Thane, India

Pioneering India's Solar Cities Program

ICLEI Local Governments for Sustainability

India's Solar Cities Program, launched in 2009 by the Ministry of New and Renewable Energy aims to promote energy efficiency and renewable energy in 60 cities. It supports cities in becoming a driving force for local energy innovation and investment. Within this framework, ICLEI South Asia (SA) and the MNRE has prepared a Guidebook for Developing a Solar City, and is rolling out the program in 12 cities. ICLEI SA's involvement builds on the lessons learned through its own Local Renewables project. In the Maharashtra, ICLEI SA is working with Thane, a city that aims to be one of India's first solar cities and has committed to a 10 per cent citywide energy reduction over five years while simultaneously promoting solar energy utilization.

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Abstract

India's current urban growth dynamics, and the associated increases in energy demand are extremely important issues for Indian cities. However, in India and many other countries, energy governance has been the domain of state and federal level government, leaving local governments with little scope to shape their own energy agenda. The Solar Cities Program of India's Ministry of New and Renewable Energy (MNRE) addresses this by enabling local governments to develop tools to reduce demand and increase renewable energy supply. Participating cities commit to a target of 10 per cent reduction in the demand for conventional energy over the course of five years. This reduction is to be achieved through a combination of renewable technology utilisation and energy efficiency techniques. Located in the State of Maharastra,

Thane is one of 12 cities that are working with ICLEI in the implementation of the Solar Cities Program. Building on its own past and extensive experience in renewable energy, and benefiting from the valuable lessons learned through the ICLEI experience, Thane is aiming to become a leader in local renewable energy innovation.

Population / Land area
~ 2 million (2010)
147 km^2

Municipal budget
Approx. Indian Rupees: 226,000 lakhs /US$: 507 million

Thane joined ICLEI in 2008

Importance of energy provision in urban development

In India, rapid economic and urban growth means greater energy demand in a context of limited supply. The country is aware of the possible climate change implications of this growth, and is committing to a path to reduce the carbon intensity of its economy. India's Planning Commission has estimated that in order to meet the energy needs of the country whilst maintaining a GDP growth of 8 per cent per year, electricity generating capacity will need to increase nearly six fold over the next 20 years.

Local energy governance plays a key role role in responding to the joint challenges of climate change mitigation and local economic development. Despite this, local energy planning is often absent in cities. Energy shortages are a common experience in urban India, and Thane is no exception. However, Thane, which has been experiencing rapid growth for over two decades (due to its proximity to Mumbai), is unique insofar that the city has been taking active steps to manage and secure its energy future.

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Fondation Charles Léopold Mayer pour le Progrès de l'Homme

This case study is part of a series of local sustainability case studies compiled as part of ICLEI's preperation for Rio+20.

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Solar PV Panels :Thane Municipal Corporation Building.

City context

Historically, renewable technologies in India were seen as an energy solution primarily for rural areas. However, rapid urbanisation and the challenges associated with meeting growing energy demands led to the formulation of renewable energy programs for urban areas. For the past decade India's MNRE has been exploring options to promote renewable energy technologies in cities, and in 2007 launched the Solar Cities Program, an initiative solely aimed at promoting renewable energy in cities.

Since 2009, ICLEI has been working with the Thane Municipal Corporation in developing a 'Solar City Masterplan' for the city. As part of the Mumbai Metropolitan Region, Thane is one of the fastest growing cities in India. For several years the city has considered an adequate energy supply to be a central feature of its development strategy. In the early 2000s, and as a result of a combination of rapid growth and infrastructure constraints, the city started promoting renewable energy and energy efficiency. Thane's active engagement with energy planning eventually lead to discussing climate change issues. The city prepared an emissions inventory, leading the way for many other cities considering how best to engage with climate change issues. In 2008, the city's commissioner represented the Local Governments and Municipal Authorities group (LGMA) at the Poznań United Nations Framework Convention for Climate Change Conference (COP 14).

ICLEI and India's Solar Cities Program

ICLEI is playing an important role in the development of India's Solar Cities Program by preparing the program's main guidelines - in the form of a Guidebook for Developing a Solar City - and rolling out the program in 11 of the 60 participating cities. ICLEI's contribution to the Solar Cities Program has been modeled upon its earlier Local Renewables project (2006 – 2010), which provided a successful template of policies, guidelines, participation mechanisms and activities for the promotion of renewable energy in cities. The resulting approach links local governments, the private sector, users and other city stakeholders in the development and implementation of a citywide renewable energy strategy.

Thane as a 'Solar City': Local governments driving renewables and energy innovation

The Solar Cities Program is part of India's MNRE. The program's objective is to empower local governments to address energy challenges whilst providing a framework that enables an assessment of each city's energy situation. The program also aims to build capacity in local governments and raise awareness of renewable technologies. There is a strong emphasis on involving a variety of stakeholders in the process to oversee it and in promoting public private partnerships. Participating cities are provided with technical assistance and financial support to advance local energy initiatives. They also join a network of other cities advancing a similar local energy agenda which allows them to share experiences and learn from each other.

The program provides an integrated policy and action framework for cities to promote energy efficiency and the use of renewables. It runs on five key steps: 1). Preparation of an energy baseline and masterplan; 2). Establishment of a stakeholder advisory committee; 3). Development of public engagement activities (through a Solar City Cell); 4). Development of pilot projects; and 5). when feasible and appropriate, the enactment of a renewable energy policy at the local level.

The Thane experience of becoming a Solar City

One of Thane's responses to its unprecedented growth has been the implementation of specific projects aimed at securing key urban services such as water, transport and energy. For example, with the help of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), Thane has made significant investments in transport infrastructure. In the case fo energy, and since the early 2000s, the city has been experimenting with renewable energy and energy efficiency initiatives. Its innovative energy interventions range from energy related building by-laws to energy audits for public services and energy efficiency strategies in public buildings. In doing so, Thane was far more progressive then other Indian cities.

Alternative energy models have a long history of promotion in Thane. In 2005, Thane was one of the first cities in India to enact a local policy that made solar hot water systems mandatory for new buildings. Today, the expanding urban landscape of Thane can be distinguished by its extensive use of solar technologies on roof terraces. In contrast to many other Indian cities, the results of this policy are linked to the effective enforcement by the city's town planning department; building owners do not get the final occupancy permits unless the system has been installed.

A series of energy audits in municipal services such as water and street lighting were undertaken between 2005 and 2010. These audits lead to energy conservation measures, significantly reducing the energy consumption of activities run by the municipality.

Solar Cities Program. In 2009, as a natural continuation of its portfolio of local energy initiatives, Thane joined the MNRE's Solar Cities Program. Over the following two years and with the steering of a 'Solar City Stakeholder Committee' that included local and regional public and private organizations, the city prepared a citywide renewable energy strategy. ICLEI was appointed as the energy master planner, taking the responsibility of preparing Thane's Solar City Masterplan.

ICLEI support. Thane is implementing the Solar Cities Program by building upon its own experiences and tools but by working with ICLEI, it also builds on the lessons of other Indian cities which have taken a similar path, those involved in ICLEI's Local Renewables program. At time of writing, Thane is in the process of opening a 'Solar City Cell', and ICLEI-South Asia has been appointed to manage the cell for the next 3 years. The cell will be modeled after Nagpur, Bhubaneswar and Coimbatore's 'Renewable Energy and Energy Efficiency Resource Center – REEERC', an initiative of ICLEI's Local Renewables project.

Consultation. Thane's Electrical Department played a key leadership role and has successfully engaged a variety of local stakeholders in the 'Solar City' process. The Solar Cities Stakeholder Committee counts on the participation of key local and regional players such as the Maharashtra Chamber of Housing Industry, the Maharashtra Solar Manufacturers Association, state level energy bodies, local energy - related business and educational organizations. Through the process of developing the Solar City Masterplan, stakeholders attending the meetings of the Solar City Stakeholder Committee engage in high-level discussions ranging from how to bring new technologies to the city, to the possibility of gaining additional funds for low carbon energy initiatives through innovative funding mechanisms. In this way various stakeholders are getting fully involved in the process of making Thane a Solar City.

'Becoming Solar' in 4 steps: Activities of the Solar Cities Program

Step 1: Baseline and energy masterplan
To get a good understanding of current and future energy dynamics of the city, a citywide energy baseline, covering residential, commercial and industrial activities, is undertaken. The baseline is followed by the preparation of an energy masterplan detailing proposals on how to reduce the predicted business as usual (BaU) demand by 10 per cent over the course of five years.

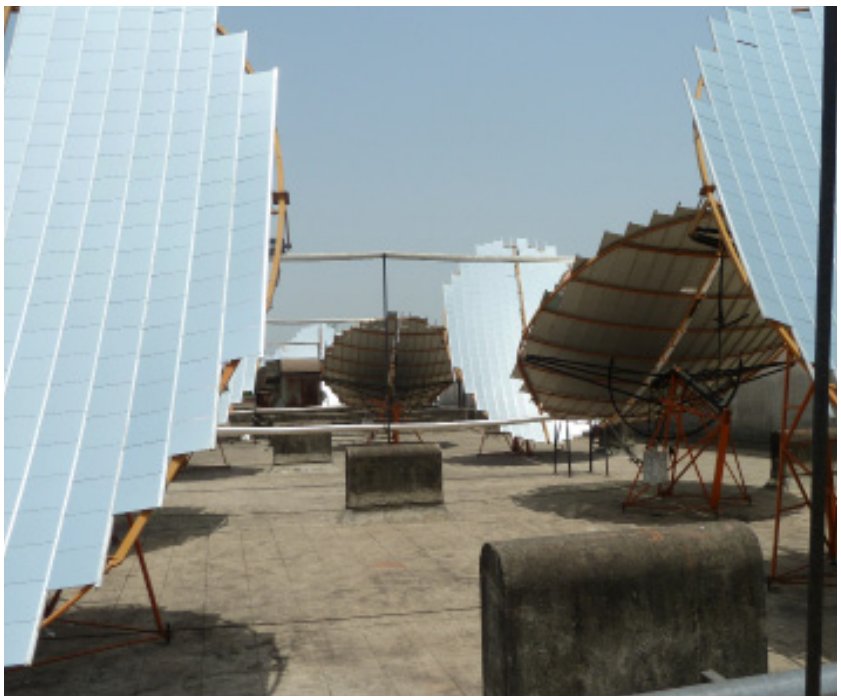
Steps 2 and 3: Public involvement and participation is ensured through the establishment of a "Solar City Stakeholders Committee" acting as an advisory board. The committee includes industry delegates, academic institutions, NGOs, elected representatives and the general public. In addition, public involvement is fostered through the implementation of a 'Solar City Cell' - a demonstration space and knowledge hub, providing information and resources on energy conservation and renewable technologies.

Step 4: Pilot projects
In order to enhance awareness and demonstrate feasibility, the municipality implemented a set of demonstration projects. For example, the use of photovoltaics in government buildings, energy audits for municipal services and energy efficiency strategies.

Step 5 Renewable energy policy
Additionally, in selected cases and where appropriate, the Solar City Program supports the local government in developing a renewable energy policy. This acts as a commitment from the municipality for the increase of renewable energy use in the city and can include practical steps such as making the use of solar hot water systems mandatory.

Results

The Solar Cities Program. Phase 1 is scheduled to run during India's 11th Five Year Plan (2007-2012). Another phase is planned for the following period. At the time of writing, over 40 cities had joined the program and there is a target of 60 by the end of 2012. At present most participating cities are developing their 'Solar City Masterplan'. Levels of progress are diverse, as some cities are starting from scratch whilst others, like Thane, are building on years of experience. In the case of Thane, the city's many positive results are related not only to the Solar Cities Program but to several earlier initiatives that provided a solid foundation for the program.



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Scheffler parabolic dishes for solar powered air conditioning: Chhatrapati Shivaji Maharaj Hospital, Thane.

Municipal managment. A significant proportion of Thane's renewable energy and and energy conservation initiatives have focused on municipal operations. This has resulted in savings of over 42.8 GW of electricity over the last 9 years. Furthemore, in recent years, the municipality has also been formulating a broader strategic agenda on energy and climate change. The city has developed an in-depth understanding of its own energy dynamics, which has enabled a prioritization of areas of action for energy and CO_2 reduction. It has also supported a series of energy related projects, thus providing a better understanding of how energy is consumed in municipal operations as well as in the overall city.

'Financial savings through energy initiatives. Local energy projects are not only saving energy but also help the city's finances. Solar hot water systems at public hospitals are saving up to 500MW of energy per year and almost Rs. 2 million/US$ 40,000 in energy bills. However, the results extend beyond public buildings and can also be seen in the commercial and residential sectors.

Energy and urban Planning. Local building by-laws make solar hot water systems mandatory in new constructions. These by-laws, in effect since 2005, have resulted in an installed capacity of 715,000 litres/day of hot water, mostly through private installations.

Innovative energy technologies in Public uildings. The municipality has installed a solar air conditioning system for the city's main public hospital, resulting in an energy saving of almost 1 giga Watt (gW) per year. Furthermore, innovative energy efficiency technologies have been installed in the city's water pumping stations and the main publicly run auditorium. Furthermore, a photovoltaic system of 50 kilo Watt (kW) powers a significant amount of the energy requirements of the municipality's public offices.

Capacity building. Thane is taking a leadership position in the development of a new local energy governance approach. The Solar Cities Program is supporting these efforts by providing momentum, funds and expertise. Enhanced public involvement via the Solar City Stakeholder Committee is providing additional avenues for expert involvement. The scheduled 'Solar City Cell' will improve public awareness as well as facilitate opportunities for the general public to avail of renewables and energy conservation in their business and home.

Lessons learned

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Domestic solar hot water systems - Thane.

The Solar Cities Program empowers local governments to monitor and take action on their own energy dynamics. Traditionally, energy dynamics are outside the control of city governments. This is the consequence of technological arrangements, policies and strategies where the management and control of energy networks and infrastructure lies with regional and national level agencies. This typical approach to energy provision in Indian cities is based on their interaction with large scale centralized power plants outside of their boundaries, whereby the city is seen exclusively as a site of energy consumption. However, through the Solar Cities Program, the city is seen as a site for energy generation, energy governance and sustainability innovation. Within the program, cities evaluate their energy performance, identify areas for improvement and develop locally tailored solutions. Such a model does not replace but complements energy governance mechanisms based on regional or national dynamics. The result is a greater awareness of local energy dynamics contributing to reduced consumption.

The program also promotes an energy strategy that actively and meaningfully involves stakeholders at the local level, from the general public to local business and organizations. This second lesson learned points to new ways of thinking about energy consumption in the city. With the municipality as the driver and custodian of the process, links to local level stakeholders are easier to build. In this way, the Solar Cities Program engages with the final energy user whether this is a household installing a solar water heater or a business user pursuing energy conservation. The benefits are felt in terms of energy conservation and security as well as greenhouse gas reductions.

It is important to find tangible entry points to justify and promote change. In Thane, the energy audits became a starting point for specific energy initiatives. They showed tangible benefits such as energy savings, cost reductions and equipment maintenance could be achieved. Energy audits provide a baseline for addressing energy consumption and can eventually lead to sustainability innovations in public services and demonstration projects.

Under innovative governance models, local leadership is key to move from vision to implementation. The Solar Cities Program provides an integrated framework for action, linking a diverse range of energy projects and challenges. However, the success of this local energy governance model relies significantly on the leadership abilities of those in the local public administration. In Thane, the city's Electrical Department and its 'Energy Conservation Cell' played a key role in the implementation of the energy projects. They established a renewable energy and energy efficiency vision, identified specific workable projects and through these, delivered tangible results. Good leadership within this department ensured support from other public and private stakeholders, including the municipality's political and administrative departments to politically and financially supported the projects.

Replication

Thane's systematic approach in promoting Renewable energy can be easily replicated, step by step in cities all over the world. ICLEI-SA and the MNRE prepared the 'Solar City Guidebook' which provided guidance and instructions for

all 60 participating cities can aid such replication. These guidelines incorporate the lessons learned through ICLEI's Local Renewables project, where Coimbatore, Nagpur and Bhubaneswar developed their own local renewable energy strategies.

Cities participating in the Solar Cities Program share experiences and derive lessons from each other, all through the MNRE organized Solar City Conference. Phase 1 of the program is being scaled up by identifying ten pilot cities and four model cities, to receive additional funding for implementation. In addition, the MNRE is planning to expand the Solar Cities Program to Townships and Special Economic Zones.

Budget and finances

Thane, along with other participating cities, is receiving up to Rs. 50 lakhs (US$ 110,000) over five years from the Indian government for the development of the Solar City Program. These funds are to be used towards the development of the city's energy masterplan, the establishment and running of the Solar Cell, oversight and implementation support, and promotional activities. Those cities selected as 'Pilot Solar Cities' will receive an additional Rs. 2.5 crore (US$550,000) from MNRE, whilst cities selected as 'Model Solar Cities' will receive Rs. 9.5 crore (US$2,090,000). In these cases, the local government commits to an equal contribution from local funds to support the implementation of the masterplan.

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