Ministry of New & Renewable Energy
Solar Thermal Division
Solar Water Heating Systems

Meeting with GIZ on
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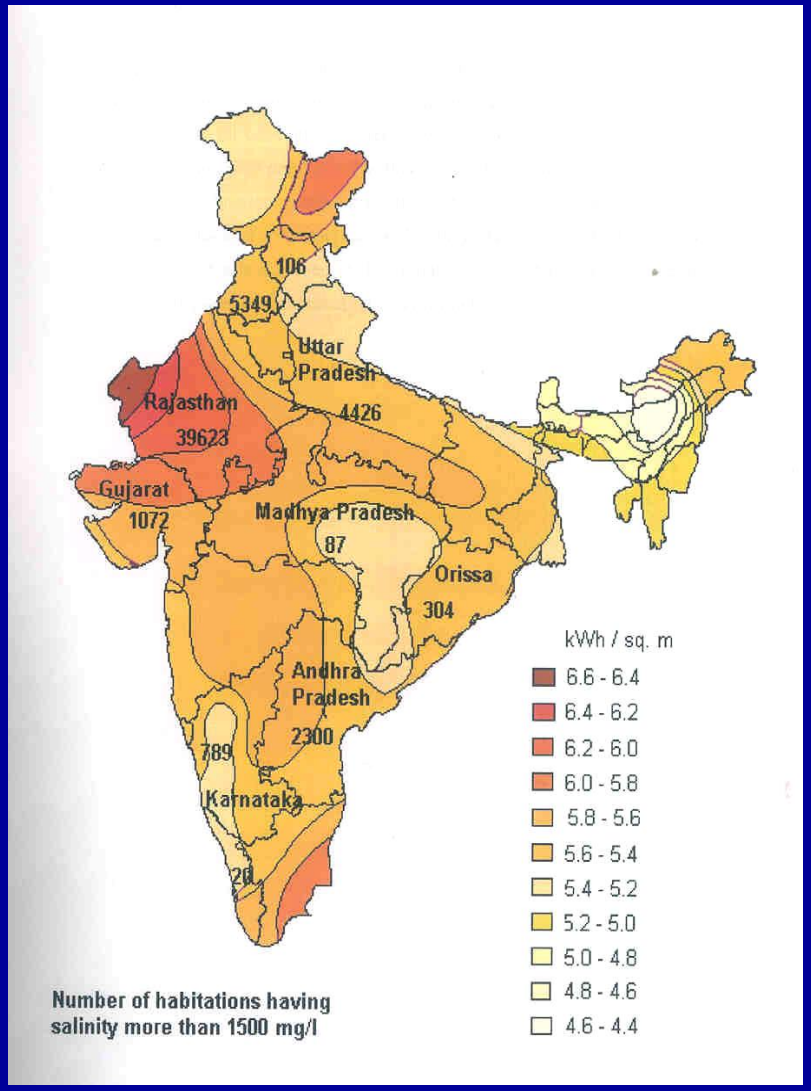
Solar Resource in India

- 5000 trillion kWh solar radiation incident over India in a year
- Daily solar radiation 4 - 7 kWh per sq. m.
- Most parts of the country receive solar radiation sufficient enough to effectively utilize solar energy systems
- Typically, 1.5 to 2.0 hectare of open space required for one mega watt solar power plant.
- On 1% land area of India about 15,00,000 MW capacity solar plants can be setup



Major Advantages

- Long Life (More than 20 years)
- Low Maintenance
- High Reliability
- Modular Nature
- No Recurring Fuel Requirement
- No Emission of Pollutants

Solar Thermal Technology

- Solar thermal collectors capture solar radiation and converts it into heat for various useful applications.
- Solar thermal technologies developed for number of applications.
  - Solar water heating.
  - Solar cooking.
  - Solar air heating and drying of agricultural, food and other products.
  - Space heating and cooling.

Solar Thermal Energy Systems

Solar Water Heating Systems

Salient Features

- A commercially viable technology.
- Can provide hot water at 60-80^{o}C. Integrated with storage tank & electrical back up.
- Saves electricity or furnace oil
- Pays back cost in 3 - 4 years.
- Suitable for homes, hotels, hospitals, guest houses, institutions, dairies, industry etc.
- Techno-economic potential: 40 million sq. m. of collector area i.e. 2 billion liters of hot water per day

FPC based system

ETC based system

Solar Water Heating Systems

Energy Savings

- A 100 lpd system
- Replace an electric geyser of 2 kW capacity
- Saves around 1200 units of electricity in homes or
- Saves around 140 liters of diesel/ furnace oil in a year in industries & commercial establishments
- 1 lakh systems installed in a city can result in 100 MW of peak load shaving if 50% of the domestic systems are assumed to be in use at a time,
- 40 million sq. m. potential could lead to peak load shaving of 14,000 MW (70% systems in homes) apart from saving of enormous amount of electricity & fossil fuels in homes & other establishments besides abating CO_2 emissions in atmosphere

Solar Water Heating Systems

Financial Provisions

- Interest subsidy to provide loans:
  - to individuals
  - to institutional users
  - to commercial users
- Capital subsidy equivalent to upfront interest subsidy of Rs. 1750 for institutions & Rs. 1400 for commercial establishments. For housing complexes @ Rs. 1900/ sq. m. of collector area
- Special demonstration projects in States of NE, J&K, Islands at sites of high visibility to promote

Solar Water Heating Systems
Major Issues

- Installation of inappropriate capacity
- Integration of conventional system with SWH system
- System's design keeping heat & mass transfer' principles in mind – pressure drop – pumping power- pipe size and its arrangements etc.
- System engg. With water quality – compatibility of materials with water quality (SS+saline water)
- Welding damages to materials
- Designing the system for sub zero temperatures

Major Issues - Continued

- Absence of information system – Creation of Help Line
- Difficulties in getting soft loan from Banks
  - Few Branches are eligible for providing soft loan
- Repairing & Maintenance facilities not easily available
- Limitations of Nodal Agencies – Tech. & Infrastructural

Solar Water Heating Systems

Action Plan 2016-17

- **NEW INITIATIVES**

- **Best Practices to be evolved – Through UNDP Project/GIZ/NCEF**
- **Supply chain to be improved – Creation of help line for users**
- **HRD in repairing & maintenance - ITI curriculum**
- **Energy Audit of some big and important cities – Potential of SWH**
- **Tourist areas coverage in hill states**
- **Tapping potential in selected Industries – Sericulture, Textile, Tea**

Solar Water Heating Systems

- **ACTIVITIES TO BE CONTINUED**

- **Central Ministries & State Deptts. to be directed to mandate their establishments for installation of solar water heaters**
- **Amendment of building bye-laws to continue**
- **Builders & Developers to be pursued to incorporate systems in new building & housing complexes**
- **Planned publicity & awareness campaign including organization of solar fairs in residential colonies**
- **Efforts to be made on easy availability of loans & rebate in property tax/ electricity tariff**

Thank You

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