

Evolution of Solar Thermal Process Heating in India

Next-Generation Solar thermal technology for Industrial Process Heating



“It shall be the Duty of every Citizen of India to protect and improve natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures.”

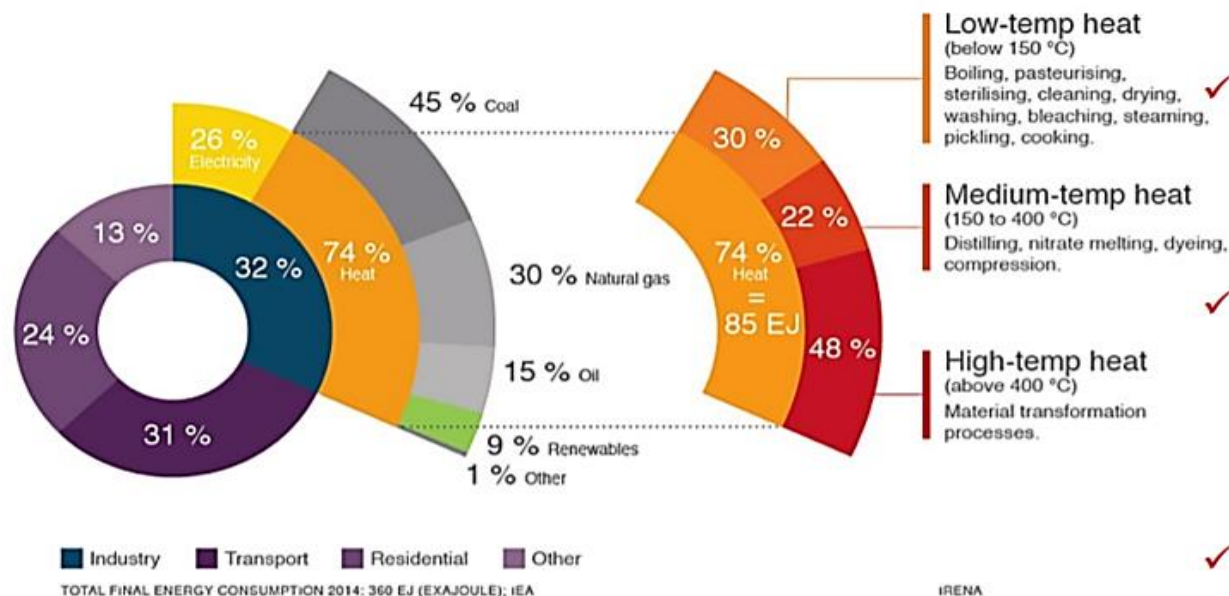
FUNDAMENTAL DUTY OF INDIAN CITIZEN



Industrial Process Heat: India's Prospective

Process heating

Direct or Indirect application of Heat in a process through a heat transfer mechanism



- ✓ Industrial energy consumption is responsible for 32% of India's total energy consumption.
- ✓ 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.
- ✓ 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.
- ✓ Solar technologies can produce a range of temperatures, between 50°C and 400°C, which can be used in a variety of these thermal applications.



Why Solar? (Save Energy, Save Environment, Save Nation)



80% ENERGY DEMAND
USING FOSSIL FUELS



212.1 MILLION TONS OF COAL
IMPORTS IN FY 2015



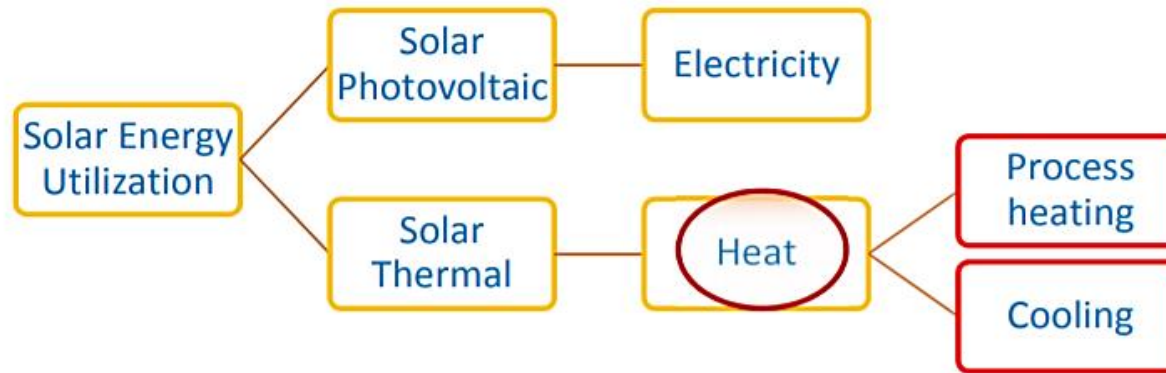
1040 BILLION RUPEES
IN IMPORT BILLS



GHG CHALLENGE TO COMBAT
CLIMATE CHANGE



Emerging Concentrating Solar Thermal Technologies (CSTs)



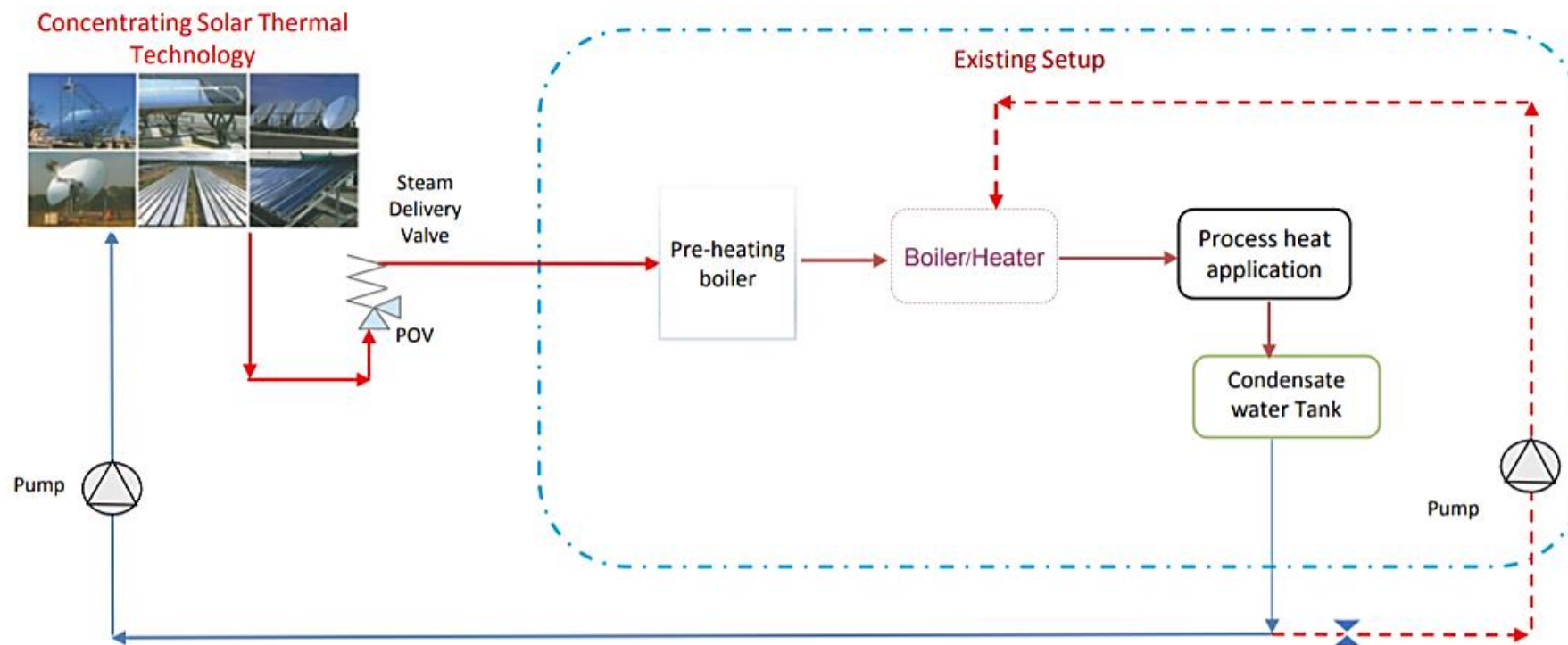
- CSTs can concentrate solar radiation using mirrors/lenses to produce low to medium temperatures heat for various applications (up to 400 °C).
- Most of these devices need automatic tracking so as to focus sun rays on to a receiver all the time.





Easy Integration of CSTs with Existing System

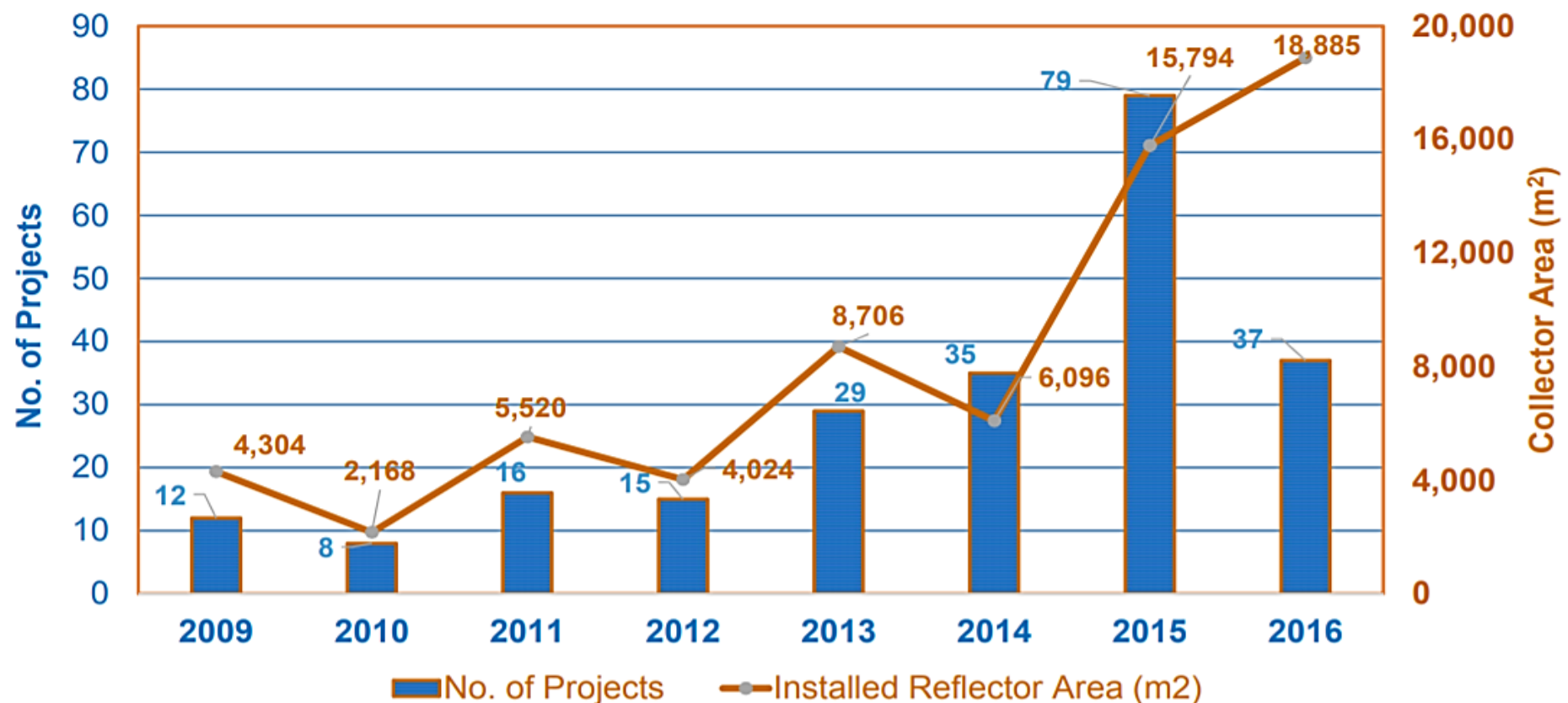
- Steam or pressurized hot water is used to increase the temperature in a process vessel/boiler.
- If the steam is used for energy generation, the thermal efficiency of the overall system can increase.





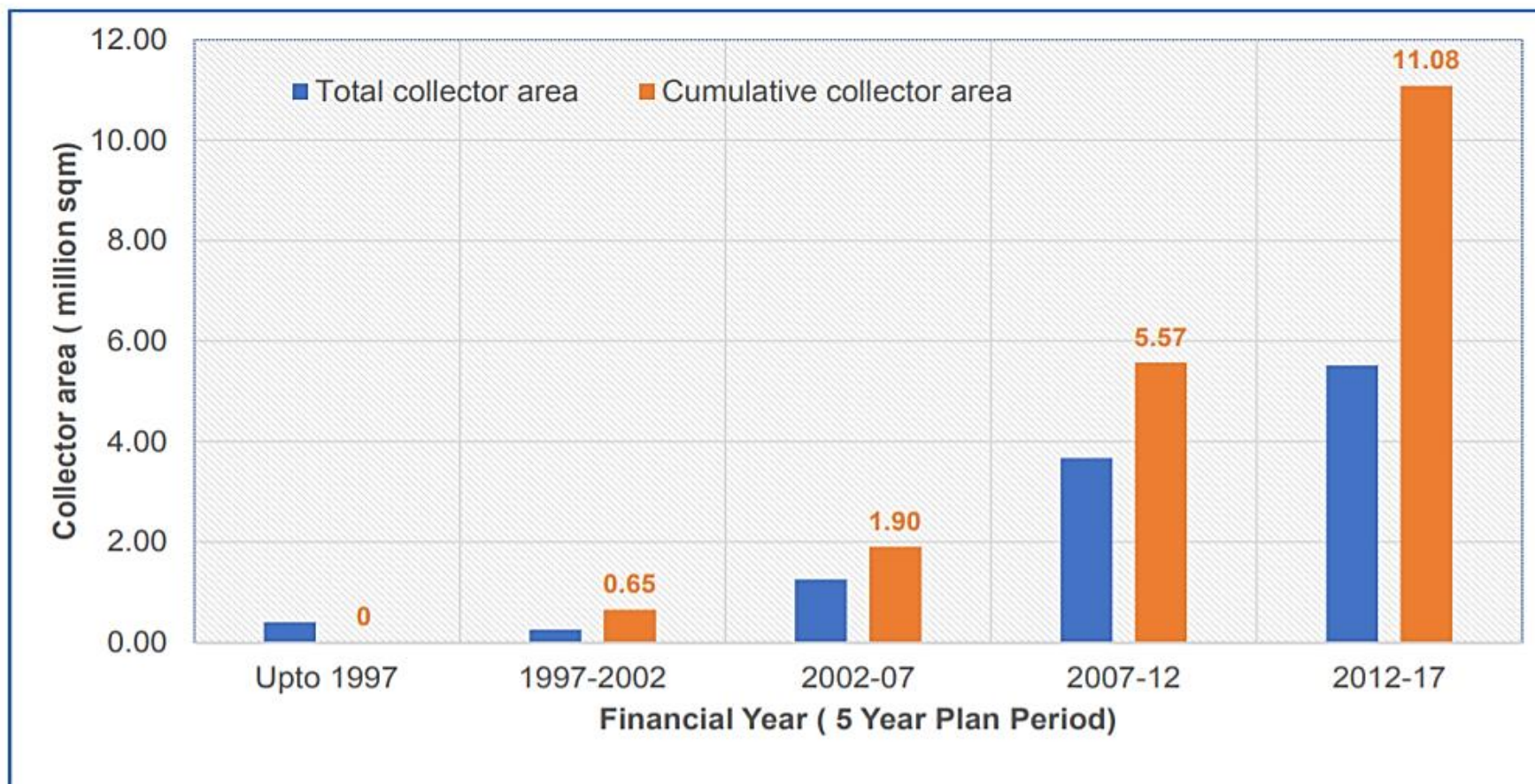
Accelerating growth of CST projects in India

No. of installed projects = 271 (Collector area = 78,290 m²; Power = 52 MW)





Installation of Solar Water Heating Systems

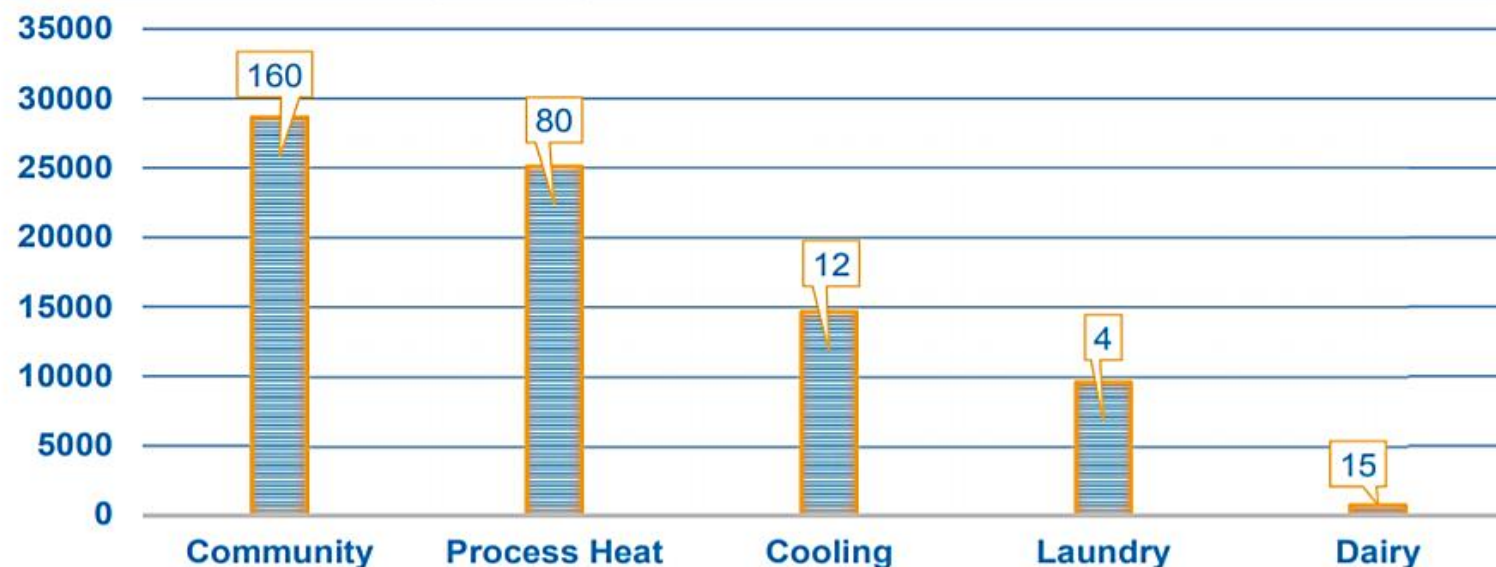




Potential Sectors for CST Deployment

S. No.	Sector	S. No.	Sector
1	Textiles (Weaving, Finishing)	8	Rubber
2	Pharmaceuticals	9	Chemical & Fertiliser
3	Tobacco	10	Petroleum Refineries
4	Breweries	11	Desalination
5	Pulp & paper	12	Ceramic tile & pottery
6	Electroplating	13	PoP, Steel re-rolling, Cement, Mining
7	Food processing (including Dairy & Sugar)	14	Other industries including tertiary using steam/cooling

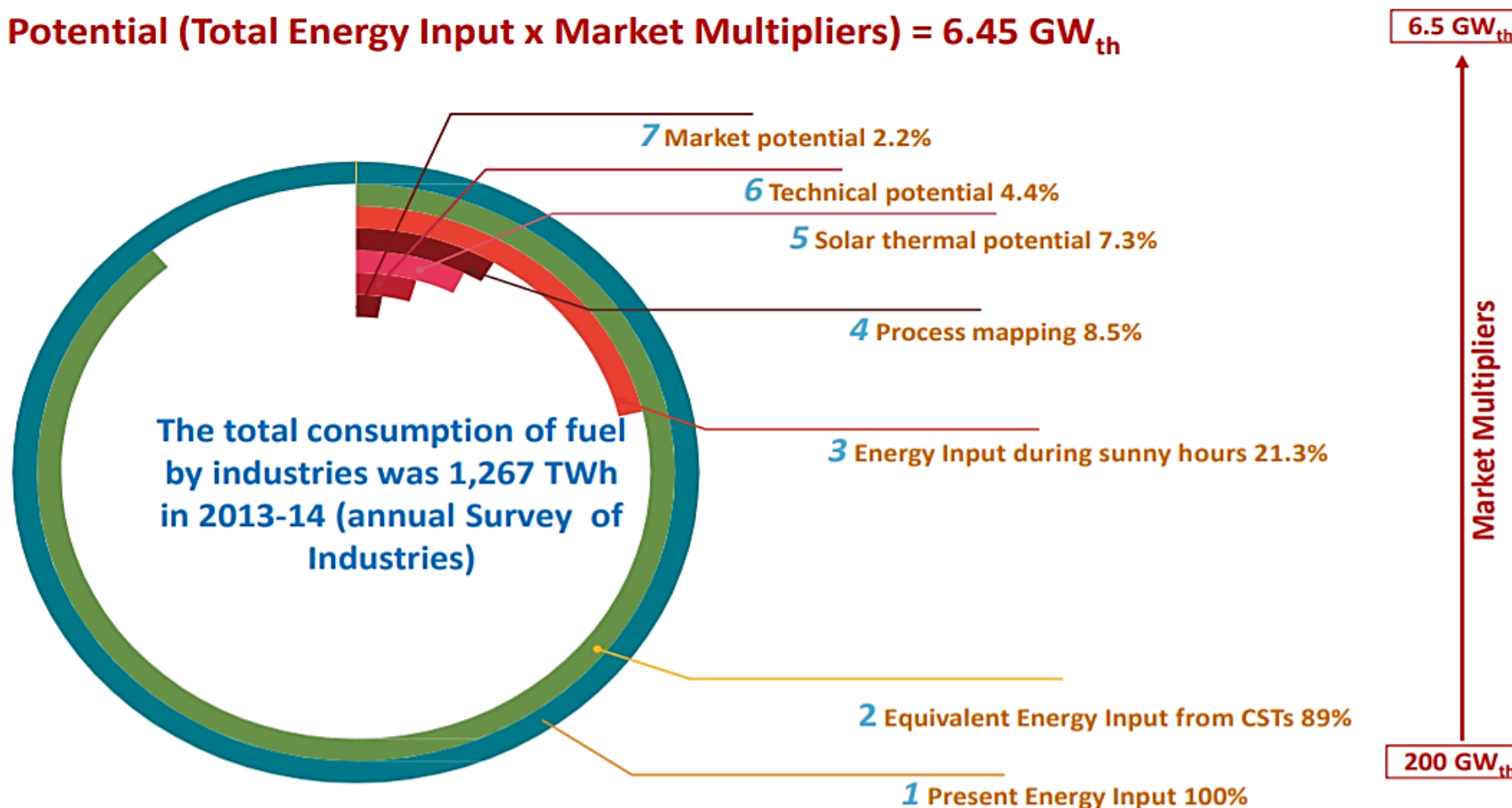
Achievements





The Market Potential of CSTs in India

Market Potential (Total Energy Input x Market Multipliers) = 6.45 GW_{th}



CLIMATENZA INDIA