



# Implementing Low Carbon Measures in Municipal School, Thane

## CASE STUDY

### Project Highlights

A first-of-its-kind “net zero energy municipal school” in Thane is implementing low-emission measures that include a) energy efficiency retrofits; b) 15 kW grid interactive Solar PV system, with potential for net-metering; and c) other low emission measures such as smart metering, rainwater harvesting and solid waste management interventions, which would reduce the quantum of waste generated by the school. The school’s energy consumption has reduced considerably, with renewable energy providing 68 percent of the energy, resulting in savings of 18,020 units of electricity and reducing GHG emissions by 15 tonnes of CO<sub>2</sub>e in two years since the implementation of the measure in February 2016.

### Background

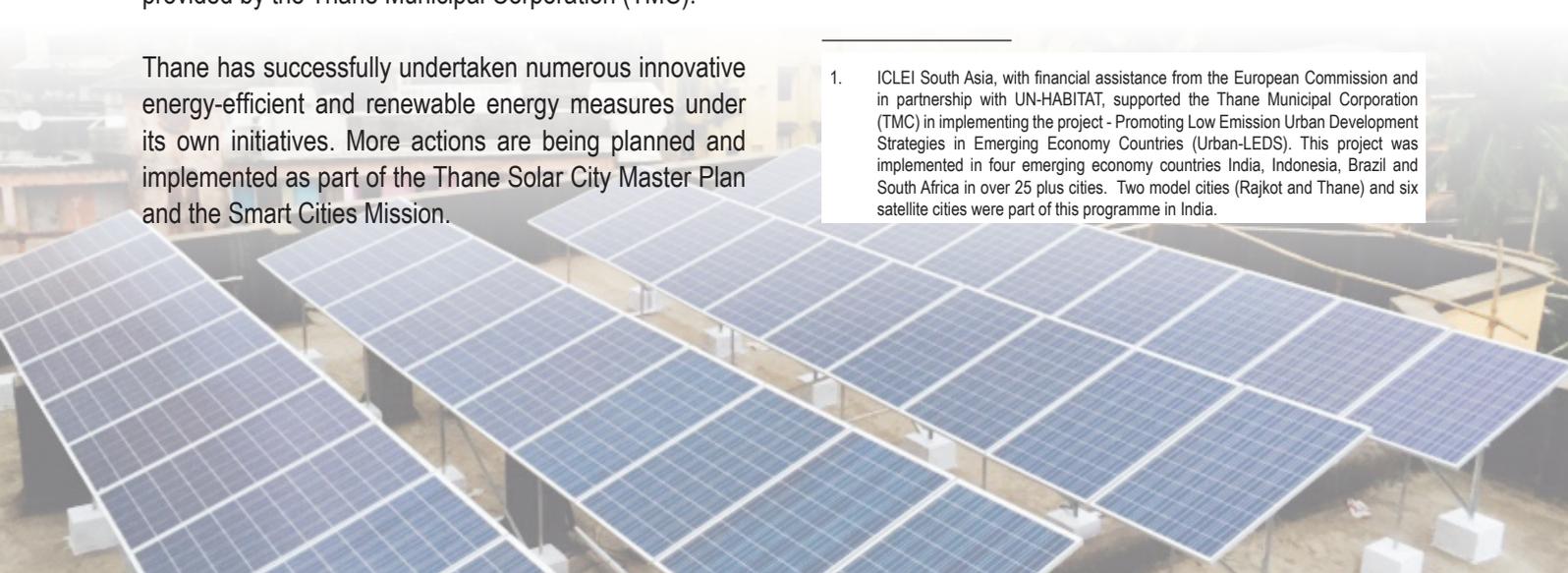
Thane, one of the fastest growing towns in the state of Maharashtra in India, is part of the Mumbai Metropolitan region and serves as the administrative centre for Thane district. Its population has grown 44 percent in the last decade, and the 2011 census listed the city’s population at 1.82 million. This growth in population, commerce and industry has led to an increased demand for the services provided by the Thane Municipal Corporation (TMC).

Thane has successfully undertaken numerous innovative energy-efficient and renewable energy measures under its own initiatives. More actions are being planned and implemented as part of the Thane Solar City Master Plan and the Smart Cities Mission.

The Thane Municipal Corporation joined the Urban-LEDS programme<sup>1</sup> in 2012 to accelerate its progressive climate action trajectory.

Guided by ICLEI’s Green Climate Cities (GCC) process, Thane embraced its role as a model city under the programme by adopting a strategic and inclusive approach to identify a set of low emission strategies and undertake a range of local actions.

1. ICLEI South Asia, with financial assistance from the European Commission and in partnership with UN-HABITAT, supported the Thane Municipal Corporation (TMC) in implementing the project - Promoting Low Emission Urban Development Strategies in Emerging Economy Countries (Urban-LEDS). This project was implemented in four emerging economy countries India, Indonesia, Brazil and South Africa in over 25 plus cities. Two model cities (Rajkot and Thane) and six satellite cities were part of this programme in India.





Case Study Location

This case study documents Thane's journey in the Urban-LEDS project, stakeholder engagement in the process, planning and implementation of MRV through pilot interventions and the key lessons learnt from Urban LEDs. The pilot intervention that is the focus of this case study is the implementation of low-carbon measures in a municipal school run by the Thane Municipal Corporation (TMC).

### Project Objective

The main aim of the pilot project was to deliver a refurbished Zero Carbon School - the first of its kind in Thane - by demonstrating the application of innovative low-emission measures in school buildings and making it a model school that could be replicable in other schools. The key aspect of the project was that it followed an integrated approach to design low-emission development (LED) oriented actions by adopting:

- Energy efficiency measures: manage demand through energy-efficient technologies by replacing old technology with new energy-efficient ones

- Renewable energy measures: use of renewable and low-carbon energy sources, e.g. solar power for electricity generation/use of solar-based appliances and products.
- Other low-emission measures such as rainwater harvesting, plantation activity to increase the green cover, water conservation, waste management, etc.

### Approach

This project was implemented in a municipal school located in Vartak Nagar, Thane. The school operates in four shifts, two each during morning and afternoon hours, with an average monthly energy consumption of 1800 kWh.

It was imperative that an energy audit of the school building should be conducted in order to recommend effective low-emission solutions and to see the technical feasibility of renewable energy measures for further application. TMC officials with support from ICLEI South Asia conducted an energy audit and pre-feasibility assessment w.r.t renewable energy installations. Based on this preliminary assessment, the project components were finalised and implemented, which were:

**Sub Work 1:** Energy efficiency retrofit: This work mainly included supply & installation of energy-efficient 08 & 16 watt LED tube lights and 35 watt ceiling fans. Smart sensors to monitor the daylight intensity and occupancy were installed in the classrooms and toilets for optimum use of fixtures.

**Sub work 2:** Renewable energy measures: Based on the load demand, a 15 kW grid interactive SPV system was commissioned on the available 480sq.m rooftop. The capacity was kept on the higher side to adopt net metering policy, which was under consideration by the Maharashtra Energy Regulatory Agency (MERC). An arrangement was made for the cleaning of solar panels as the ongoing construction work in the vicinity could lead to accumulation of dust on the panels, lowering their efficiency and power generation capacity. A CCTV camera has been installed to monitor the cleaning activity.

**Sub Work 3:** Other low-emission measures: These included the installation of smart distribution board; smart metering for real-time monitoring of load, solar power and remote data logging features; rainwater harvesting to recharge a borewell and tree plantation. The work of toilet renovation was undertaken by the TMC to maintain hygiene. The wiring of the entire building was changed so as to allow the smart appliances to work efficiently. For waste management, two bins provided on each floor for collection of wet and dry waste. During awareness activities, students and teachers were introduced to the various benefits of energy efficiency, renewable energy, groundwater recharge and solid waste segregation.

### Outputs

- It is the first-of-its-kind project to attempt real-time monitoring of solar power generation for a small-scale plant.
- Smart appliances have been used to increase energy efficiency
- A grid interactive SPV system with power blockage arrangement for net metering will be provided in future.

### Outcomes

- Renewable energy powers 68% of the school's energy requirement and improvement of 125% over base illumination of 68 Lux.
- The TMC connected the system to the electrical grid through net metering in 2017.

- The TMC allocated INR 0.2 million for installation of solar energy systems in municipal schools for the year 2015-16.

### Key Takeaways

- The project helped to encourage a sustainable way of thinking amongst stakeholders, which is reflected in the TMC's approach towards new projects.
- It is imperative to involve experts for their technical assistance in implementing pilot/demonstration projects.
- Techno-economic due diligence prior to project designing and implementation is critical for its success.
- Apart from the climate benefits, the low-emission projects developed should also encompass direct or indirect social and economic benefits to the city and its residents.
- The project(s) should leverage existing policies and resource opportunities (like Central/State schemes or programmes) for implementation. For instance, the TMC has used the net metering policy for this project.
- Lastly, these LED pilot/demonstration projects should be used as 'lighthouse' cases to create awareness and promote scaling-up of the initiative.

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