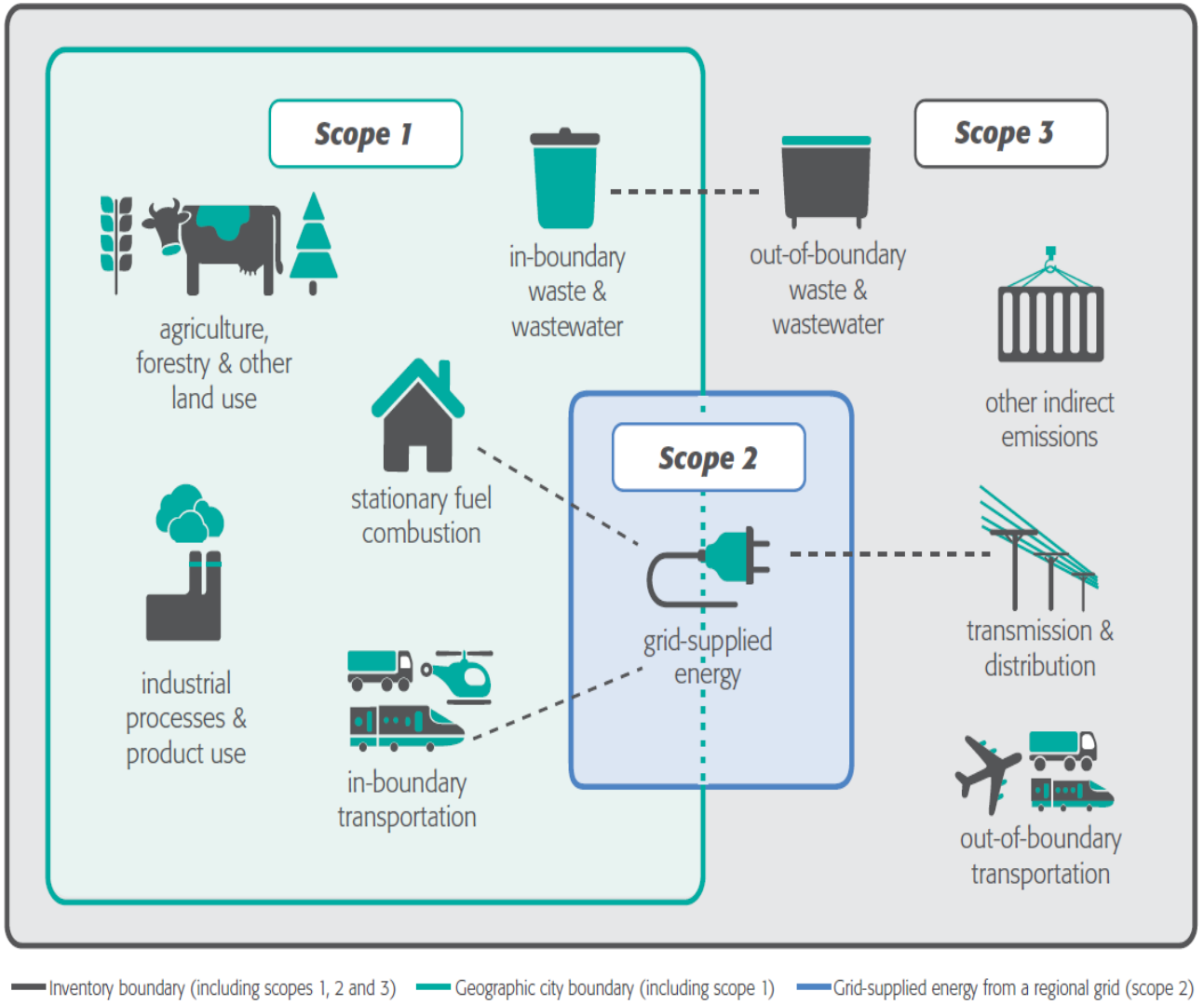
CONTINUED…

Scope	Definition
Scope 1	GHG emissions from sources located within the chosen boundary.
Scope 2	GHG emissions occurring because of the use of grid-supplied electricity, heat, steam and/or cooling within the chosen boundary.
Scope 3	All other GHG emissions that occur outside the city boundary as a result of activities taking place within the city boundary.



Categorizing stationary energy emissions by scope

- **Scope 1:** Emissions from fuel combustion and fugitive emissions in the city
- **Scope 2:** Emissions from the consumption of grid-supplied electricity, steam, heating and cooling in the city
- **Scope 3:** Distribution losses from grid-supplied electricity, steam, heating and cooling in the city

Can you think of examples from your city?

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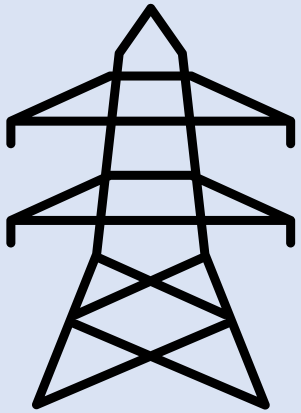
STATIONARY ENERGY EMISSION SOURCES AND THEIR SCOPE CATEGORIZATION

GHG Emission Source	Scope 1	Scope 2	Scope 3
Stationary Energy	Emissions from fuel combustion and fugitive emissions within the city boundary	Emissions from consumption of grid-supplied electricity consumed within the city boundary	Transmission and distribution losses from the use of grid-supplied energy
Residential buildings	BASIC 	BASIC 	BASIC+ 
Commercial & institutional buildings			
Manufacturing industries and construction			
Energy industries			
Agriculture, forestry and fishing activities			
Non-specified sources			
Fugitive emissions from mining, processing, storage and transportation of coal			Sources included in Other Scope 3
Fugitive emissions from oil and natural gas systems			Sources included in Other Scope 3

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Categorizing transportation emissions by scope

- **Scope 1:** Emissions from transportation occurring in the city
- **Scope 2:** Emissions from grid-supplied electricity used in the city for transportation
- **Scope 3:** Emissions from the portion of transboundary journeys occurring outside the city, and transmissions and distribution losses from grid-supplied energy from electric vehicle use

Can you think of examples from your city?

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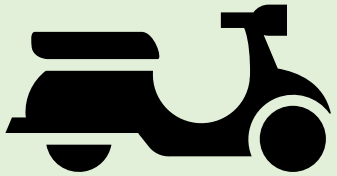
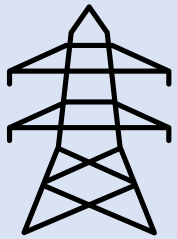
TRANSPORTATION EMISSION SOURCES AND THEIR SCOPE CATEGORIZATION

GHG Emission Source	Scope 1	Scope 2	Scope 3
Transportation	Emissions from fuel combustion for transportation occurring in the city	Emissions from consumption of grid-supplied electricity used in the city for transportation	Emissions from the portion of transboundary journeys occurring outside the city, and transmissions and distribution losses from grid-supplied energy
On-road	BASIC 	BASIC 	BASIC+ 
Railways			
Water			
Aviation			
Off-road			Other Scope 3

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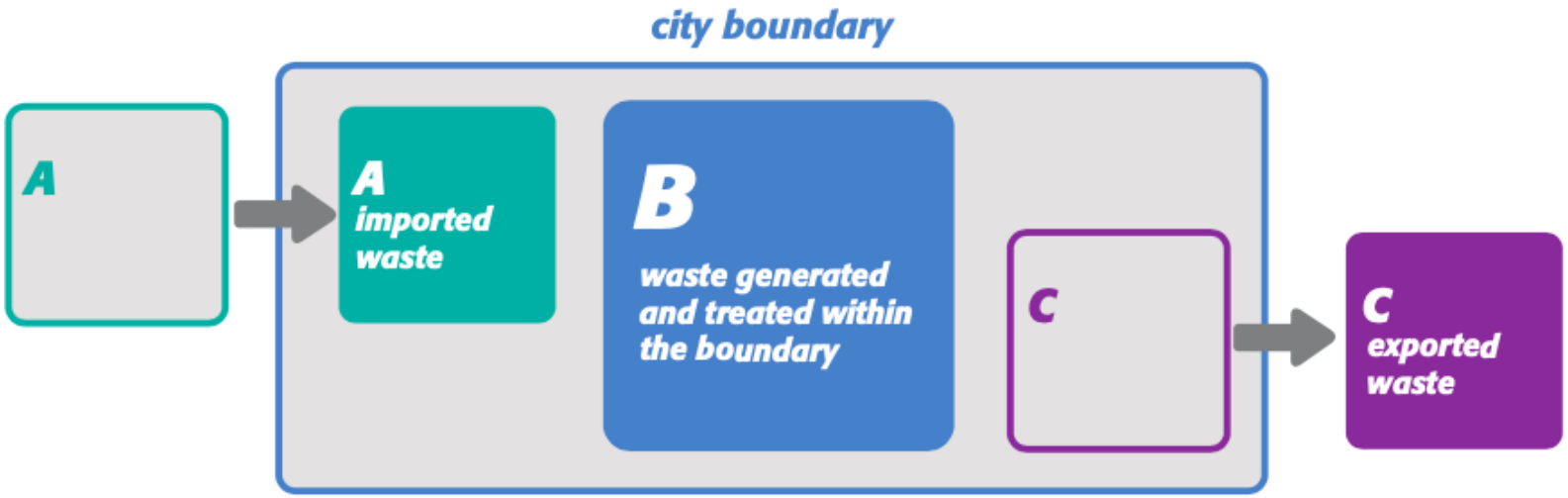
Categorizing waste emissions by scope

- **Scope 1:** Emissions from waste treated inside the city
- **Scope 2:** Not applicable
- **Scope 3:** Emissions from waste generated by the city but treated outside the city

Based on boundaries for imported and exported waste in the image below, can you categorize A, B & C by scope?



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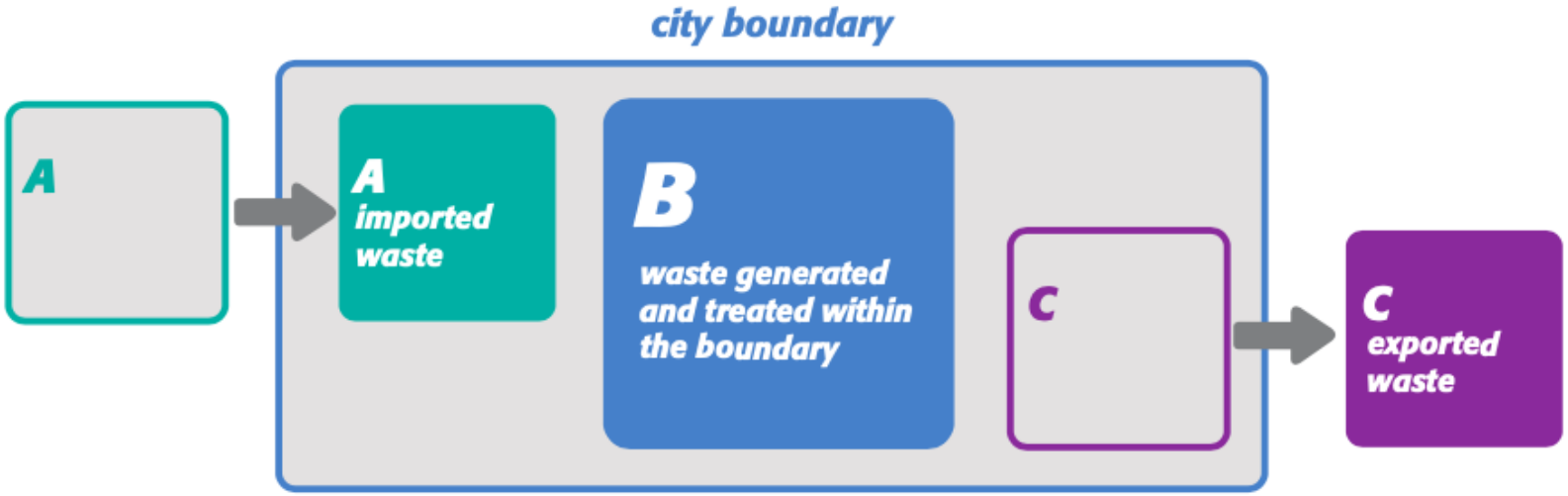
Let's see what we think…

In terms of A, B & C, how would you define Scope 1 emissions?

- Just A
- Just B
- Just C
- A+B
- B+C
- C+A



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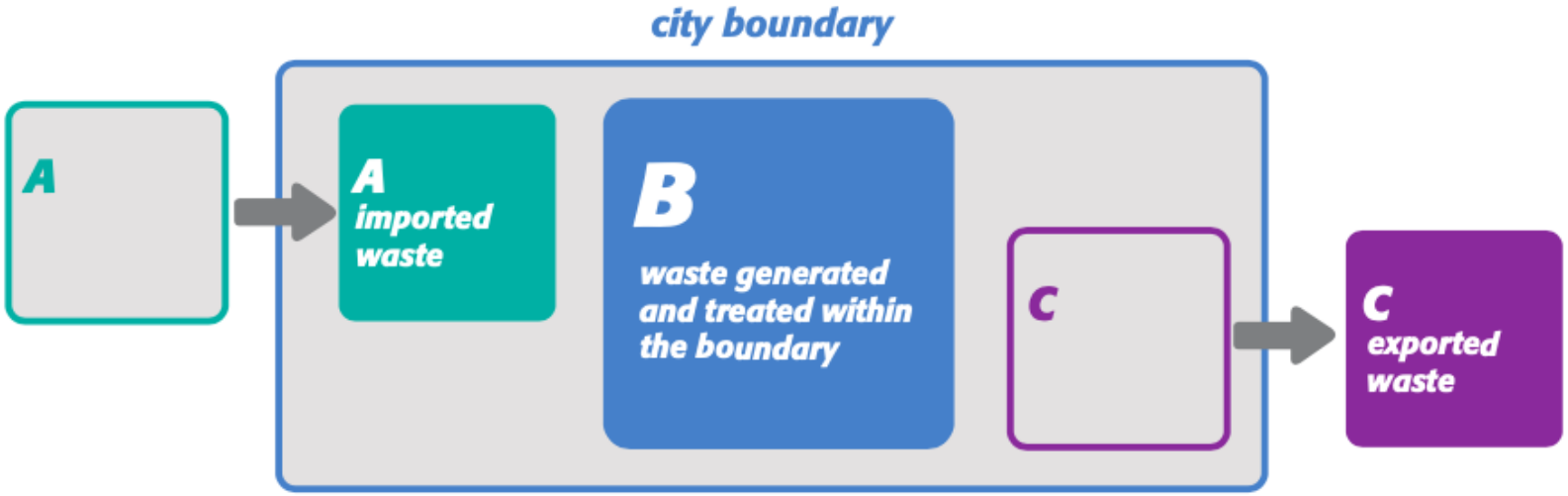
Let's see what we think…

In terms of A, B & C, how would you define Scope 3 emissions?

- Just A
- Just B
- Just C
- A+B
- B+C
- C+A



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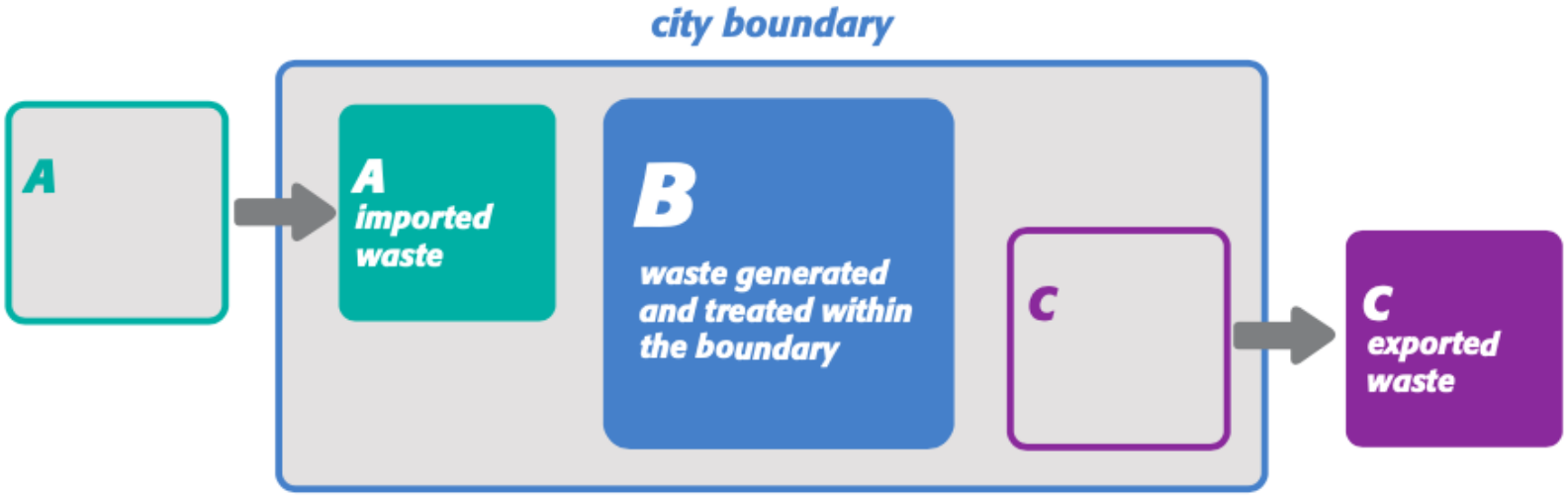
Based on the above, the reporting requirement for the *Waste* sector is as follows:

- Scope 1 emissions = emissions from A + B
  (all emissions generated within the city boundary)

- Scope 3 emissions = emissions from C



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Waste emission sources and their scope categorization

GHG Emission Source	Scope 1	Scope 2	Scope 3
Waste	**Emissions from in-boundary waste treatment**		**Emissions from waste generated in the city but treated out-of-boundary**
Solid waste generated in the city disposed in landfills or open dumps	BASIC		BASIC
Solid waste generated in the city that is treated biologically			
Solid waste generated in the city incinerated or burned in the open			
Wastewater generated in the city			

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Aggregating City Inventories

City inventories can be aggregated at the subnational and national levels in order to:

- Improve the data quality of a national inventory, particularly where major cities' inventories are reported
- Measure the contribution of city mitigation actions to regional or national GHG emission reduction targets
- Identify innovative transboundary and cross-sectoral strategies for GHG mitigation.

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Thank You

Avni Agarwal
Avni.agarwal@wri.org

The agenda

Time	Session	Speaker	Organization
2:30-2:45	Welcome and introductions	**Mr. Panagiotis Karamanos, Mr. Nikhil Kolsepatil, Mr Chirag Gajjar**	IUC India, ICLEI SA, WRI India
2:45-3:00	Introduction to climate change	**Mr Panagiotis Karamanos**	IUC India
3:00-3:15	National & international developments	**Mr Panagiotis Karamanos**	IUC India
3:15-3:30	Q&A	**Mr Panagiotis Karamanos**	IUC India
3:30-4:00	Inventory accounting principles	**Ms Avni Agarwal**	WRI India
4:00-4:30	Boundary scope and sources	**Ms Avni Agarwal**	WRI India
4:30-4:45	**Q&A**	**Ms Avni Agarwal**	**WRI India**
4:45-5:15	Data collection	**Mr Prateek Mishra**	ICLEI South Asia
5:15-5:45	Goal setting, tracking GHG emissions over time and reporting	**Mr Keshav Jha**	ICLEI South Asia
5:45-6:00	Q&A	**Mr Prateek Mishra Mr Keshav Jha**	ICLEI South Asia

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WRI INDIA

GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY

IUC INTERNATIONAL URBAN COOPERATION European Union-India

ICLEI Local Governments for Sustainability

GHG Emission Calculation and Data Collection

Day 01, Session 05: Define Basic Calculations, Determine Activity Data and Emission Factor, GWP of Major Greenhouse Gases, Managing Data Quality

About the Trainer

Prateek Mishra is working as a Project Engineer in the Energy and Climate Division of ICLEI South Asia, New Delhi. He has been working on the greenhouse gas emission accounting & reporting, low emission development planning, climate action plan preparation and baseline assessment of climate policies and programmes in South Asia.

As part of ICLEI South Asia, Prateek is supporting the implementation of Urban Low Emission Development Strategies (Urban LEDS) project in India and Bangladesh. He is also contributing as a team member in the Climate Footprint Project, an Under2Coalition initiative, where he is involved in key discussions with state departments and stakeholders to understand current on-ground climate action & MRV situations and issues in India. Prateek has also supported on the Madhya Pradesh State Climate Mitigation Action Plan, under the GHG Platform India initiative.

Objective

What will we understand?

- basics of GHG emission calculation
- how energy use and activity level impacts GHG emission
- data collection and management for GHG inventory preparation

How do we go about calculating GHG emissions?

GHG emissions are (relatively) simple to calculate:

Activity data x Emission factor = GHG emissions

Amount of energy used

e.g. liters of petrol used

OR

amount /scale of an activity generating GHG emissions

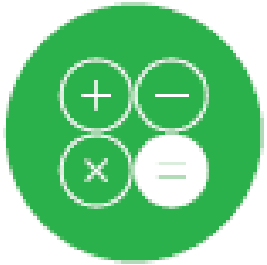
e.g. mass of solid waste sent to landfill

Amount of GHG emitted per unit of activity data

eg. kg of CO_2 per liter of petrol consumed

OR

e.g. kg of CH_4 per kg of waste disposed in landfill



How do we go about calculating GHG emissions?

- Households in the city use 5,000 kilowatt hour (kWh) or units of electricity from the grid per year
- The emission factor of the electricity grid is 0.80 kg of CO_2 per kWh of electricity

Calculation of GHG Emission (CO_2 gas)

GHG emissions = Activity data x Emission factor

GHG emissions = 5,000 kWh x 0.80 kg of CO_2/kWh

GHG emissions = 4,000 kg of CO_2

Emission Factors

India Electricity Grid	Grid electricity Emission Factor (kg of CO_2 per kWh)					Source
	2014-15	2015-16	2016-17	2017-18	2018-2019	
	0.83	0.82	0.83	0.82	0.82	The Central Electricity Authority of India (CEA), Government of India (Weblink: https://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver13.pdf)

Energy Source	Unit	Emission Factor (kg of CO_2e per unit)	Sources of EF
Kerosene	Litre	2.52	(1) Default: IPCC 2006 guidelines (https://www.ipcc-nggip.iges.or.jp/EFDB/main.php) (2) Country Specific: 2.1 India National Communication (NATCOM) II to UNFCCC (https://unfccc.int/non-annex-I-NCs) 2.2 Second Biennial Update Report to the United Nations Framework Convention on Climate Change (https://unfccc.int/BURs)
LPG	kg	1.61	
Petrol	Litre	2.27	
Diesel	Litre	2.67	

Do all GHGs have the same warming effect? How do we compare?

- **Global Warming Potential (GWP)** to compare the amount of heat trapped in the atmosphere by a GHG compared to a similar mass of Carbon dioxide (CO_2).
- The higher the GWP the more heat a GHG can trap in the atmosphere

Primary GHGs in a city/state inventory

Carbon Dioxide CO_2	1
Methane CH_4	25
Nitrous Oxide N_2O	298
Hydrofluro carbons HFCs	12 - 14,800
Perflouro carbons PFCs	7,390->17,340
Sulfur Hexafluoride SF_6	22,800

Source: IPCC Fourth Assessment Report: Climate Change 2007 (AR4)

Let's Calculate GHG emission in CO_2 equivalent values

- GHG emissions are accounted and reported in tonnes of CO_2 equivalent (CO_2e)
- Emission amounts of other GHGs are converted in CO_2 equivalent terms using their Global Warming Potential (GWP) values

Example: GHG emission calculation in kg of CO2 equivalent from a car which uses 1000 liters of petrol in a year

kg CO_2/liter	kgCH_4/liter	kgN_2O/liter	GWP of CO_2	GWP of CH_4	GWP OF N_2O
2.5	0.001	0.0002	1	25	298

GHG emissions = Activity data x Emission factor

Gas-wise x emission **GWP**

CO_2 emission = 1000 liter x 2.5 kg CO_2/ liter = 2500 kg CO_2 x **1** = 2500 kg CO_2e

CH_4 emission = 1000 liter x 0.001 kg CH_4/ liter = 1 kg CH_4 x **25** = 25 kg CO_2e

N_2O emission = 1000 liter x 0.0002 kg N_2O/liter = 0.2 kg N_2O x **298** = 59.6 kg CO_2e

Use Global Warming Potential values to convert to CO2 equivalents

Total GHG emission to be reported = 2500 + 25 + 59.6 = 2584.6 kg of CO_2e

My other car is a bicycle

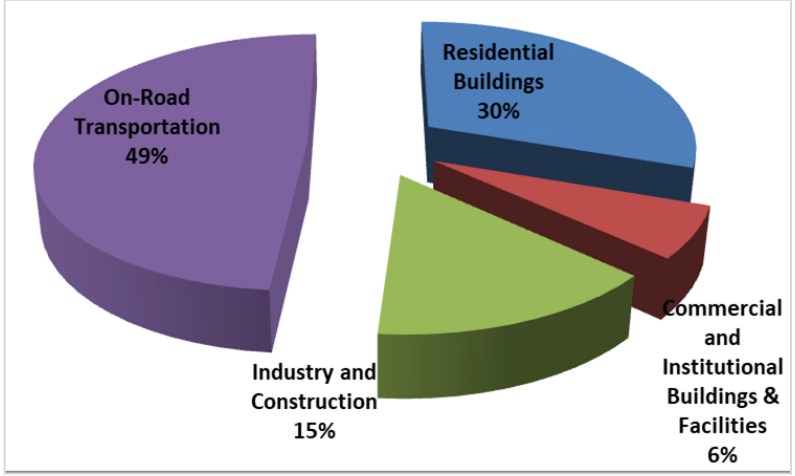
How does a city's energy use and GHG emission profile look like ? Case – Rajkot City, Gujarat

Population: 12.86 lakh persons (2011)
Area: 129 sq. km
Total GHG emission: 1.88 million tonnes of CO_2e

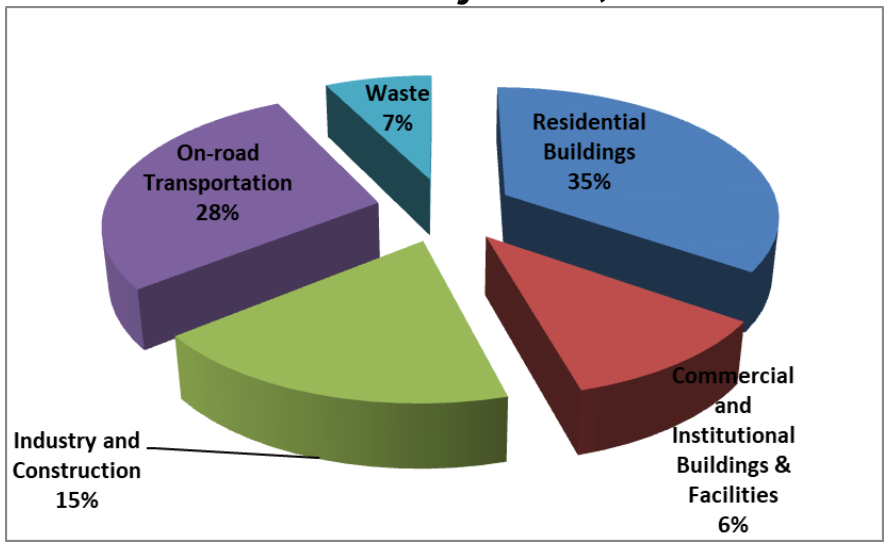
Sector	GHG emission (t CO_2e)
STATIONARY UNITS	**1,212,538**
Residential Buildings	655,578.2
Commercial/Institutional Buildings and Facilities	207,597.4
Industry and Construction	349,362.2
MOBILE UNITS	**534,818.2**
On-Road Transportation	534,818.2
WASTE	**140,329**
Solid Waste Disposal	140,329
	1,887,685

Source: City Climate Resilient Action Plan – Rajkot, 2018

Energy Consumption Share by Sector, 2015-16

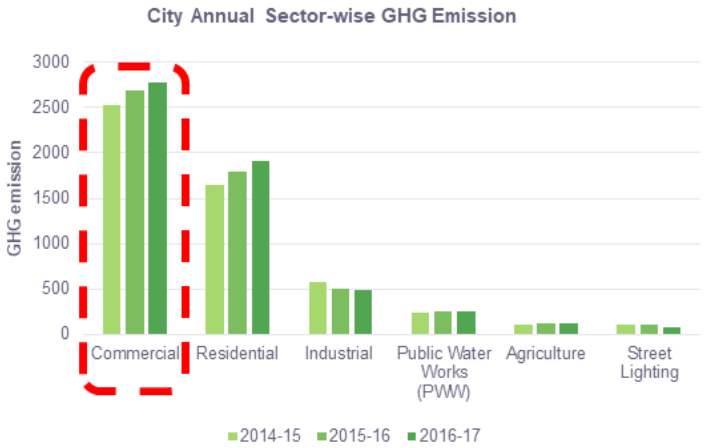


GHG Emission Share by Sector, 2015-16

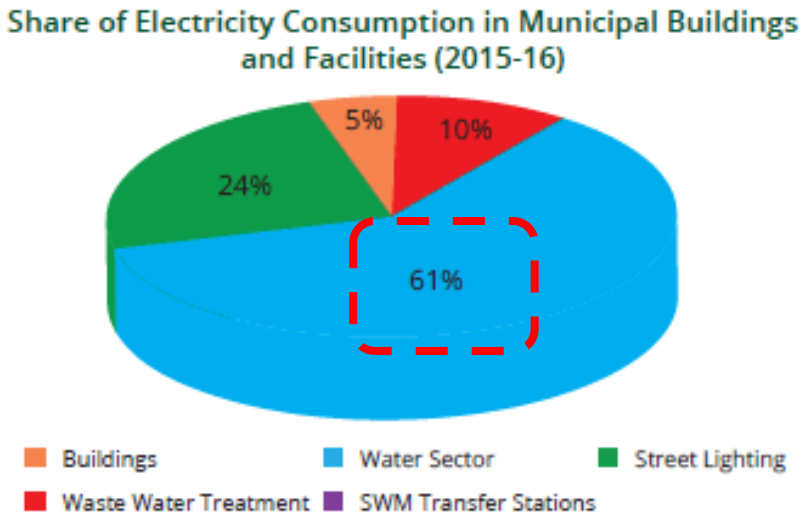


Emission Hotspots

- **'Emission hotspots' are sectors and sources having high share in emissions or with a high/increasing trend over time**
- **Detailed, disaggregated data helps cities identify emissions hotspots** more precisely and design more specific mitigation actions



Rajkot identified a hotspot and took action



Source: City Climate Resilient Action Plan – Rajkot, 2018

145 kWp solar PV installed at Aji Water Treatment plant, Rajkot

Let’s see what we think..

1) Total GHG Emission for a city is usually accounted and reported in

   i. Tonnes of Oxygen

   ii. Tonnes of Carbon Dioxide

   iii. Tonnes of Methane

   iv. Tonnes of Carbon Dioxide equivalent

Activity Data Collection

Activity Data Collection and Management

- Collecting requisite activity data is a **critical starting step** in developing a GHG inventory
- Data may come from **different sources** and will **vary in quality, format, units and completeness**
- To better understand historical trends and track impacts of policies and actions, it is important to track emissions over time
  - ✦ ***recommended to collect data and estimate GHG emissions over a period of time (at least over 3 years***) – helps inform decision-making and climate action planning
  - ✦ **Sufficiently disaggregated** to enable effective identification of emission sources and plan specific targeted actions

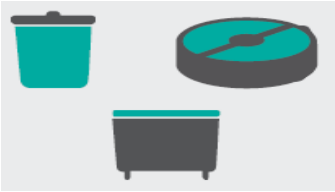
What data do we need to collect and from where?

Sectors	What is the type of data to be collected?	Who can provide this data?
 **Residential**	… Stationary fuel use such as LPG, kerosene, piped natural gas in households... … Electricity consumption by residential consumers	… Electricity Distribution Companies (DISCOM) … Electricity Department … Oil Marketing Companies (OMCs), Natural Gas Supplier
 **Commercial/ Institutional**	… Stationary fuel use such as LPG, diesel.. … Electricity use in commercial and institutional buildings (educational institutions, hotels, shops, hospitals, public buildings)	… Electricity Distribution Companies (DISCOM) … Electricity Department … Oil Marketing Companies (OMCs), Natural Gas Supplier

What data do we need to collect and from where?

Sectors	What is the type of data to be collected?	Who can provide this data?
 **Municipal Facilities**	… Electricity consumption in water pumping and water and sewage treatment … Electricity consumption in street lighting and traffic lights … Others	… Municipal Corporation … Public Water Works … Electricity Department
 **Manufacturing Industries**	… Stationary fuel use such as PNG, Petrol, Diesel and Fuel oil... … Electricity consumption by industrial consumers	… Electricity Distribution Companies (DISCOM) … Electricity Department … Oil Marketing Companies (OMCs), Natural Gas Companies

What data do we need to collect and from where?

Sectors	What is the type of data to be collected?	Who can provide this data?
 **Waste**	… Quantity of municipal solid waste disposed at landfill/dump site … Waste composition … Type of landfill site (managed/ unmanaged/ open dump) … Quantity of MSW being processed in composting, bio-gas, and waste to energy facilities	… Solid waste department, Municipal Corporation … Waste Management Contractor (appointed by the authority)
 **Transport**	… Number of vehicles (public, private, commercial) … Consumption of fuel by vehicles type and fuel wise … Mode share (trips by two-wheeler, four-wheeler/car, public transport)	… Transport Department … Regional Transport Office (RTO) … Oil Marketing Companies (OMCs)

A Data Management Plan helps

- Assign roles and responsibilities- *to avoid responses such as 'was I supposed to do that!'*
- Establish formal communication and relationship with data owners- *helps to make sure correct data is received and on time and in the correct format*
- Use data collection templates, storage, checks- *ensures transparency, quality, minimizes errors and avoids ' the staff responsible quit, we don't know where the data is and how they got it'!*

Company	LPG Domestic(KG))			
	HPCL	BPCL	IOCL	Total
2017-18	31,564,000	**9,649,000**	-	41,213,000
2016-17	26,785,000	9,602,500	-	36,387,500
2015-16	22,022,000	9,385,000	-	31,407,000
2014-15	22,214,000	10,092,000	-	32,306,000
2013-14	22,151,000	10,510,000	-	32,661,000

Company	LPG Commercial (MT)			
	HPCL	BPCL	IOCL	Total
2017-18	2,188,000	3,299,500	-	5,487,500
2016-17	1,844,000	4,278,000	-	6,122,000
2015-16	2,187,000	3,280,000	-	5,467,000
2014-15	1,943,000	1,676,000	-	3,619,000
2013-14	1873000	1,806,000	-	3,679,000

Name of Contact person(s)	Santosh Nivendkar
Designation	**State Level Coordinator**
Contact number	
Mail_ID	
Department details	
Name of Contact person(s) (list all)	Manoj K
Designation	BPCL - Territory Manager Uran LPG
Contact number	
Mail_ID	
Department details	
Name of Contact person(s) (list all)	Vinit Acharya
Designation	Chief Regional Manager- LPG;HPCL
Contact number	
Mail_ID	

City profile | Electricity | **Fuels** | Govt._Vehicle fleet | Solid Waste | Govt._Buildings | Streetlight Details | Transport

How Should We Collect Data

Identify emissions sources

- Identify potential data providers

During data collection, ask for clarity and record

- Description and applicability of data set
- Time span of data
- Break-up
- Units
- Assumptions and any known data gaps
- Name, organization and contact details of data provider

Closing Data Gaps

If data is unavailable, identify alternative or supporting data sources (reports, studies..), use district/state/national level data with suitable assumptions

Example

1. Fuel consumption in vehicles is available only at the district level and not for the area within the city's boundaries

Possible Solutions

- Apportion or estimate based on no of vehicles or use information from transportation studies/reports
- Simply ask the fuel supplier for approximate share of sale from fuel outlets in the city

Managing Data Quality

- Ensures "**full transparency**" of activity data and emission factors used and assumptions made when estimating GHG emissions
- Quality control (QC) helps to control the quality of the inventory as it is being developed
  - ✦ Provide routine and consistent checks to ensure data integrity, correctness, and completeness
  - ✦ Identify and address errors and omissions
  - ✦ Document and archive inventory material and record all QC activities

QC activities include

- accuracy checks on data acquisition and calculations,

- use of approved standardized procedures for emission calculations, measurements, archiving information and reporting

Source: www.ghgprotocol.org/city-accounting

Managing Data Quality

Document and organize data such that helps to check consistency and quality

Community Inventory

Sectors	Energy Source/Activity	Activity Data				
		Unit	2010-11	2011-12	2012-13	2013-14
Residential Buildings	Electricity	MU	45.43	33.38	39.73	38.91
	Kerosene	kL	1,254.00	1,254.00	269.00	182.00
	LPG	tonnes	3,145.19	2,970.06	2,411.37	1,288.38
Commercial and Institutional Buildings/Facilities	Electricity	MU	53.93	46.71	54.40	52.07
	LPG	tonnes	472.12	557.98	645.60	474.42
Manufacturing Industry and Construction (i.e. Industrial sector)	Electricity	MU	1.16	0.79	0.88	0.81
Agriculture, forestry and fishing activities (i.e. mainly agriculture)	Electricity	MU	0.0042	0.0035	0.0003	0.007
Waste	Solid Waste to Landfill	tonnes	5,041.32	5,112.90	5,184.48	5,256.00
	Solid Waste to Compost	tonnes	10,909.71	10,883.23	10,856.74	10,830.28
Mobile (Transportation)	Petrol	kL	13,231.00	13,646.00	13,372.00	13,692.00
	Diesel	kL	7,704.00	8,511.00	8,602.00	8,406.00
Total	-	-	-	-	-	-

Local Govt Inventory

Consolidated_data and GJ | **Consolidated_data and Emissions** | Community_Demand-Supply | Trend_Energy and GHG

Let’s see what we think..

1) Collecting how many years data at a minimum is recommended when preparing a GHG Emission Inventory?
   i. 2
   ii. 3
   iii. 6
   iv. 4

2) Do you think a recent solid waste survey carried out in 5 wards would be useful for the GHG inventory?
   i. Yes
   ii. No

Harmonized Emissions Analysis Tool plus (HEAT+)

A web based tool developed by ICLEI to prepare GHG Emissions Inventory and support Climate Action Planning

HEATplus
HARMONIZED EMISSIONS ANALYSIS TOOL

http://heat.iclei.org

HEAT+ Features

GHG Emission

Robust Tracking and Management of Local Governments and Provincial Greenhouse Gas Emission

Modules

(1) Community

Territory-wide Emission

(2) Government operations

Emission from Governments owned operations and services

Gases

GHGs: Carbon Dioxide, Methane, Nitrous Oxide..

NOx, SOx, CO, Volatile Organic Compounds (VOC), Particulate Matter (PM10)

Uses multiple emissions factor data sets (country specific, IPCC default, research organizations, US EIA, etc.)

GPC Compatible

Multi-lingual

Case Exercise – Emission Profile

City Name: Wonderful City Coastal, hills…

Population: 5,00,000 **Area:** 150 sq. km

Low-income population: 15%

Economy: Administrative capital, center of education and commerce, witnessing high population influx; informal employment and settlements

Water supply: 250 million liters per day **MSW generation:** 350 tonnes per day

Total Electricity Consumption: 500 lakh kWh

Issues that the city is keen to address:

(1) High dependency on grid electricity but keen to deploy renewables

(2) Upgrade public transport system and reduce dependency on private vehicles

(3) Sustainable waste management

(4) Integrated water management and conservation

Lets see what the Emission Profile of Wonderful City looks like..

Case Exercise – Emission Profile

- We will see what drives increase and reduction in emissions
- We will change the baseline activity data (column F) using drop down to see the impact on GHG emissions
- We can see the final result in the pie charts to the right and in a table in row 23

What happens when –

- Electricity consumption in buildings increases - ***emission increases correspondingly***
- We increase share of renewable energy - ***emission decreases by corresponding share as renewable energy has zero emission***
- How do emissions of LPG vs piped natural gas to deliver the same energy compare - ***Piped gas has lower emission***
- How do emissions of LPG vs diesel to deliver the same energy compare - ***LPG has lower emission***
- What will happen when demand for municipal services increases with population - ***emission will increase***

Any Questions or thoughts…

Thank You

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The agenda

Time	Session	Speaker	Organization
2:30-2:45	Welcome and introductions	**Mr. Panagiotis Karamanos, Mr Nikhil Kolsepatil, Mr Chirag Gajjar**	IUC India, ICLEI SA, WRI India
2:45-3:00	Introduction to climate change	**Mr Panagiotis Karamanos**	IUC India
3:00-3:15	National & international developments	**Mr Panagiotis Karamanos**	IUC India
3:15-3:30	Q&A	**Mr Panagiotis Karamanos**	IUC India
3:30-4:00	Inventory accounting principles	**Ms Avni Agarwal**	WRI India
4:00-4:30	Boundary scope and sources	**Ms Avni Agarwal**	WRI India
4:30-4:45	Q&A	**Ms Avni Agarwal**	WRI India
4:45-5:15	Data collection	**Mr Prateek Mishra**	ICLEI South Asia
5:15-5:45	**Goal setting, tracking GHG emissions over time and reporting**	**Mr Keshav Jha**	**ICLEI South Asia**
5:45-6:00	Q&A	**Mr Prateek Mishra Mr Keshav Jha**	ICLEI South Asia

WRI INDIA

GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY

IUC INTERNATIONAL URBAN COOPERATION European Union-India

ICLEI Local Governments for Sustainability

Goal Setting & Tracking GHG Emissions

Day 01, Session 06: Type of Goals, Tracking Emissions Over Time and Recalculations , Snapshot of Different Reporting Platforms, etc.

About the Trainer

Keshav has nine years of experience working with cities and states in India on GHG emissions accounting and reporting and preparation of climate action plans

- Project Management Professional (PMP)®
- Climate Reality Leader and Salzburg Global Fellow
- CII Certified Expert in Climate Change and Environmental Sustainability
- Lead Auditor ISO 50001:2018 Energy Management System (EnMS)
- Lead Auditor ISO 14001:2015 Environmental Management Systems (EMS)
- Sub-group member of the Government of India's Climate Smart Cities Assessment Framework (CSCAF)

Post Graduation in Environment from Delhi University

Post Graduate Diploma in Environmental Law and Management

Objective

What will we understand?

- Steps and considerations to set emission reduction goals
- Tracking emissions and recalculation
- Introduction to Climate reporting platforms

Setting Goals for Emission Reduction

A mitigation goal is a commitment to reduce or limit the increase of GHG emissions or emission intensity by a specified quantity, to be achieved by a future date

Prepare for Goal Design

- GHG Inventory
- Understand Mitigation Needs and Opportunities

Define Goal Boundary

- Geographic coverage
- Sectors to be targeted
- GHGs

Choose Goal Type

- Base year emissions
- Base year intensity
- Fixed-level
- Baseline scenario

Define Goal Time Frame

- Choose base/start year
- Choose target year/period

Define Goal Level (scale)

- Ambitious
- Realistic

Source: GHG Protocol – Mitigation Goal Standard
https://ghgprotocol.org/sites/default/files/standards/Mitigation_Goal_Standard.pdf

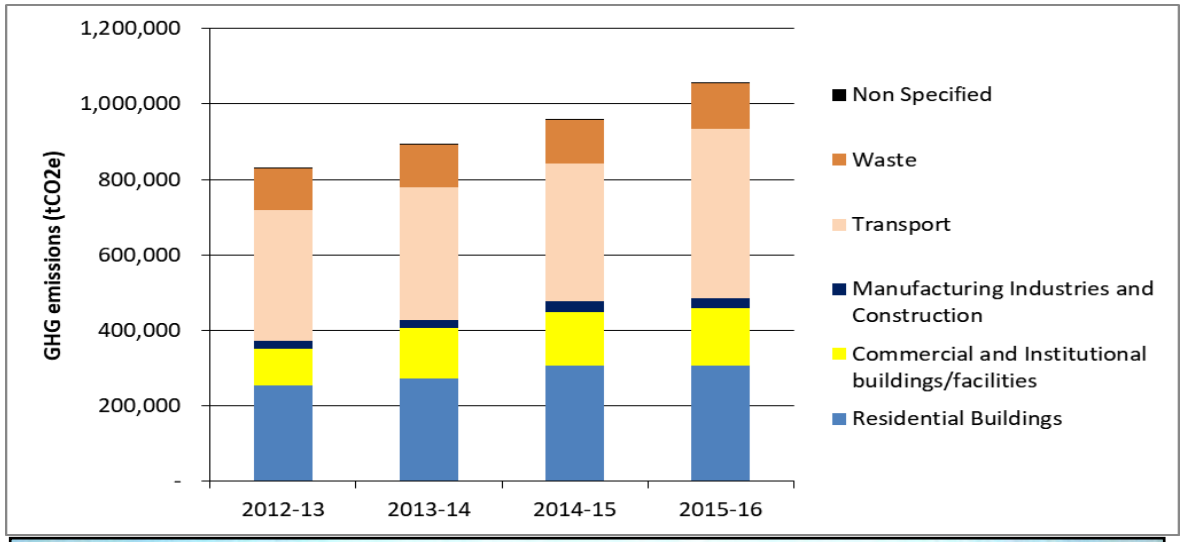
Which Goal Types can we opt for

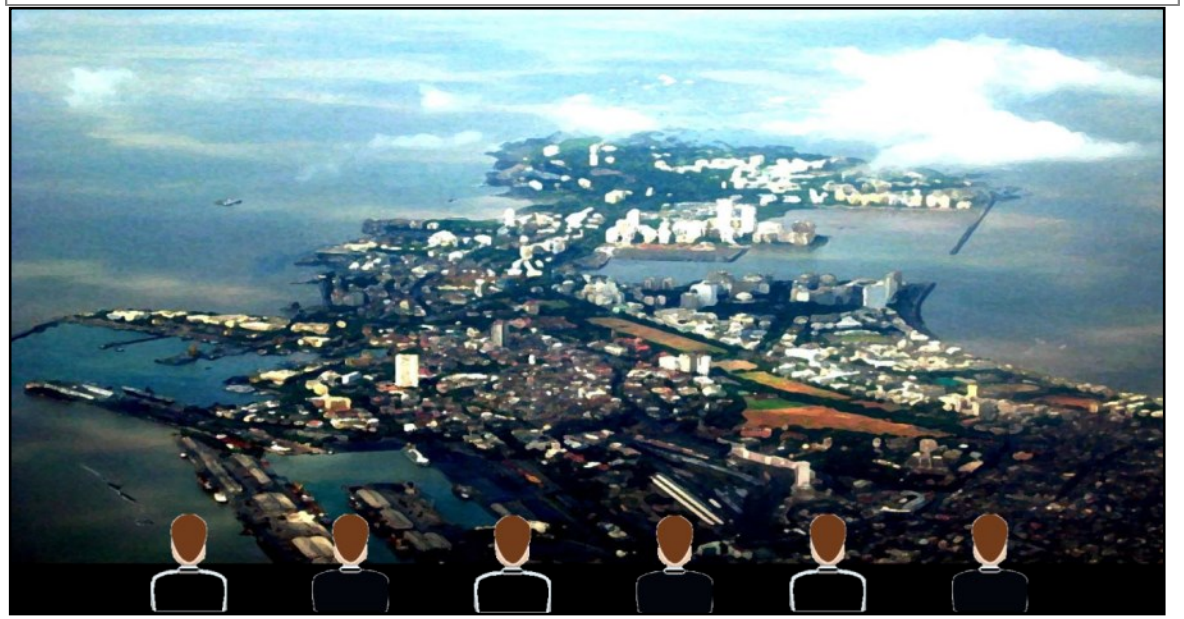
Goal Type	Reduction in What?	Reduction relative to What?	Examples
Base year intensity goal	Emissions intensity	Historical base year emissions	India in its Nationally Determined Contributions (NDC) has committed to reduce the GHG emissions intensity of its GDP by 33 to 35% by 2030 from 2005 levels
Base year emissions goals	Emissions	Historical base year emissions	"Rajkot city has pledged to reduce its greenhouse gas (GHG) emissions by 14% by the year 2022-23, from the baseline year 2015"
Fixed-level goal	Emissions	No reference level	Melbourne (Australia) set a target to achieve zero net carbon emissions by 2020, and plans to achieve the goal through internal reductions and purchasing offsets.
Baseline scenario goal	Emissions	Projected baseline scenario (i.e. business as usual) emissions	Singapore pledged to reduce GHG emissions to 16% below business-as-usual (BAU) levels by 2020.

Source: www.ghgprotocol.org/city-accounting

Why should we track emissions over time

- Historical emissions **trends (at least last 3 years data should be reported as per GPC)**
- **Helps to track** the impacts of policies
- Helps in identification of **actions** to reduce city-wide emissions
- All emissions over time should be estimated **consistently** (as far as possible)
  - ✦ Emissions should be **calculated using the same methods, data sources and boundary definitions in all years**





What helps in tracking emissions over time

Create a clear and replicable process for updating your GHG inventory periodically

- **Identify a department or committee to be responsible for periodic GHG inventory updates -** *designate responsibility and set the foundation for maintaining capacity and knowledge over time*

- **Store all files and supporting data in a central location –** *helps to identify what data records and sources used and to replicate the methods to consistently update the community's GHG inventory*

- **Log changes made to the data and methods -** *to maintain transparency and consistency in how your data is reported*

When should we recalculate emissions

In order to maintain consistency over time, historic emissions data from a base year inventory should be recalculated

Cities **should recalculate** base year emissions for

- Structural changes in the inventory boundary
- Changes in calculation methodology or improvements in data accuracy
- Discovery of significant errors

- Cities **should *not* recalculat**e base year emissions for organic growth (e.g., changes in the level or type of city activities)
- Emission factors for electricity and Global Warming Potential (GWP) vary with studies and research, and their changes do not count as methodology changes

Cities can identify protocols such as thresholds for recalculation
Eg. Base year emissions will be recalculated and reported as such only if changes due to data or calculation method exceed 5%

Examples of Recalculation Triggers

Goal Type	Example	Recalculation needed (if significant)	No recalculation needed
Changes in inventory boundary	A community is included in or set aside from a city's administrative boundary	X	
	Change in goal boundary from BASIC to BASIC +, or from 6 GHGs to 7 GHGs (i.e. coverage in terms of sectors or gases)	X	
	Shut down of a power plant		X
	Build of a new cement factory		X
Changes in calculation methodology or improvements in data accuracy	Change in calculation methodology for landfilled MSW frame Methane Commitment Approach to the first order Decay Method	X	
	Adoption of more accurate activity data instead of a scaled-down national figure	X	
	Change in global warming potential factors used		X
	Change in electricity emission factor due to energy efficiency improvement and growth of renewable energy utilization		X
Discovery of significant errors	Discovery of significant mistake in units conversion in formula used	X	

Let’s see what we think..

1) Which step when setting a GHG Emission Reduction Goal is missing?
   i. Prepare for Goal Design
   ii. Define boundaries of the Goal (Sectors, geography, GHGs)
   iii. Select type of goal
   iv. Define the scale of the Goal

Any Questions or thoughts…

Emission Reporting Platforms: GCoM and its Common Reporting Framework

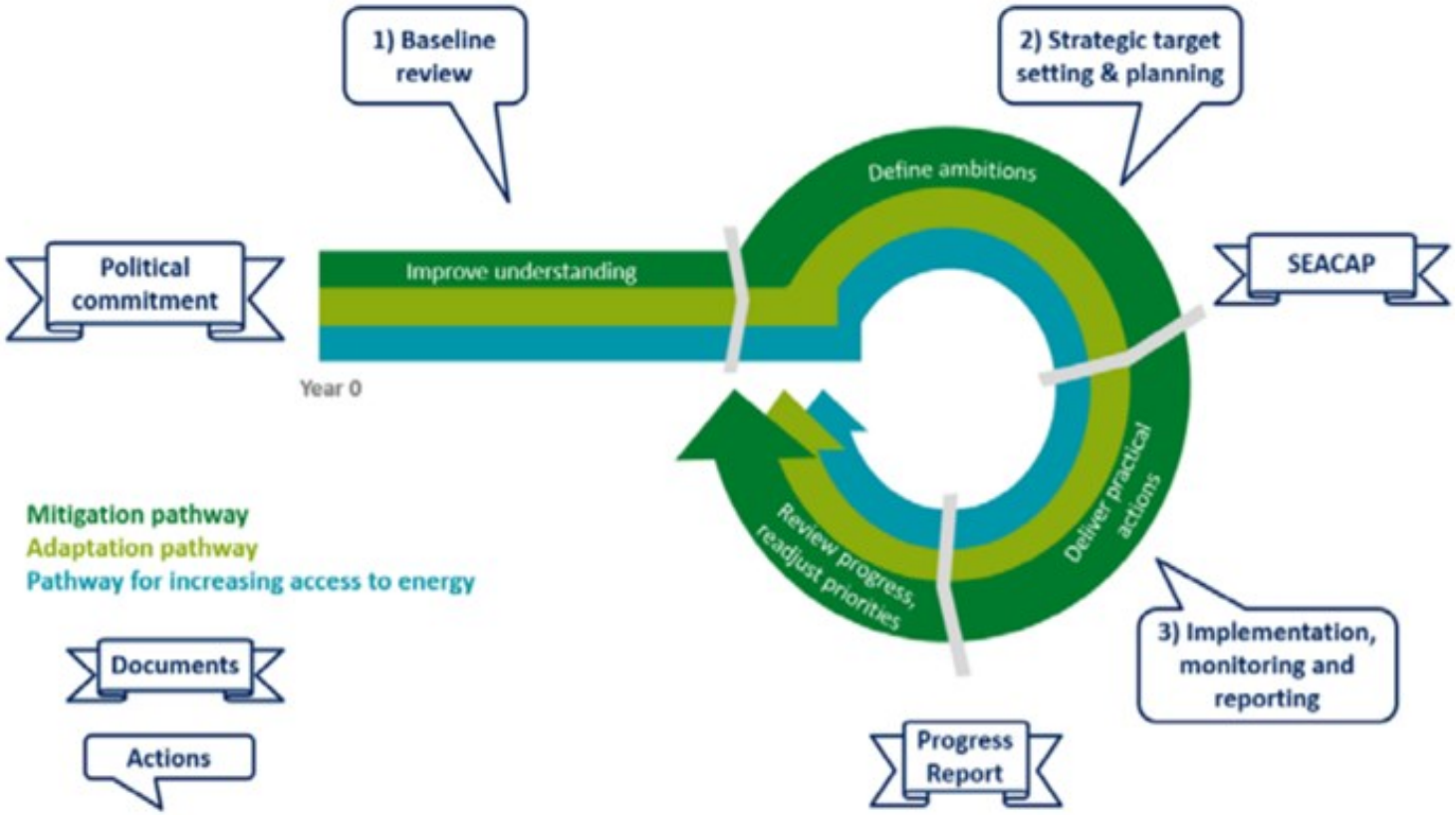
The Global Covenant of Mayors for Climate & Energy (GCoM) is the world's largest coalition of cities and local governments voluntarily committed to actively combatting climate change and with a shared long-term vision to moving to a low emission, climate resilient future

https://www.globalcovenantofmayors.org/

GCoM Common Reporting Framework (CRF)

- Launched in 2018, the GCoM Common Reporting Framework (CRF) allows for cities (across geographies and of all sizes) to use a **single harmonised approach to sharing information on climate action**

  The CRF is the reference framework for GCoM signatories throughout all phases of engagement
  Ensures **robust assessment, target setting, integrated climate action planning and monitoring, as well as streamlined reporting**



GCoM CRF

CRF Guidance Note

Source: https://www.globalcovenantofmayors.org/our-initiatives/data4cities/common-global-reporting-framework/

Emission Reporting Platforms:
ICLEI and CDP's Unified Reporting System

- Access to CDPs Open Data Portal and Cities Analytics to benchmark yourself against other cities

---

- Positioning your city as a world leader and to attract the attention through CDP and ICLEI's communication tools
- Detailed feedback on your response and scoring to help you take stronger climate action
- Attracting finance through CDPs Matchmaker program

Weblink to get started on Reporting: https://www.cdp.net/en/guidance/guidance-for-cities

Send an email to carbonn@iclei.org or cities@cdp.net

CLIMATESMART CITIES ASSESSMENT FRAMEWORK 2.0

NIUA | C3
Climate Centre for Cities

Overview of 2.0

25%	25%	20%	15%	15%
Energy and Green Building	Urban Planning, Green Cover and Biodiversity	Mobility and Air Quality	Water Resource Management	Waste Management

5 Sectors

28 Indicators

5 Levels

Development levels

Climate Warriors

Climate Explorers

Climate Trendsetters

Climate Leaders

Climate Champions

CSCAF 2.0 –Indicators

Energy & Green Buildings	Urban Planning, Green Cover, & Biodiversity	Mobility and Air Quality	Water Management	Waste Management
1. Electricity Consumption in the City	1. Rejuvenation & Conservation of Water Bodies & Open Areas	1. Clean Technologies Shared Vehicles	1. Water Resources Management	1. Waste minimization initiatives undertaken by the City
2. Total Electrical Energy in the City Derived from Renewable Sources	2. Proportion of Green Cover	2. Availability of Public Transport	2. Extent of Non-Revenue Water	2. Extent of dry waste recovered & recycled
3. Fossil Fuel Consumption in the City	3. Urban Biodiversity	3. Percentage of coverage of Non Motorized Transport network (pedestrian and bicycle) in the city	3. Wastewater Recycle and Reuse	3. Construction & Demolition (C&D) waste management
4. Energy efficient street lighting in the city	4. Disaster Resilience	4. Level of Air Pollution	4. Flood/ water stagnation risk management	4. Extent of Wet Waste Processed
5. Promotion of green buildings	5. City Climate Action Plan	5. Clean Air Action Plan (Planning and Implementation)	5. Energy efficient water supply system	5. Scientific Landfill availability & operations
6. Green Building Adoption			6. Energy efficient wastewater management system	6. Landfill/ dumpsite Scientific Remediation

Climate Action Planning process enables addressing all indicators across all 5 sectors of CSCAF

Source: https://smartnet.niua.org/csc/index.html

Case Exercise – Wonderful City (Recap)

City Name: Wonderful City Coastal, hills… **Population:** 5,00,000 **Area:** 150 sq. km

Low-income population: 15%

Economy: Administrative capital, center of education and commerce, witnessing high population influx; informal employment and settlements

Water supply: 250 million liters per day **MSW generation:** 150 tonnes per day

Total Electricity Consumption: 500 lakh kWh

Issues that the city wants to address

(1) High dependency on grid electricity through deploying renewables

(2) Keen to improve public transport system and reduce dependency on private vehicles

(3) Sustainable waste management

(4) Integrated water management and conservation

For Wonderful City, some mitigation actions to reduce GHG emissions and address climate impacts have been identified…

Case Exercise – Scale of Action and Goals

Let us see how we can set the Scale of Actions .

- We will see how the scale of different interventions can impact energy saving and GHG emission reduction potential - our Aggregated Emission Reduction and Goal will depend on this..
- The scale of intervention will be selected using the drop down menu to see the impact on energy savings and GHG emissions
- We can see the final result in the pie chart to the right and in the table below

Climate Actions identified for Wonderful City:

- **Water Conservation**: Rainwater harvesting systems, dual plumbing deployed in Affordable Housing projects
- **Energy Efficiency:** LED lighting instead of conventional tubelights for common area lighting in Affordable Housing projects
- **Electric Mobility:** Introduction of E-buses. Buses to be charged using Solar PV systems at stations
- **Waste Management**: Setting up composting and waste to energy (bio-methanation) plants for food, garden, paper waste
- **Water Management:** Reduction of water leakages in distribution network through water audits, pipe replacement, etc.
- **Renewable Energy:** Solar Photovoltaic Installation for large Residential, Commercial and Public buildings in Smart City Area

Any Questions or thoughts…

Thank You

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Day 2: February 12th, 2021

Time	Session	Organization
2:30-2:40	Recap of day 1	ICLEI South Asia/WRI India
2:40-3:05	Reporting requirements	WRI India
3:05-3:15	Q&A	WRI India
3:15-3:45	Climate action planning	ICLEI South Asia
3:45-4:15	Hands on exercise	ICLEI South Asia
4:15-4:45	Principles of inclusive climate action planning	WRI India
4:45-5:15	Hands on exercise	WRI India
5:15-5:40	Case studies	IUC India
5:40-6:00	Way forward	ICLEI South Asia/WRI India

Housekeeping guidelines

- Presentations will be shared with the completion of the webinar.
- There are dedicated Q&A sessions, but when needed provide your input in the Questions box or raise your hand.
- Speakers please use camera.
- Listeners please mute yourself, unless you want to speak.
- This is meant to be an interactive webinar, so your contribution is much appreciated.
- At the end of the webinar certificates will be provided to all 2-day participants.
- Technical issues contact: Saransh Bajpai

  (Saransh.Bajpai@wri.org | +91 9425230187)

The agenda

Time	Session	Speaker	Organization
2:30-2:40	**Recap of day 1**	**Mr Nikhil Kolsepatil Ms Avni Agarwal**	**IUC India**
2:40-3:05	Reporting requirements	Ms Avni Agarwal	WRI India
3:05-3:15	Q&A	Ms Avni Agarwal	WRI India
3:15-3:45	Climate action planning	Mr Bhaskar Padigala	ICLEI South Asia
3:45-4:15	Hands on exercise	Mr Bhaskar Padigala	ICLEI South Asia
4:15-4:45	Principles of inclusive climate action planning	Ms Faiza Solanki	WRI India
4:45-5:15	Hands on exercise	Ms Faiza Solanki	WRI India
5:15-5:40	Case studies	Mr Kamlesh Yagnik	IUC India
5:40-6:00	Way forward	Mr. Nikhil Kolsepatil, Mr Chirag Gajjar	ICLEI South Asia/WRI India

Recap - Day 1

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WRI INDIA

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REPORTING REQUIREMENTS AND VERIFICATION

Day 02, Session 01: Approaches, Reporting requirements, GPC Framework, GCoM Framework and Verification, Data Portal for Cities, CSCAF – Self Assessment Tool

About the Trainer

Avni Agarwal is a Project Associate with the Climate Program at WRI India. She has been involved in developing an emission estimation tool based on Ministry of Housing & Urban Affair's Climate SMART Cities Assessment Framework. She is currently involved in creating city-level inventories and climate action plans and supporting efforts to build capacity and mainstream climate action at the subnational level.

She also has experience working with Intellecap's Sankalp Forum, where she worked on their 3rd Southeast Asia Conference and covered themes related to entrepreneurship, innovation, investment and impact while working on outreach for the forum.

She holds a Master's in Public Policy from St. Xavier's College (Autonomous), Mumbai, and a Bachelor's in International Studies (Major) and Environmental Studies (Minor) from Foundation for Liberal and Management Education (FLAME University), Pune.

APPROACHES FOR REPORTING EMISSIONS

- Scope framework
  - Report all GHG emissions within the geographic boundary of the city;
  - Scope 1 (or territorial);
  - Scope 2 (grid-supplied energy sources);
  - Scope 3 (out of boundary sources).

- City-induced framework
  - Reports GHG emissions attributable to the activities taking place within the geographic boundary of city;
  - Two level of reporting – BASIC and BASIC+

Source: Global Protocol for Community-Scale GHG Emission Inventories

EMISSION SOURCES AND SCOPES

BASIC TOTALS

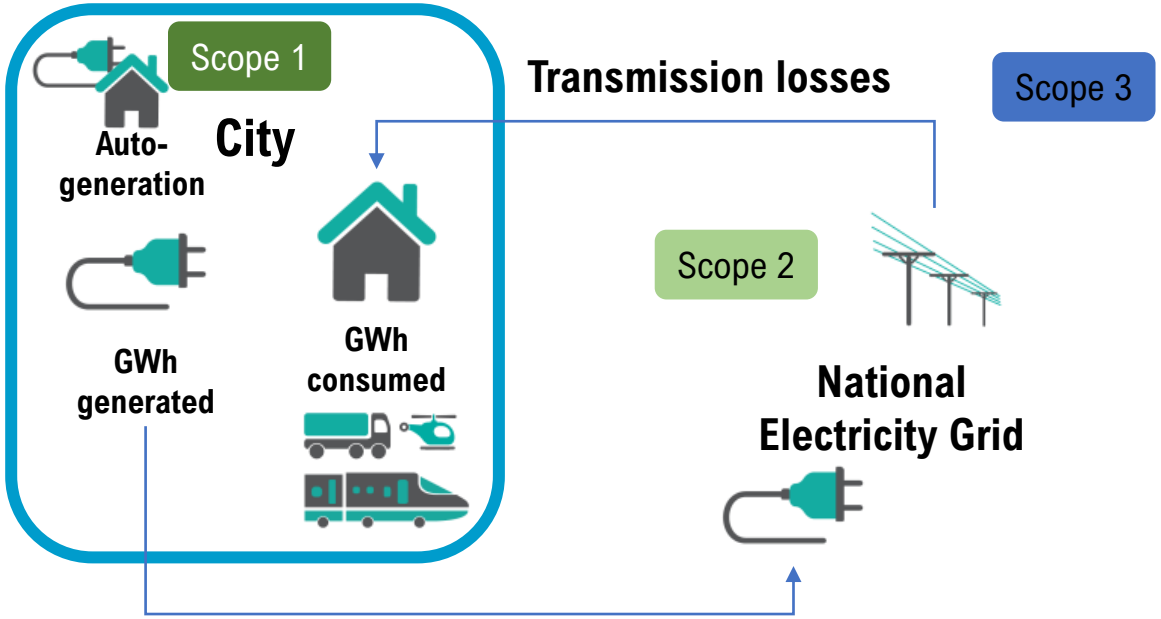
- All scope 1 emissions from ***stationary energy*** sources (excluding energy sources supplied to the grid)
- All Scope 1 emissions from ***Transportation*** sources
- All Scope 1 emissions from ***Waste*** sources (excluding emissions from imported waste)
- All scope 2 emission sources from ***stationary energy*** sources
- Scope 3 emissions from treatment of ***exported waste***

BASIC+ TOTALS

- Includes all BASIC sources
- All scope 1 emissions from ***IPPU***
- All scope 1 emissions from ***AFOLU***
- Scope 3 emissions from ***stationary energy sources*** (only ***T&D*** losses)
- Scope 3 emissions from **transportation**

Source: Global Protocol for Community-Scale GHG Emission Inventories

EXAMPLE



Source: Global Protocol for Community-Scale GHG Emission Inventories

REPORTING REQUIREMENT: BOUNDARY

- Description of geographical boundary
- List of activities included in the GHG inventory including scope 3, if reported
- Specific exclusions and subsequent rationale
- Reporting period
- Reporting level chosen (BASIC or BASIC+)
- Overview of the reporting city

Source: Global Protocol for Community-Scale GHG Emission Inventories

REPORTING ON EMISSIONS

- Emission by sector
  - Emissions sequestered from CO_2 capture and storage shall be excluded from the total emissions but can be reported separately
- Emission by scope
  - Reporting is independent of any GHG trades (e.g. carbon credits trade)
- Emission by greenhouse gases (GHGs)
  - All 7 GHGs (CO_2, CH_4, N_2O, PFCs, HFCs, SF_6 and NF_3) in tonnes of CO_2e
  - GCoM CRF requires, at minimum, reporting of CO_2, CH_4 and N_2O
- Emission by total
  - Aggregated by scope and city-induced framework (BASIC or BASIC+)
- Emissions from biogenic origin
  - Reported separately from the scopes and other gases

Source: Global Protocol for Community-Scale GHG Emission Inventories

REPORTING ON METHODOLOGIES AND DATA

- Report reference or link to any calculation tools or equations used
- For each emission source, provide:
  - Description of type and source of data
  - Activity data and emission factor
  - GWP values used
- Assessment of data quality for activity data and emission factor

Data Quality	Activity Data	Emission Factor
High (H)	Detailed Activity Data	Specific (unit level)
Medium (M)	Modelled Activity Data with robust assumptions	General (country-specific)
Low (L)	Highly modelled or uncertain	Default (IPCC)

Source: Global Protocol for Community-Scale GHG Emission Inventories

REPORTING ON EMISSION CHANGES

- Identify the base year and report base year emissions (when city have a mitigation goal)
- Identify significant threshold that triggers re-calculation of base year emissions
  - Acquisition of nearby communities
  - Changes in reporting boundaries
  - Changes in calculation methods

Source: Global Protocol for Community-Scale GHG Emission Inventories

ADDITIONAL REPORTING REQUIREMENTS

- Scope 2 emissions based on market-based method calculation
  - This reflects any electricity products or programs that city consumers participate in
  - Cities shall use location-based method for scope 2 calculation in the GPC framework
  - Separately document emissions from market-based method
- Offset credit transactions shall be separately reported when
  - Offsets credit are generated within the geographic boundary
  - Offsets credit are purchased outside the geographic boundary
- RE generation within the geographic boundary

Source: Global Protocol for Community-Scale GHG Emission Inventories

GHG EMISSION SUMMARY

Sector		Total by scope (tCO_2e)				Total by city-induced reporting level (tCO_2e)	
		Scope 1 (Territorial)	Scope 2	Scope 3 included in BASIC/ BASIC+	Other Scope 3	BASIC	BASIC+
Stationary Energy	Energy use (all I emissions except I.4.4)						
	Energy generation supplied to the grid (I.4.4)						
Transportation (all II emissions)							
Waste	Generated in the city (all III.X.1 and III.X.2).						
	Generated outside city (all III.X.3)						
IPPU (all IV emissions)							
AFOLU (all V emissions)							
Total		(All territorial emissions)				(All BASIC emissions)	(All BASIC & BASIC+ emissions)

- Sources required for BASIC reporting
- + Sources required for BASIC+ reporting
- Sources included in Other Scope 3
- Sources required for territorial total but not for BASIC/BASIC+ reporting (*italics*)
- Non-applicable emissions

Source: Global Protocol for Community-Scale GHG Emission Inventories

GCOM COMMON REPORTING FRAMEWORK (CRF)

GCOM COMMON REPORTING FRAMEWORK

Particulars	Mandatory	Optional	Comments
Office name of Local Govt.	✓		-
Country	✓		-
Region	✓		-
Inventory Year	✓		-
Geographic boundary	✓		Description along with map
Resident Population	✓		-
GDP		✓	-
Heating/ Cooling degree days		✓	-
GHGs	✓		In CO_2 or CO_2e (CO_2, CH_4, N_2O)
Emission Factors	✓		IPCC recommended
GWP	✓		Local govt. to disclose which IPCC AR is followed.

Source: Common Reporting Framework (CRF) of Global Covenant of Mayors (GCoM)

EMISSION SOURCES: STATIONARY ENERGY

Key source category	Fossil Fuel	Grid-supplied energy	Comments
Residential buildings	✓	✓	• All GHG emission sources within the geographic boundary shall be accounted; • GHG emissions from the source covered under regional and national emission trading program should be identified and separately reported.
Commercial buildings and facilities	✓	✓	
Institutional buildings and facilities	✓	✓	
Industry	✓	✓	
Agriculture	✓	✓	
Fugitive Emissions	✓	-	

Source: Common Reporting Framework (CRF) of Global Covenant of Mayors (GCoM)

EMISSION SOURCES: TRANSPORTATION

Key source category	Fossil Fuel	Grid-supplied energy	Comments
On-road	✓	✓	• If emissions are not happening or they are not significant from the water-borne, aviation, and off-road, notional key NO can be used. • Road and rail emissions should be disaggregated based on municipal fleet, public transport and private.
Rail	✓	✓	
Water-borne navigation	✓	✓	
Aviation	✓	✓	
Off-road	✓	✓	

Source: Common Reporting Framework (CRF) of Global Covenant of Mayors (GCoM)

EMISSION SOURCES: WASTE

Key source category	Waste Generated	Comments
Solid waste	✓	• All GHG emissions from disposal and treatment of waste generated within the geographic boundary needs to be accounted; • Waste used for energy generation need not to be reported in waste category.
Biological waste	✓	
Incinerated and burned waste	✓	
Wastewater	✓	

Source: Common Reporting Framework (CRF) of Global Covenant of Mayors (GCoM)

EMISSION SOURCES: ENERGY GENERATION

Source	Within city boundary	Owned by city	Comments
Electricity-only generation	✓	✓	All GHG emissions from generation of grid-supplied electricity within the boundary, grid-supplied electricity by facilities owned (fully or partially) by local govt. outside the geographic boundary to be accounted.
CHP generation	✓	✓	
Heat/ cold generation	✓	✓	
Local RE generation	Recommended	-	

Source: Common Reporting Framework (CRF) of Global Covenant of Mayors (GCoM)

TARGET REPORTING FRAMEWORK

Parameter	Minimum	Ambitious	Remarks
Boundary (geography, sectors and GHGs)	Consistent with minimum requirements of GHG inventory framework	-	Where target boundary does not align with inventory boundary, additions and exclusions shall be specified and justified.
Target Type	base year, base year intensity, baseline scenario, fixed level	-	For baseline scenario target, modeling methodology and parameters shall be transparently described
Target Year	Same as NDCs or as set by regional/ national covenants	2050	If beyond 2030, shall also include interim target. If the NDC target is before 2030, cities should additionally set a target for 2030.
Ambition	Same as NDC, or as set by regional/national Covenant	More Ambitious than NDC	Refers to unconditional components of NDC

Source: Common Reporting Framework (CRF) of Global Covenant of Mayors (GCoM)

GCoM and WRI's DATA PORTAL FOR CITIES

VERIFICATION

WHAT DOES VERIFICATION INVOLVES?

- Determine that the accounting principles are adhered to
- Assessment of the completeness, accuracy and reliability of the reported data
- Determine if there are any material discrepancies between reported data and the data generated from the proper application of the relevant standards and methodologies
- Determine if the reporting requirements have been met
- Calculation of GHG emissions are correct and data sourced is reliable

Adherence to the accounting and reporting principles and the presence of transparent, well-documented data are the basis of successful verification

Source: Global Protocol for Community-Scale GHG Emission Inventories

PERFORMING VERIFICATION

- Two ways of conducting Verification of reported GHG emissions:
  - Third-Party Verification (independent organization conducts verification)
  - Self verification (conducted by internal staff, independent of the inventory process)
- Both type of verification shall follow similar procedures and processes
- For external stakeholders, third-party verification is likely to significantly increase the credibility of the GHG inventory
- Verification is iterative process
- Verification can take place at various points during the development and reporting of GHG inventory.

Source: Global Protocol for Community-Scale GHG Emission Inventories

PARAMETERS FOR VERIFICATION

- Verifiers should be selected based on
  - Previous experience and competence to undertake GHG verification
  - Understanding and familiarity with the standards and guidance
  - Objectivity, credibility and independence
- Verification criteria for GHG emission inventory should include:
  - Inventory boundary is clearly and correctly defined
  - All emission sources are used and notation keys are appropriately used
  - Calculations are consistent with the requirement of the standard followed
  - Data are time- and geographically-specific to the chosen boundary
  - Data are sourced from reliable and robust sources and referenced accordingly
  - All assumptions are documented

Source: Global Protocol for Community-Scale GHG Emission Inventories

CLIMATE SMART CITIES ASSESSMENT FRAMEWORK

EXAMPLE: ELECTRICITY DERIVED FROM RE

	1	2	3	4	5
Progression Level	No electricity generated from RE	RE contribution <5%	RE contribution b/w 5% – 10%	RE contribution b/w 10% – 15%	RE contribution >15%
Evidence/ Data Source	• Data on electrical energy consumption from all grid connected renewable energy sources can be obtained from local power distribution companies (DISCOMs) ▪ Data on total electricity consumption and connected electrical load can be obtained from DISCOMs ▪ Data of installed capacity of all off-grid renewable energy sources used for self-consumption verified by State Energy Development Agencies (SEDA) - They may provide number based on the estimation of sale data, RE products, or RE proponents applying for subsidies.				
Score	0	25	50	75	100

CSC – SELF ASSESSMENT TOOL

User Guide

Methodology

User login

Username *

Password *

- Create new account
- Request new password

Log in

Home / About CSC - Self Assessment Tool

About CSC - Self Assessment Tool

The CSC – Self Assessment Tool is an Excel-based, emissions assessment tool that is based on the CSC Assessment Framework. It uses activity data, already being collated in the framework to estimate greenhouse gas emissions from activities mentioned under indicators across the five sectors. The tool follows the 'Global Protocol for Community-Scale Greenhouse Gas Emission Inventories' (GPC) to estimate indicator-wise GHG emissions and further provides mitigation potential for the interventions mentioned in the framework. The mitigation potential is estimated based on the progression levels mentioned in the framework, thereby providing cities with quantifiable, emission-based evidence to identify low-hanging fruits.

Based on the emission numbers, the tool gives cities focused actions to prioritise categories and indicators. Under the Urban Planning, Green Cover & Biodiversity category, the tool estimates the amount of carbon sequestration of green cover and the sequestration potential of increasing the existing green cover. Thus, the tool would help design and locate climate solutions within the Smart Cities Mission.

Developed by:

Ministry of Housing and Urban Affairs
Government of India

Ministry of Housing & Urban Affairs (Responsible):
Mr. Kunal Kumar, Joint Secretary, Smart Cities Mission
Mr. Lal Chhandama, Director, Smart Cities Mission
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In collaboration with:

Supported by giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
On behalf of Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of the Federal Republic of Germany

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INDICATOR-WISE EMISSION OVERVIEW

Sector	Indicator	Emissions Removals
Energy & Green Buildings	Electricity Consumption in the City	Emissions
	Total electrical energy in the city derived from renewable sources	
	Fossil fuel (Diesel, Petrol, CNG, LPG) consumption in the city	
	Energy efficient street lighting In the city	
	Green Building Adoption	
Urban Planning, Green Cover & Biodiversity	Proportion of Green Cover	Removals
Mobility & Air	Clean Technologies Shared Vehicles	Emissions
Water Resource Management	Extent of Non-Revenue Water	Emissions
	Energy efficient wastewater management system in the city	
	Energy efficient water supply management system in the city	
Waste Management	Extent of wet waste processed	Emissions

REPORT GENERATED BY THE TOOL

ClimateSMART CITIES

Self Assessment Report

Ludhiana, Punjab
2020

Total GHG Emissions By Sector	Emissions tCO_2e
Energy and Green Buildings	63,19,054.64
Urban Planning, Green Cover and Biodiversity	-16,500.00
Mobility & Air Quality	1,490.46
Water Resource Management	1,03,86,955.50
Waste Management	2,41,676.20

Total GHG Emissions By Gas Type	Emissions
tonne Carbon Dioxide (tCO_2)	63,11,647.31
tonne Methane (tCH_4)	7,139.94
tonne Nitrous Oxide (tN_2O)	157.66
tonne Total Carbon eq (tCO_2e)	65,62,221.30

Sector	Indicators	Emissions tCO_2e
Energy and Green Buildings	Indicator 1: Total electrical energy consumption in city	63,10,178.80
	Indicator 2: Per capita and Per area electricity consumption for municipal services	655.79
	Indicator 3: Per capita fossil fuel (Diesel, Petrol, CNG, LPG) consumption for municipal services	8,875.84
	Indicator 4: Total electrical energy consumption for street lights	82.00
	Indicator 6: Total electrical energy consumption for green and other buildings	2,65,884.18
Urban Planning, Green Cover and Biodiversity	Indicator 4: Proportion of green cover*	-16,500.00
Mobility & Air Quality	Indicator 2: Shared Vehicles	1,490.46
Water Resource Management	Indicator 2: Total electrical energy consumption by Non-Revenue Water	3,01,12,393.42
	Indicator 5: Total electrical energy consumption by wastewater management system in the city	1,01,236.30
	Indicator 6: Total electrical energy consumption by water supply management system in the city	1,02,85,719.20
Waste Management	Indicator 4: Greenhouse Gases (GHGs) emission due to Municipal Waste processing and treatment facilities	2,41,676.20

Thank You

Avni Agarwal
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The agenda

Time	Session	Speaker	Organization
2:30-2:40	Recap of day 1	Mr Nikhil Kolsepatil Ms Avni Agarwal	ICLEI South Asia/WRI India
2:40-3:05	Reporting requirements	Ms Avni Agarwal	WRI India
3:05-3:15	Q&A	Ms Avni Agarwal	WRI India
3:15-3:45	**Climate action planning**	**Mr Bhaskar Padigala**	**ICLEI South Asia**
3:45-4:15	Hands on exercise	Mr Bhaskar Padigala	ICLEI South Asia
4:15-4:45	Principles of inclusive climate action planning	Ms Faiza Solanki	WRI India
4:45-5:15	Hands on exercise	Ms Faiza Solanki	WRI India
5:15-5:40	Case studies	Mr Kamlesh Yagnik	IUC India
5:40-6:00	Way forward	Mr. Nikhil Kolsepatil, Mr Chirag Gajjar	ICLEI South Asia/WRI India

WRI INDIA

GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY

IUC INTERNATIONAL URBAN COOPERATION European Union-India

ICLEI Local Governments for Sustainability

Climate Action Planning

Day 02, Session 02: Opportunities for integrating Climate Action, Planning for Low-Carbon Interventions, Analysis of Impacts Due to Low Carbon Interventions, Adaptation, Mitigation and Overall Resilience as well as Governance

Objective

What will we understand?

- Opportunities for integration of climate action in Indian cities
- Applying principles for inclusive climate action planning
- Step-by- step planning and implementation of climate resilient action including climate governance

ABOUT THE TRAINER

Bhaskar Padigala is a energy and climate professional with more than 9 years of experience working with National Government, Civil Society Organisations (CSOs) & Industry.

He has done extensive work with cities in India and other Asian countries on various technical aspects like GHG emission inventory, vulnerability and risk assessment, developing climate action plans, pilot implementation etc., trainings & capacity building.

Previously, he has worked with Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India and WWF-India. He was involved in India's submissions to UNFCCC on APA and SBSTA agenda items of adaptation, Loss & Damage and Nairobi Work Programme, develop and finalize strategy paper for forestry target under India's NDC and preparation of National REDD+ Strategy and REDD+ Safeguard Information System documents.

Opportunities to integrate Climate Resilient Urban Development in Indian Urban Areas

- Evidence base for climate resilient urban development

- City planning and urban service provision/rejuvenation as entry points for climate action

US$ 1.2 trillion in capital investment required over the next 20 years to meet urban services demand

→

Equivalent to $134 per capita per year, almost eight times the level of spending today[1]

Housing for All by 2022

20 mn

Affordable houses to be built in urban areas by 2022

Smart Cities

100

Smart cities to be developed by 2022

Urban Transformation

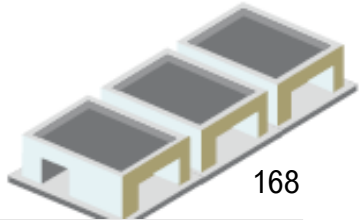
500

Cities and towns to be rejuvenated under AMRUT mission by 2020

Swachh Bharat Mission

10 mn

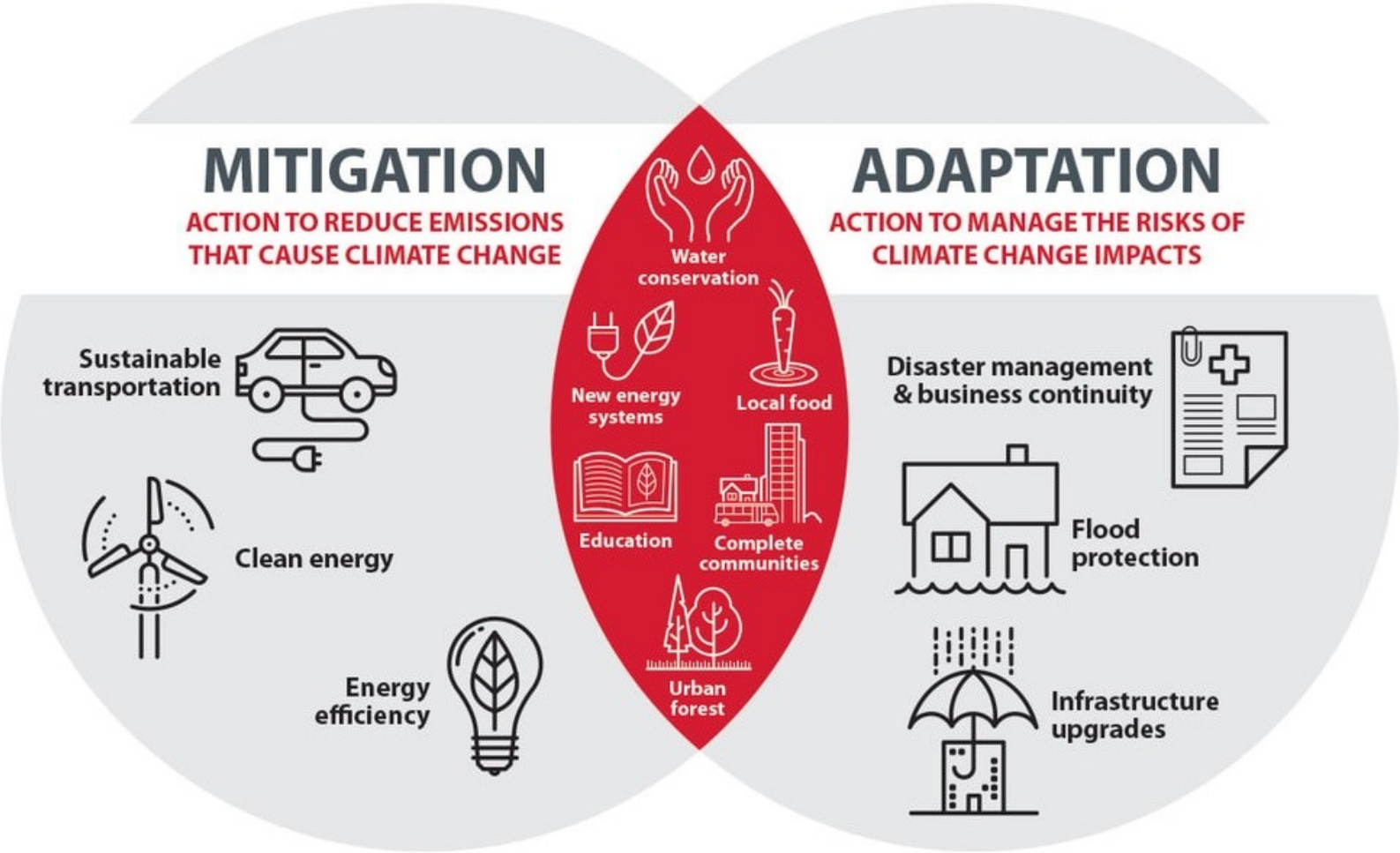
Toilets to be constructed in urban areas by 2019



How Can We Build Climate Resilience

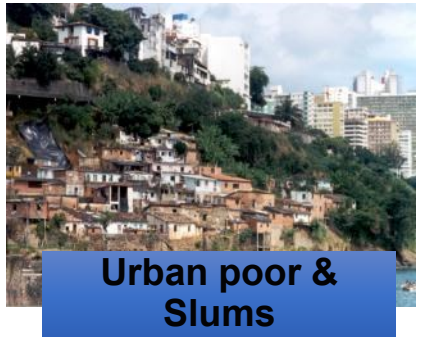
- Climate Resilience includes **solutions to reduce GHG emissions** as well as **actions to manage risks to climate impacts** in an **integrated manner**
- Effective resilience action should be **Inclusive of All** and focus on addressing needs and risks of most vulnerable groups

Climate Resilience = Climate Mitigation + Climate Adaptation



Source: https://environmental-communication.com/climate-resiliency-organizations/

Key Sectors in Indian Cities with Potential for Climate Resilient Action



Climate Resilient Cities - Planning and implementation

Let us see how we can go about planning for enhancing Climate Resilience

Climate**R**esilient**CITIES**

An innovative combined adaptation and mitigation planning methodology for Cities

Addresses climate action planning through three primary phases/steps

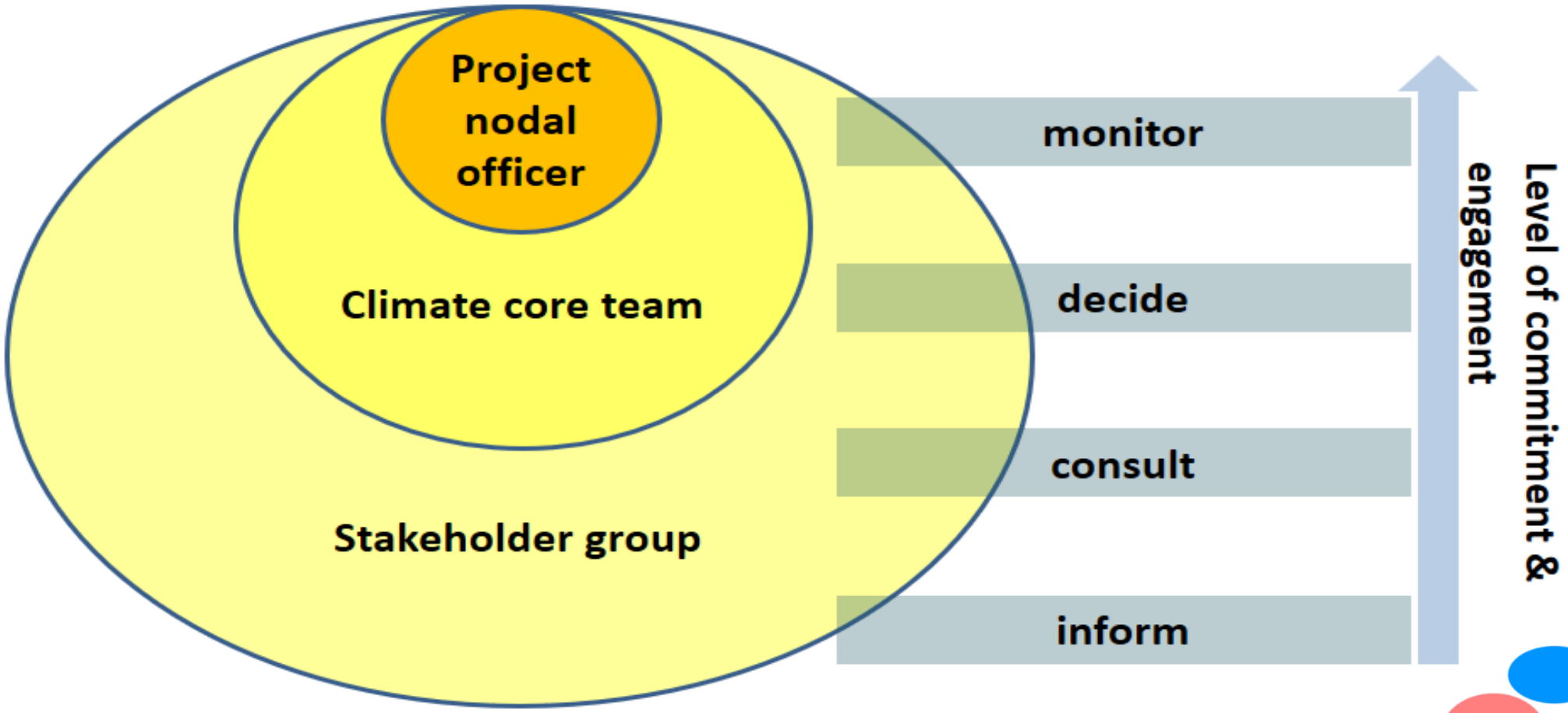
I. **Analyze**
II. **Act**
III. **Accelerate**

Phase 1: Analyze

Key Activities

- *Sign relevant regional commitments*
- *Mayoral Announcement*
- *Climate Core Team*
- *Stakeholder Consultation*
- *City, Country Profile*
- *Climate Change Impacts & Responses*
- *Climate Readiness Review*
- *GHG Emissions Inventory*
- *Identify fragile urban systems, climate vulnerabilities & risks*

Phase 1 : Analyze – Key Outputs - Steering Structure



- Climate change is a cross sectoral issue
- Engagement process brings all relevant stakeholders on a common platform

Phase 1 : Analyze – Key Outputs - Climate Core Team

- Engaging staff from different municipal departments and areas of expertise is an important early step
- To ensure gender inclusivity in climate change decision making, the climate core team must have representation (preferably 50%) of women

Example: Members of the Climate Core Team in a City

Name	Position	Responsibility
Ms. Jane Dev Khan	Chairperson (Mayor/Municipal Commissioner)	Supervising the working of the Core Team and providing management support
Mr. Ibrahim	Nodal Officer (Sr. Technical Officer)	Coordinating all the activities of the Core Team and ensuring its smooth functioning
Ms. Gayatri Devi	Member	Coordinating activities with the Water Resources department

Stakeholder Engagement

For climate vulnerability assessment and preparation of Climate Resilient City Action Plan

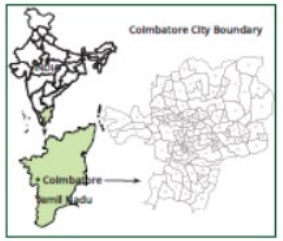
Phase 1: Analyze - Key Outputs – City Profile

- Demography, economic activities, local government and key public & private agencies
- Infrastructural information and service level information: Water supply; Sewerage; Solid Waste Management; Drainage; Transport; Housing; Electricity and Energy
- Policy and regulatory framework, plans and projects

City Climate Profile - Coimbatore

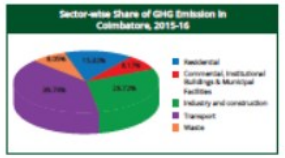
Coimbatore is the second largest city in Tamil Nadu, situated on the banks of the river Noyyal surrounded by the Western Ghats. Often referred to as the Manchester of South India, it is one of the fastest growing cities in India and is a major hub for textiles, industries, commerce, education, information technology, healthcare, and manufacturing.

Population: 1,050,721 (2011 Census of India)
Area: 257 sq. km.
No of Wards: 100 wards
Gender Ratio: 997/1000 males
Literacy rate: 91%



Greenhouse Gas Emissions Inventory

The total GHG emission (2015-16) for Coimbatore city was 4.89 million tonnes of carbon dioxide equivalent (CO_2e). This translates to an average per capita GHG emission of 3.03 tonnes of CO_2e, which is almost double of India's per capita GHG emission 1.56 tCO_2e (2010).



Climate Risk / Vulnerability Assessment

A climate risk assessment and vulnerability assessment of the fragile urban systems of the city was conducted in the city with the help of the Shared Learning Dialogues (SLDs). Coimbatore will see an increase in average maximum temperature by 3.3°C; increase in average minimum temperature by 3.4°C by the end of the century and increase in rainfall upto 0.5% by 2050, with increasing frequency of short duration high intensity rainfall.

Fragile Urban Systems	Climate Risks	Climate Fragility Statements	Risk*
(Water)		• There will be increase in demand of water. This will lead to more ground water extraction lowering ground water table • GDP, economy (Industry and agriculture) and health will be impacted	Extreme
(Sanitation)		• Change in green-blue cover in the city will change the micro-climate • Increased heat island effects will lead to impacts on health, food and cattle feed production	High
(Sewerage)		• Overflow of sewage lines and dilution of waste water will impact efficient of waste water treatment	Extreme
(Solid Waste)		• Decomposition rates in treatment facilities will be affected impacting ecosystems, increasing GHG emissions, odour, sanitation and health issues	High
(Transport)		• Private vehicular volume will increase, increasing the temperature and emissions	High

* Risk Score (likelihood x consequence) – Low: 1-4; Medium: 5-10; High: 11-20; Extreme: 20-25

temperature increase; rainfall increase

Example: Water Supply Baseline

Proposed Indicator	SLB fixed by GoI	Service level provided in 2015-16	Service Level planned for 2016-17
Coverage of Water Supply Connections	100%	44%	50%
Per Capita Supply of Water	135 lpcd	102 lpcd	115 lpcd
Extent of metering of water connections	100%	26%	30%
Extent of non-revenue water (NRW)	20%	56%	46%
Continuity of Water Supply	24 hours	Once in 4 days / 4 Hrs.	Once in 3 days / 4 Hrs.
Quality of Water Supplied	100%	75%	80%
Efficiency in redressal of customer complaints	80%	65%	70%
Cost recovery in water supply services	100%	60%	70%
Efficiency in collection of water supply-related charges	90%	60%	75%

Urban services & infrastructure assessed through a **Climate Lens**

Water Sector Issues

Indiscriminate use, encroachment of water bodies, high leakages (56% NRW), poor regulatory policies for water use

→ adaptation & mitigation

ClimateResilientCities - Phase 1: Analyze - Urban Issues

- **Water**
  - Indiscriminate use, encroachment of water bodies, poor NRW management (56% NRW), poor regulatory policies for water use ➡ adaptation & mitigation
- **Sewerage and Drainage**
  - Inadequate collection and treatment of sewage , mis-match between treatment capacities and actual treatment ➡ adaptation & mitigation
- **Solid Waste Management**
  - Improper source segregation, lack of facilities for hazardous waste, e-waste, C&D waste ➡ mitigation
- **Transportation**
  - Inadequate public transport, traffic congestion, conventional fuel based transport ➡ mitigation
- **Land Use Planning**
  - Need to manage green (tree) and blue (water bodies) cover in city

➡ adaptation & mitigation

Phase 1: Analyze - Key Outputs – System Analysis

Climate risk and vulnerability assessment of fragile urban systems in Coimbatore

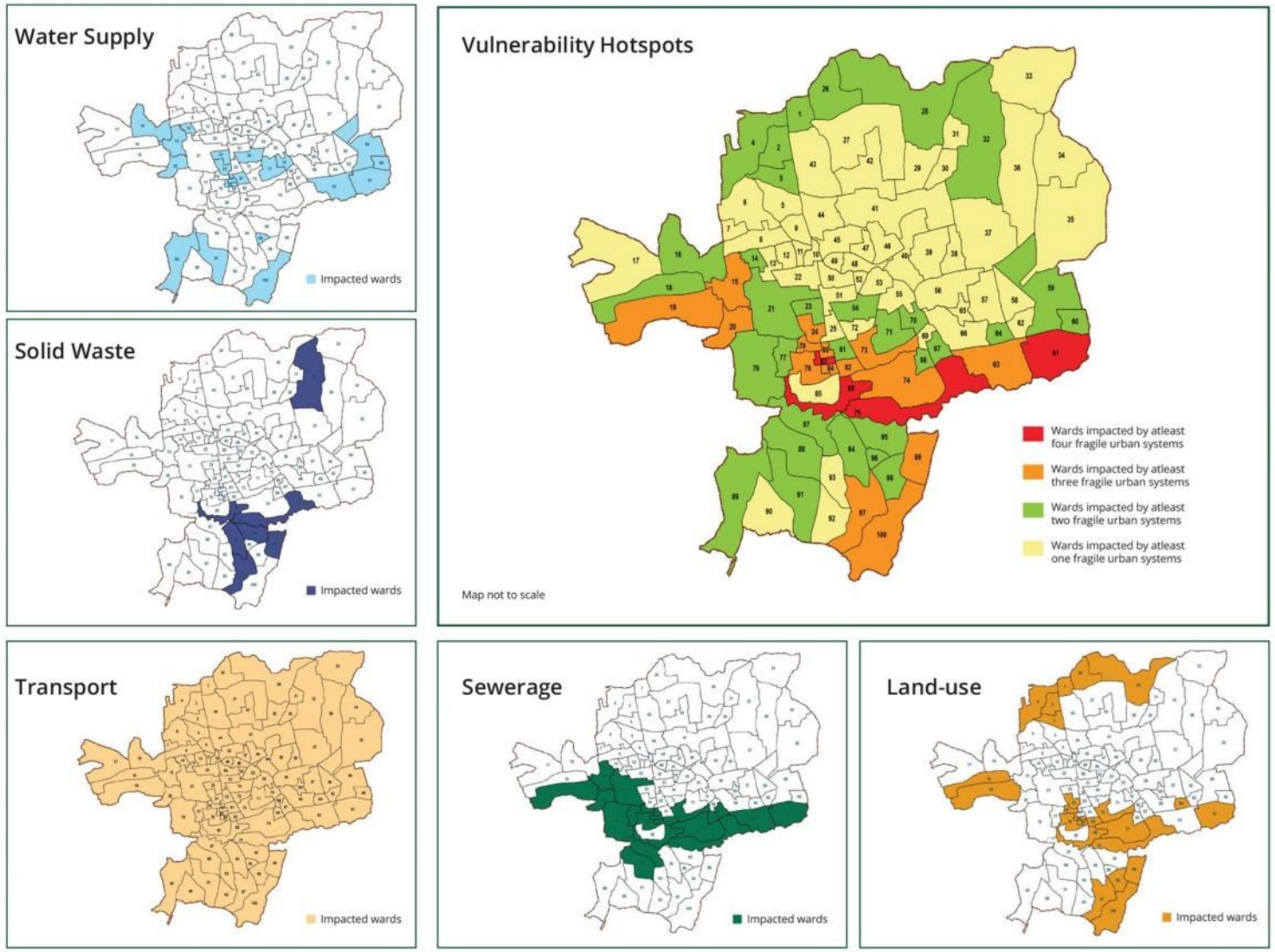
Fragile Urban Systems	Climate Risks	Climate Fragility Statements	Risk*
(Water)		• There will be increase in demand of water. This will lead to more ground water extraction lowering ground water table • GDP, economy (industry and agriculture) and health will be impacted	Extreme
(Land-use)		• Change in green-blue cover in the city will change the micro-climate • Increased heat island effects will lead to impacts on health, food and cattle feed production	High
(Sewerage)		• Overflow of sewage lines and dilution of waste water will impact efficient of waste water treatment	Extreme
(Solid Waste)		• Decomposition rates in treatment facilities will be affected impacting ecosystems, increasing GHG emissions, odour, sanitation and health issues	High
(Transport)		• Private vehicular volume will increase, increasing the temperature and emissions	High

*** Risk Score (likelihood x consequence)** – Low: 1-4; Medium: 5-10; High: 11-20; Extreme: 20-25

temperature increase; rainfall increase

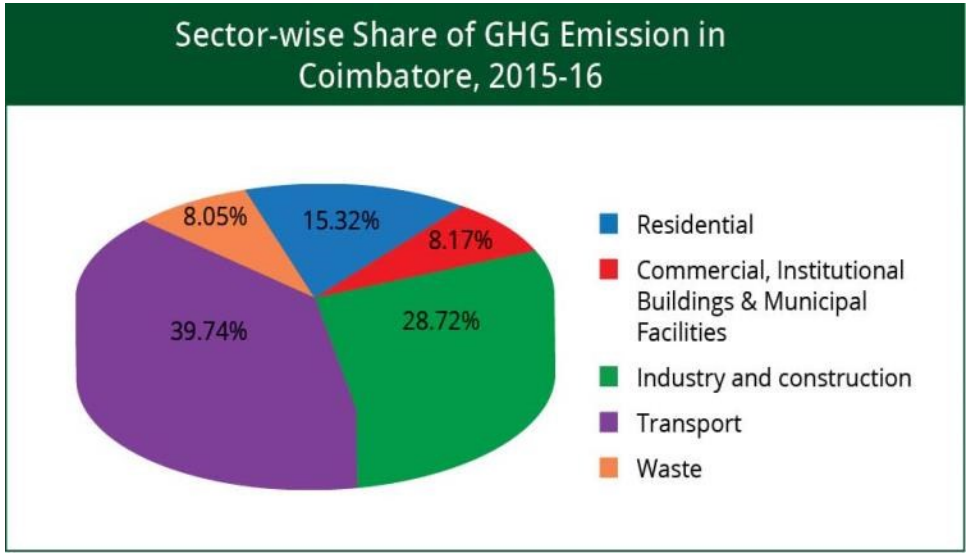
Source: Climate Action Plan - Coimbatore City, 2018

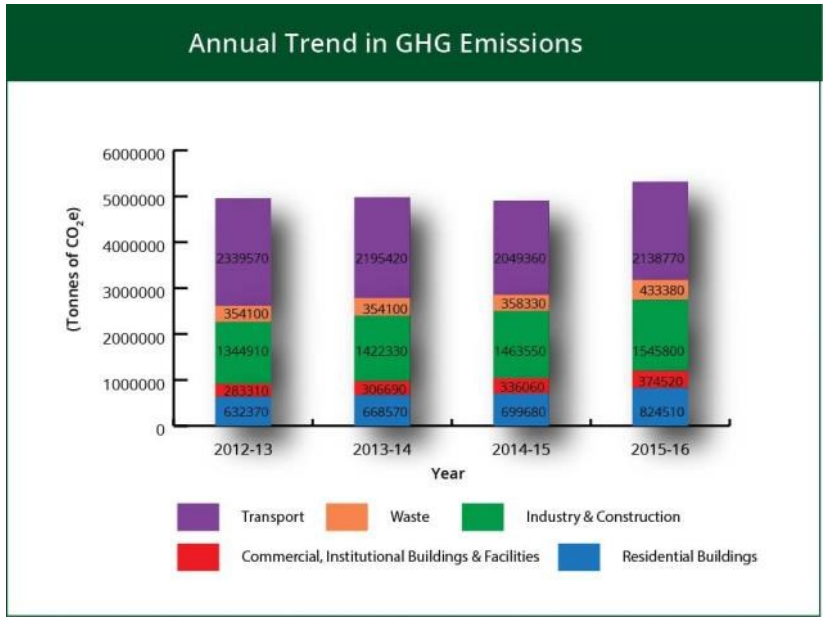
Phase 1: Analyze - Key Outputs – Vulnerability Maps

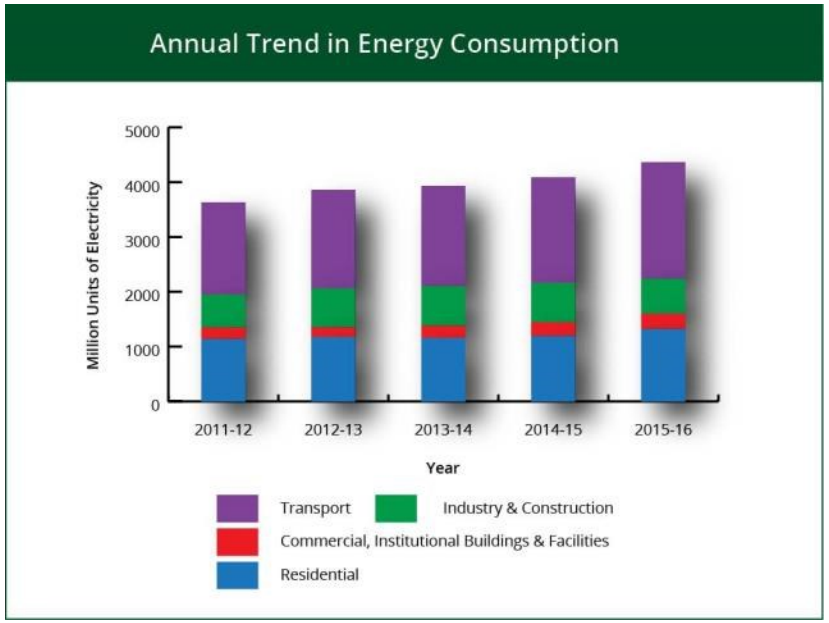


Source: Climate Action Plan - Coimbatore City, 2018

Phase 1: Analyze - Key Outputs – GHG Emission Inventory

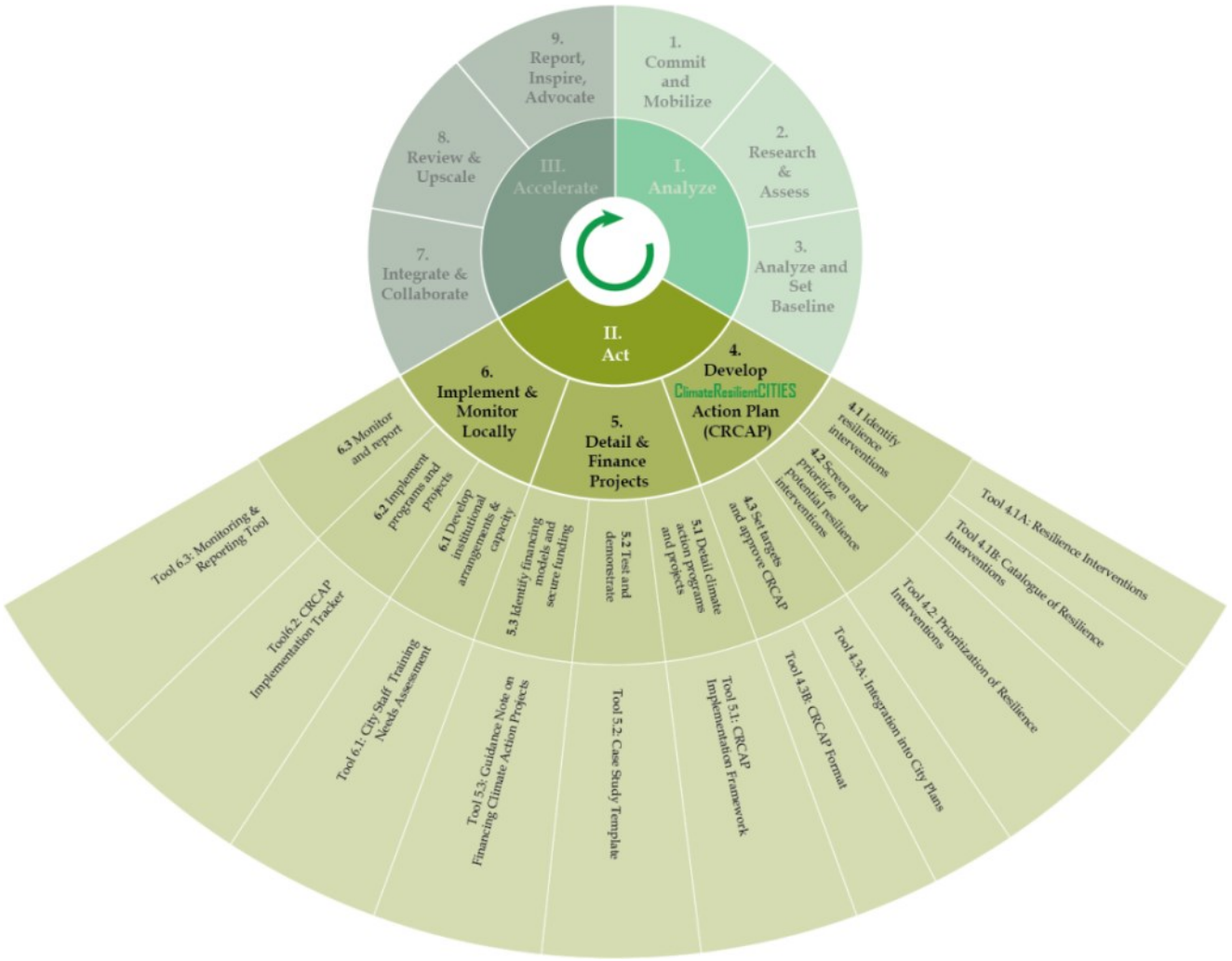






Source: Climate Action Plan - Coimbatore City, 2018

Phase 2: Act



Key Activities

- *Develop Climate Resilient Cities Action Plan*
- *Identify Resilience Interventions*
- *Screen and prioritize potential resilience interventions*
- *Set targets and approve CRCAP*
- *Detail actions - development of various financial model options*
- *Test & demonstrate pilot projects*
- *Institutional arrangements*
- *Mobilization of finance*
- *Implementation of programs*
- *Reporting – MRV and M&E*

Phase 2: Act – Key Outputs - Resilience Interventions

Identifying Climate Resilience Interventions – Develop a list of interventions to address GHG hotspots and climate vulnerabilities

Climate Fragility Statements	Vulnerable Areas	Urban Actors		Potential Climate Resilience Interventions
		Vulnerable Actors	**Potential supporting actor**	
Contamination of water supply due to flooding and lack of alternate sources. High GHG Emissions from water pumping	Ward 5	Slum dwellers Residents Local Authority Water Supply Department	Water Authority	• Rooftop water harvesting and safe storage • Improved efficiency of water supply pumps at headworks and secondary distribution points • Reduction in water leakage from the distribution system

Remember to

- Aim for a mix of “hard” (i.e. infrastructure related) and “soft” (i.e. non or minor infrastructure related e.g. policy changes, capacity building) solutions
- Focus on strengthening the resilience of the most vulnerable groups (especially women and children) and sectors through resource mobilization
- Explore traditional local knowledge to deal with changing climate

Phase 2: Act – Key Outputs – Prioritization of Interventions

Important to prioritize interventions due to availability of limited resources (financial and man power etc.) with local governments

Potential Climate Resilience Interventions	Resilience Indicators					Overall Resilience 5/5: very high 4/5: High 3/5: Medium 2/5: Average 1/5: Low
	Back-up system (yes/no)	**Flexibility (yes/no)**	**Responsivenes s/ re-organisation (yes/no)**	**Energy saving and GHG emission mitigation potential (yes/no)**	**Potential to reduce the impact of Climate Change on local community**	
e.g. Roof top water harvesting to be made mandatory to deal with water stress due to anticipated increasing temperatures and decreasing	Yes Supports a higher degree of self sufficiency at the household level	Yes Allows for water to be channelized towards recharging groundwater	Yes In case of a shutdown of the city's water supply system, households have stored rainwater for use	Yes Reduction in electricity consumption and GHG emission due to reduced pumping requirement	Yes Can improve groundwater level and availability	Very High

Phase 2: Act – Key Outputs – Feasibility and Impact Assessment

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

Remember to

- Focus on considering feasibility as well as opportunities - there may be good reasons to choose an intervention which does not score as highly as some others
- Conduct discussions with the Climate Core Team and/or the Stakeholder Group to validate the prioritization and feasibility and to gather any inputs which may help with assessment

Phase 2: Act – Key Outputs - Integration into City Plan

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

Remember to

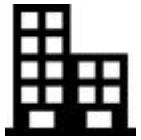
- City government will already have a comprehensive set of plans, ongoing programs and projects
- Wherever possible, climate resilience interventions should be linked with or built into existing departmental work plans
- Climate Action Plan should be seen as a way of strengthening the resilience of city plans, rather than an additional workload

Example: Resilience Interventions for Mitigation – Linkages to Urban Programmes

- **Water**
  - Use of energy efficient systems in WTPs
  - NRW reduction

- **Street Lighting**
  - Solar PV for parks
  - Replacement of conventional lights with LEDs

- **Transportation**
  - Replacement of diesel based public transport with CNG vehicles and added electric vehicles
  - Pedestrian infrastructure



- **Building sector – residential, municipal and commercial**
  - Use of energy efficient equipment
  - Renovation and retrofitting with energy efficient fans, lights, ACs.
  - Rooftop solar systems
  - Solar PV in dumping grounds

- **Manufacturing industry and construction**
  - Use of energy efficient systems
  - Micro-grid solar PV systems

- **Solid Waste Management**
  - 200 TPD - 4 bio-methanation plants
  - 850 TPD incineration facility (2035)

AMRUT, Smart City, Swachh Bharat Mission

Phase 2: Act - Key Outputs
– Test and Demonstrate Replicable Pilots

E-Rickshaws at Udaipur

E-Rickshaws at Udaipur

Water leak detection, Siliguri

Zero Waste Wards in Siliguri

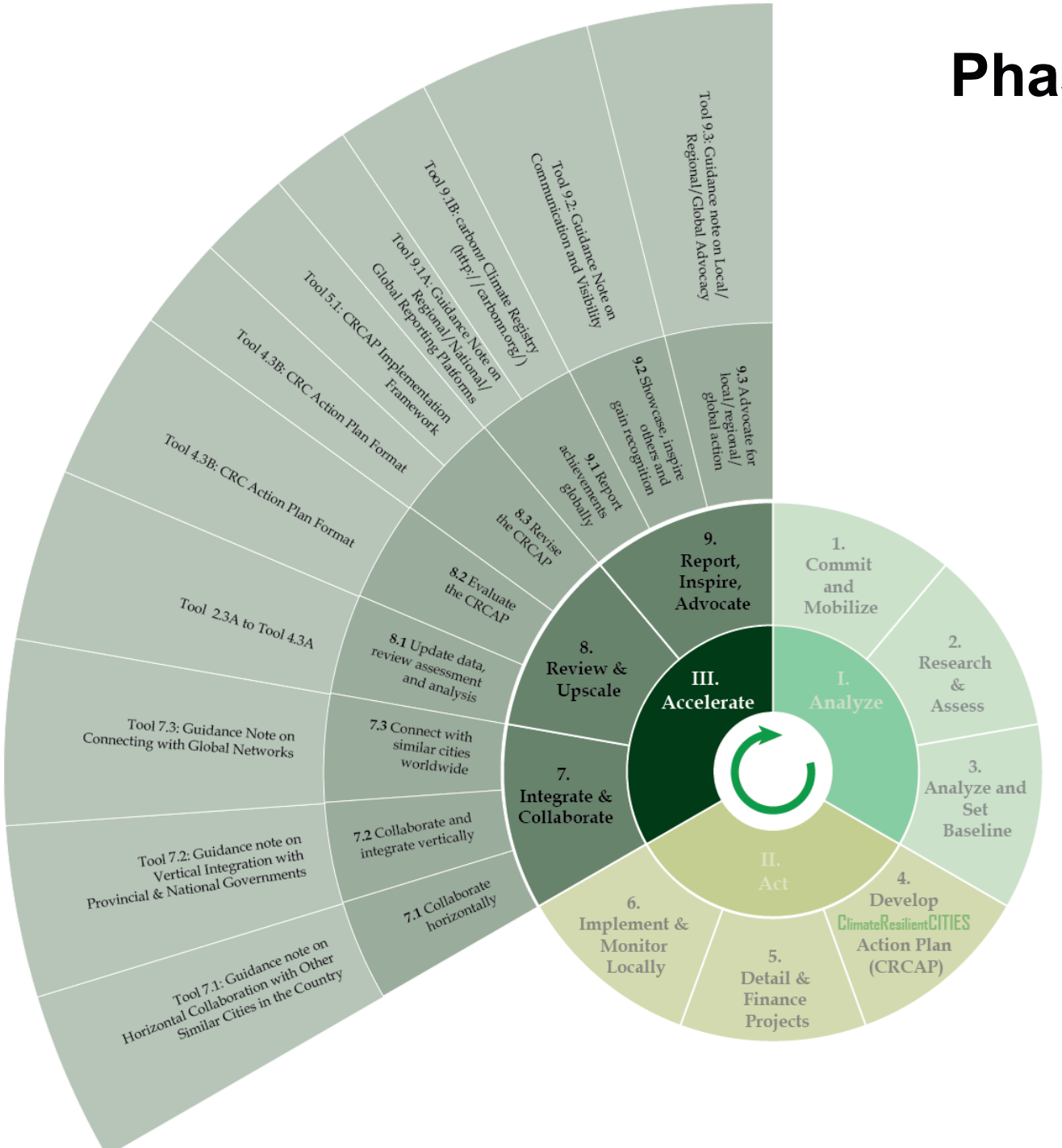
Phase 2: Act – Key Outputs – Process of Monitoring by Climate Core Team

Phase 2: Act – Key Outputs –Tracking progress and results

- M&E or MRV framework to keep track of activities that are scheduled for implementation periodically
- Helps monitor and report specific projects and impacts over their preparation, development and operational phases

Sector	Resilience Intervention	Timeline	Allocated budget	Milestones for the implementation process	Status of Implementation Process	Climate Change Impact: Annual Mitigation Potential (from CRCAP)			Climate Change Impact: Annual Mitigation – Reported based on the actual implementation		
						Potential energy saving (Million KWh)	Potential fuel saving (unit)	Potential emission reduction (tCO_2e)	Reported energy saving (Million KWh)	Reported fuel saving	
Water Supply	Reduce water leakages from 30% to 20% by replacing refurbishing old water pipeline	October 2018 to December 2021	INR ----	1.Water and Energy audit of water supply system 2.Identify most critical areas where water losses are high 3.Feasibility and detailed project report for replacing old network with new DI network 4.Implementation completed 5.Monitoring Impact	1.The consultant is identified, water audit and energy audit is completed, critical areas identified 2.Preparation of prefeasibility is in progress						

Phase 3: Accelerate

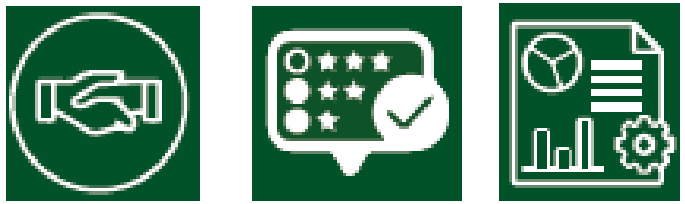


Key Activities

- *Horizontal Collaboration – scope for regional programs and achieving scale*
- *Vertical collaboration and integration – long term sustainability of programs & scale-up potential*
- *International networking – access to knowledge & finance*
- Systematic review of systems, processes, capacities, partners and actions and an assessment of targets vs. results
- Revise CRCAP: Identify new sector areas, as well as revised priorities and actions – enhanced ambition & scale-up
- National & Global Advocacy

Phase 3: Accelerate - Key Outputs

- Completing on-going programs and actions to realize targeted GHG reductions and climate adaptive capacities



- Increasing ambition of the Climate Action Plan - Revising the Climate Action Plan

- New policy and projects identified to accelerate action, reflecting increased city ambitions

- Reporting locally/regionally & globally

- Advocating for local/ regional/ global climate action

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ICLEI Local Governments for Sustainability

EXERCISE: PRIORITIZATION OF ACTIONS

ICLEI SOUTH ASIA

Case Exercise – Wonderful City (Recap and Climate Risks)

City Name: Wonderful City Coastal, hills… **Population:** 5,00,000 **Area:** 150 sq. km

Low-income population: 15%

Economy: Administrative capital, center of education and commerce, witnessing high population influx; informal employment and settlements

Water supply: 250 million liters per day **MSW generation:** 150 tonnes per day

Total Electricity Consumption: 500 lakh kWh

By end of the century: Avg. max temp: 3.4 & avg. min temp: 3.3ºC
By 2050: 25% increase in annual rainfall, increasing frequency of short duration high intensity rainfall

Existing situation and climate impact and risks	• Energy demand: High cooling load due to increased temperature and heat waves in peak summers • Water: Lowering ground water table and contamination, increasing water scarcity • Waste: Rising waste volume, and increasing decomposition rates in dumpsite will be affected impacting ecosystem • Transport: Inadequate public transport ,private vehicles volume increasing rapidly leading to emissions, congestion during water logging

Lets see how we can prioritize mitigation actions for Climate Action plan..

Issues city wants to address
(1) High dependency on grid electricity through deploying renewables
(2) Keen to improve public transport system and reduce dependency on private vehicles
(3) Sustainable waste management
(4) Integrated water management and conservation

Case Exercise – Prioritization of Actions

Time duration: 10 mins

Link:

Please see Prioritization tab

- We will look assess prioritization for 3 mitigation interventions based on the given criteria
- Please start with the water conservation intervention of residential sector and try to select suitable options using dropdown (low, medium, high) for all of the criteria (Column F to I) to see the overall priority rank of interventions (Column J)
- Please take a careful look at the description of each prioritization criteria before making final selection of level of response
- Please do not change or type anything in the fields

Climate Actions to be prioritized:

- **Water Conservation**: Rainwater harvesting systems, dual plumbing deployed in Affordable Housing projects
- **Electric Mobility:** Introduction of E-buses. Buses to be charged using Solar PV systems at stations
- **Waste Management**: Setting up composting and waste to energy (bio-methanation) plants for food, garden, paper waste
- **Water Management:** Reduction of water leakages in distribution network through water audits, pipe replacement, etc.
- **Renewable Energy:** Solar Photovoltaic Installation for large Residential, Commercial and Public buildings in Smart City Area

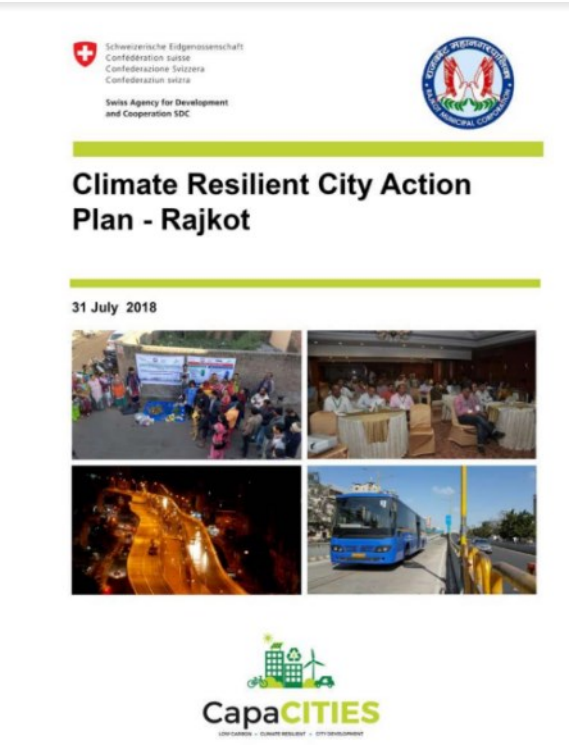
Case Studies:
Climate Resilience Planning and Action in Indian Cities

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

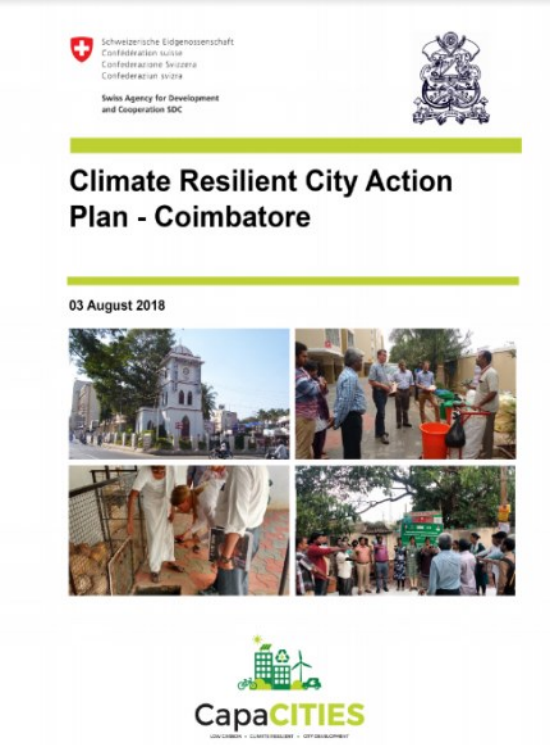
Swiss Agency for Development and Cooperation SDC

Climate Resilience Action Plans of Indian Cities

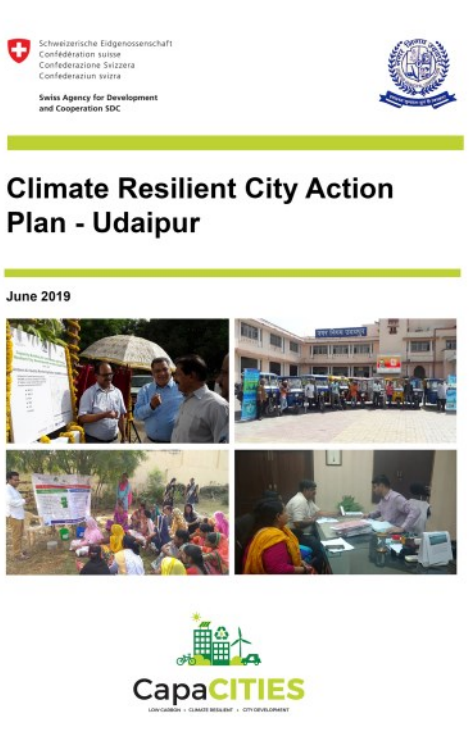
CapaCITIES
LOW CARBON • CLIMATE RESILIENT • CITY DEVELOPMENT



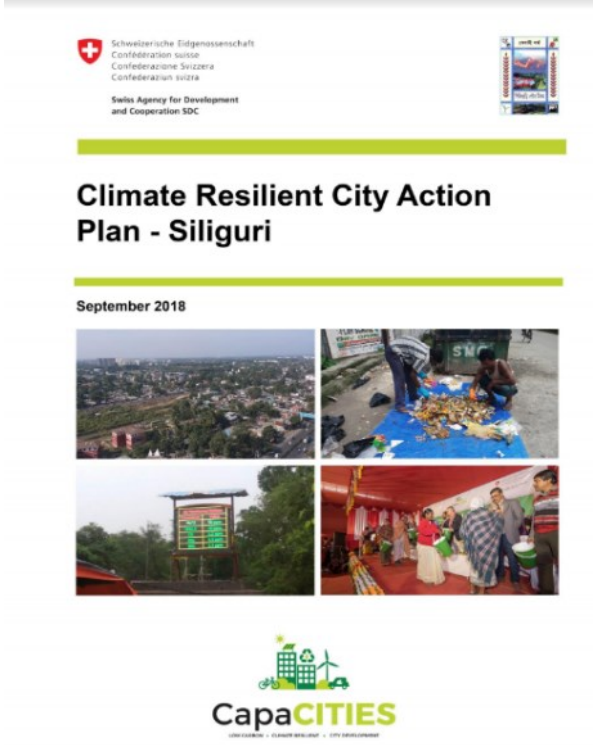
Rajkot



Coimbatore



Udaipur



Siliguri

All CRCAPs are approved by local municipal councils

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Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

Target and Summary of Climate Action Plans

CapaCITIES
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GHG Inventory
Vulnerability & Risk Assessment
= Climate Resilient City Action Plan

Focused on mitigation & adaptation strategies

Quick-win Pilot Implementation

102200 m3/ year biogas Generation

257060 kWh/ year renewable energy generated

6000 tCO2e/ year GHG emission reduced

Potential of Climate Resilient City Action Plan

Cost of Climate interventions **INR 60 Billion**

INR 6.9 Billion secured under Municipal Budget

2 million tCO2e Annual GHG emission reduction

Emission reduction targets by 2022-23 from 2015 levels

Coimbatore: 33%

Udaipur: 18%

Siliguri:14.8%

Rajkot: 14%

Source: City Climate Resilient Action Plan – Coimbatore, Rajkot, Siliguri, Udaipur, 2018

Pilot Project:
Decentralized Municipal Solid Waste Management in wards 22 & 24

Impact on GHG Emission Reduction in Coimbatore, Tamil Nadu:

34,200 litres of diesel consumption has been reduced yearly from 2 wards due to reduced trips of lorries through improved household and community waste management

97.49 GHG Emission (tonnes of CO_2e) reduction achieved yearly due to the reduced lorry trips

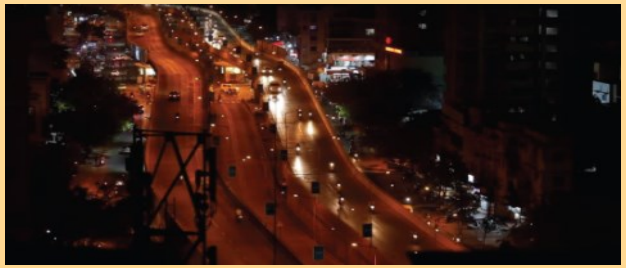
1771 tonnes of CO_2e per annum GHG mitigation potential of the 1.5 tons bio-methanation plant

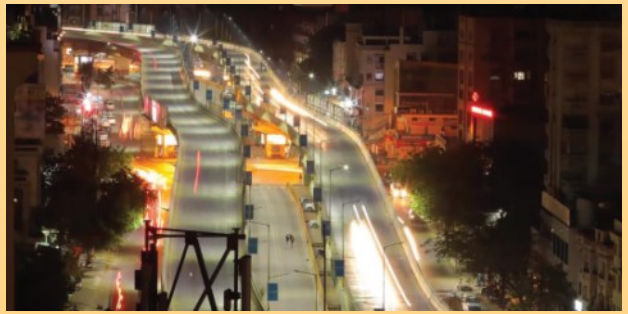
Pilot Climate Interventions Scaled up by Cities

Low Carbon Measures in Municipal School, Thane

- Solar powers 68% of the school's energy requirement
- Energy efficiency improvement – fans, lights, smart sensors
- Thane Municipal Corporation allocated INR 20 lakh for installation of solar energy systems in municipal schools

Energy efficient Street Lighting – ESCO, Rajkot





- 300 LED streetlights piloted with feasibility study and results monitored
- Lighting level improved 3 to 4 times
- Scaled up to retrofit 60,000 streetlights through ESCO model
- Energy savings of 60% and GHG emission reduction of ~7000 tCO2e

Ground Water Recharge, Rajkot

- Ground recharge systems implemented at 5 locations
- Reduced water logging and rain water use for augmenting groundwater
- Scale-up to 10 more identified locations across the city

TAP Transformative Actions Program

Funds for climate projects are available and investors are ready; however, there is a shortage of bankable projects

TAP PROCESS

TAP helps local and regional governments make their project idea robust, transformative and bankable

STEP 1: APPLY TO THE TAP

- Project screening - basic quality assurance
- Evaluation of completeness
- Evaluation of transformative approach

OUTCOMES

- Well defined transformative action
- Project improvement feedback

STEP 2: GAIN TAP APPROVAL

- Receive the TAP seal of approval from the ICLEI World Secretariat to access TAP services

OUTCOMES

- TAP projects gain access to selected services

STEP 3: ACCESS SERVICES

ACCESS IMPLEMENTATION AND FINANCE SUPPORT

TAP projects bearing the TAP seal can be selected for capacity building and technical assistance. They also gain access to investors, PPFs and financial service providers.

Contact: tap@iclei.org

Any Questions or thoughts…

Thank You

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Websites: www.iclei.org, www.southasia.iclei.org

The agenda

Time	Session	Speaker	Organization
2:30-2:40	Recap of day 1	Mr Nikhil Kolsepatil Ms Avni Agarwal	ICLEI South Asia/WRI India
2:40-3:05	Reporting requirements	Ms Avni Agarwal	WRI India
3:05-3:15	Q&A	Ms Avni Agarwal	WRI India
3:15-3:45	Climate action planning	Mr Bhaskar Padigala	ICLEI South Asia
3:45-4:15	Hands on exercise	Mr Bhaskar Padigala	ICLEI South Asia
4:15-4:45	**Principles of inclusive climate action planning**	**Ms Faiza Solanki**	**WRI India**
4:45-5:15	Hands on exercise	Ms Faiza Solanki	WRI India
5:15-5:40	Case studies	Mr Kamlesh Yagnik	IUC India
5:40-6:00	Way forward	Mr. Nikhil Kolsepatil, Mr Chirag Gajjar	ICLEI South Asia/WRI India

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PRINCIPLES FOR INCLUSIVE CLIMATE ACTION PLANNING

Introduction to Needs assessment , Action analysis diagnosis and Inventorization through the lens of Equity & Inclusivity

INTRODUCTION TO THE TRAINER

Faiza Solanki works as a EPP Consultant with **Climate Program at WRI India.** She has been involved in various research work based on thematic areas of CITIIS 2.0 project , informing transport sector in the next round of NDCs and climate action planning at sub-national level.

Prior to joining WRI , she has worked with GIZ in the Climate smart cities project for Coimbatore Municipal Corporation , where she was involved in on-field technical support , research , training and capacity development workshops for city and state officials of Tamil Nadu in collaboration with NIUA , TU-Berlin and TNIUS.

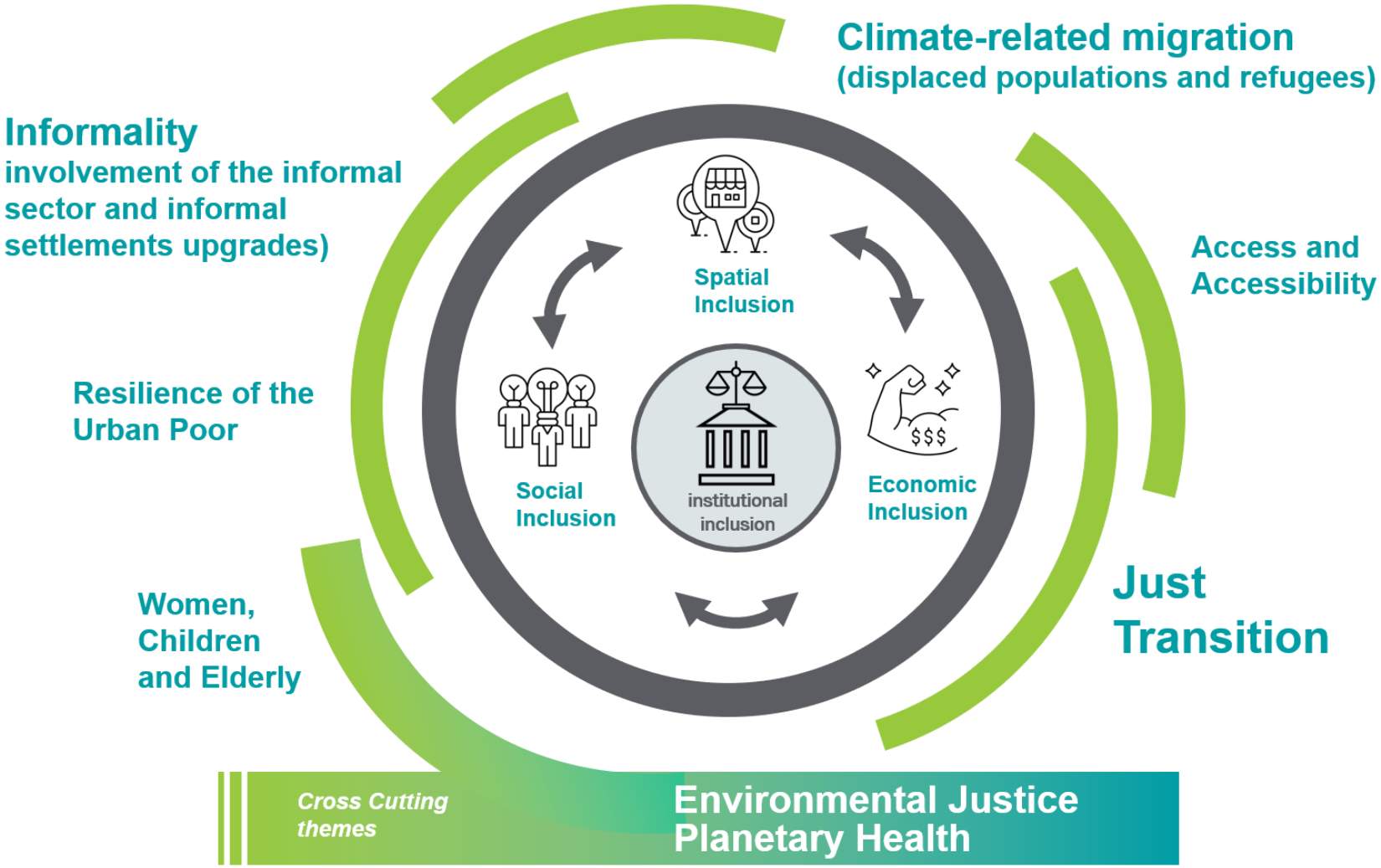
She holds a Master's in Urban Planning from CEPT University, Ahmedabad with her master thesis on localization of CSCAF funded by GIZ and has a Bachelor's in Architecture from ANNA University, Chennai.

INCLUSIVE CLIMATE ACTION PLANNING

- Inclusive and equitable climate action : the new normal to achieve a better city
- Putting people first
- Applying an equity lens
- Adopting actions that help mitigate and adapt to the impacts of climate change by ensuring that the needs of vulnerable groups are met

Adopted from the Climate Change and Inequality Jointly in Cities reports available here

EMERGING THEMES OF ICAP



Adopted from the Climate Change and Inequality Jointly in Cities reports available here

IS A CITY'S CLIMATE PLANNING INCLUSIVE OR EXCLUSIVE?

Exclusive Process

Selective community participation

Inequitable Policy

Allocation of resources **without attention** to assessing impacts groups

Inequitable Impacts

Disproportionate negative impact on disadvantaged groups and positive impact on those with means

Inclusivity of Process

Engagement of a wide range of communities and stakeholders, with increasing **participation and involvement** of impact groups

Inclusivity of Policy

Designing/testing fairness in accessing climate programmes, actions and policies.

Inclusivity of Impact

Equitable distribution of the impact of climate programs, actions and policies together with indicators that can support monitoring and evaluation

Adopted from the Climate Change and Inequality Jointly in Cities reports available here

ICAP AT SUBNATIONAL LEVEL

Inclusivity of Process

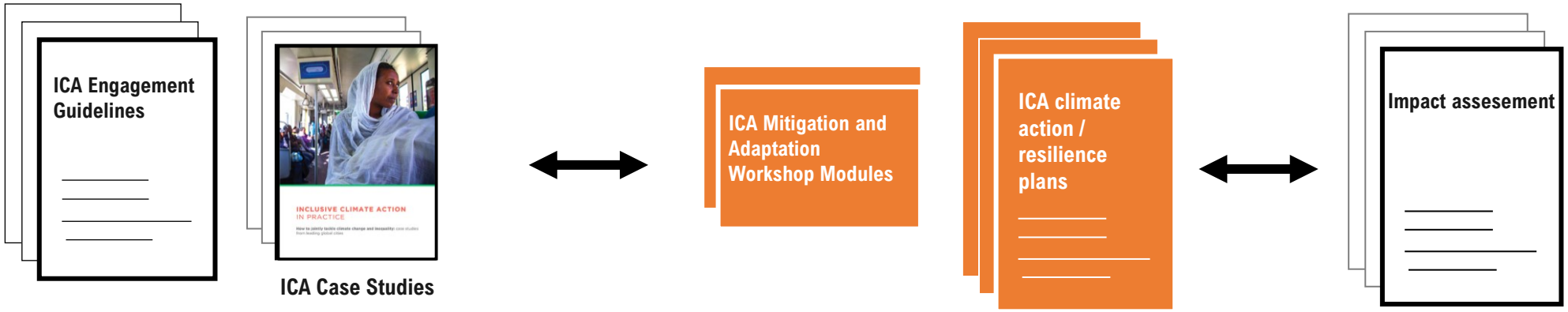
Rooted in engagement of diverse set of stakeholders, suffering from inequality and the impacts of climate change

Inclusivity of Policy

Actively designed with people, fairness and justice at the centre of decision making

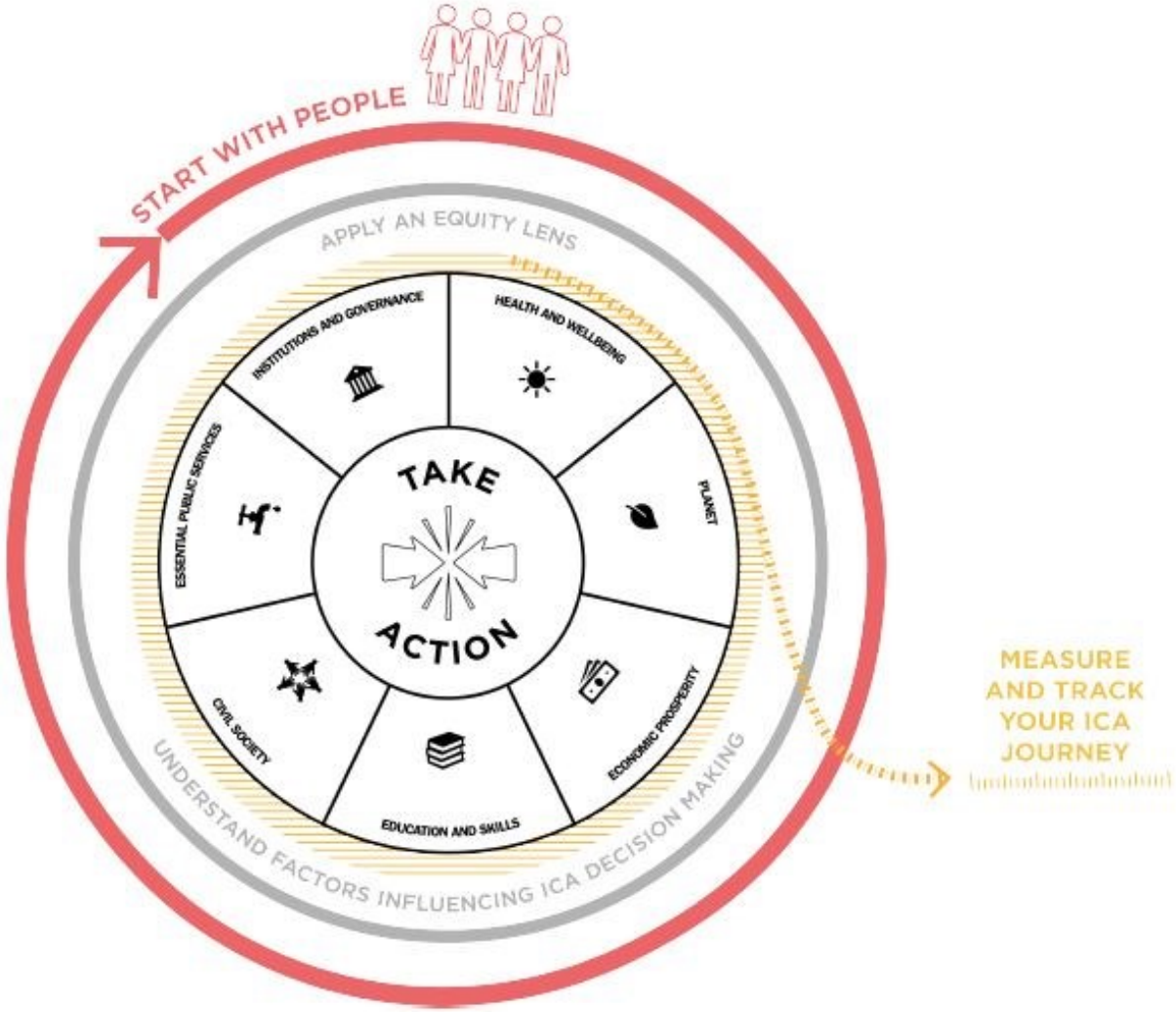
Inclusivity of Impact

Clear mechanisms for measuring, monitoring and evaluating the direct impacts and distribution of impacts of climate actions



Adopted from the Climate Change and Inequality Jointly in Cities reports available here

PUTTING PEOPLE AT THE CENTRE



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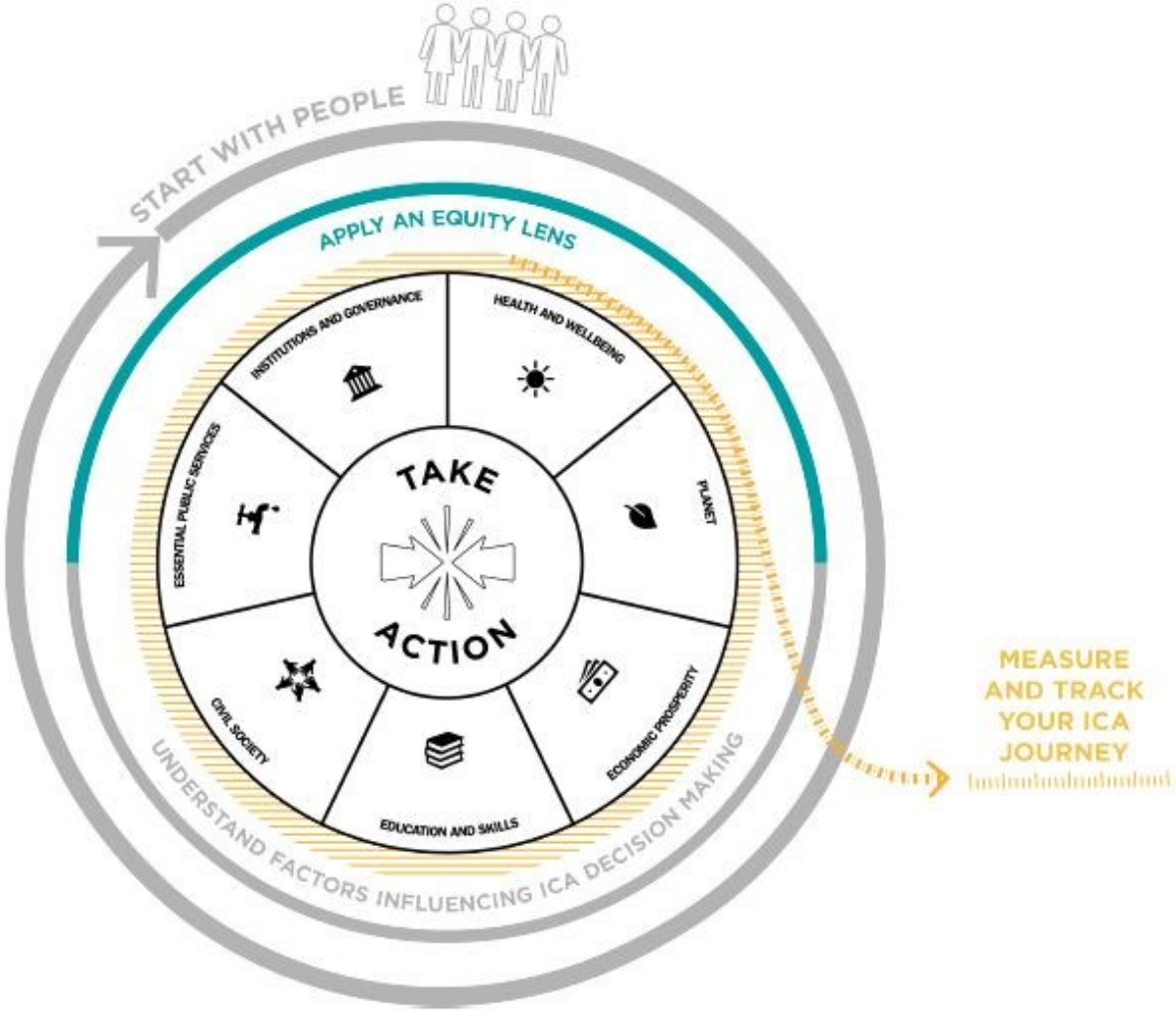
APPLYING AN EQUITY LENS



Adopted from the Climate Change and Inequality Jointly in Cities reports available here

DESIGNING INCLUSIVE CLIMATE ACTION PLANNING

START WITH PEOPLE

Which groups or frontline communities are most crucial for ICA in the city?

CONDUCT AN ICA DIAGNOSIS

Where should we focus our efforts? How will we define and quantify success?

UNDERSTAND FACTORS INFLUENCING ICA DECISION MAKING

What is the existing governance structure? Who could be positively or negatively impacted by your selected climate actions?

APPLY AN EQUITY LENS

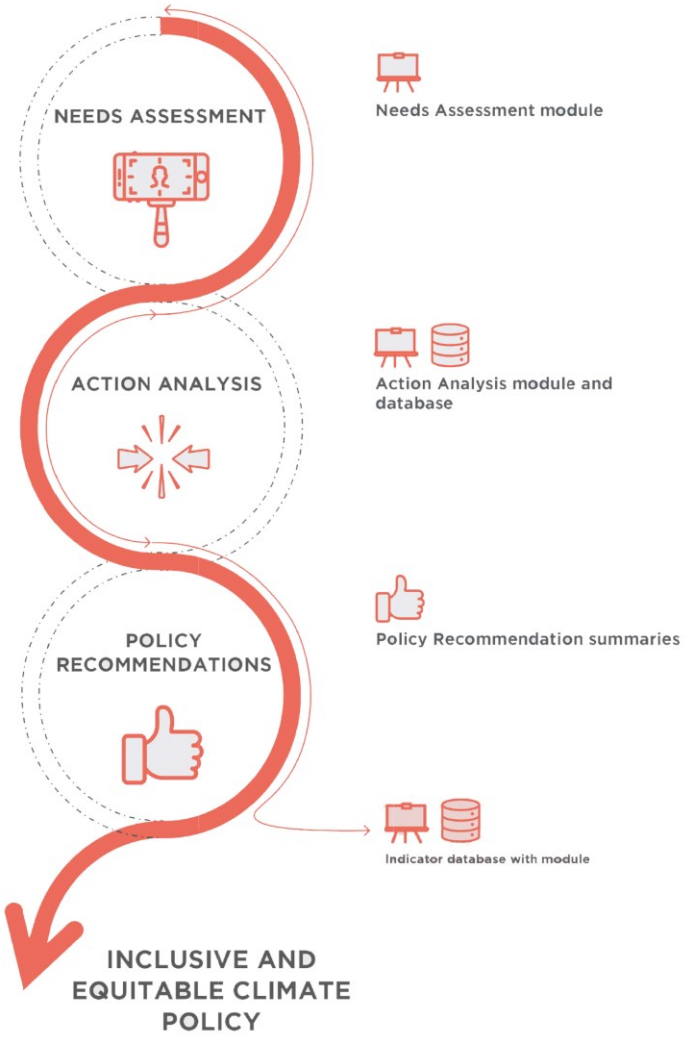
When it comes to climate action, who has access? Who doesn't? What could be root causes for the social exclusion of these groups?

MEASURE AND TRACK YOUR ICA JOURNEY

What data exist to support an action analysis? How can we develop benchmarks to track our targets?

Adopted from the Climate Change and Inequality Jointly in Cities reports available here

STEPS FOR INCLUSIVE CLIMATE ACTION PLANNING



1 Understanding the needs of various frontline communities and factors influencing decision-making

2 Database of challenges and action analysis frontline communities might face in accessing climate actions

3 Clear recommendations and strategies tied to challenges to help cities implement inclusivity and equity incrementally in climate planning

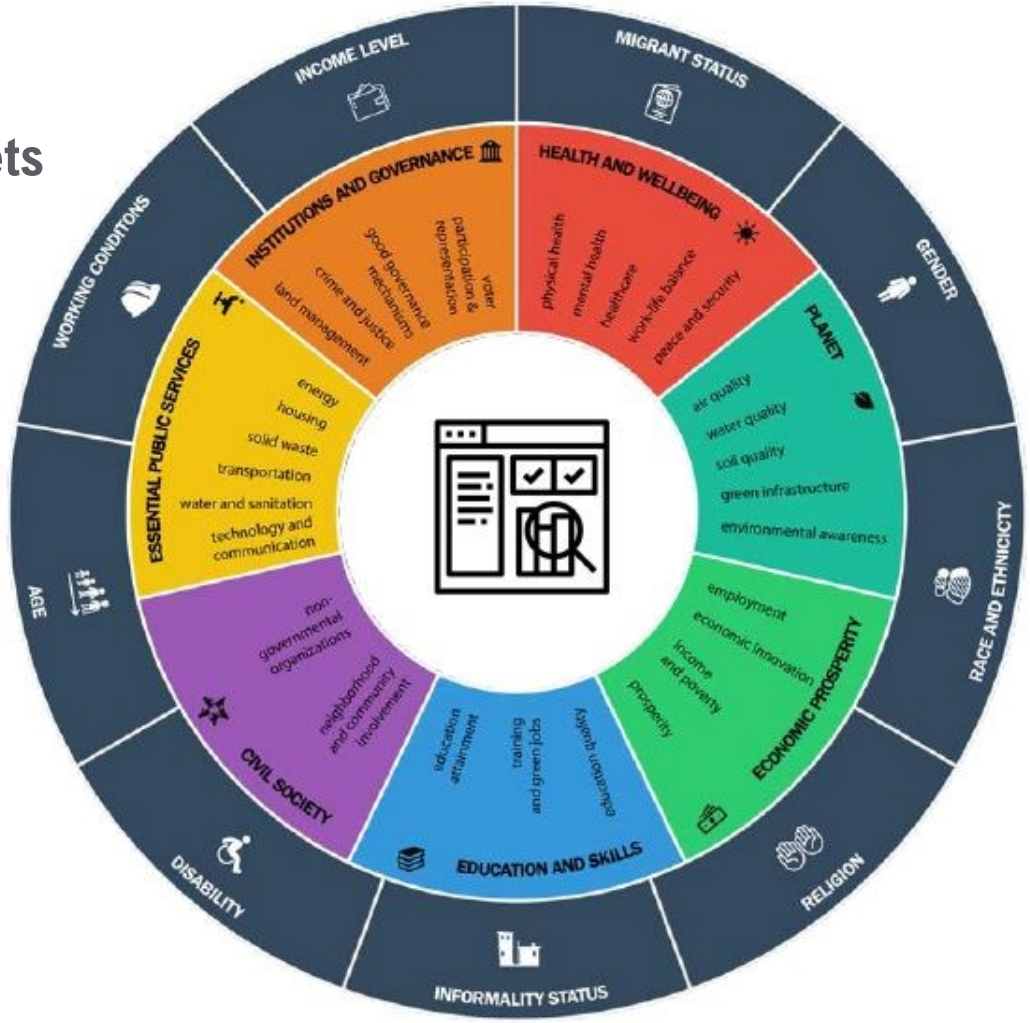
Adopted from the Climate Change and Inequality Jointly in Cities reports available here

INTRODUCTION TO THE ICAP TOOL

Adopted from the Climate Change and Inequality Jointly in Cities reports available here

STEP 01 : CONDUCTING NEEDS ASSESEMENT

Set selected climate targets



Adopted from the Climate Change and Inequality Jointly in Cities reports available here

STEP 01 : CONDUCTING NEEDS ASSESEMENT

Set selected climate targets

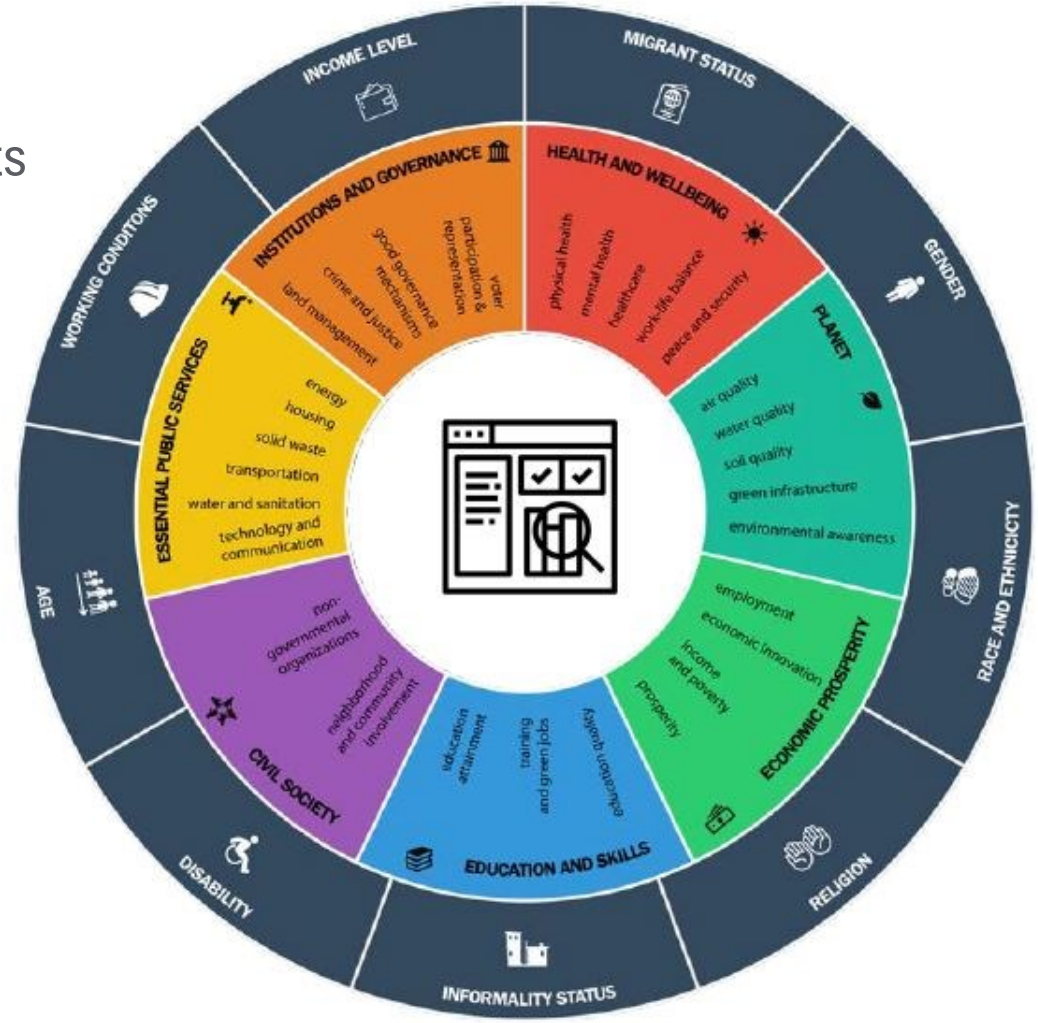
Case Barcelona : 10-minute walking distance of climate shelter by 2030

Case Study Type:	Plan	Primary Sector:	Urban Planning
ICA Pillar:	Policy	Primary Impact:	Quality of Life & Urban Livability

Adopted from the inclusive climate action in practise report available here

STEP 01 : CONDUCTING NEEDS ASSESEMENT

Set selected climate targets



Identify vulnerable communities

Adopted from the Climate Change and Inequality Jointly in Cities reports available here

STEP 01 : CONDUCTING NEEDS ASSESEMENT

Identifying vulnerable communities

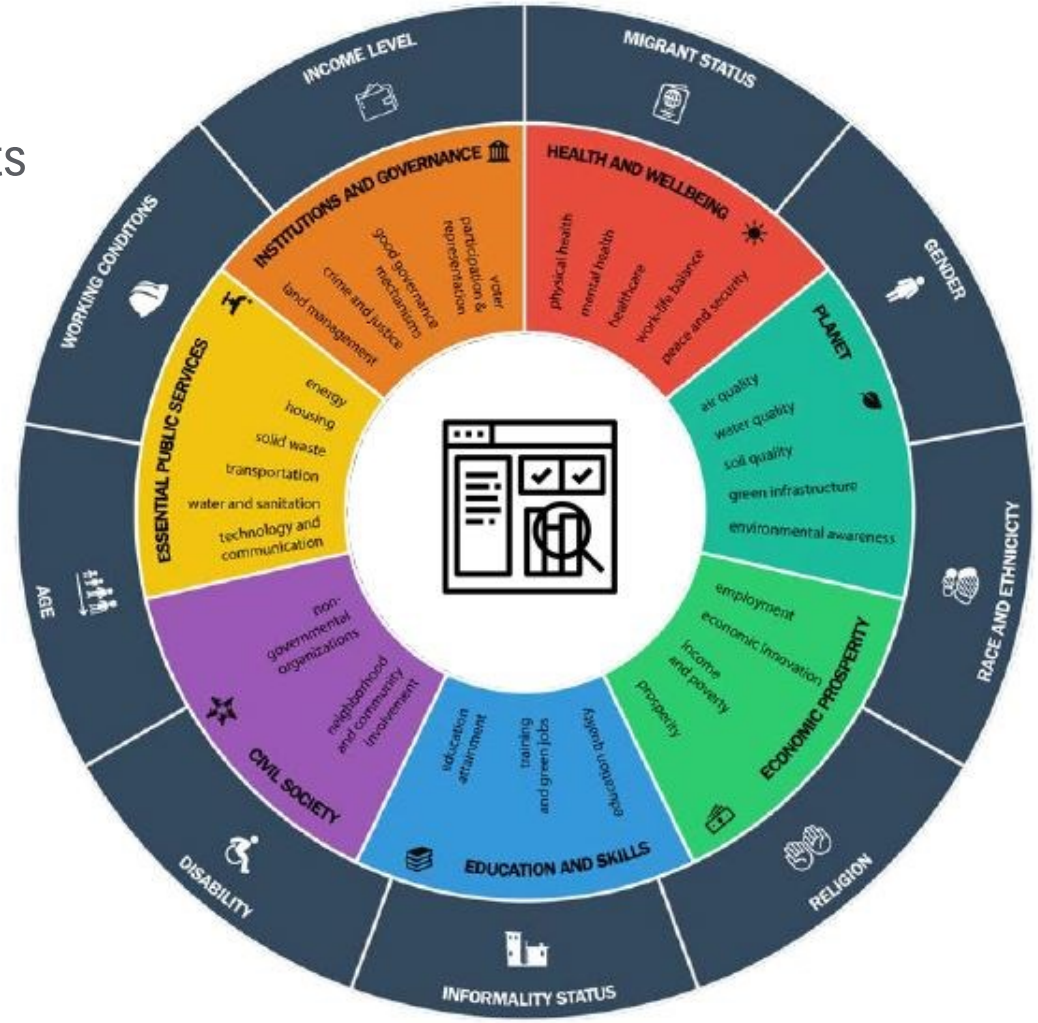
Impact category	Description	Impacted group
Income level	Grouping or thresholds connected to earnings of labour and/or capital. Categories typically are defined related to the local/national economy.	Low-income communities
Migrant status	Refers to the legal and immigration status of a person who changes their place of residence. Categories include locals, expatriates, documented or undocumented migrants, refugees and asylum seekers.	Migrants
Gender	The socially constructed characteristics of women and men – such as norms, roles and relationships of and between groups of women and men. Categories typically include lesbian, gay, bisexual, transsexual and intersex, and traditional biological sex categories of male and female.	Women
Race and ethnicity	Race is defined as a category of humankind that shares certain distinctive physical traits. The term ethnicity is more broadly defined as large groups of people classed according to common racial, national, tribal, religious, linguistic, or cultural origin or background.	Racial and ethnic minorities
Religion	Religious or spiritual belief of preference, regardless of whether or not this belief is represented by an organized group, or affiliation with an organized group having specific religious or spiritual tenets.	Religious minorities
Informality status	Relationship of individuals, households, activities or firms to the formal or informal economy, typically with respect to production, employment, consumption, housing or other services.	Informal communities (residents, workers)
Disability	Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others.	People with disabilities
Age	Chronological grouping based on years lived	Elderly, Youth, Children.
Working conditions	Working conditions cover a broad range of topics and issues, from working time (hours of work, rest periods, and work schedules) to remuneration, as well as the physical conditions and mental demands that exist in the workplace and job stress for workers in transitioning industries (e.g. fossil fuels)	Outdoor workers, temporary workers, workers in transitioning industries

Adopted from the Climate Change and Inequality Jointly in Cities reports available here

STEP 01 : CONDUCTING NEEDS ASSESEMENT

Set selected climate targets

Identify vulnerable communities



Impacted Domains and subdomains

Adopted from the Climate Change and Inequality Jointly in Cities reports available here

STEP 01 : CONDUCTING NEEDS ASSESEMENT

Identifying Impact Domains and subdomains

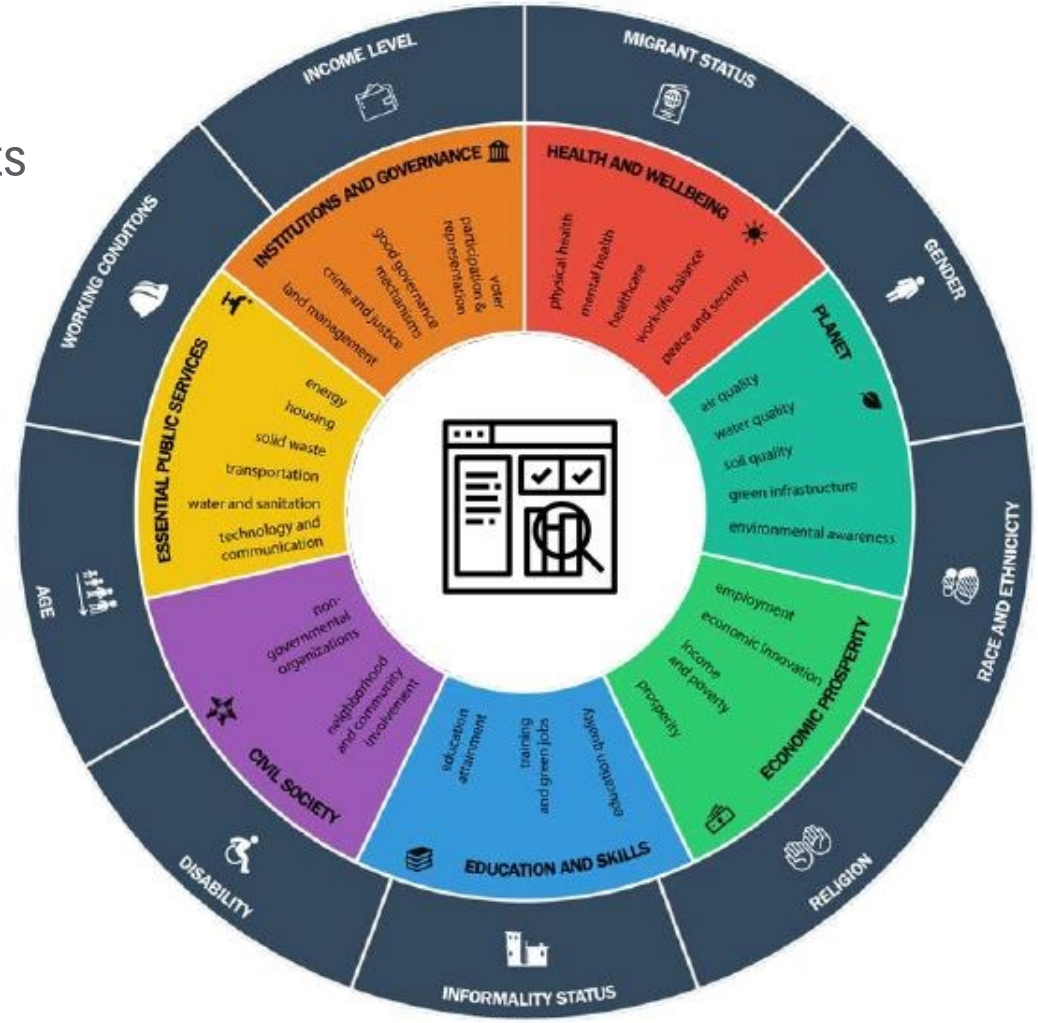
No	Action	Potential impact domain	Subdomain	Impact description
1	Collective Purchase of Renewable Energy	Planet		Reduced air pollution from fossil fuel-based energy production and reduction in associated health risks
1	Collective Purchase of Renewable Energy	Economic prosperity		New green jobs associated with renewable energy installation
1	Collective Purchase of Renewable Energy	Economic prosperity		Enhanced land value capture from investment in renewable energy rather than polluting power plants
1	Collective Purchase of Renewable Energy	Essential public services	energy	Reduced energy bills for end consumers
1	Collective Purchase of Renewable Energy	Essential public services	energy	Reduced energy costs for the city and communities
1	Collective Purchase of Renewable Energy	Essential public services	energy	Potential formalization of energy access for residents previously underserved
1	Collective Purchase of Renewable Energy	Essential public services	energy	Increased grid reliability and resilience resulting from diversified energy portfolio
1	Collective Purchase of Renewable Energy	Essential public services	energy	Lower administrative costs from purchasing large quantities of energy in single
2	Distributed Renewable Energy	Planet		Reduced air pollution from fossil fuel-based energy production and reduction in associated health risks
2	Distributed Renewable Energy	Economic prosperity		Creation of new low-skill jobs for installation and maintenance of distributed
2	Distributed Renewable Energy	Essential public services	energy	Increased energy access from distributed renewable energy projects installed in areas not served by traditional grid
2	Distributed Renewable Energy	Essential public services	energy	Reduced infrastructure cost associated with central generation systems
2	Distributed Renewable Energy	Essential public services	energy	Reduced energy bills for consumers
2	Distributed Renewable Energy	Essential public services	energy	Increased energy reliability and resiliency from diversified energy portfolio
3	New building standards, codes and regulations for energy and water conservation	Planet		Reduced GHG emissions and air pollution from reduced energy consumption in energy efficient buildings
3	New building standards, codes and regulations for energy and water conservation	Essential public services	energy, water	Benefits of energy and water cost savings to households
3	New building standards, codes and regulations for energy and water conservation	Essential public services	energy, water	Higher availability of energy and water for all in the community if consumption standards are followed
4	Retrofitting programmes that improve both building efficiency and resiliency	Health and wellbeing		Increased climate resiliency due to regularized indoor temperatures (better insulated walls and windows) and flood/storm proofed buildings

Adopted from the Climate Change and Inequality Jointly in Cities reports available here

STEP 01 : CONDUCTING NEEDS ASSESEMENT

Set selected climate targets

Identify vulnerable communities



Impacted Domains and subdomains

Engagement & Planning

Adopted from the Climate Change and Inequality Jointly in Cities reports available here

STEP 01 : CONDUCTING NEEDS ASSESEMENT

Engagement & Planning

Case Sydney : A centralized approach for Sustainable Sydney Climate plan 2030

Case Study Type:	Guidelines	Primary Sector:	Urban Planning
ICA Pillar:	Process	Primary Impact:	Quality of Life & Urban Livability

Adopted from the inclusive climate action in practise report available here

STEP 02: ACTION ANALYSIS & DIAGNOSIS

Tool Purpose

Cities can analyse the inclusivity and equity implications of potential climate actions using the Action Analysis database. This database explores the impacts and potential barriers that cities might face in implementing 17 climate policies, from creating new low-carbon building standards to improving emergency management and early warning systems for climate hazards. The impacts of each climate action are mapped to the following domains or outcome areas: health and wellbeing, planet, education and skills, economic prosperity, essential public services, civil society, and institutions and governance.

The impacts in this database cover the following city domains:

Health and wellbeing	(physical health, mental health, healthcare, well-being, safety)
Planet	(air quality, water quality, soil quality, noise pollution, green infrastructure, environmental awareness, vulnerability to natural hazards, renewable energy)
Education and skills	(education attainment, education quality, skills and training)
Economic prosperity	(employment, economic innovation, income and poverty, productivity)
Essential public services	(housing, transportation, energy, solid waste, water, sanitation, technology, communications)
Civil society	(social cohesion, nongovernmental organizations)
Institutions and governance	(voter participation, representation, good governance mechanisms, crime and justice)

- Health & well being
- Planet
- Education & skills
- Economic prosperity
- Essential public services
- Civil society
- Institutions & governance

Adopted from the Climate Change and Inequality Jointly in Cities reports available here

WRI INDIA

GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY

IUC INTERNATIONAL URBAN COOPERATION European Union-India

ICLEI Local Governments for Sustainability

TAKEAWAYS FROM THE EXERCISE

TAKEAWAYS FROM THE EXERCISE

- In the planning phase , concentrate on needs assessment by identifying priority actions and potential impact groups
- Identify specific actions and work towards them in a holistic way
- Devise recommendations addressing the above challenge and monitor their progress

STEP 03 : DESIGNING RECOMMENDATIONS

ACTION

RECOMMENDATIONS

CITY TARGETS

E.g. Action 08

E.g. Electrification of vehicles, with focus on public transport and shared vehicle

Innovative financial models & subsidies to make EVs affordable for all groups

Develop a long-term infrastructure plan to support large-scale electrification

Install 10,000 publicly available EV chargers by 2022 and 28,000 by 2028

Barcelona, Spain

Conduct training and raise awareness regarding EV use and benefits

Establish plan for EV end use with battery scrapping or recycling

Enhancing affordable EV by schemes and ensuring that municipally deployed EV chargers are distributed equitably around the city

Los Angeles, U.S.

Adopted from the Climate Change and Inequality Jointly in Cities reports available here

STEP 03 : DESIGNING RECOMMENDATIONS

Case Los Angeles , USA : Affordable EV sharing Blue LA

Case Study Type:	Project	Primary Sector:	Transportation
ICA Pillar:	Impact	Primary Impact:	Wealth and Economy

Adopted from the Climate Change and Inequality Jointly in Cities reports available here

STEP 03 : DESIGNING RECOMMENDATIONS

ACTION

RECOMMENDATIONS

CITY TARGETS

E.g. Action 04

Retrofitting Programmes for Improving Building Efficiency and Resiliency

Reduce the up-front costs of building retrofits

Energy usage per person rather than energy usage per unit of living area

By 2032, retrofit 100% of existing commercial and multi-family buildings to achieve net-zero energy standards, starting with all public housing

Washington, D.C., U.S.

Conduct training and raise awareness on low cost retrofitting mechanisms

Use of land value capture instruments

Cool Roof Project - Covering over 100 households and 40,000 square feet

Surat, Gujarat ., India

Adopted from the Climate Change and Inequality Jointly in Cities reports available here , Surat cool roof project here

STEP 03 : DESIGNING RECOMMENDATIONS

Case Ahmedabad , India : Carbon Neutral Vision - Green buildings & Climate Retrofits

Adopted from the carbon neutral vision for Ahmedabad municipal corporation report 2019

Thank You

Faiza Solanki

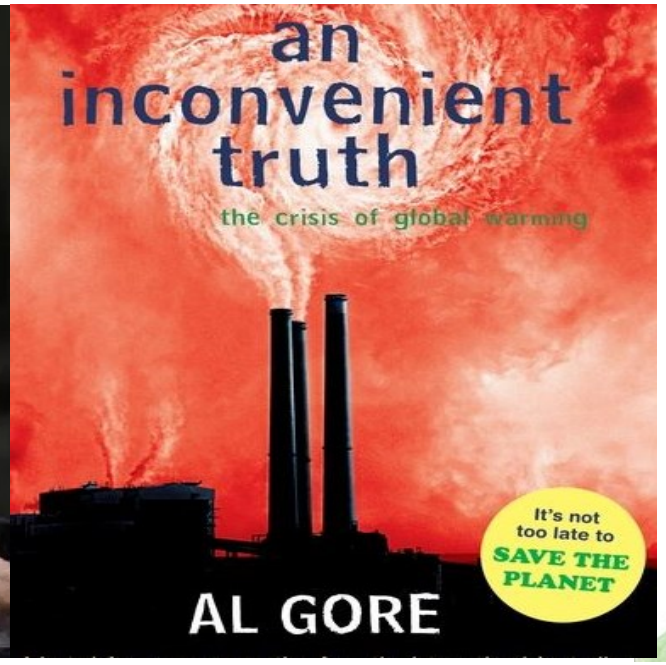
faiza.solanki @wri.org

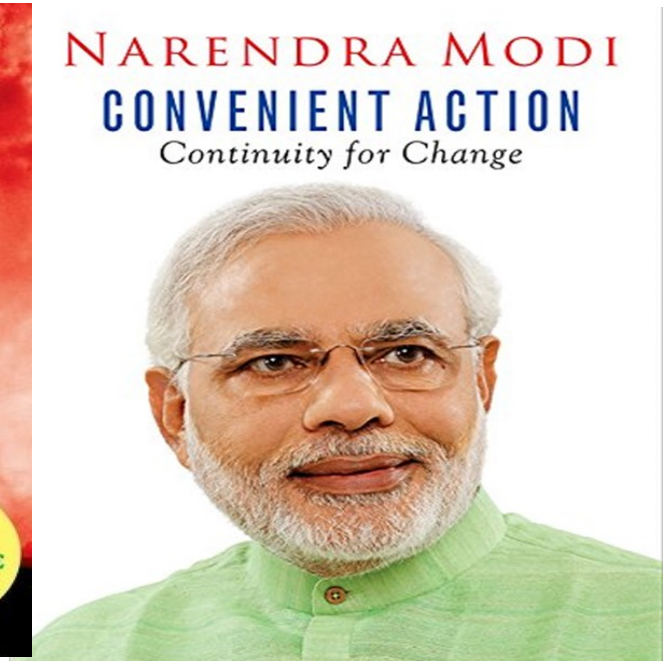
The agenda

Time	Session	Speaker	Organization
2:30-2:40	Recap of day 1	Mr Nikhil Kolsepatil Ms Avni Agarwal	ICLEI South Asia/WRI India
2:40-3:05	Reporting requirements	Ms Avni Agarwal	WRI India
3:05-3:15	Q&A	Ms Avni Agarwal	WRI India
3:15-3:45	Climate action planning	Mr Bhaskar Padigala	ICLEI South Asia
3:45-4:15	Hands on exercise	Mr Bhaskar Padigala	ICLEI South Asia
4:15-4:45	Principles of inclusive climate action planning	Ms Faiza Solanki	WRI India
4:45-5:15	Hands on exercise	Ms Faiza Solanki	WRI India
5:15-5:40	**Case studies**	**Mr Kamlesh Yagnik**	**IUC India**
5:40-6:00	Way forward	Mr. Nikhil Kolsepatil, Mr Chirag Gajjar	ICLEI South Asia/WRI India

Climate Action Planning for Surat

PM, Mr. Narendra Modi, President, European Council, Mr. Charles Michel and President, European Commission, Ms. Ursula von der Leyen on 15th July 2020 on implementation of Partnership for Smart and Sustainable Urbanization





Mr. Prakash Javadekar, Minister for environment, forest and climate change during COP21,Paris in 2015

India leads Showing Climate Actions

…from darkness unto light…

Objectives: To reduce carbon emission intensity - emission per unit of GDP - by 33-35% from 2005 levels over 15 years. Aimed at producing 40% of its installed electricity capacity by 2030 from non-fossil fuels

- May 2018, Surat joined GCoM at the launch of GCoM- South Asia at New Delhi
- GCom India has now 17 Indian cities representing 42.62 million people

GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY

What is GCoM?

A global alliance for city with the shared vision of promoting and supporting voluntary action to combat climate change, built upon the commitment of over 10,479 cities from 6 continents and 138 countries representing 945 million people

Main Objectives

1. Create competencies to integrate CC & Energy Resilience planning.
2. Empower communities for participatory and decentralized action.
3. Make integrated and technology reliant ecosystems, to ‘de-risk’ city environment.
4. Devise innovative and forward looking policies and implementation.
5. Prepare cities to participate in Global Covenants of Mayors

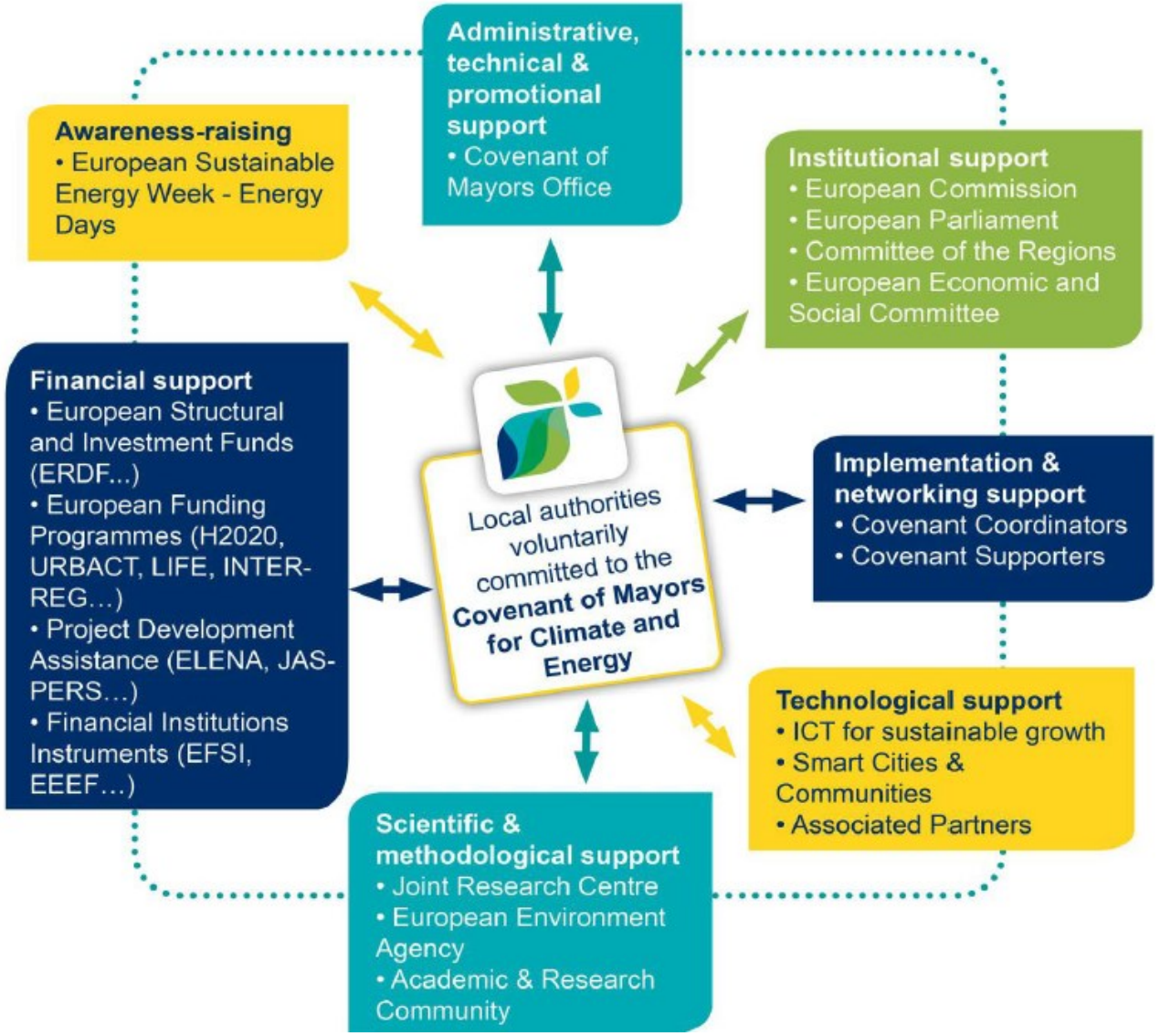
Deliverable : Climate Action Plan on Climate Change and Energy Resilience

GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY

10 Reasons to Join GCoM?

1. **G**ain high international recognition and visibility
2. **C**ontribute in shaping India's climate and energy policy
3. **S**trengthen the credibility of the commitments
4. **S**ecure long-term support for your climate and energy actions
5. **B**oost access to financing
6. **P**articipate in networking, capacity building sessions and discussions
7. **E**njoy easy access to 'excellence know-how'
8. **B**enefit from facilitated self-assessment and benchmarking
9. **G**et connected to national and subnational authorities
10. **R**eceive tailored guidance

Multi-stakeholders involvement and support to cities



Surat Climate Action Plan

(CRF: Drawn on the expertise of a broad range of stakeholders)

Integrated CC scenarios, scientific data in **Consonance** with National & State Action Plan **Addressing** key priorities

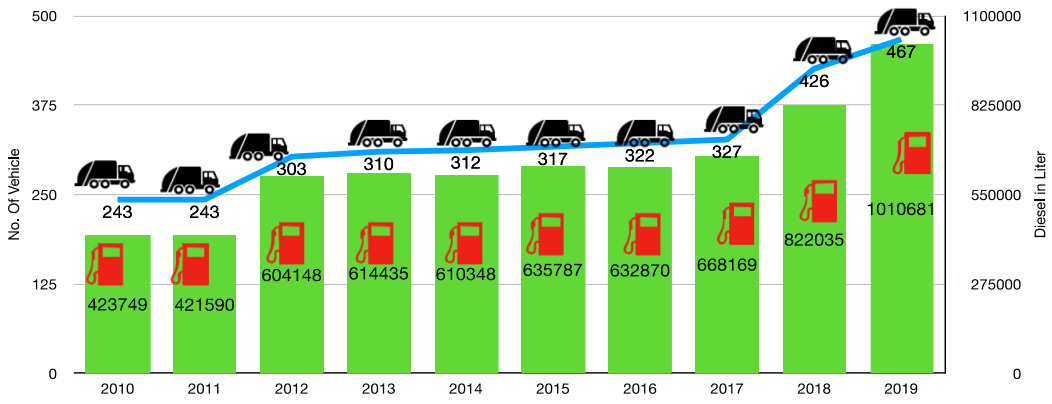
Surat Climate Action Plan

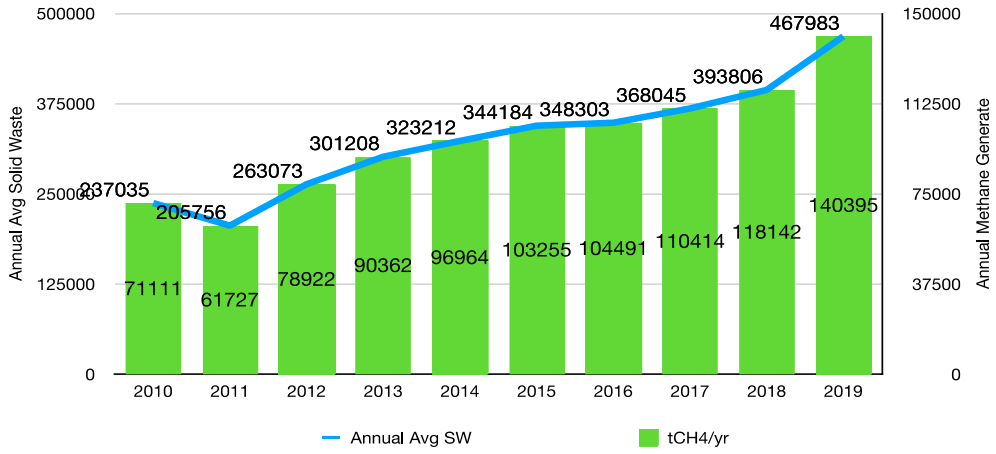
Sr	GCoM Activity	Start	Due
1	Formation of Team and Stakeholders Consultation	Sep 2019	Oct 2019
2	Introduction to Reporting Framework	Nov 2019	Dec 2019
3	GHG Emission Inventories Reporting	Dec 2019	Mar 2020
4	Risk & Vulnerability Assessment	Mar 2020	May 2020
5	Targets and Goals for Mitigation & Adaptation	Jan 2020	May 2020
6	Draft Climate Action Plan and Energy Access Plan	May 2020	Jul 2020
7	Joint Collective Actions Amongst Stakeholders	Jul 2020	Oct 2020
8	Formal Adoption of Plan	Oct 2020	Nov 2020
9	Monitoring, tracking and reporting progress towards commitments in the climate action plan	Dec 2020	Dec 2020
10	Progress of action implementation in the climate action plan	Jan 2021 Onward	

SWOT analysis of Surat

Strength	Weaknesses
• Active Citizenry • Sound City Leadership • Strategic Location and Connectivity • Cosmopolitan Culture • Growth Engine of Gujarat • Compact City • Class Physical Infrastructure • Green Heritage • Highest Migration	• Transition in Leadership • Public Transport System Utilisation • Need of Urban Housing • Frequent Flooding • Solid Waste Management • Credible Mapping of Underground Utility Network • Unavailability of ready data of services
Opportunities	**Threats**
• Centre For Education & Skill Development • Attracting Investments In Futuristic Technologies • Quantum Jump In Industrial Sector • Scope For Planned Extension • Growth In Real Estate	• Forthcoming Mayoral Election • Increased Pressure on Civic Amenities • Increased Pressure on Natural Resources • Possibilities of Industrial Disaster • Safety and Security Issues • Social Cohesion

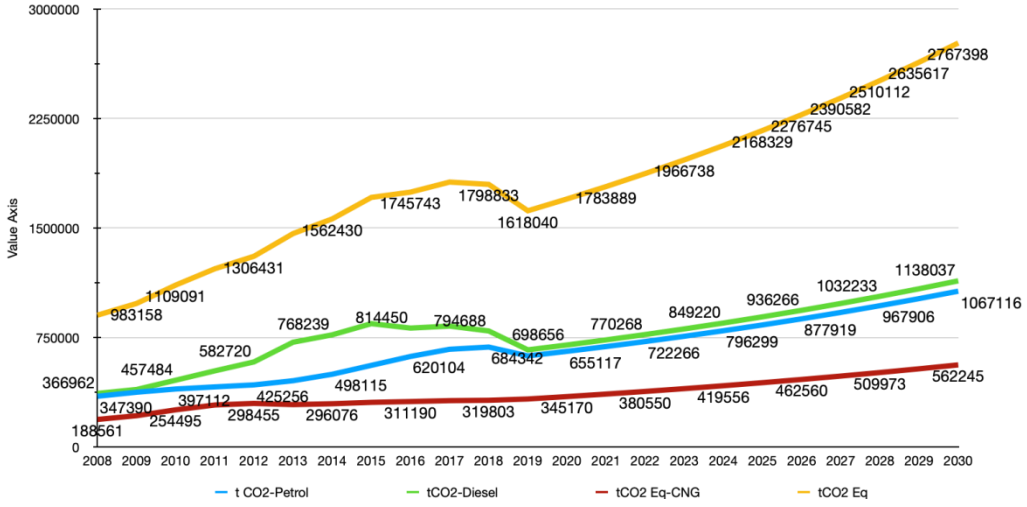
GHG emissions from solid waste management

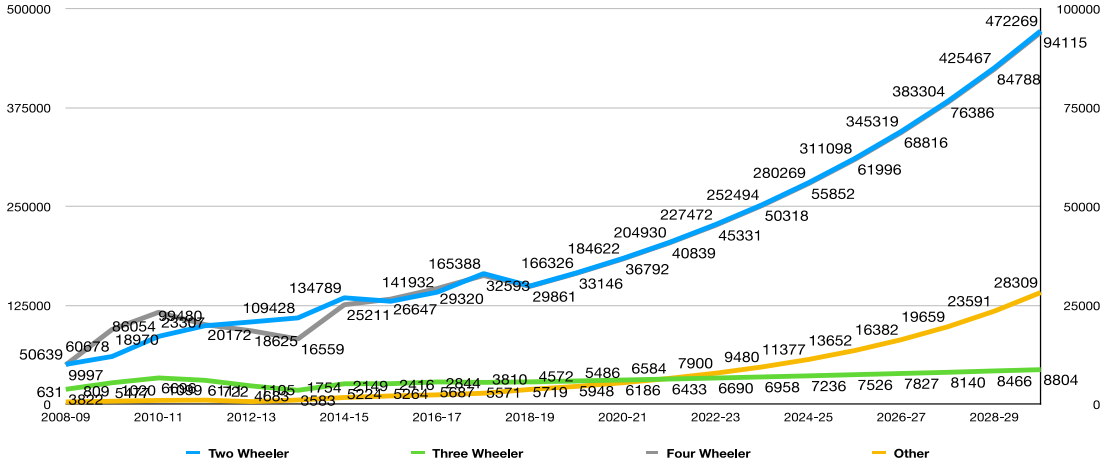




Sr	Action
1	Replace all the existing vehicles used in D2D collection by Electrical Vehicles
2	100% Segregation at Source at each ward through individuals, societies, institutes, commercial establishments, public offices and industries
3	Set up Manual or Auto Material Recovery Facility (MRF) of dry waste collection before sending to landfill
4	Set up Organic Waste Compost (OWC) Centre at each ward
5	Manage landfill site scientific way

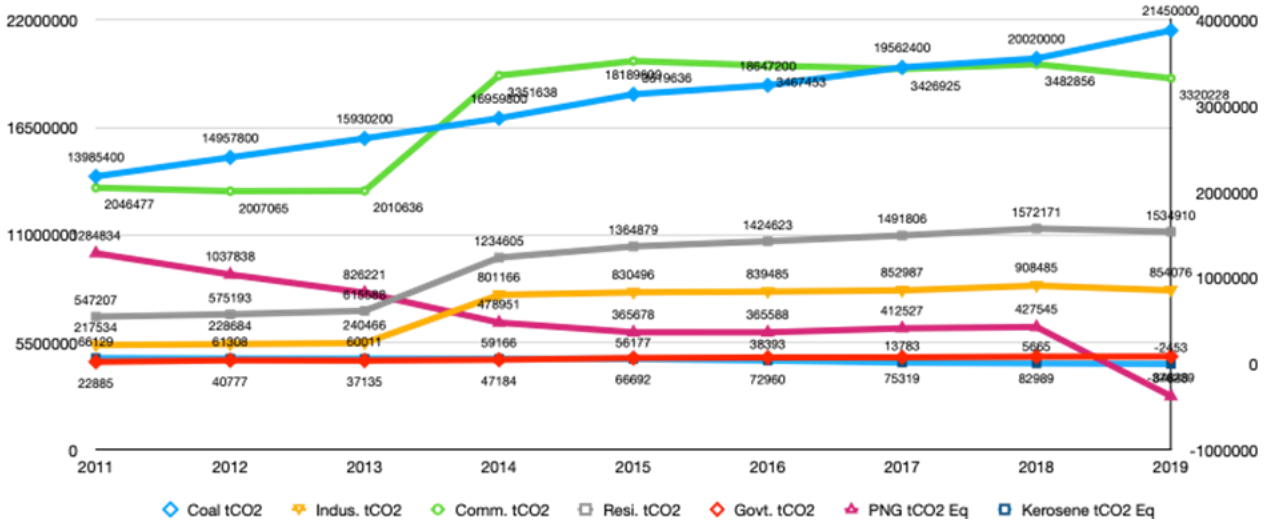
GHG emissions from transportation

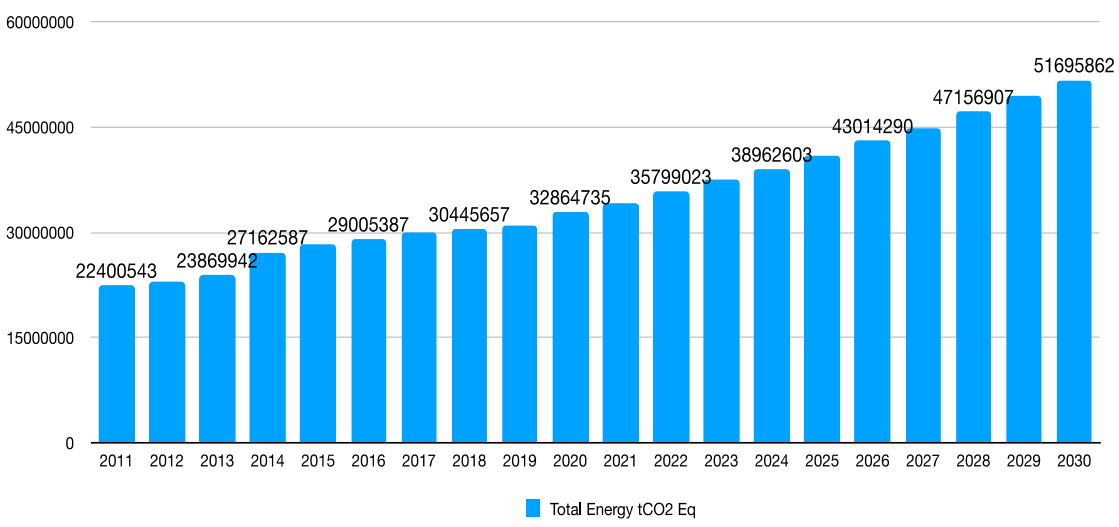




Sr	Action
1	To develop policy for Avoid -Shift-Improve (A-S-I) Framework
2	Introduce Financial Mechanism for sustainable transportation, Carbon tax, Link PUC data with city air quality
3	Effective implementation of CMP, Public transportation, BRTS
4	Set up last mile connectivity

GHG emissions from energy





Sr	Action
1	Energy Efficiency Cell, Implement ECBC and BEE standard in appliances
2	Renewable in GRIC segments, Wind Mill, Solar Rooftop, Solar Park
3	Electrification of Industrial Processes
4	Carbon Capture and Storage Strategy

Surat response to climate change reactive to proactive action

2006 Reactive (driven by actual perceived variability)

2020 Proactive (driven by forecasting / future scenarios)

Disaster mitigation/ response (post extreme event)	Disaster preparedness measures (based on current variability)	"Climate" at project level	Mainstreaming Resilience into sectoral policies and processes	Strategic multi-stakeholder adaptation planning
Key actors:				
Households, community groups, relief organizations and institutions	Hazard management agencies ACCCRN	Private developers, insurers, development NGOs, SCCT	*Sectoral agencies (environment, water, housing, etc.), EU IUC*	Centralized unit ("resilience czar") with strategic planning authority

Miles to go before I sleep…

Thank You

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