मुंबई
CLIMATE ACTION PLAN

Stakeholder Consultations

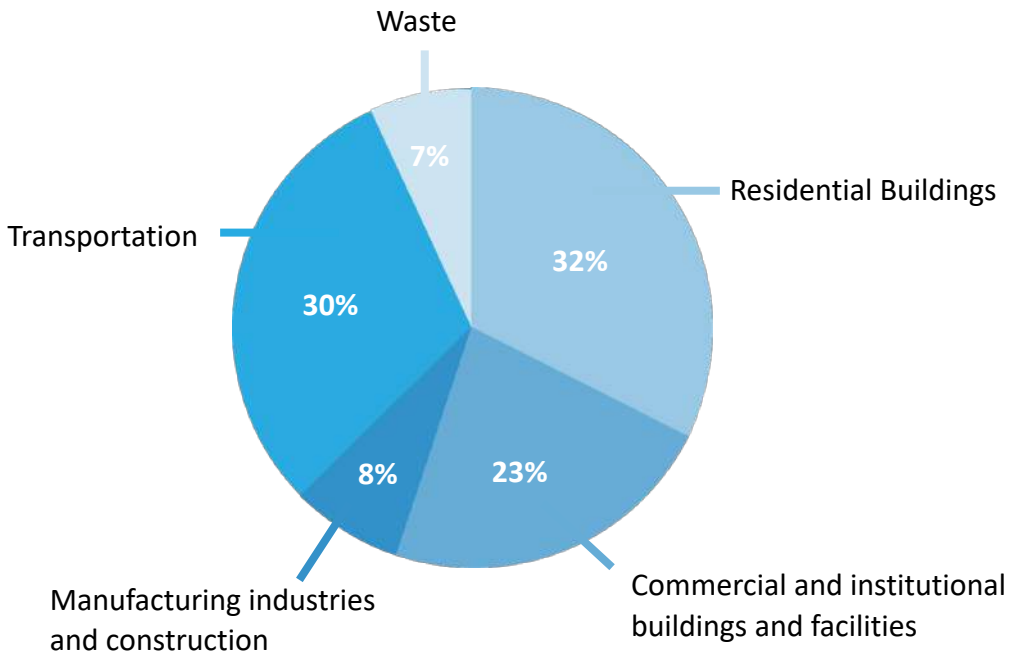
# Energy & Buildings

Avni and Mehul

# Energy & Buildings emissions in Mumbai

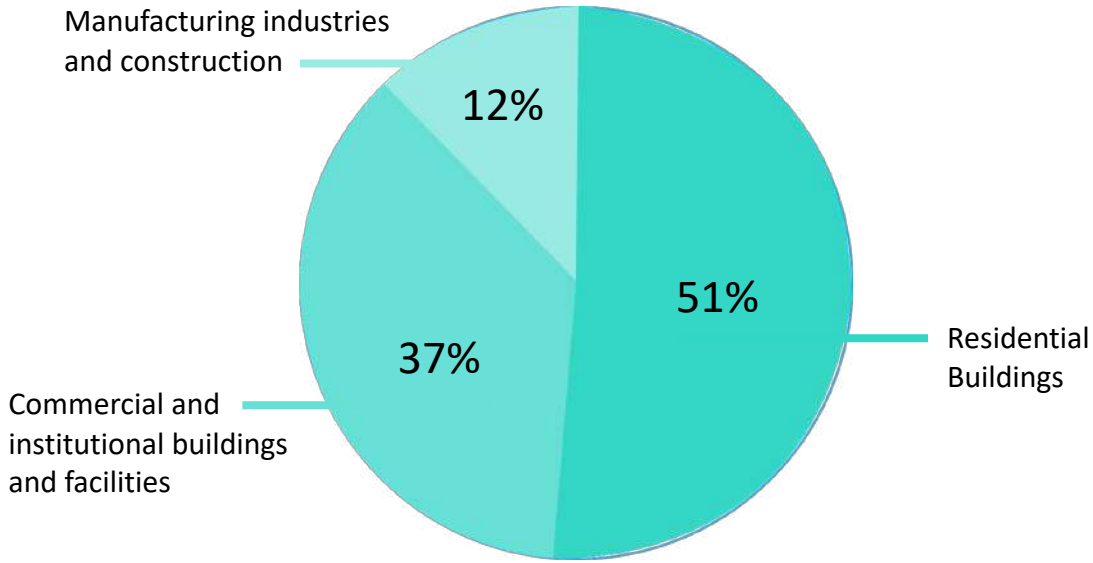
Energy & Buildings sector is responsible for over 60% of Mumbai's total GHG emissions

**Total GHG emissions by sector**




Stationary energy emissions: 63%

**Stationary energy emissions by subsector**




Source: Primary Data Analysis based on 2019 data – WRI India

मुंबई CLIMATE ACTION PLAN

# Understanding the grid

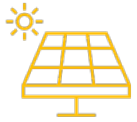
Mumbai's electricity demand is 3,400-3,600 MW

**Mumbai's Energy mix**

95.34%
Thermal

2.10%
Wind

1.86%
Hydro



0.70%
Solar

**Distribution Companies (DISCOMs) in the city**

- Bombay Electric Supply and Transport (BEST)
- TATA Power Company Limited
- Adani Electricity Mumbai Limited
- Maharashtra State Electricity Distribution Company Limited (MSEDCL)

Source: Primary Data Analysis based on 2019 data – WRI India & Environment Status Report 2020

# Residential, Commercial & Institutional buildings

- Residential and Commercial & Institutional buildings emissions are dominated by **electricity** and **LPG**
- Residential and Commercial & Institutional buildings emissions are estimated to go up **3.3 times by 2050** in a business-as-usual scenario

**Key Sources**

- Appliances
  - Air conditioners
  - Geysers & refrigerators
  - Fans & lights
  - Other electricals
- Cooking
  - LPG, PNG, Kerosene, Fuelwood

Source: Primary Data Analysis based on 2019 data – WRI India

# Mumbai's solar potential

- 1,724 MW

Half of Mumbai's total energy demand

Rooftop Solar Potential –

- Residential buildings: **1,300 MW**
- Industrial buildings: **223 MW**
- Educational buildings: **71 MW**

- **Andheri West** (K West Ward) & **Borivali** (R Central Ward) have the highest solar potential

Source: IIT Study, 2017

# Heat island effect

- Poor choice of building materials
- Increases indoor temperatures

- Increase in building energy demand
- Increased heat risk on public streets

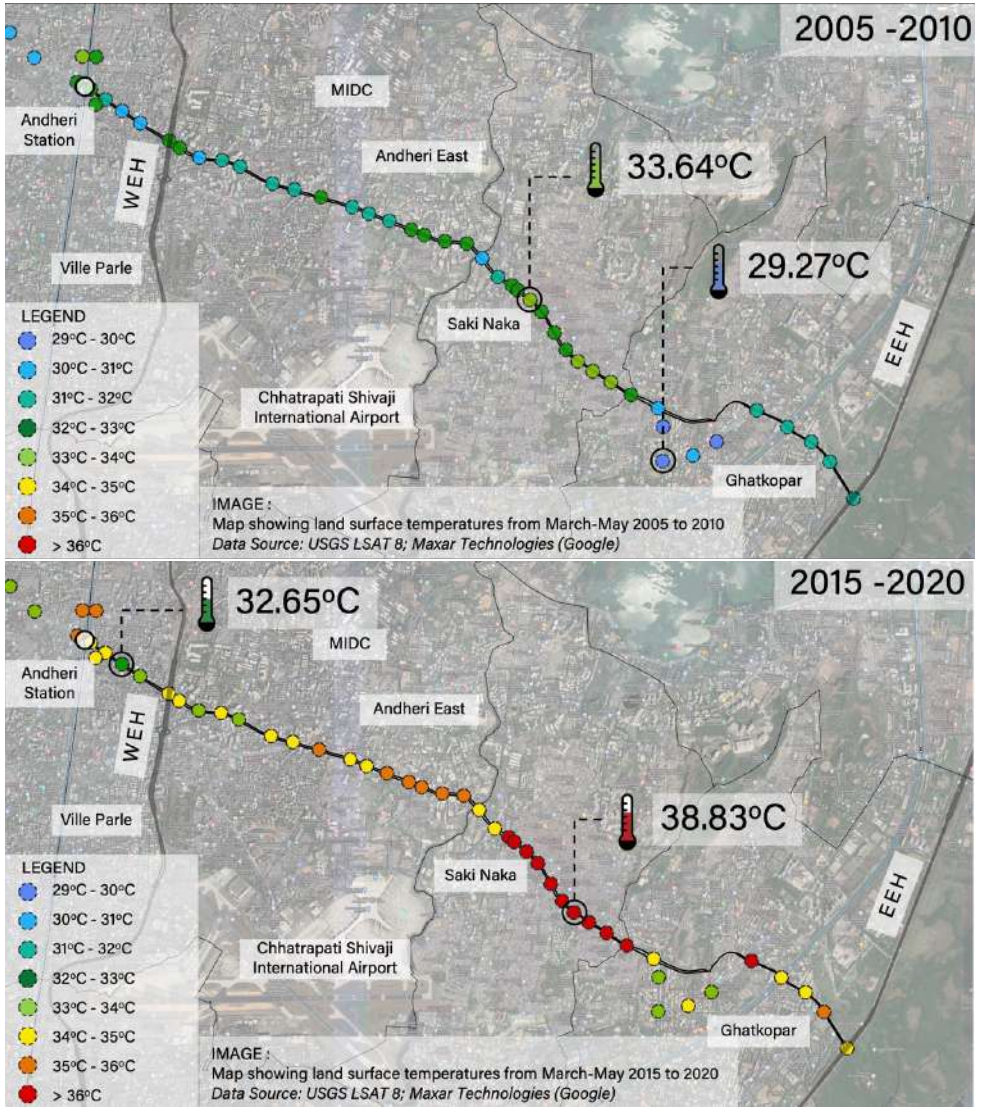



*Figure: Land surface temperature increase over 10 years (range from 2005-2010 [top] and 2015-2020 [bottom]) along Andheri-Ghatkopar link road due to heat island effect*

Source: WRI India Analysis

# Ongoing Initiatives

**1. Green Power Tariff**

MERC allowed a green power tariff of ₹0.66/kWh for consumers opting for 100% RE

**2. State Energy Conservation Policy**

Was envisioned in 2017 to save 1000 MW electricity

**3. Energy Clubs in Schools**

Establish & strengthen energy clubs to make children aware and involve parents

**4. LED Streetlighting**

BEST has converted 39,441 lights out of 41424 into LED lights

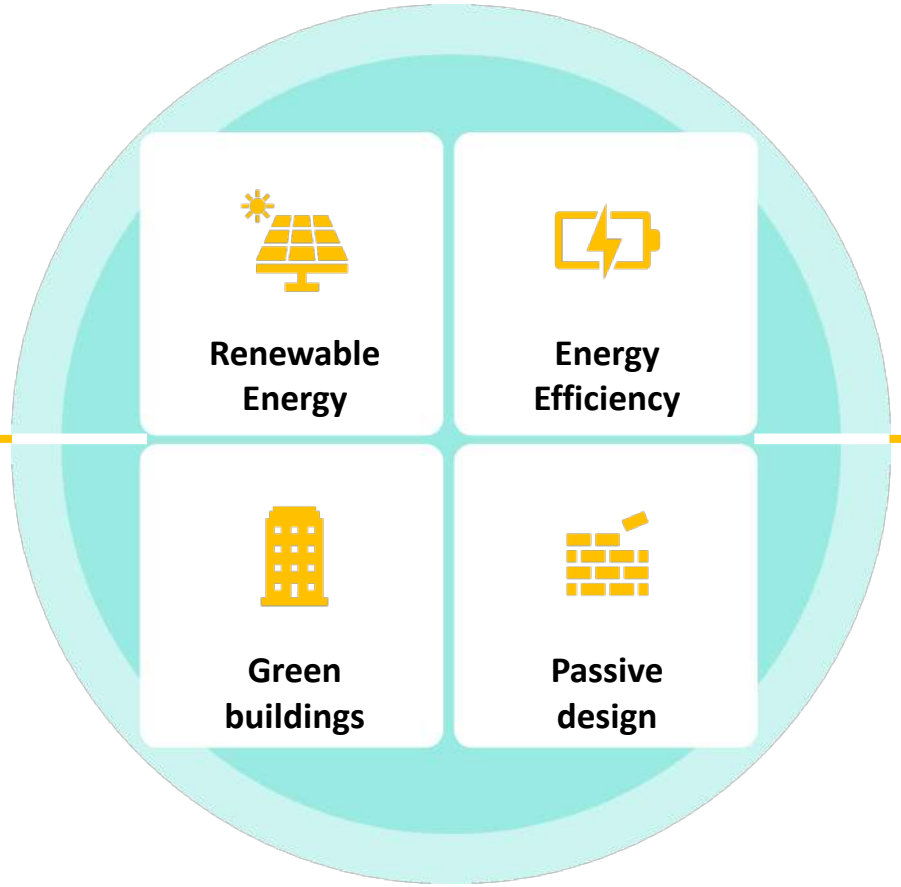
**5. Subsidy for Rooftop Solar**

40% subsidy to residential consumers, 20% subsidy to housing groups & RWAs

# Key Gaps & Challenges

- High dependency of grid on fossil fuel based thermal power
- Decentralized rooftop solar installation

- Monitoring, auditing and benchmarking
- Energy cell

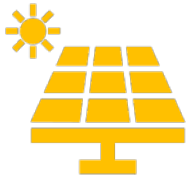



- State/city-level mandate & capacity to ensure ECBC compliance
- Green building rating systems notified in City DCRs
- Green building cell

- Official guidelines to adopt passive building design
- Thermal comfort strategies for low-income settlements

# Decarbonizing Mumbai's grid and building energy-resilient infrastructure

Supply side interventions



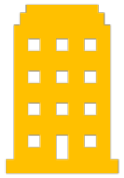
**Renewable Energy**

Increasing the proportion of renewable energy in Mumbai's energy mix

Demand side interventions

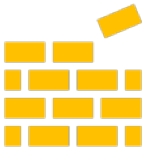
**Energy Efficiency**

Improving energy efficiency in new & existing infrastructure



**Green buildings**

Promoting green buildings through certification and ECBC compliance



**Passive design**

Integrating passive design strategies to ensure thermal comfort

# Potential Strategies

- Increasing the proportion of Renewable energy in Mumbai's energy mix
- Grid Decarbonization
- Distributed Renewables

- Improving energy efficiency in new & existing infrastructure
- 100% transition to energy efficient streetlighting, public & traffic lighting systems
- Retrofitting
- Transition to electric stoves & water heaters

- Promoting green buildings
- Strengthen & ensure ECBC compliance
- Certification by established rating agencies
- Undertake a demonstrative zero carbon municipal building project
- Value-chain approach to decarbonize buildings & construction

- Integrating passive design strategies to ensure thermal comfort
- Ventilation, cool roofs, green walls
- Alternate building materials, building form & density

# Thank you