

## **Solar Water Heating Program**

### ***Background***

The number of domestic and residential consumers serviced by Maharashtra State Electricity Board (MSEB) is around 9.6 million; Tata Power and Reliance Energy, providing electricity service in predominantly urban sectors in Maharashtra, have an additional 25% consumer base. In case of all the three utilities (MSEB, Tata Power and Reliance Energy), the peak demand is observed in two slabs, one in the morning (7 to 10 AM) and the other in the evening (6 to 9 PM). The contribution of water heating to the morning peak demand is very high.

In the case of MSEB, considering average 10% consumption from the residential consumers towards water heating applications, in 2002-03 alone close to 740 Million KWH were consumed in this application. With an assumption of 10% of consumers in Maharashtra using 2 KW water heaters (geysers and immersion rods), the total installed capacity of water heating application in the Maharashtra grid is approximately 2395 MW. With an optimistic diversity/co-incidence factor of 50%, total technical off-setting potential of converting electricity-based water heating application to a combination of renewable and low-carbon intensity fossil fuel (LPG or NG for example) is estimated to be 500 MW.

### ***Rationale***

The Solar Water Heating Program is targeted at improving the end-use efficiency and reducing peak electric loads by replacing the current electrical geysers. Through a joint effort by the utilities, local bodies, suppliers and MEDA will promote the use of SWH systems in the residential sector.

### ***Program Objectives***

- Assist utilities in Maharashtra reduce the morning peak caused due to water heating applications
- Promote energy efficient solar water heating technologies in the residential/domestic sector
- Promote benefits of efficient water heating applications among the end-users with targeted awareness campaigns
- Demonstrate benefits of solar water heating applications by promoting testing and equipment standardization

### ***Program Design***

As the facilitating and implementing agency, MEDA will carry out the following activities:

- Conduct joint awareness campaign with MSEB in the urban and peri-urban sectors to promote solar water heating systems
- Assist in implementation and monitoring of pilot projects and disseminate results to other distribution circles as a part of joint promotional campaign
- Design and conduct training programs for artisans to develop and service solar water heating systems in Maharashtra
- Analyze fiscal impacts of solar water heating systems
- Evaluate the possibility of a joint (utilities, banks and system designers) micro-credit policy for the solar water heating systems

***Target Market Segments*** - Domestic/residential sector

***End Uses Targeted*** - Water heating application in the domestic/residential sector

### ***Key Barriers Addressed -***

The following are the key barriers that will be addressed to promote SWH system in the domestic/residential sectors:

- Lack of innovative product packaging integrating renewable and fossil fuel with low carbon-intensity
- Lack of trained mechanics for servicing new SWH products
- High first-cost of SWH systems

### ***Technologies to be employed***

- High-efficiency solar water heating systems

### ***Financing Approach***

Utility should recover the cost of SWH system from the customer in equal installments and also may thought off to give any incentive for usage of SWH system in place of electric heaters.

### ***Anticipated Results***

- Installation of solar water heaters will result in higher level of savings spread over the next ten to fifteen years as the average life-cycle of such units is very high
- Awareness building will increase the innovations in the solar water heating system design, also resulting in product standardization

### ***Program Benefits***

Reduction in morning peak

### ***Key Action Steps***

#### **Developing database of domestic/residential consumption**

MEDA shall collect information from MSEB and other private sector utilities on feeder connected load, load profile and census of water heating system. MEDA shall collect information from various sources (including equipment manufacturers/suppliers, results of energy efficiency studies under this program/other parallel and prior projects.

#### **Designing pilot programs**

MEDA shall identify sub-stations in consultation with MSEB and other utilities to identify at least five distribution circles from the urban and per-urban sectors to generate feeder-level load profile and to design “integrated solar water heating program”.

#### **Marketing and awareness campaign**

MEDA shall initiate a marketing and awareness campaign in collaboration with MSEB and other utilities through a variety of channels:

- Sensitization workshops
- Documentation of “Innovations in Solar Water Heating”
- Site visits