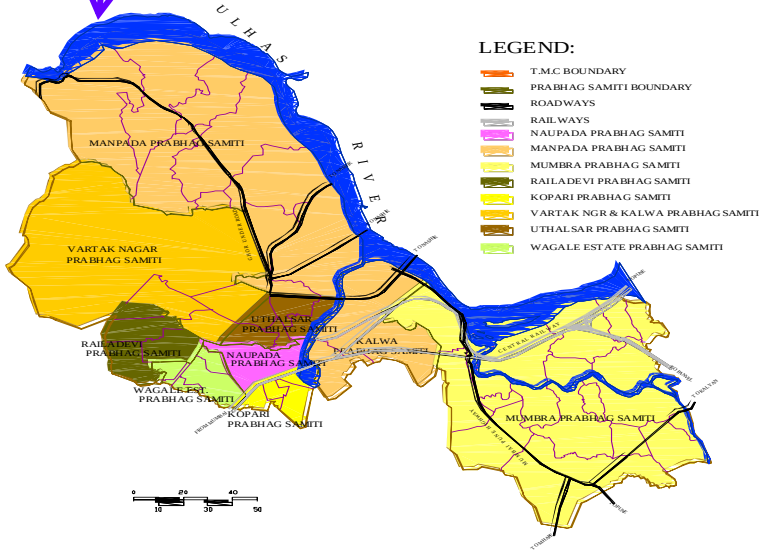
PRESENTATION ON

Success Stories in Local Climate Action

By

Sunil Pote
Dy City Engineer
Thane Municipal Corporation, India

Thane Municipal Corporation, Thane, India



- **Area**
  128 Sq. Km.
- **Location**
  Latitude 72° – 50 ‘ North
  Longitude 19° – 10‘ East

- **Weather**
  Typical Coastal sultry & not very hot.
- **Rainfall**
  Average 250 to 300 cm beginning of June to end of September.
- **Temperature**
  Average Min.16-24^{0}C Max. 32-37^{0}C
- **Humidity**
  45% to 87% highest in the month of August.

- **Population**
  Present – 2 Million
  Projected (2031) – 3.4 Million

Journey Towards Low Carbon City

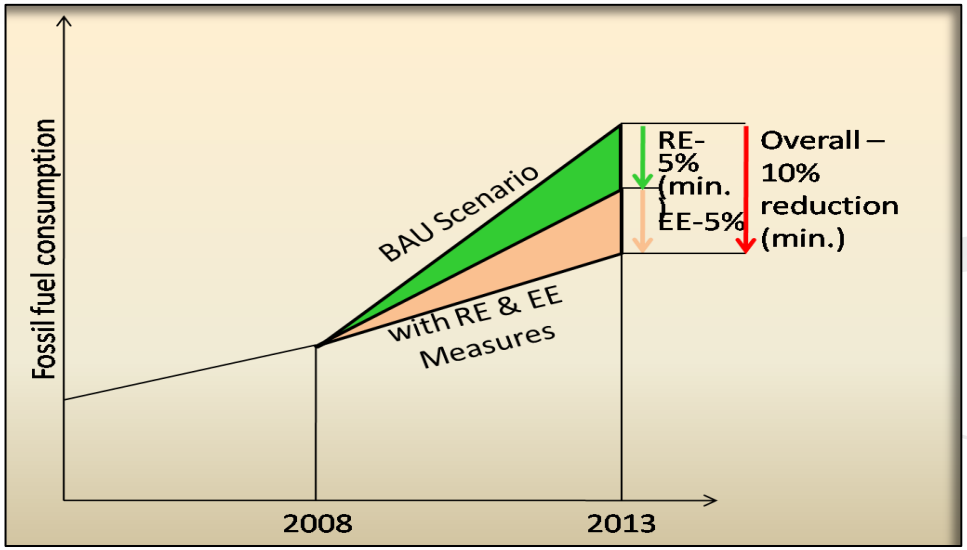
- RE and EE measures in Municipal services initiated since year 2000.
- Policy intervention to promote solar energy at city level in the year 2006.
  - Solar water heating system made mandatory for all categories of new buildings
  - 10% incentive in property tax to promote installation of solar water heating system in existing residential buildings.
- Preparation of city level baseline GHG Emission Inventory and sector wise Energy Status Report - supported by British High commission & ICLEI, SA.
- City level climate protection policy.
- Active participation in solar city programme of Govt. of India.

Solar city programme & it's implementation in Thane

- First Stakeholder meeting
- Data Collection, Discussion and Survey
- Data verification, analysis and emission profiling
- Draft Solar City Master plan prepared
- Draft Master plan discussed in second stakeholder meeting
- Draft Master plan finalized after incorporation of all suggestions
- MNRE, Govt. of India accorded approval to Solar City Master plan
- Solar City Master plan published on www.thanecity.gov.in
- Implementation

Objectives

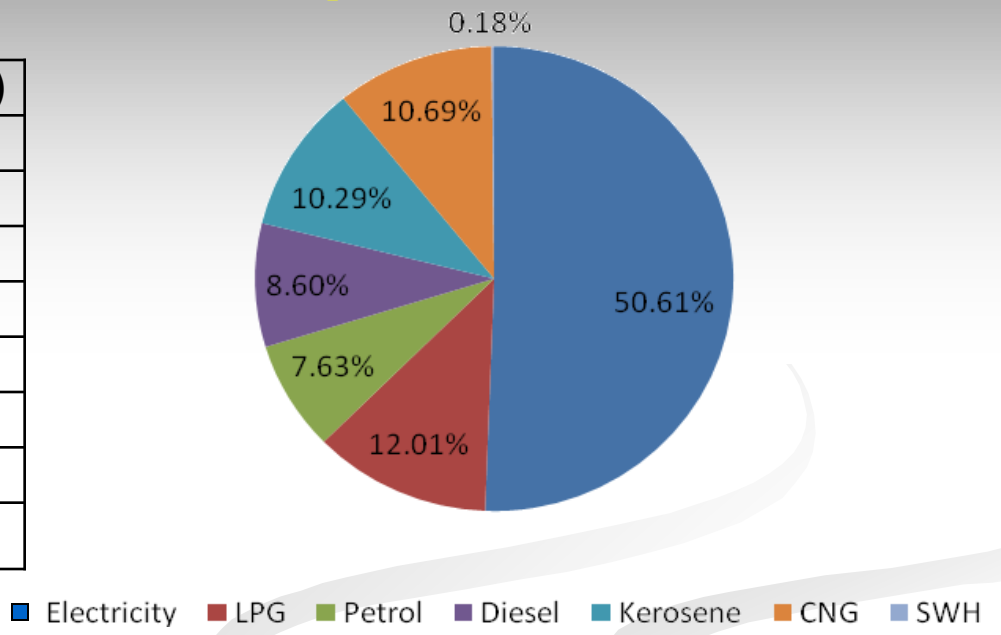
- Min. 10% reduction in projected demand of conventional energy at the end of five years i.e. 230 million electrical unit saving .
- Financial outlay of 160 million USD



- Govt. of India financial support of 0.1 million USD for solar city activities such as preparation of master plan & awareness activities

Total Energy Consumption- BAU

Source	Consumption	Unit	Consumption (MU)
Electricity	1224	MU	1259.67
LPG	20566.31	MT	299
Petrol	20630.05	kL	190
Diesel	18828.67	kL	214
Kerosene	25468	kL	256
CNG	73000	MT	266
SWH	3439	No.	4.39
		Total	**2489.06**



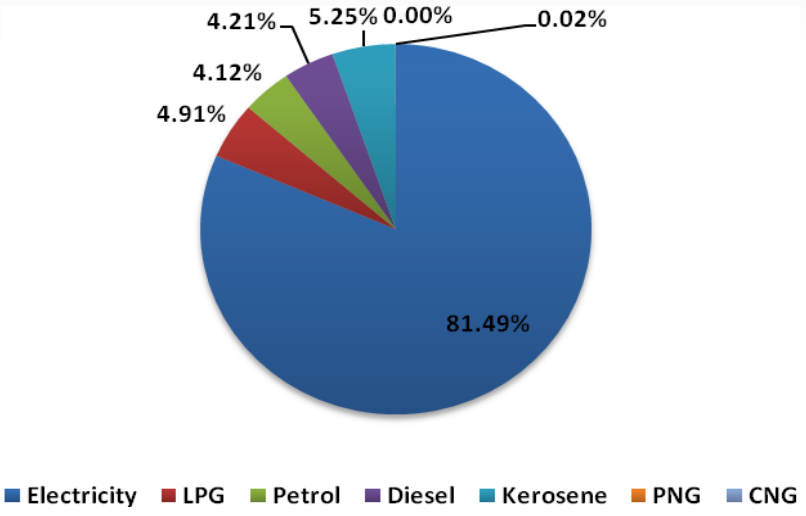
The above table shows the total energy consumption from different sources in Thane for the year 2007-08

Electricity consumption has the highest share in total energy consumption in the city. Thereafter comes the LPG, Kerosene and Diesel & other fuels.

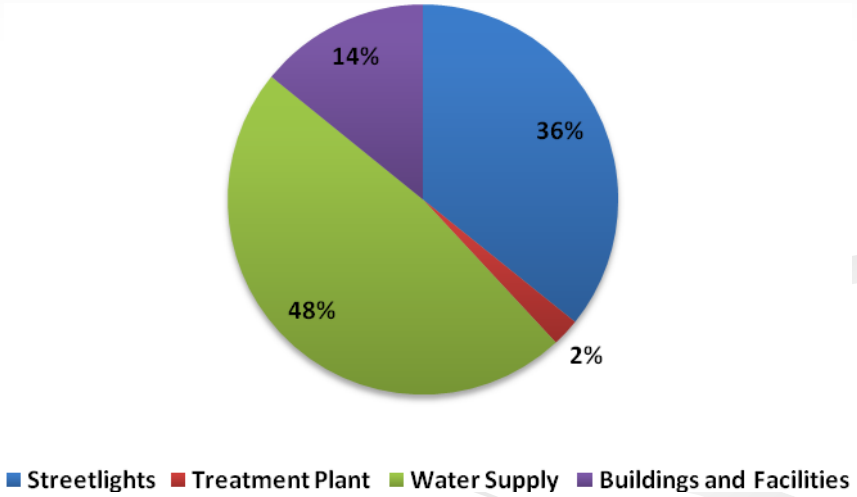
*Further details published on www.thanecity.gov.in

City GHG Emission

Citywide emissions in Thane city

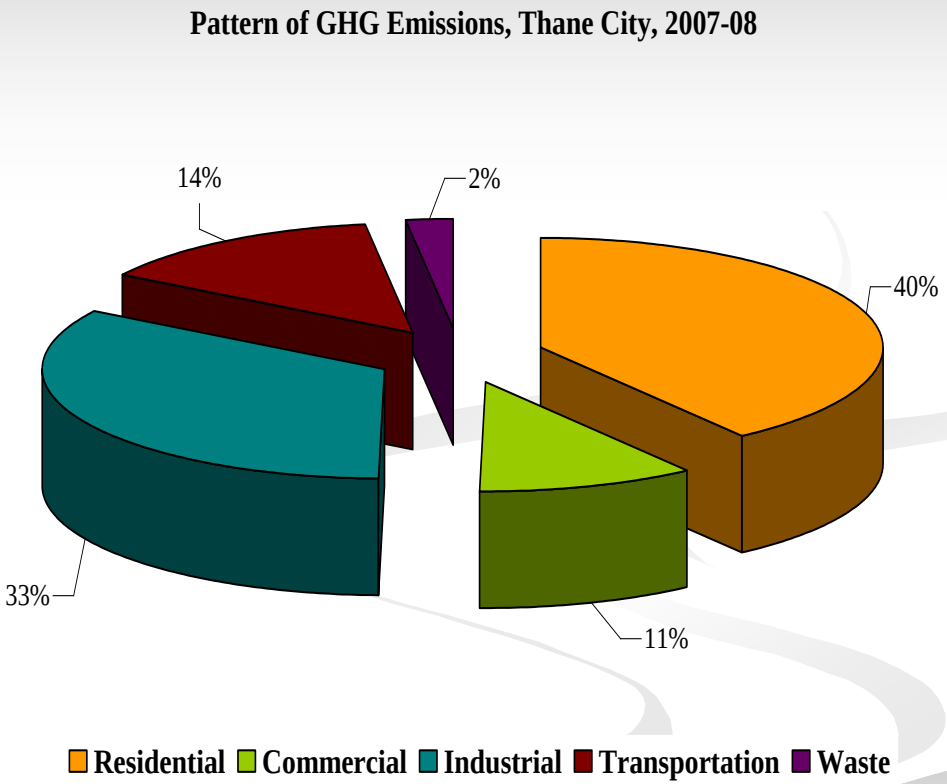


Emissions from Municipal Sector



Community level Carbon emission Pattern

- All activities in Thane city contributed to 14.11Million T eCo2 (Year 2007-08)
- Per capita emission for Thane city - 1.15 T/ Year (2007-08)
- The municipal corporation contributes about 2.88 % to the total city level emissions.

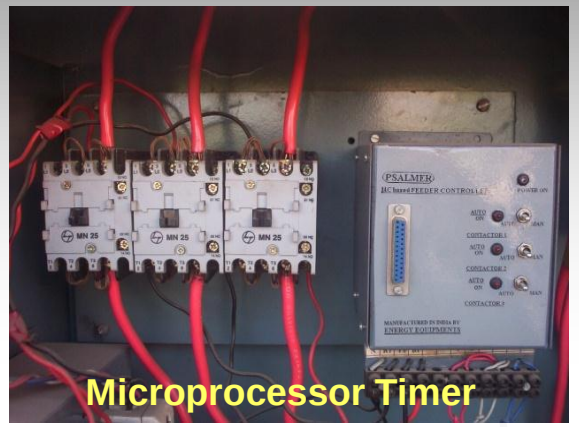


Initiatives of Thane City

- Street lighting - Energy Efficiency
- Energy Efficient Municipal Buildings
- Energy Efficient & CFC free air conditioning
- Water Supply - Energy Efficiency
- Waste to Energy
- Renewable Energy
- Amendments in Building Bye-Laws
- City Climate protection policy
- EE & RE measures at City level

Municipal Street lighting

- Use of Microprocessor based Almanac timers for precisely switching ON/OFF street lighting considering seasonal changes.
- Use of energy efficient HPSV lamps (more than 130 lumen per Watt) and low loss ballast
- Use of energy efficient, optically well designed streetlight fixtures.
- Pilot project of GSM based advanced street light management system including energy saving cum power conditioning features.
- Use of Induction and LED street light fixtures (50% energy saving)
- Overall Saving 30%
- Saving of 0.4 million USD per annum w.r.t. baseline financial year 2000-01.


Microprocessor Timer


LED Lighting


Induction Streetlight

Municipal Buildings

- Use of energy efficient tri band phosphor T5 tube lights, LED Lights CFL lamps, electronic ballast, occupancy sensors.
- Improvement in power factor near to unity by providing Automatic power factor correction panels
- Use of BEE five star rated ceiling fans and air-conditioners
- Use of Variable Voltage Variable Frequency Drive for water pumps.
- Use of Solar Water Heating System for hospitals, residential quarters etc.
- 30 % savings in energy consumption.


Automatic pf Control Panel

BEE 5 Star rated AC

Energy Efficiency in Indoor Sports lighting

- ***Case Study- Badminton Court lighting at Dadoji Konddev Stadium***

Before

- Lighting level- 90 Lux
- Electrical Load - 14 kW
- Metal Halide (5000 Burning Hrs. Life)
- Restart- takes time
- More heat generated

After

- Lighting level- 300 Lux
- Electrical Load - 7.6 kW
- T-5 Tube light fitting with special reflectors having 94% Reflectivity Index (15000 Burning Hrs. Life, comparatively higher Life)
- Restart- Instant

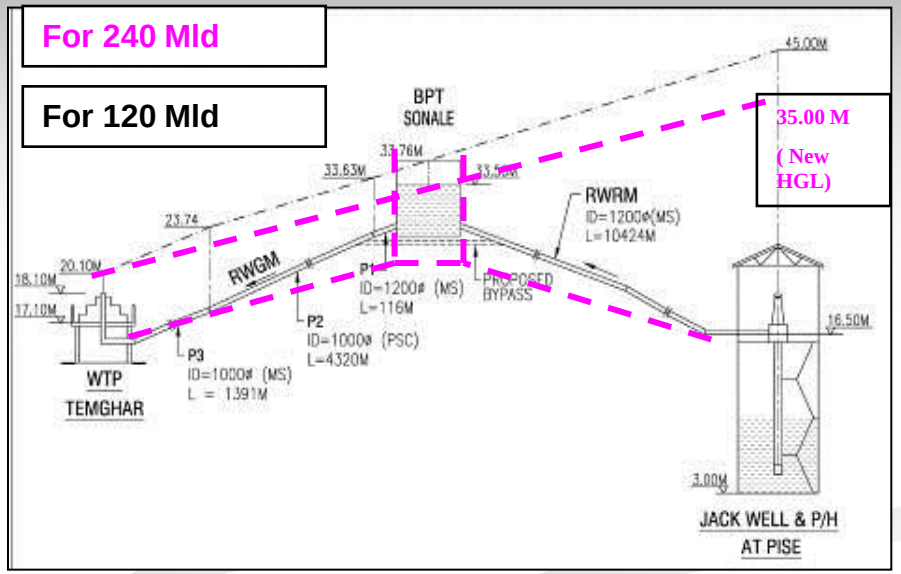
Energy Efficient & CFC free Thermal Storage Air Conditioning System for Auditorium

- Provision of thermal storage system for shifting energy demand to lean demand period i.e., 10 pm to 6 am.
- Replacement of existing inefficient compressors having specific energy consumption of 1.8 kW/Ton by energy efficient Screw Compressors having efficiency 0.8 kW per Ton.
- Elimination of CFC based refrigerant
- Demand side management- need of the hour.
- Improved air-conditioning - as per ASHRAE Standard

Energy Conservation in Water Supply Sector

- Water and Energy Audit for Bulk as well as Distribution network

- Redesigning of Raw water Pumps for reducing head by lowering the depth of existing pipeline at Break Pressure Tank.
  - Energy savings about 33 %



- Lowering of head on Pure water pumps by redesigning the Pure water Pipeline and the discharging point at M.B.R.
  - Saving around 0.1 million USD p.a.

- System Automation with SCADA system from Raw water lifting up to the distribution Reservoirs
  - Improving System Efficiency and Water Balancing.

Energy Generation from MSW

Bio Methanation Plant

- Methane gas plant on Bio-degradable waste Total capacity – 15 T
- Designed Gas production – 650 M^3/day
- Gas used for Electricity generation
- 50 kVA Bio gas generator commissioned
- Electricity generation 810 units per day
- Electricity generated at load center


Bio metanation Plant


50 kVA Bio Gas Generator

Promotion and utilization of Renewable Energy

- Amendments in Building permission rules whereby provision of Solar assisted Water Heating System made mandatory for all category.

- Municipal corporation offers 10% rebate in property tax, in case of existing residential buildings providing Solar assisted Water Heating System.

- As on date more than 2 million LPD Solar assisted Water Heating Systems have been commissioned in the Thane city.

- TMC has already commissioned 35550 LPD solar water heating systems for municipal hospitals & buildings. Also 76500 LPD SWH system being commissioned.

- Solar street lighting , power packs, traffic signals, blinkers, inverters

Solar Power Generation for Municipal Buildings

- 50 kWp SPV installed at Main Administrative building of TMC
- Annual generation of 65000 electrical Units
- Green Power generated at load center
- Uninterrupted quality power is available for essential loads
- 11 kWp SPV system at other Bldgs.
- 136 kWp SPV system being installed.

Combination of Energy Efficiency & Solar Power Generation

Case Study- Maternity Home (Anandibai Joshi hospital)

- Energy requirement reduced by using BEE 5 star rated energy efficient ceiling fans & T5 tube lights
- 30 % reduction in energy requirement

- Solar water heating system installed for hot water requirement
- 3 kWp solar PV system installed for power generation
- Annual power consumption of 33000 electrical units reduced to 11000 units
- Similar implementation at all other maternity homes , dispensaries & administrative offices

Solar Air conditioning plant (160 T)

- Solar parabolic concentrators (13.6 sq.m x184 nos) generates steam
- Steam fed to vapor absorption machine to produce chill.
- Agro residue briquette fired boiler for backup during non sunny days.
- Use of liquid desiccant technology for removal of moisture , resulting in reduction of heat load.
- Elimination of CFC based refrigerant.
- Saving in energy – 1 million Units per annum
- Diesel fired boiler replaced by agro residue briquette fired boiler.


Solar Parabolas


Vapor Absorption Machine

Way Forward.....

- Solar Roof Top Net Metering based power generation project- 5MW capacity
  - Green power generated and utilized at consumer end
  - Transmission , Distribution & conversion losses minimized
  - Surplus power exported to grid , Storage batteries are eliminated
  - Cost per unit generation is substantially reduced
  - Cost per unit generation comparable with conventional power
  - Real solution for promoting solar energy in urban areas
  - Interacting with power utility and electricity regulatory commission for techno commercial aspects

Way Forward.....

- Municipal Street lighting energy efficiency project
  - Investment grade audit of street lights done
  - Potential of reduction of street lighting connected load from 7 MW to 3 MW
    - By replacement of existing conventional HPSV lights with energy efficient Induction/LED lights.

- Identification and Implementation of projects funded by European commission in collaboration with UN-Habitat
  - Project titled - "Promoting Low Emission Urban Development Strategies in the Emerging Economy Countries".
  - Financial support of € 0.1 million

Way Forward.....

- Waste to Energy
  - 1000 TPD capacity Incineration based MSW treatment plant
  - Scientific processing of MSW as per National and International environmental standards
  - 8 to 10 MW power generation expected
  - 230 million electrical units will be generated during next 5 years
  - This alone will meet energy saving target of solar city project

Ultimately we are aiming for carbon neutral Local Self Governance

Thank you

Thane Municipal Corporation

Mahapalika Bhavan , Dr. Almeida Road , Panchpakhadi, Thane.

Ph.:- +91 (022) 2533 1590, +91 (022) 2533 1211, +91 (022) 2533 1747

Website : www.thanecity.gov.in