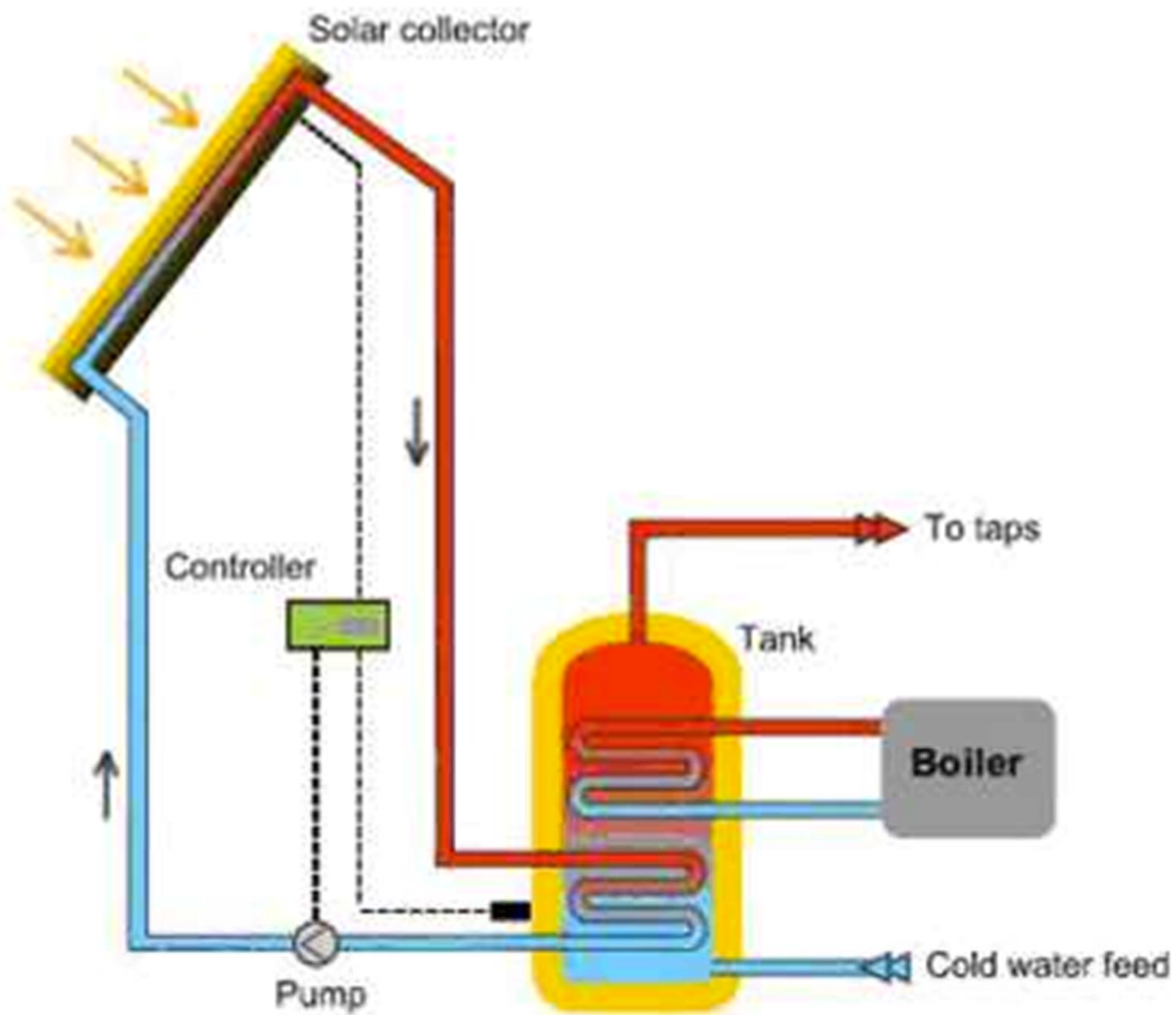


SOLAR THERMAL ENERGY

By: Archit Jain

WHAT IS SOLAR THERMAL?

- Solar Thermal energy (STE) is a form of energy and a technology for harnessing solar energy to generate thermal energy or electrical energy for use in industry, and in the residential and commercial sectors [1]
- Sahara Desert approximately in 1910
- Mojave Desert
 - 9 in California
- Passive and Active



■ Classified

- Low
- Medium
- High

■ Two Categories

- Concentrated Solar Thermal (CST)
- Concentrated Solar Power (CSP)

■ There are three different technologies in STE

- Parabolic troughs
- Central receivers (twoers)
- Parabolic dishes

THERMOSIPHON



LOW TEMPERATURE

- Systems for utilizing low-temperature solar thermal energy include means for heat collection; usually heat storage, either short-term or interseasonal; and distribution within a structure or a district heating network.
- Heating is the most obvious application, but solar cooling can be achieved for a building or district cooling network by using a heat-driven absorption or adsorption chiller (heat pump).
- With in Low Temperature we have
 - Low-temperature collectors
 - Heat storage
 - Solar-driven cooling

MEDIUM TEMPERATURE

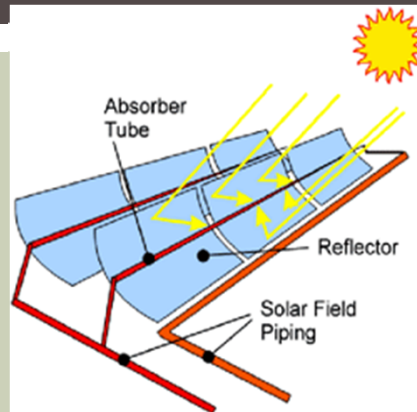
- These collectors could be used to produce approximately 50% and more of the hot water needed for residential and commercial use in the United States.
- Cost
- Solar Drying
- Cooking



HIGH TEMPERATURE

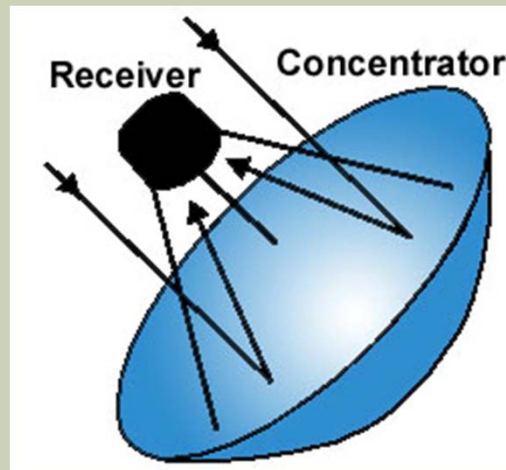
- Where temperatures below about 95 °C are sufficient, as for space heating, flat-plate collectors of the nonconcentrating type are generally used.
- System Designs
 - Parabolic trough design
 - Power tower design
 - Dish design

- Parabolic troughs



- Central receivers (towers)

- Parabolic dishes



CHALLENGES

- Coal
- Land Requirements
- Advantages
 - No Fuel Cost
 - Predictable, 24/7
 - No Pollution and Global Warming Effects
 - Using Existing Industrial Base
- Disadvantages
 - High Cost
 - Water Issue
 - Ecological and Cultural Issues

REFERENCES

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