

Presentation Outline

- Rajkot City Profile
- Climate Profile and Projections
- Methodology Followed
- Energy profile and GHG emission inventory
- Sector wise Urban Systems and Climate Fragility
- Sector wise CapaCITIES project interventions and potential

Rajkot – City Profile

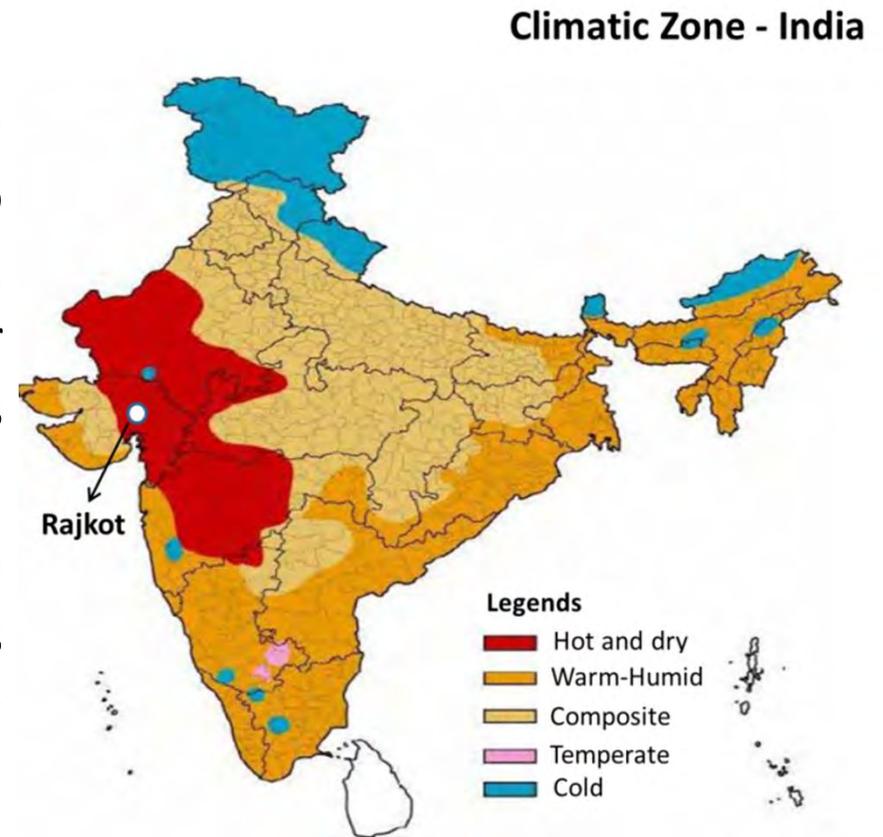
- 4th largest city of Gujarat, 35th largest urban agglomeration in India and 22nd fastest-growing city in the world

State	Gujarat
Location	Centre of the Saurashtra region of Gujarat
Area	129 Sq. Km (4th largest city in Gujarat)
Population	1286678 (Census, 2011)
Part of National Urban Development Schemes and Programmes	<ol style="list-style-type: none">1. Smart City Mission2. Atal Mission for Rejuvenation and Urban Transformation Scheme (AMRUT)3. Swachh Bharat Mission (SBM)4. Housing for All



Climate Profile and projections

- Rajkot falls under India's hot and dry climatic zone.
- The State of Gujarat shows a projected rise in the range of 1.5 to 2.5°C for the period of 2030's, Saurashtra and Kutch shows higher increase in night temperature as compared to other regions.
- The average annual rainfall is 500 mm in Rajkot. However, the city has received lower than normal rainfall in 20 of the last 60 years. Seasonal rainfall from meteorological data from all the stations in Gujarat for the 40 year period (1969-2008) shows an increase in normal rainfall.

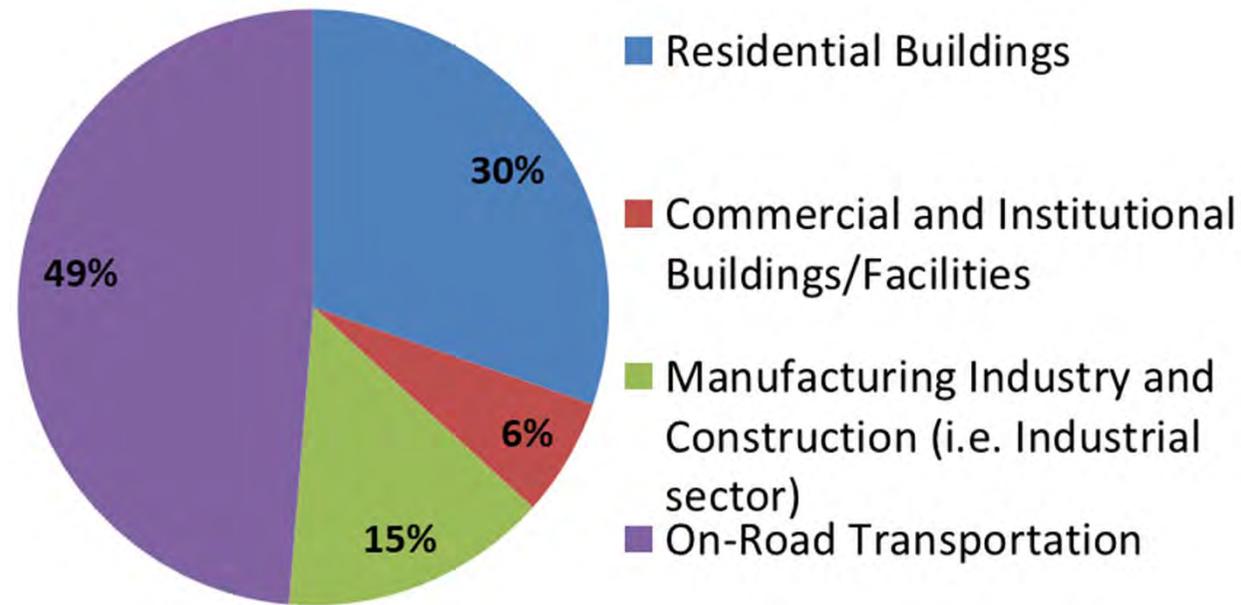


Climate Action Plan Methodology

- Rajkot city has initially committed to reduce total 25% GHG emission by year 2020 from baseline year 2012-13
- Core team and stake holders group are identified
- Existing city planning, local context and city government priority were reported
- Energy data and community activity data are collected and detailed GHG emission inventory was prepared by using HEAT+ tool
- Current emissions and climate impact on urban system and Climate Fragility Statements were analyzed and critical sectors were identified through stakeholder consultation
- Sector wise potential adaptation and mitigation priorities were identified inline with ongoing planning process of city after close consultation with core team and stake holder committee

Energy Profile

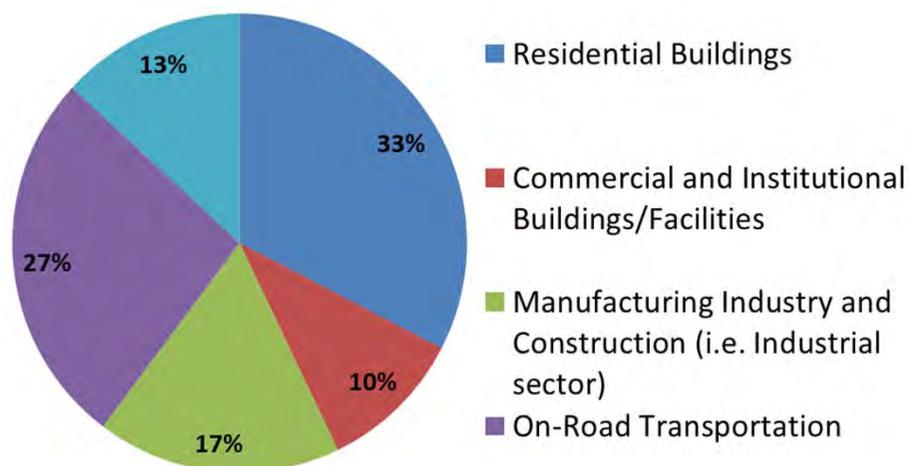
- About 15.7 Million Giga Joule (GJ) of energy is consumed in Rajkot city.
- **Transportation Sector has the maximum contribution of 49%** to the total energy consumption, followed by the Residential Buildings Sector, which has a share of 30%.



Share of energy consumption by Sector in Rajkot, 2015-16

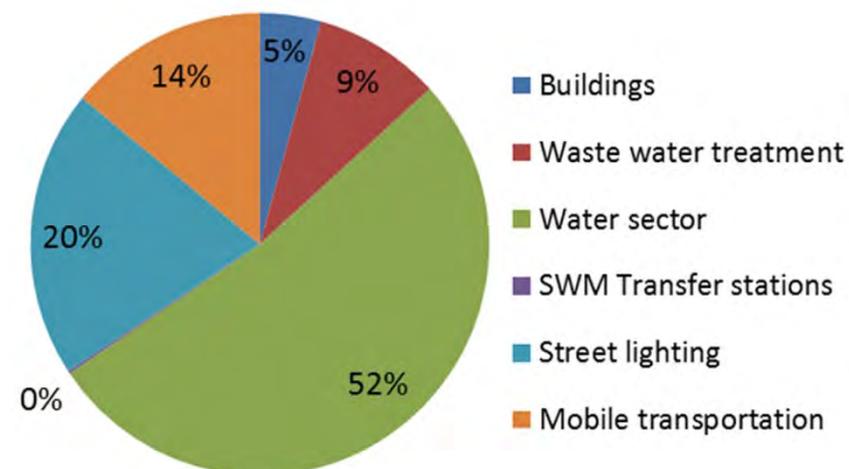
GHG Emission Inventory

Share of Community GHG emission by Sector in Rajkot, 2015-16



- The total GHG emission for Rajkot City is 2.01 million tonnes of carbon dioxide equivalent (CO₂e) (~1.40tCO₂e per capita) in the year 2015-16
- Residential building Sector is highest contributor followed by Transport Sector

Share of Government GHG emission by Sector in Rajkot, 2015-16



- Government operations contributes to ~55,000 tCO₂e GHG emission in year 2015-16
- Water sector is highest contributor with 52% of total GHG emission from government operations

Urban Systems and Climate Fragility

Water Sector

With
increase in
high
intensity
rainfall

- With increase in high intensity rainfall and in absence of storm water drainage and low maintainance of natural drains, there are high chances of mixed sewer overflows, impacting human health, particularly vulnerable communities residing along the banks of natural drains

With
increase in
temperature

- Increase in water demand and related stress

CapaCITIES Project Intervention

Water Sector

Bankable - Assessing potential for augmentation of local water resources through ground water/ aquifer recharge, rain water harvesting, and waste water reuse in Rajkot (Status – On-going)

- The Gujarat Water Infrastructure Limited (GWIL) spends more than 1,000 million INR per year on electricity to supply water from Narmada source to Rajkot, leading to **~143 Million kWh electricity** consumption per year, which leads to **~117,540 tCO₂e of GHG emission.**
- Study will identify mechanisms for augmenting surface and ground water resources
- Increase availability of water to the city during the dry months
- Reducing the climate vulnerability of the city, with reference to increased availability and access to local water resources
- Reduce dependency on Narmada water, reduce the energy consumption from pumping and GHG emission

Urban Systems and Climate Fragility

Transportation Sector

Inefficient public transport system

- With an increase in number of vehicles and inefficient public transport system, and due to lack of last mile connectivity and in the absence of proper parking spaces in the city, traffic congestion and related air pollution are a concern – extreme weather events exacerbate this condition

Encroachment

- Inadequate parking facilities, unsatisfactory footpaths for pedestrians and dedicated cycle lane for cyclists, encroachments on existing footpaths/cycle tracks by local property owners as well as informal vendors on major corridors contribute to the congestion of roads in the city - extreme weather events exacerbate this condition

CapaCITIES Project Intervention

Transport Sector

Bankable - Assessment and plan for ensuring last-mile connectivity along the BRT stretch, including feasibility of electrification of corridor (Status – On-going)

- During 2015-16, on road transport accounts for 49% of the total energy consumption and results in 27% of the total GHG emissions in the city.
- There is a significant potential to minimize energy consumption and GHG emissions in the transport sector by increasing the ridership of public transit systems through this study
- Shift from fossil fuel based mobility to electric mobility – focus on RE for electric mobility



CapaCITIES Project Intervention

Transport Sector

Quick Win - Installation of Ambient Air Quality Monitoring Stations (AAQMS) at various locations - Identification of locations, implementation and monitoring (including training for RMC staff for monitoring) (Status – To be initiated)

- Traffic congestion and industrial pollution lead to poor air quality in Rajkot city
- At present, there are only two Ambient Air Quality Monitoring Stations (AAQMS) in the city monitoring PM, which are not at appropriate locations
- Data generated from these monitoring stations will help the city government take necessary actions to regulate traffic, improve air quality and implement public warning systems regarding potential health hazards

Urban Systems and Climate Fragility

Sewage and Drainage Sector

With
increase in
high
intensity
rainfall

- With increase in rainfall in absence of separate storm water drainage, there is mixed sewer overflows, leading to by-pass of sewage from the treatment plants to the river, as well as chances of back flow of sewage inside houses, which may lead to severe health issues in city

CapaCITIES Project Intervention

Sewage and Drainage Sector

Bankable - Assessment of the Gas Digester Chamber in Raiya STP plant to stop direct methane emissions due to reactor leakages (Status – On-going)

- In Rajkot, an anaerobic digester built at Raiya STP is dis-functional at the moment due to leakage, which leads to enormous direct methane emission.
- Aim of this study is to assess the cause of leakage and propose an appropriate technology to arrest the methane leakage and reduce huge amount of GHG emission and also ensure that the plant is functional.



Urban Systems and Climate Fragility

Solid Waste Management Sector

With
increase in
high
intensity
rainfall

- Littering and indiscriminate dumping of solid waste increases water logging conditions, impacting people and traffic movement, also providing conducive conditions for breeding of disease vectors

- Waste segregation is identified as the biggest issue in Rajkot, which impedes efficient waste treatment.
- Currently all mixed waste is going to dumping site with out any treatment leads to environment degradation.

CapaCITIES Project Intervention Solid Waste Management Sector

**Bankable - Preparation of holistic integrated solid waste management action plan for 20 years planning horizon
(Status – To be initiated on 15th December, 2017)**

- Total energy consumption for waste management and direct disposal of waste in dumping site results in 13% of the total GHG emissions in the city, emitting 265,097 tCO₂e of GHG emissions in 2015-16.
- Various centralized and decentralized level Solid Waste Treatment options are proposed
- Holistic waste management plan is needed
- Proposed study will help to streamline waste management activities and reduce GHG emission from SWM sector in the city



Urban Systems and Climate Fragility

Building Sector

- Total energy consumption of residential and commercial is 848 Million kWh per year in year 2015-16
- Residential building sector has the **2nd largest contributor of 30% to the total energy consumption** in city and highest contributor of electricity consumption (2015-16)
- Residential Building sector has the **maximum contribution of 33% to the total GHG emissions** (2015-16)
- Poor building design and inefficient material used in building may increase its energy consumption, this sector has huge energy reduction potential

CapaCITIES Project Intervention

Affordable Housing in Building Sector

Quick Win Project - Implementation of pilot project to provide energy efficient fixtures and rooftop solar PV system in social housing schemes (Status – To be initiated)

- There is significant potential to reduce energy consumption in buildings by using energy efficient appliances and renewable energy, also resulting in significant GHG emission reduction
- It is proposed to showcase implementation and benefits of such measures through quick-win implementation under the CapaCITIES project

Thank You!

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