



सत्यमेव जयते

Ministry of New and Renewable Energy
Government of India

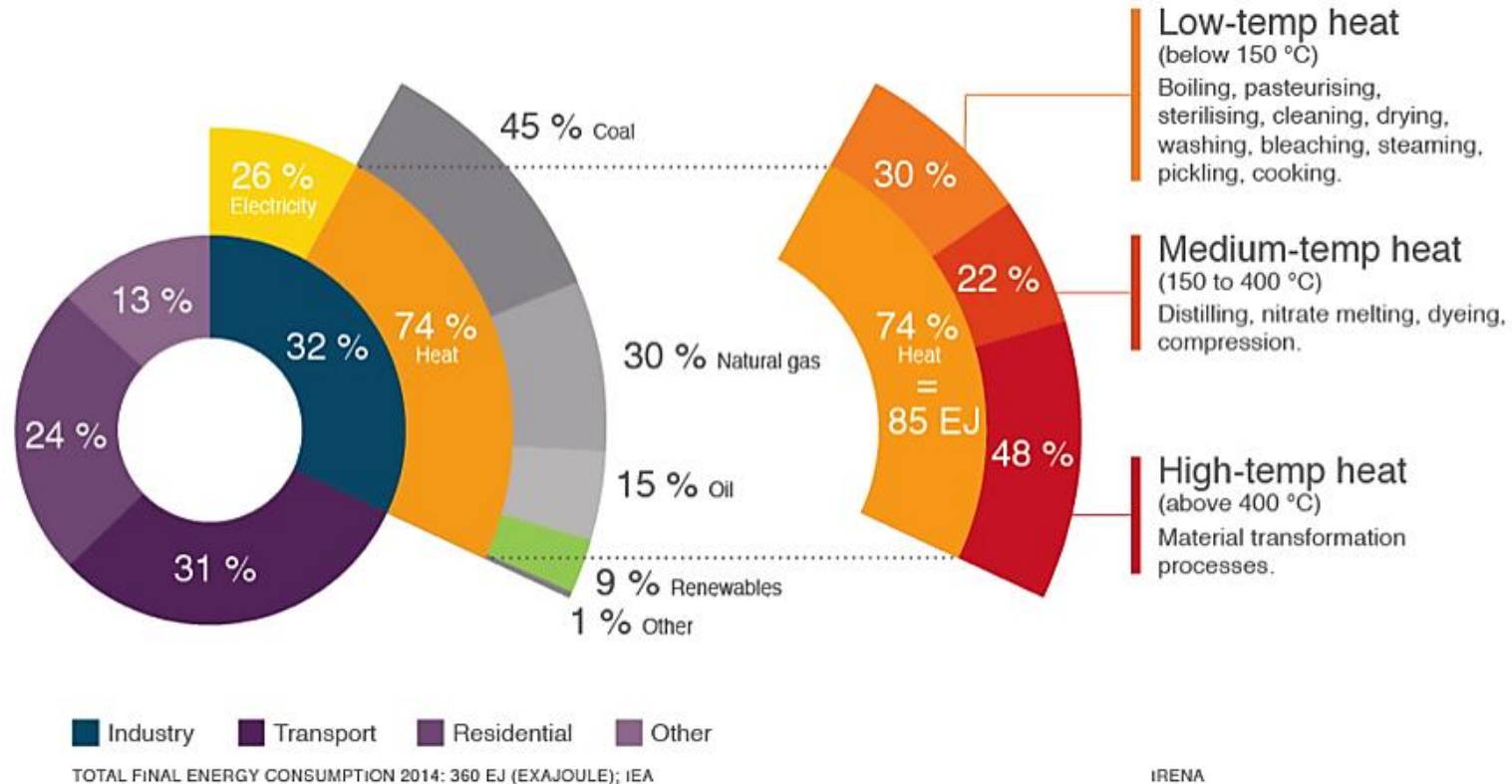
Concentrating Solar Thermal (CST) Technologies Potential and Status

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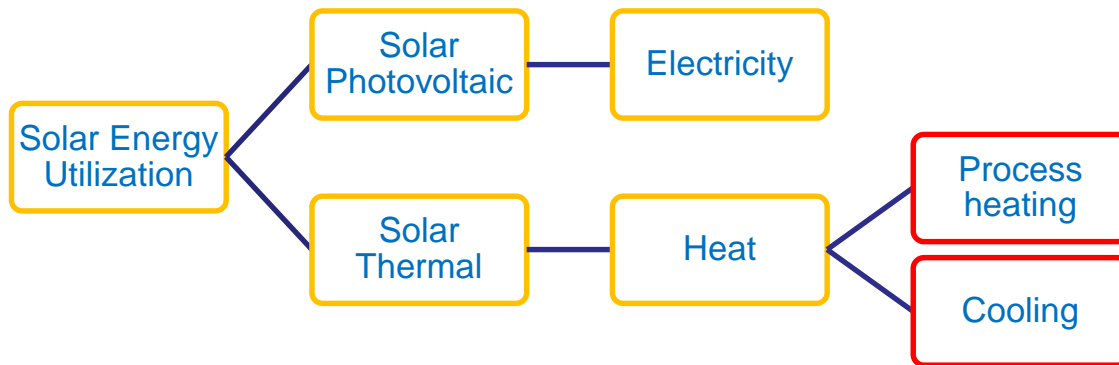
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Industrial Requirement for CST



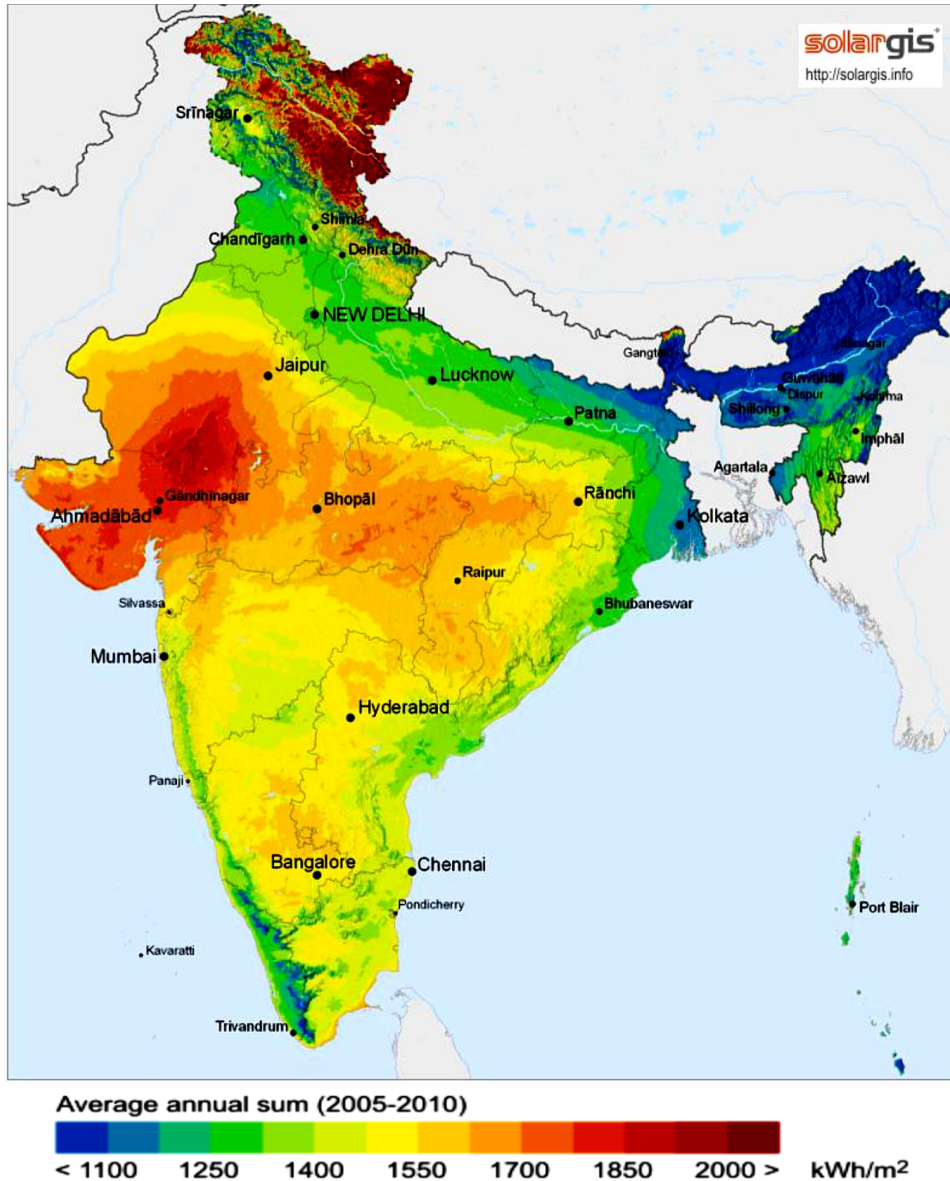
- Industrial heat is characterized by a wide diversity with respect to temperature levels, pressures and production processes to meet the many different industrial process demands.
- Over 30 million tones of imported crude oil/year in industries for steam generation below 250°C
- CST technologies can produce a range of temperatures, between 50°C and 390°C, which can be used in a variety of these thermal applications.

Emerging CST Technologies



- Solar heat at medium & high temperatures uses concentrating solar collectors such as parabolic trough or dish collectors or Linear Fresnel system.
- CST Technologies can concentrate solar radiation using mirrors/lenses to produce heat for various applications (up to 400°C).
- Most of these devices need automatic tracking so as to focus Sun rays on to a receiver all the time.

Radiation Suitability for CST technologies



- 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 is solar radiation $DNI > 1700 \text{ kWh/m}^2$ and the availability of flat land or roof area.

MNRE Scheme for CST

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

Objectives

- Promote off-grid applications of CST systems
- Provide financial support to CST manufacturers/suppliers and beneficiaries
- Create awareness through capacity building and demonstrate effective and innovative use of CST systems.
- Create a paradigm shift needed for commoditization of off-grid decentralized solar thermal applications and create suitable business models.
- Reduce use of fossil fuels and thereby reducing GHG emission to the atmosphere.

Target

Collector area of 90,000 m² (till 2019-20)

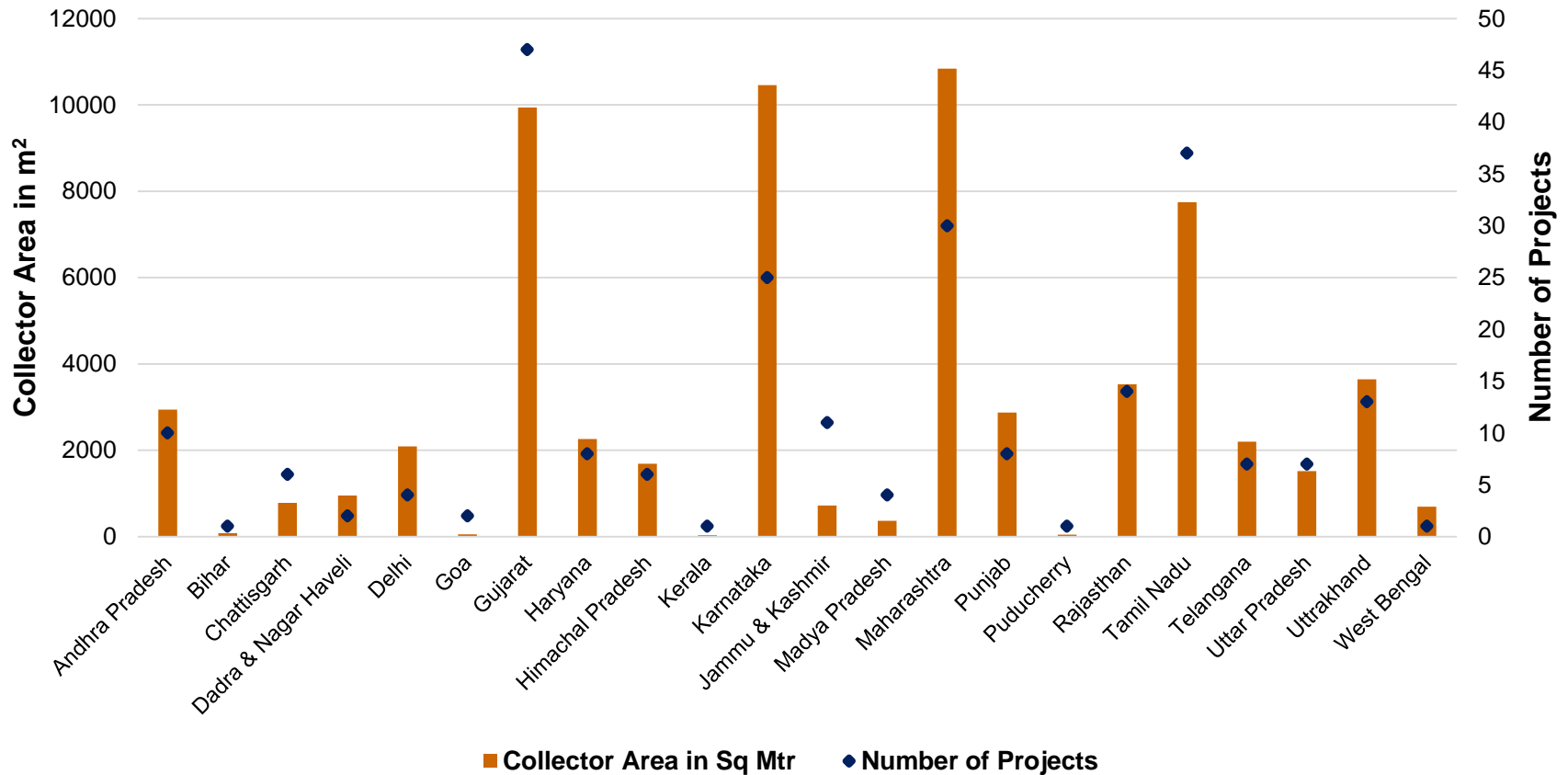
Financial Support for CST projects

- 30% of the bench mark cost or actual cost (whichever is less) to all beneficiaries in all States/UTs.
- 60% of the bench mark cost or actual cost (whichever is less) to Non-profit making bodies and institutions in special category states/UTs
- Accelerated Depreciation benefit also available.

Solar Collector Type	Benchmark Cost (INR per m2)
Concentrator System with manual tracking	7,000
Solar Collector Systems for direct heating & drying and Non Imaging/ Compound Parabolic Concentrators (NIC/CPC)	12,000
CSTs with single axis tracking (including Scheffler Dishes)	15,000
CSTs with single axis tracking, Solar Grade Mirror/ Reflector & Evacuated tube collectors	18,000
CSTs with double axis tracking	20,000

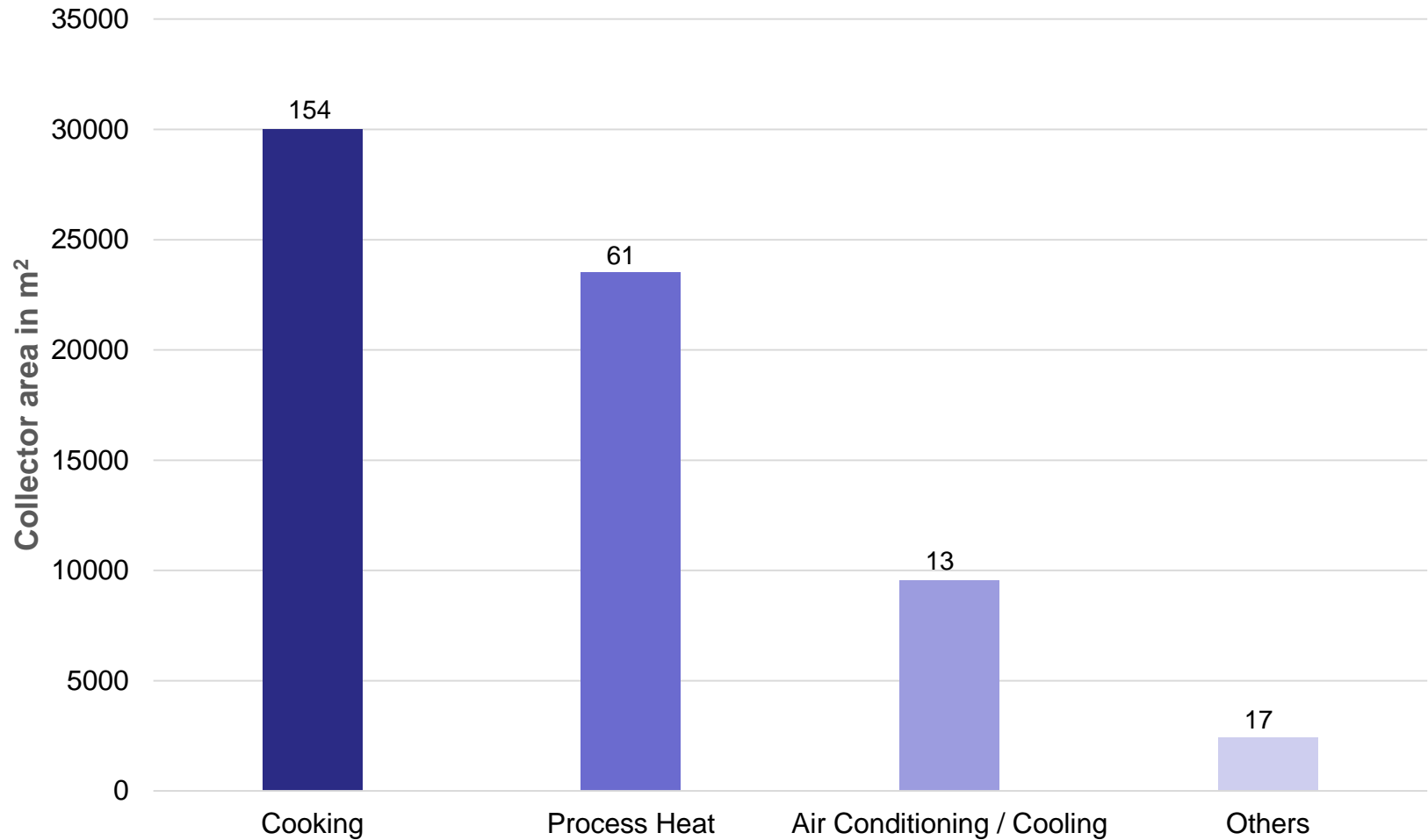
Completed CST projects (as on 01.08.2019)

State-wise number of projects and total collector area

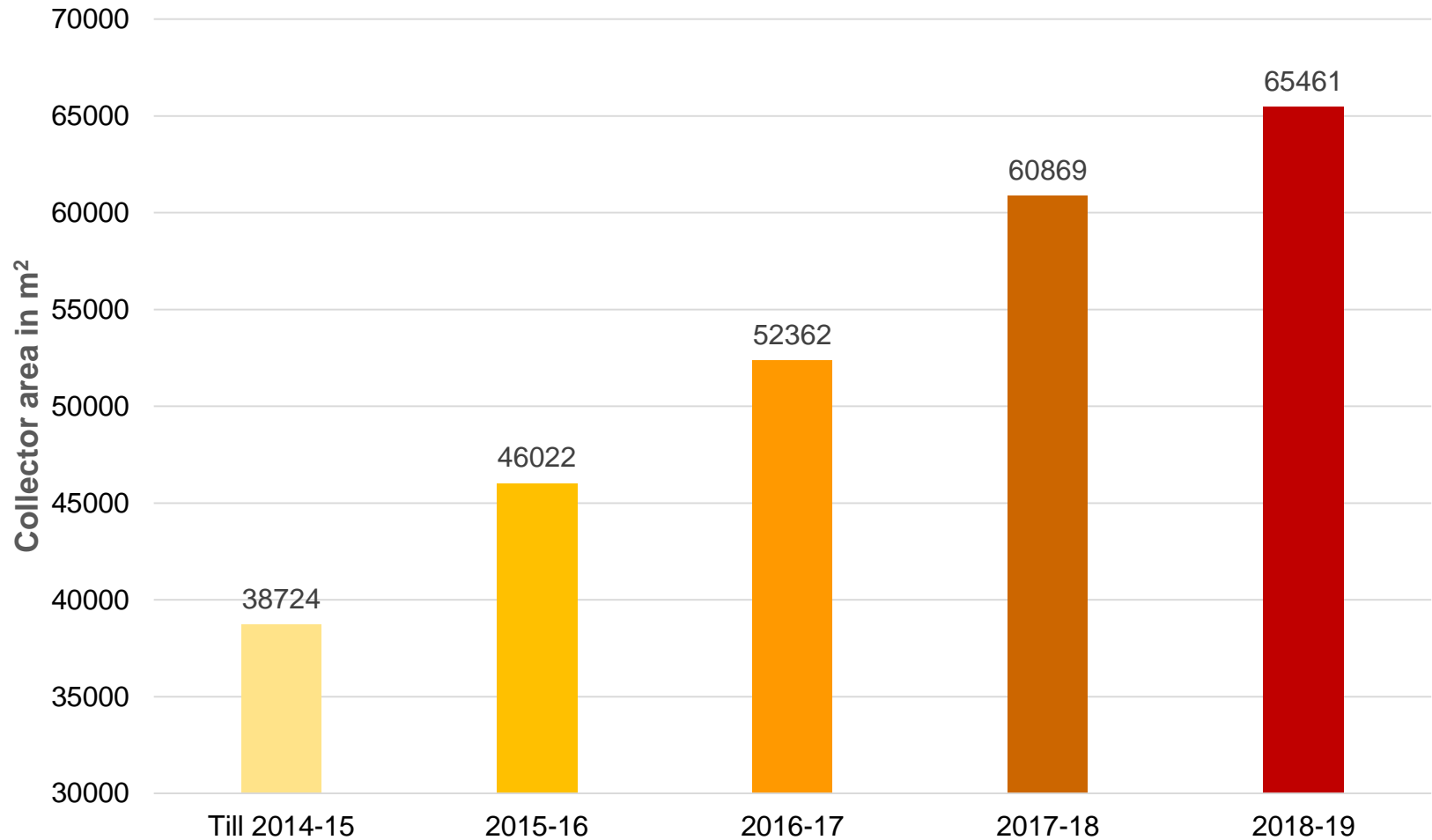


Total 245 CST projects with around 65,500 m² collector area

Application wise CST projects



Cumulative CST growth



CST Applications



**Chitle Dairy, Sangli
(338 m²; Milk Pasteurization)**



**Paraboloid Dishes at Synthokem
Pharmaceutical, Hyderabad
(540 m²; Process Heating)**



**Non- imaging Collectors at
Neel Metal, Gurgaon
(612 m²; Process Heating)**



**Parabolic Trough Collectors
at Siddhartha Surgical, Vadodara
(263 m²; Process Heating)**

MNRE-UNIDO/GEF Project

Objectives

- Promotion of projects based on CST technologies for industry application of heating, cooling, cogeneration etc.
- To develop Business Models for promoting Solar Energy based heating/cooling, tri-generation through different CST technologies in industries and commercial sectors with a view to replace fossil fuels and reduce GHG emission

The project aims installation of CST technology covering an area of about 45,000 m² of concentrating solar collectors in the five years of the project duration.

Innovations through UNIDO's Project

- Dedicated loan scheme for CST projects through IREDA
- First project to support manufacturing in the CST sector
- Promotion of system integrators for 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
 - Other for installation, operation and maintenance of CST systems.
- R&D on thermal storage solutions.

IREDA-UNIDO Financing Scheme

Financing Arrangement

- Loan up to 75% of installation cost
 - 45% - Soft loan with interest subvention of 5%
 - 30% - Bridge loan against MNRE subsidy at normal interest rate
- Support also available for improving the manufacturing of CST system/ components besides technical support.

Eligibility

- Any entity as per IREDA guidelines setting up a solar thermal heating/cooling/ tri-generation project
- Minimum loan amount - Rs 50 Lakhs
- Projects approved for subsidy from MNRE
- Beneficiaries of CST based systems, manufacturers and ESCOs
- All other conditions shall be as per IREDA financing guidelines.

Thank You