

# 01

## LED STREET LIGHTING VIA ESCO MODE: THANE

### Project Highlights

- Replaced 8000 High Pressure Sodium Vapour street lamps with LED Lights across Thane
- Annual energy saving of 5.33 Million kWh
- Avoiding Greenhouse Gas (GHG) Emissions of 4385 tonnes of CO<sub>2</sub> eq.

### Background

Thane city, located near Mumbai, the financial capital of India in state of Maharashtra, is a rapidly growing city due to extensive immigration and urbanization. Thane Municipal Corporation is continuously undertaking environment-oriented projects to reduce GHG emissions from city and improve its municipal facilities. Considering the energy saving that LEDs can achieve, TMC was exploring options for assessing different financial models for scaling up the LED street lighting pilot initiatives across the city. TMC, with support from ICLEI South Asia, under the project Urban Low Emission Development Strategies, undertook feasibility assessment of its streetlight infrastructure to arrive at an ESCO mode of streetlight project implementation.



### Project Objectives

- I. Establishment of baseline of 8000 plus street-lights
- II. Performance Contracting with shared savings
- III. Involvement of third party for measurement and verification protocol
- IV. Development of remote management system, highest lumen per watt LEDs, adoptive control panels to optimize power consumption of LEDs as per the requirement of the time etc.

### Key Stakeholders

Thane Municipal Corporation, ICLEI South Asia

### Approach of LED Street Lighting Initiative

TMC followed a systematic approach for execution of LED installation under ESCO mode wherein, stakeholders were consulted at every stage. The approach is summarized as follows:

1. Stakeholder Consultations: Numerous stakeholders including energy experts, lighting experts, techno-commercial experts, political and administrative heads to local residents etc. were consulted for execution of LED street-lighting projects across city
2. Site Selection: Numerous sites were selected across the city based on various parameters like electrical infrastructure, road type, road width, geographical location, project visibility etc.
3. Investment Grade Audit and Baseline Assessment: An investment grade audit was carried out at different locations to establish the baseline and electrical infrastructure assessment of the site
4. Identification of Technology and Energy Saving Potential: Market assessment for best available technology with upgradability and compatibility
5. Payback and Public Private Partnership Financial Modelling:

- Carried out financial assessment to arrive at a feasible payback
  - Developed PPP structure around the capital and operation expenditure estimated
  - A suitable transaction procedure was established
6. Tendering and Procurement: Bids were invited through public competitive bidding
  7. Retrofitting: The streetlight replacement was carried out panel by panel. Once the entire replacement on a panel was carried out, the reduction in demand was recorded and new baseline established
  8. Third-Party Verification: TMC has implemented a third-party expert to verify the energy saving and ensure transparent transaction to technology provider

## Financial Structure of the initiative

The project was based on PPP arrangement with multiple stakeholders.

## Achievements



### Benefits and Co-Benefits

1. Energy Savings:
  - The LED ESCO project has achieved maximum energy savings in city, i.e., 5.33 Million kWh per year and energy consumption for street lighting reduced by more than 60%
  - Avoided GHG emissions of 4385 tonnes CO<sub>2</sub> eq. annually
  - On operational level, the share of GHG emissions from municipal services in Thane have reduced from 35% in 2012-13 to 11.7% 2017-18
  - Connected load of streetlight infrastructure reduced by 70%
2. Improved facilities for citizens:
  - The citizens have reported that white light provides better visibility and provides a sense of safety on roads
3. Enhanced Reliability:
  - Conventional technology was highly maintenance prone whereas higher life of lamp (50,000 hrs against 15,000 hrs) implies lesser downtime and higher reliability
  - Systems can be effectively controlled and monitored due to improved infrastructure and hence increasing the reliability
4. Better Light Quality:
  - The lighting optics as designed resulted in optimum lux levels with uniform spread across the roads and hence leading to improved visibility



Before (HPSV Settings)



After (LED Settings)

Are Thaneites happy with the new tech? We throw some light

“ I am elated to see that the Talaopali area has suddenly been illuminated. The area looks brighter and more clear.

**Vikas Mishra**

“ It’s a very good initiative taken by Thane Municipal authorities. As these lights consume less power. They should be installed all across the city.

**Rohini Mandappwar**

“ The old yellow eyes used to prick the eyes, however this light has a soothing effect and everything looks crystal clear.

**Devappa Waze**

## Success Factors

- Determined Leadership
- Technical innovations for effective implementation of the LED street lighting project

## Limitations

1. Nascent Technology: LED was a nascent technology and was constantly evolving. Parameters like color rendering index, lens optics, drivers used to fail frequently
2. Higher cost of LED in comparison to conventional street lights
3. Absence of Indian standards for LED lighting
4. Shortage of testing facilities for Led lighting in India and limited expertise on LED technology
5. Retrofitting on existing infrastructure

## Future Prospects

TMC, plans to increase the LED installation to 100%. In addition to this, it plans to add individual addressability and Wi-Fi connectivity to the poles, in order to monitor individual lamp parameters and faults.

Source: As received from ICLEI, South Asia

For more Information

[https://carbonn.org/uploads/tx\\_carbonndata/Invitation%20for%20expression%20of%20interest%20and%20request%20for%20proposal%20for%20ESCO%20model%20at%20TMC.pdf](https://carbonn.org/uploads/tx_carbonndata/Invitation%20for%20expression%20of%20interest%20and%20request%20for%20proposal%20for%20ESCO%20model%20at%20TMC.pdf)

[http://www.districtenergyinitiative.org/sites/default/files/Thane%20Rapid%20Assessment%20Report\\_0.pdf](http://www.districtenergyinitiative.org/sites/default/files/Thane%20Rapid%20Assessment%20Report_0.pdf)

<https://egov.eletsonline.com/2018/02/thanes-transformation-into-a-smart-city/>