



Roadmap for Low Carbon and Climate Resilient Kolkata

**Ranks 7th in
global climate
change risk list;
3rd for flooding –
expected
sea-level rise of
25 cm by 2030**

Kolkata's vulnerability to Climate Change

- 3rd largest city in India – 19th largest urban area in the world
- GHG emissions = 5th highest in India; GHG emissions/ capita = 2nd highest in India
- 70% of population has respiratory problems as a result of vehicle pollution
- Open space declined from 25% (1990) to 10% (2012)
- City's landfill saturated – landfill gases estimated to emit 250,000 tons CO₂ equivalent 2013-22
- KMC's energy consumption continues to increase (1.41-tCO₂/INR lakh)
- Heat Island Effect evident - Heat Island Assessment indicates temperature difference to the tune of 2-6 degrees between different areas within the city during peak summers.

Projections

- City's population to reach 23m by 2030 – growth rate of 6-7%/ annum
- Vehicular pollution will increase by over 50% by 2025
- Emissions in Kolkata are projected to increase by some 54% by 2025 based on 2014 levels.
- Simulations of Kolkata comparable to rainfall levels in Chennai during recent floods indicate that more than 90% of the city will be flooded, most affected regions being the west, south and northern parts of the city.

PROPOSED INTERVENTIONS – A SNAPSHOT



Disaster management

- Setting up of a disaster management cell at KMC
- Strengthening existing Emergency Operation Centre (EOC) control room with manpower and modern technical devices.



- Smart early warning system - A KMC mobile application (multi-lingual) for early warning (storm, floods, water logging and heat waves)
- Tidal back flow prevention system
- Microzonation of city for detailed vulnerability assessment at ward level
- Safeguarding natural drainage contours - Ecosystem based trans-municipal basin approach for integrated riverfront development



Public Health

- Formulation of a **Heat and Health Action Plan** for KMC towards integrated action to combat impacts of weather changes influenced by climate change and air pollution
- Electronic health record maintenance at ward level enabled by a comprehensive Health Management Information System (HMIS)
- Better health data to enable development of prediction models providing climate-induced disease early warning system and response strategies



Climate smart mobility

- Kolkata needs to retain and encourage the good mobility practices prevailing in the city:
 - ⇒ Walking behaviour - pedestrians comprise 60% of the modal share
 - ⇒ High use of public transport/ mass transit systems
 - ⇒ Use of Trams and Waterways
 - ⇒ Excellent paratransit modes for last mile connectivity
- **Sustainable transit linkages** could be developed to promote tourism, for example; walking and cycling tours, heritage walks, city tour buses, etc Canals if cleaned up could be an excellent mode of transportation as well as tourism
- Introduction of common mobility card is proposed.
- Creation of designated 'safe routes' for Non motorised transport (NMT), creation of design guidelines to retrofit roads with standardised **NMT infrastructure** is recommended.
- Establishment and enforcement of **auto fuel quality guidelines** and emission standards to lower pollution levels. Vehicle age to be controlled. Penalties to be implemented.
- The city could initiate promotion of Car free days and slowly make it a weekly/monthly feature



Built environment

- Promoting green buildings
- Green building measures for heritage buildings and slums
- Promoting vertical and rooftop gardens, urban organic farming on rooftops - to increase city leaf index and reduce heat island effect



Rainwater Harvesting

- Total rainwater harvesting potential of the city estimated at **320,000 million litres**
- RWH installation highly recommended in public buildings, parks and public spaces



Climate-smart Landuse

- Developing a hierarchy of green and open spaces and their conservation
- Restoration of heritage buildings – linking with non-motorized transport and tourism
- Riverfront development – linking with inland waterways
- Reduction of heat island effect – greening of streets and transit corridors (rail, waterways)
- Introduction of a transit-oriented development (TOD) designed to encourage mixed-use development at transport hubs to reduce journeys by private vehicles.
- Creation of a Landscape Design Unit within KMC

Early implementation of this roadmap could make Kolkata India's first climate resilient city.



Sensitisation, Knowledge Exchange and Interface

- **Integration with the Kolkata Climate Change Cell (KCCC) at KMC** – dedicated portal and mobile application developed under the programme
- Use of traditional media; eg; dedicated prime time television programmes
- Use of participatory forms of mass outreach such as **street plays, urban street art, walking festivals**, fundraiser events to promote cycling and observing regular car free days



Solid Waste Management

- Decentralised waste treatment options
- Cluster-based landfill-sharing between ULBs
- Land mining and reclamation of landfill site
- Green capping of existing landfills
- Rehabilitation and alternative livelihood of ragpickers
- Technologies for non-biodegradable waste - polymer blended bitumen, Catalytic Gasolysis, Co-incineration, Making of alternate products, construction & demolition (C&D) waste recycling to sand, Waste to Energy



Green Livelihoods

- The city business plan estimated potential green jobs in sectors such as **rooftop solar PV, green buildings, waste management, eco-sanitation (bio-toilets), eco-restoration of canals, bike-sharing systems and green vending zones**.
- Integration with existing livelihood promotion schemes such as National Urban Livelihood Mission (NULM) is recommended.



Ward Action Plans

Several innovative pilot projects have been proposed in the Ward Action Plans, with many having potential for replicability in other KMC wards and for scope enlargement if the circumstances permit. Apart from an integrated model for climate resilient neighbourhood, interventions such as **use of biotechnology (floating gardens for water body restoration), green sky malls and skywalks, green vending zones, eco-friendly street kitchen kiosks** have been proposed.



Rooftop solar

- Rooftop solar policy - First-of-its-kind comprehensive and target-driven policy with a detailed technical guidelines in India at city level.
- A scheme has been designed to make rooftop solar popular in the city. State government to provide generation-based incentive for the eligible institutional producers in Phase I.
- With a generation target set at 350 MW for Kolkata (including newly amalgamated Bidhan Nagar MC) by 2022, the scheme is envisaged to **attract investment upto ₹1750 crore** which would generate about **6000 direct employment** in the solar industry. This will also reduce **402412 tonnes of CO₂ emission** on annual basis.
- KMC to implement a project for converting 16 parks into carbon neutral parks by introducing solar energy and LED lighting, resulting in electrical savings of approximately INR 1.8 million and annual CO₂ emission reduction of approximately **150 tonnes**.

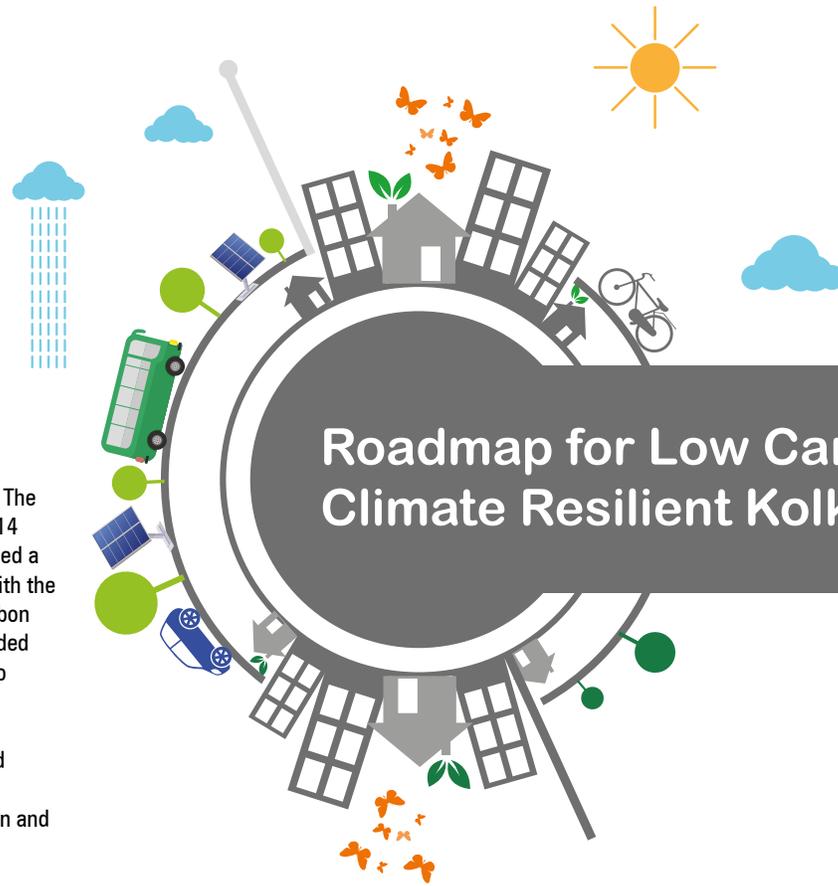


Energy Efficiency

- Energy Management Cell proposed within KMC
- **Green Procurement Guidelines**
- Lighting Master Plan developed for KMC

As a contribution to the national objective of climate resilient growth, **KMC should target a reduction of about 30% in GHG intensity** from the current (2013-14) level of 1.41- tCO₂/INR (in lakh) of municipal expenditure.





About the Programme

During the visit by the UK Prime Minister, The Rt Hon David Cameron MP to Kolkata on 14 November 2013, the UK Government signed a Memorandum of Understanding (MoU) with the Kolkata Municipal Corporation on low carbon and climate resilient Kolkata. UKAid provided technical assistance of up to £ 1 million to implement this unique initiative.

The MoU covers the following three broad areas:

- i. Preparation of a Roadmap for low carbon and climate resilient development of Kolkata
- ii. Strategies to strengthen institutional capacity of KMC to implement the Roadmap and improve overall governance in response to the challenges and opportunities of climate change
- iii. Sensitisation programme for key stakeholders within KMC (Hon'ble Members of the Mayor-in-Council and Councillors) on green growth of the city

With the 2015 major floods in Chennai and Mumbai fresh in the collective memory and the ink barely dry on the landmark December 2015 'Paris Agreement' signed by all nations at the United Nations Paris Climate Change Conference (COP21), the comprehensive Roadmap is a pioneering effort by Kolkata to move the city towards a low carbon and climate resilient future.

Roadmap for Low Carbon and Climate Resilient Kolkata

Key programme achievements

- For the first time, a detailed ward level mapping of climate vulnerabilities has been done in 5 wards of Kolkata
- Study yielding most recent and conclusive data on Heat Island Effect in Kolkata
- Energy audit survey towards energy neutral parks in Kolkata – will lead to 16 Carbon Neutral parks in near future
- Key recommendations for Rooftop Solar Policy for the State
- Pilot scale demonstration of integrated model for climate resilient neighbourhood – integrating concepts of micro-planning, community awareness, livelihood training, women empowerment and community-led projects.
- Establishment of Kolkata Climate Change Centre – with a dedicated web portal and mobile app



Implementation Partners:



Disclaimer

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