SUSTAINABLE DEVELOPMENT GOAL 9
INDUSTRY, INNOVATION AND INFRASTRUCTURE

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New Delhi, India

MNRE-GEF-UNIDO Project

Promoting business models for increasing penetration and scaling up of solar energy

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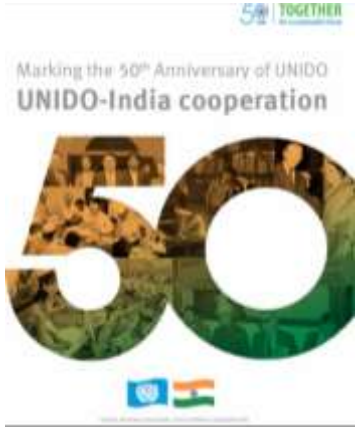
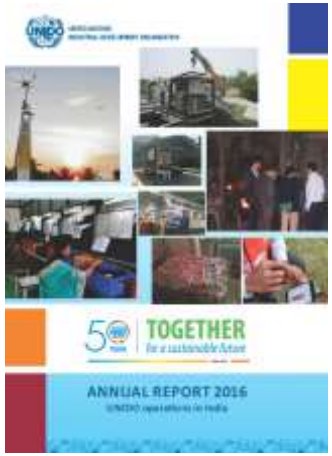
UNIDO in India



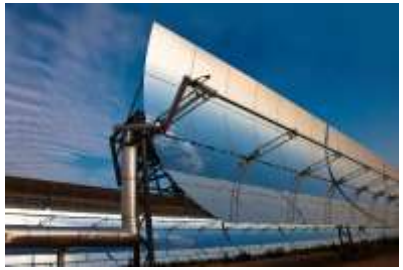


- **Technical cooperation services since 1966**
- **2013-2017 Country Programme**
  - Green industrial development
  - Inclusive economic development
  - South-South industrial cooperation
  - Operationalized 24 projects with total budget of USD 87 million
- **2018-2022 Country Programming Framework**
  - Productive and resilient MSMEs
  - Solutions for climate, resources and environment
  - Inclusive and responsible value chains and business
  - Strategic policy for industrial transformation

- **Potential for deployment of Concentrating Solar Thermal (CST) technologies**
- **Current status and schemes to promote CSTs**
- **UNIDO's project supporting the growth of CST sector**
- **Innovations under the UNIDO project**
- **Barriers to the growth of CST deployment**

Dhursar (Rajasthan) 125 MW/ 2014

2.5 MW ACME Solar Tower in Bikaner, Rajasthan/ 2013

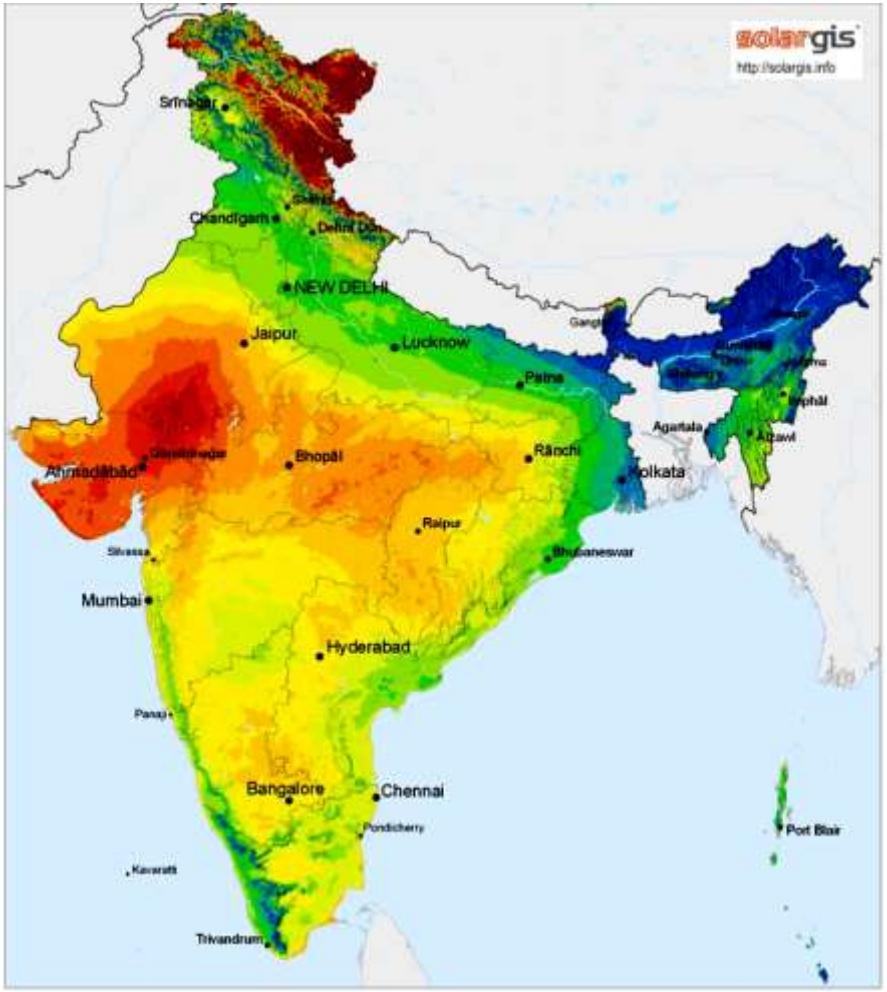


50 MW Godawari (Nokh), Rajasthan/ 2013

1 MW Mt.Abu, Rajasthan/ 2017

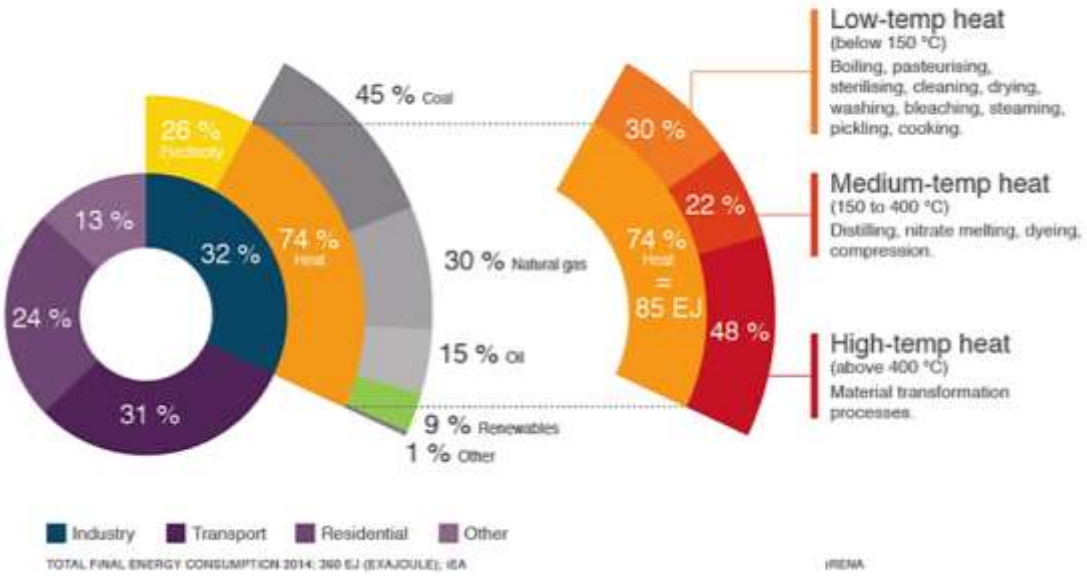
1 MW NISE, Gurugram

Radiation Suitability for CSTs



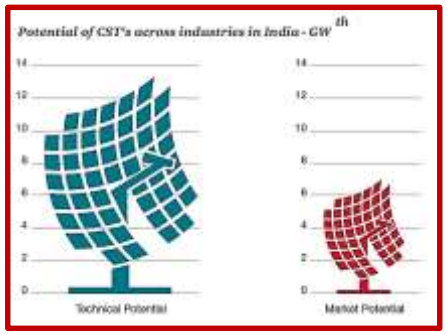
- India has good climatic conditions to operate CST systems in direct competition to fossil fuels.
- Large number of potential customers - industrial units in many sectors.
- Applications: Process heat and steam, cooling, water desalination, hybridisation with biomass or biogas, electricity generation.
- Key criteria for the economical usage of solar thermal booster is a solar radiation DNI >1700 kWh/m^2 and possibly the availability of flat land or roof area.

Background



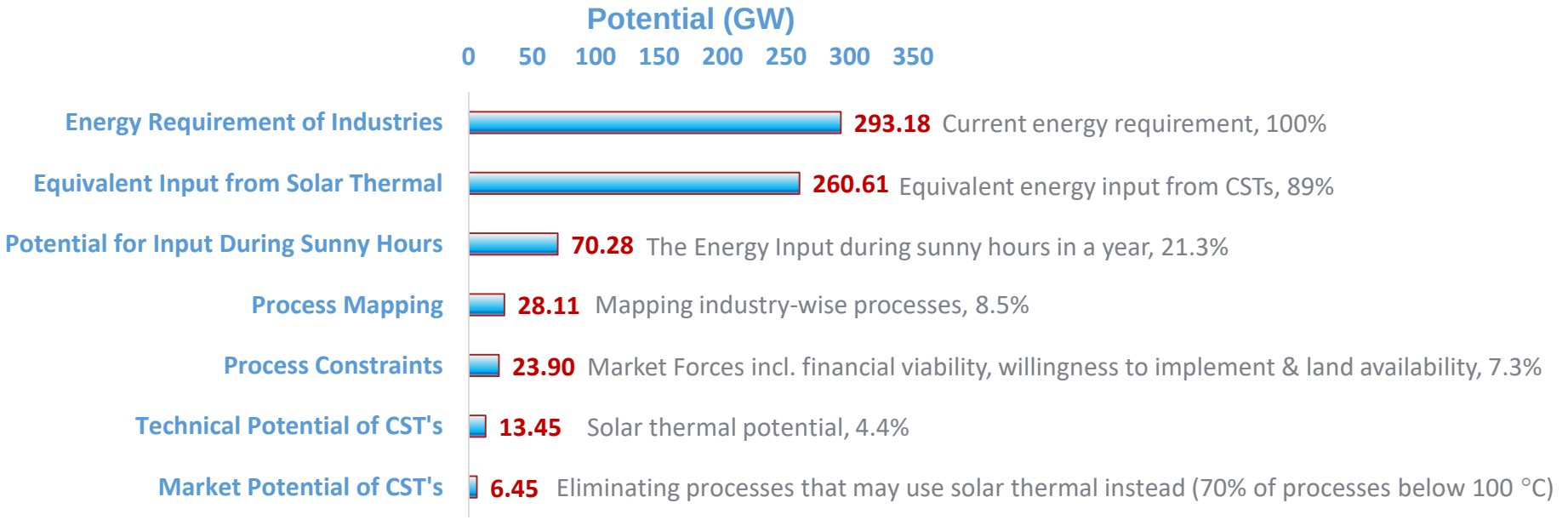
- Industrial energy consumption is responsible for 32% of India's total energy consumption.
- Energy demand of the Industrial sector accounted for 42% of the imported crude oil in 2014-15 (189.43 mil. tonnes), out of which around 30 mil. tonnes provided thermal energy at temperatures below 250 °C.
- A small part of energy demand is met by electricity, rest by coal, biomass, oil products and gas, indicating that a large amount of energy in the industrial sectors is used to provide thermal energy/heat.
- Industrial heat is characterized by a wide diversity with respect to temperature levels, pressures and production processes to meet the many different industrial process demands.
- *Solar thermal based technologies can produce a range of temperatures, between 50°C and 400°C, which can be used in a variety of these thermal applications*.

Potential of CST Deployment



Technical potential: fraction of resource potential that can be used under the existing technical restrictions.
= Potential for Energy Input During Sunshine Hours * Process Mapping Multiplier * Process Constraints Multiplier * Concentrated Technologies Multiplier

Market potential: final CST potential incorporating the market dynamics (acceptability, financial viability, space limitations, etc.).



Chitle Dairy, Sangli
(338 m^2; Milk Pasteurization)

Paraboloid Dishes at Synthokem Pharmaceutical, Hyderabad
(540 m^2; Process Heating)

Parabolic Trough Collectors at Honeywell Technology Solutions, Hyderabad
(820 m^2; Cooling)

Non- imaging Collectors at Neel Metal, Gurgaon
(612 m^2; Process Heating)

Parabolic Trough Collectors at Siddhartha Surgical, Vadodara
(263 m^2; Process Heating)

National Scheme for CST

Off-Grid and Decentralized Solar Thermal Technologies for Community Cooking, Process Heat and Cooling Applications in Industrial, Institutional or a Commercial Establishments

Objectives

- To promote off-grid applications of Concentrating Solar Technology (CST) systems for meeting the targets set in the National Solar Mission.
- To provide support to CST manufacturers/suppliers and potential beneficiaries, within the framework of boundary conditions and in a flexible demand driven mode.
- To create awareness through capacity building and demonstrate effective and innovative use of CST systems.
- To create a paradigm shift needed for commoditization of off-grid decentralized solar thermal applications and create suitable business models.
- To reduce use of fossil fuels and thereby reducing GHG emission to the atmosphere.

Targets (Collector Area)

30 000 m^2 (FY 2018-19); 40 000 m^2 (FY 2019-20)

Central Financial Assistance available for CST projects

Solar Collector Type	Benchmark Cost (USD/ INR per m^2)
• Concentrator System with Manual tracking	100/ 7 000
• Solar Collector Systems for Direct Heating & drying and Non imaging/ Compound Parabolic Concentrators (NIC/CPC)	172/ 12 000
• CSTs with single axis tracking (including Scheffler Dishes)	214/ 15 000
• CSTs with single axis tracking, Solar Grade Mirror/ Reflector & Evacuated tube collectors	258/ 18 000
• CSTs with double axis tracking	286/ 20 000

- 30% of the bench mark cost or actual cost (whichever is less) to all beneficiaries in all states.
- 60% of the bench mark cost or actual cost (whichever is less) to Non-profit making bodies and institutions in special category states, viz., NE states, Sikkim, J&K, Himachal Pradesh, Uttarakhand and islands.
- Accelerated depreciation (AD) benefits to profit making bodies.

Central Financial support for CST projects (Highlights)

- No upper cap on the subsidy to be provided on CST based systems.
- The subsidy will be released to implementing agencies/Channel Partners/ beneficiaries on a reimbursement basis after successful commissioning of the system and on receipt of relevant documents.
- A CST Project should have been approval by the Ministry before its implementation. Projects started before sanctioning will not be eligible for the subsidy.
- The projects will have to be completed within 12 to 18 months. Non completion of the projects within this time might attract reduction or forfeiture of eligible subsidy from MNRE.
- Mirrors of solar grade quality is going to be made mandatory soon for CST based systems.

UNIDO's Project

The project aims to complement MNRE's support programme by helping to **remove barriers associated with Concentrating Solar Thermal (CST) technology, its awareness, capacity building, market and financial barriers**.

The project will therefore assist in the commercialization of concentrating solar technologies by innovating the technical and financial support

Innovations through the UNIDO Project

- Introduced the first ever dedicated loan scheme for CST – Promotes large-scale projects due to availability of funds.
- First project to support manufacturing in the CST sector.
- Promotion of system integrators for proper Integration of CST system with an existing industrial process and its optimization.
- Support to diversified application of CST in unexplored sectors such as Oil refining, Effluent treatment etc.
- Specialized Trainings –two-pronged approach for trainings in CST sector, one focused singularly on targeted design of CST systems for Indian conditions and one for installation, operation and maintenance of CST systems.
- On-going R&D work on thermal storage solutions.

Financing Arrangement under UNIDO project

- **The beneficiary's or project developer's contribution would be 25%.**
- **Subsidy of 30% would be provided by MNRE.**
- **Bridge loan against subsidy and at normal interest rate would be available.**
- **Loan for the remaining amount would be provided at an interest subvention of 5%. The funds under the UNIDO project would be used for subvention of the interest rate.**
- **Support is available also for improving the manufacturing of CST system/components besides technical support.**

Benefits of the Scheme

Soft Loan for the Project

- ✓ **75% of the project cost could be considered upfront for the provision of loan & bridge loan.**

Single Window for Multiple Funding

- ✓ **Both the loan and MNRE subsidy would be bundled in form a financial package by IREDA. One application is required for loan, subsidy and interest subvention under this scheme.**

Simpler Processing and Documentation

- ✓ **Composite loan application form for Soft Loan and Bridge Loan.**

Increased Availability of Finance and Faster Disbursal of subsidy

- ✓ **Effective and fast method for lowering capital cost of project, and reducing the burden of working capital.**

Barriers to Further Growth of CST sector

- **Lack of awareness**
  - Demonstration, awareness & capacity barriers.
- **Financial barriers**
  - **Perceived** high costs & unattractive payback periods
  - Availability of ‘working capital’.
- **Technical barriers**
  - Benchmarks for Quality of Installation/ Performance, System integration and optimization.
- **Mandates for the CST sector**
  - Mandates for the CST sector may provide the right push to accelerate the deployment
  - Mandates may be proposed on Industries burning fossil fuels or Industries crossing a certain threshold (in terms of kW load or boiler sizes). MoEF to be involved in implementing the mandates.

Thank you

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