Acclaim
Sun @Work

GO GREEN
Drive through the Future

Presentation for

Acclaim Product Portfolio

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Parabolic Trough Solar Concentrator (PTSC)

Indigenously designed & developed Parabolic Trough Solar Concentrator (PTSC) to generate Hot Water, Hot Air & Steam

Acclaim Product Portfolio

✓**Biomass Gasifier for CHP application** –

Replace Fossil Fuels in Power & Thermal applications.

Biochar based Fertilizers

By-product Biochar converted into Soil Sequestration input.

Product Portfolio

Energy Plantations

Integrated with Biomass Gasifier Plants

Briquetting of Agro & Animal Waste

Acclaim Product Portfolio

Biomethanation

BARC "Nisargruna" Twin Digester Technology for converting Kitchen, Food, Plant, animal and other biodegradable Waste-2-Value

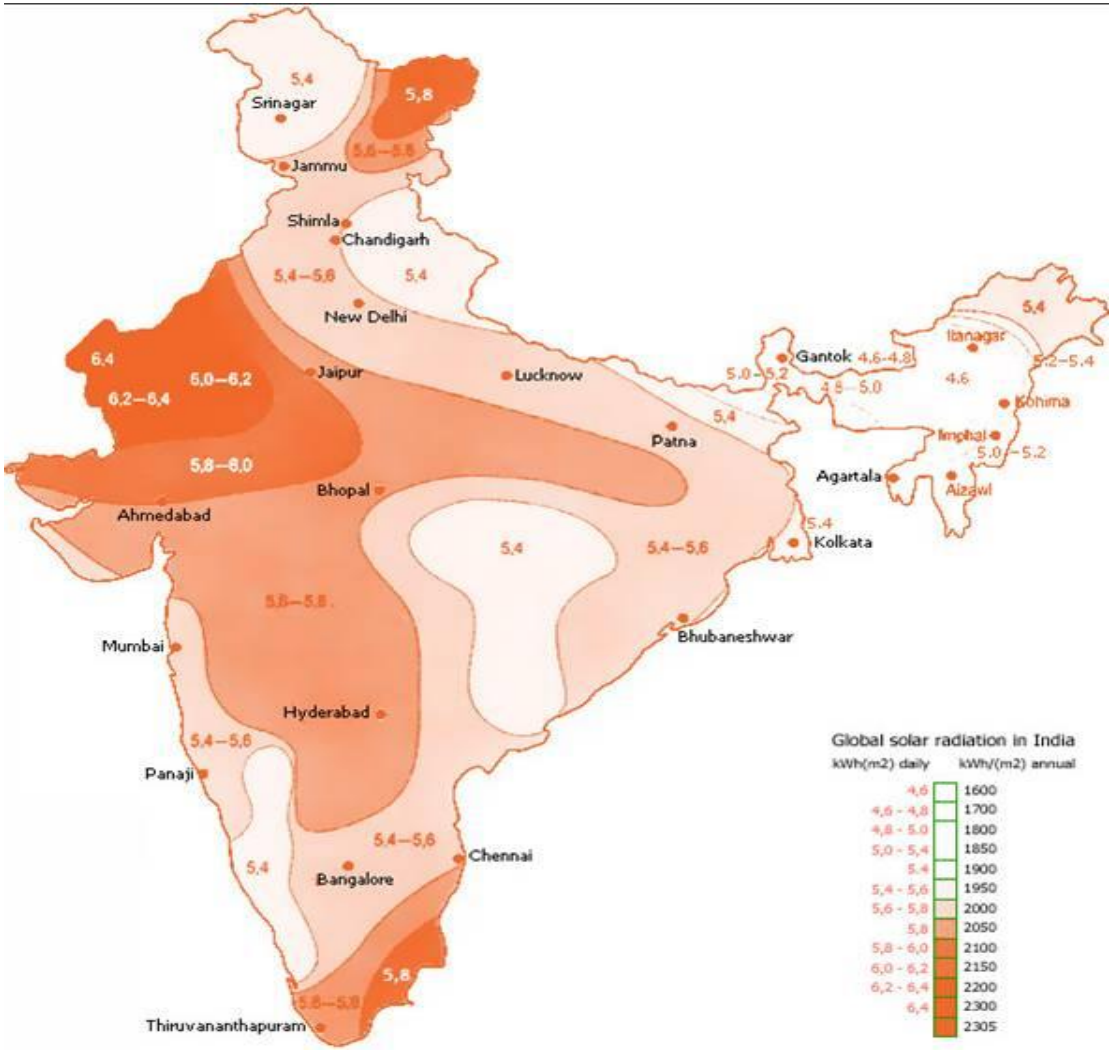
Acclaim Smart BIO

Sun Energy

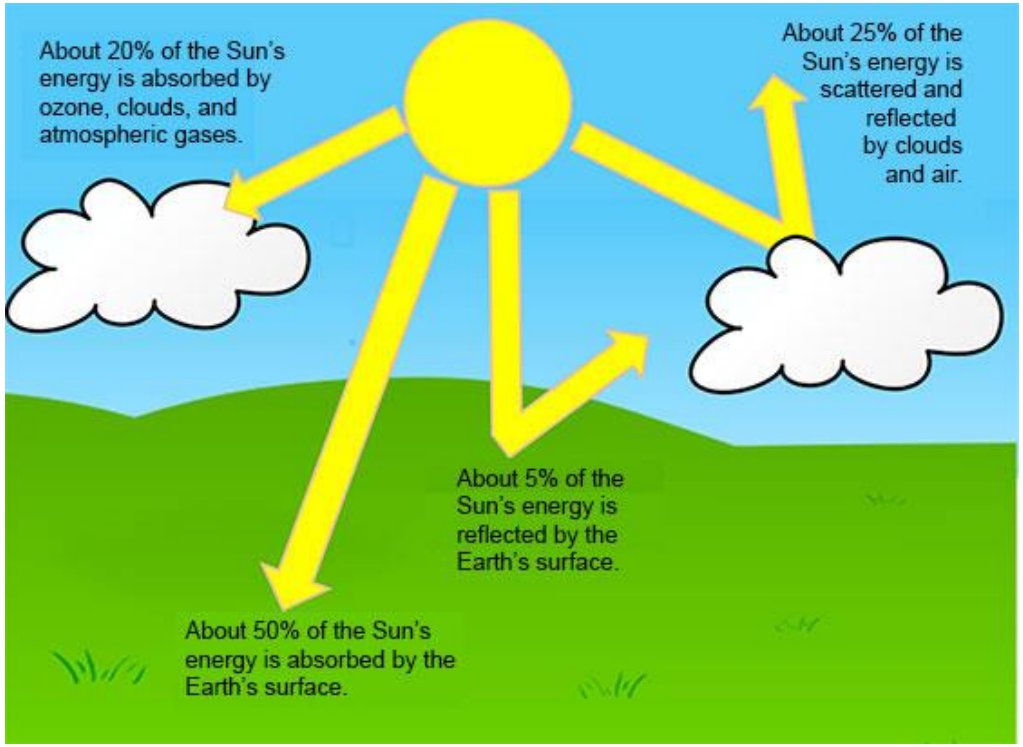
Free Gift of Nature to mankind

Solar Radiation Potential in India (mainly Tamilnadu)

4 – 7 kWh /m2/day



It's Renewable Energy



Solar energy is the most reliable, abundant and humanity's oldest energy source. Sun produces 4×10^{26} watts of energy every second.

In one hour more sunlight falls on earth than what is used by the entire population in one year. It will last another 5 billion years.

Why Solar Thermal

PV 12% to 15% efficient

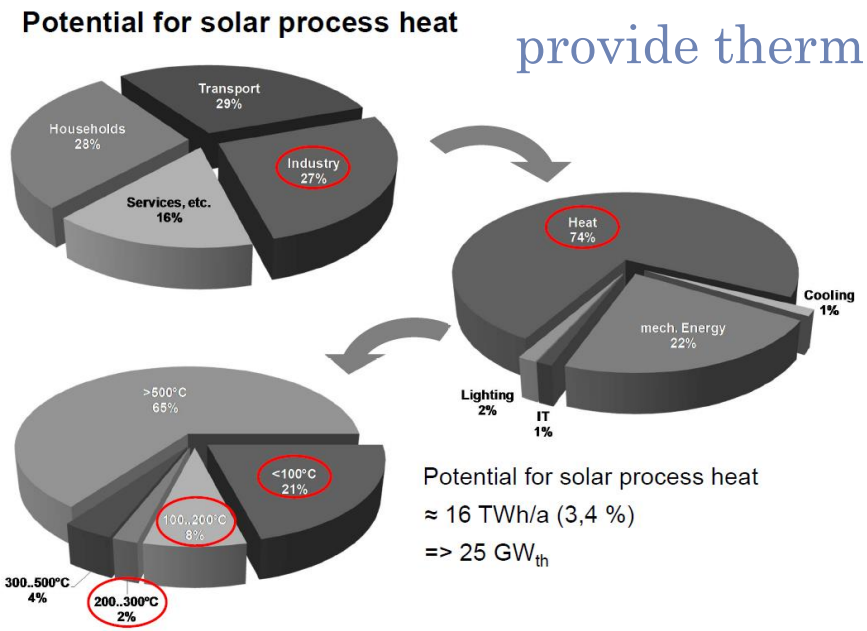
Concentrated Solar Thermal 72% efficient

Process Heat Applications

Industrial sector is second largest consumer of energy in India (28%)

Yet electricity (21%) is a relatively small constituent of industrial demand

Rest of demand is met by coal, biomass, oil products and gas, which indicate that a large amount of energy in the industrial sector is used to provide thermal energy/heat



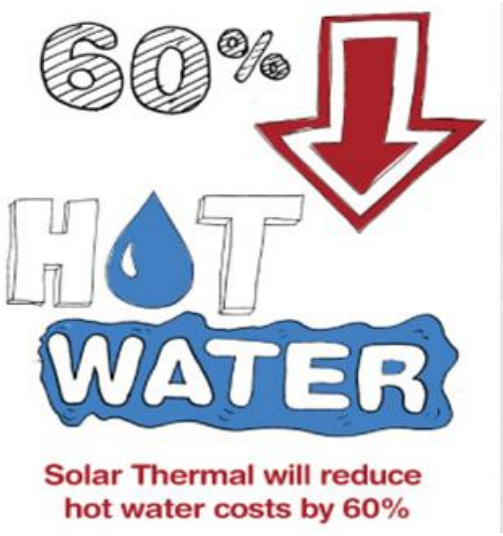
Potential for solar process heat
≈ 16 TWh/a (3,4 %)
=> 25 GW_{th}

Solar heat for industrial processes – Technology and potential

1. Potential and application areas
2. System integration and collectors
3. Existing solar process heat systems
4. Conclusion

Potential and application areas

Space Heating and Water Heating Two LARGE ENERGY consumers



And

Industrial Process Heat

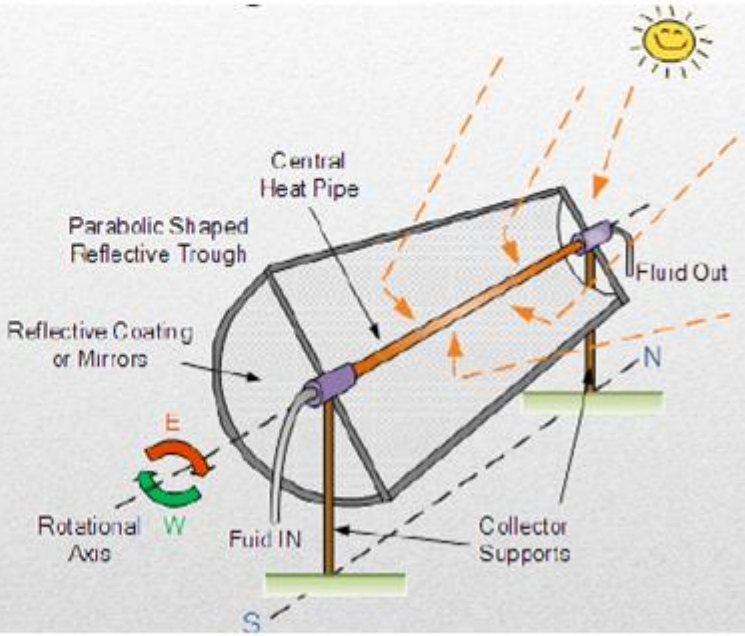
Industries and potential Solar Thermal Applications

Industry	Applications
Textile	Bleaching, Drying, Heat Treatment, Mercerizing, Effluent Treatment
Plastic/Polymer	Extrusion, Drying, Effluent Treatment
Automobile	Cleaning, Paint Drying, Degreasing, Effluent Treatment
Chemical	Heat Treatment, Drying, Extraction, Galvanizing, Boiling, Distillation, Effluent Treatment
Pharmaceutical	Drying, Process Heating and Chilling, Sterilization, Effluent Treatment
Paper & Pulp	Bleaching, Drying, Kraft Pulping, Effluent Treatment
Services Sectors – Hotel & Hospital	Washing, Laundry, Cooking, Air conditioning, Heating
Food Processing	Concentration, Dehydration, Drying, Pasteurization, Sterilization, Effluent Treatment.
Crumb Rubber & Tyre	Heating, Curing, Mixing and Processing

Parabolic Trough Collector (PTC)

A parabolic trough collector (PTC) essentially has a linear parabolic shaped reflector (usually coated silver or polished aluminum) that focus the incident solar radiation on a linear receiver/ absorber located at the focus of parabola. Parabolic troughs use single-axis tracking. In order to achieve maximum efficiency of the collector, the trough is usually aligned on a north-south axis which tracks the sun along one axis from east to west during the day to focus maximum incident beam solar radiation along the line. Due to the parabolic shape of the collector, the trough can achieve average temperatures over 400°C. The heated working fluid may be used for medium temperature space or process heat, or to operate a steam turbine for power or electricity generation.

- Collector (Reflector)
- Receiver (Absorber)
- Tracking System
- Mounting structure

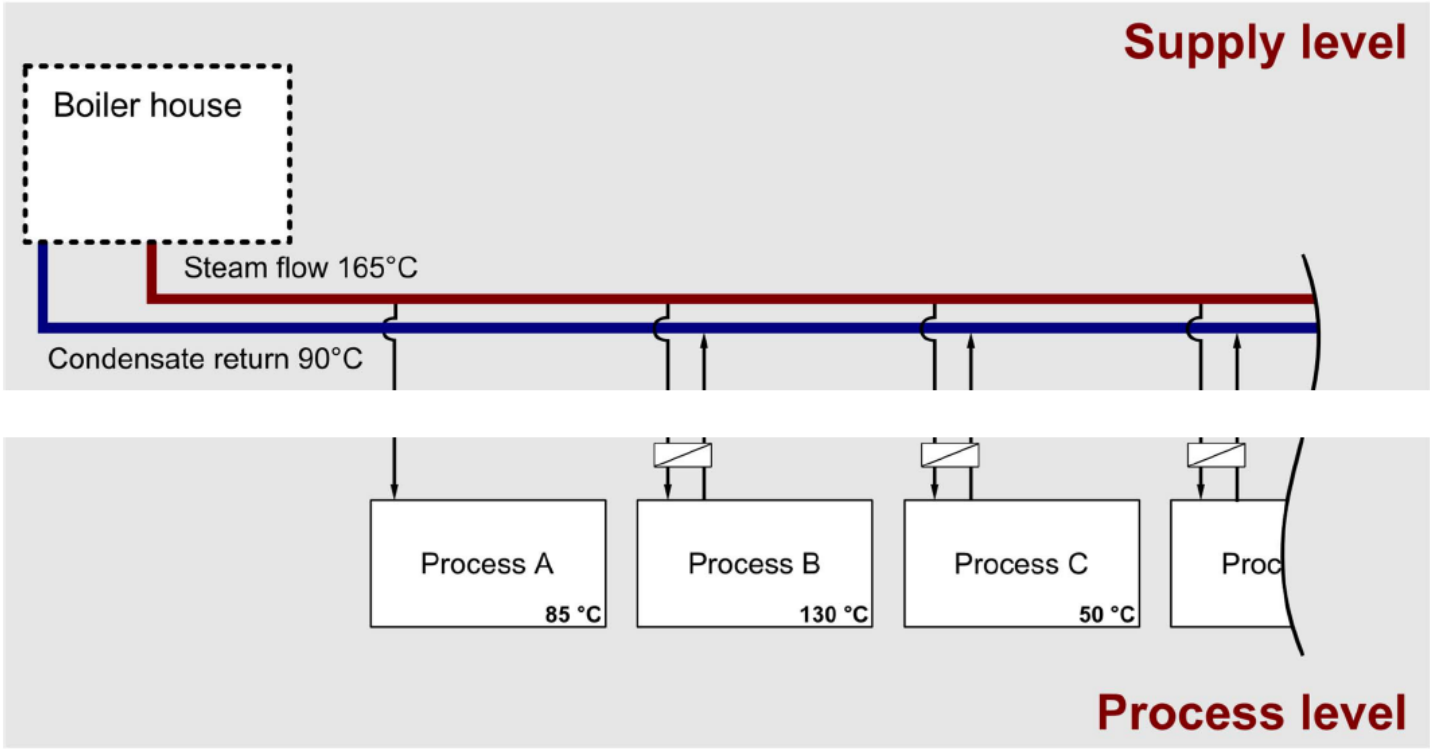


PTSC can be integrated with:

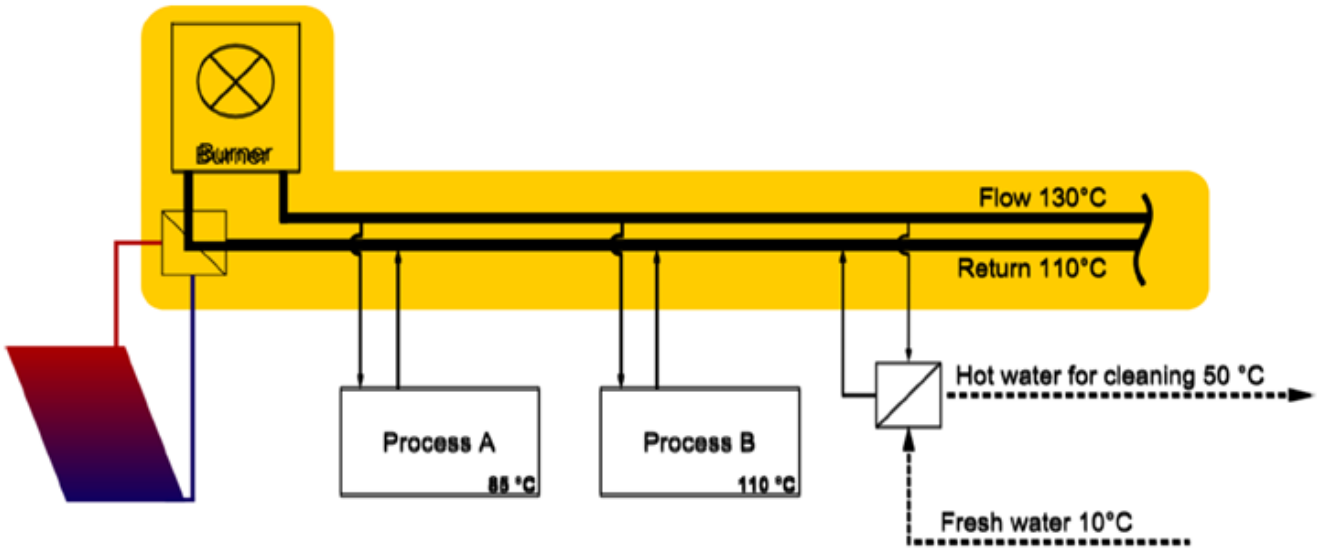
- Boilers
- Steam Ejectors
- Dryers
- Heat Exchangers

System integration and collectors

Principles of system integration



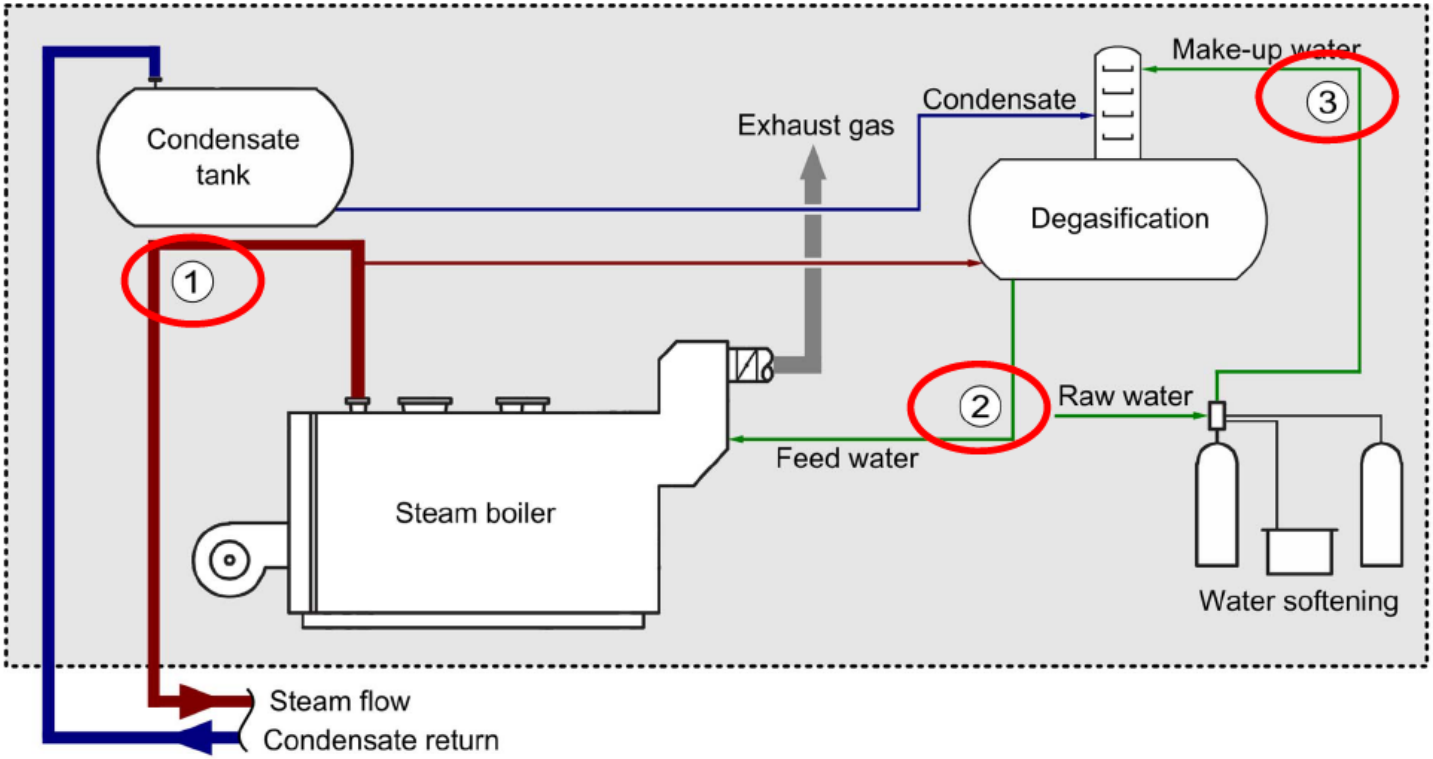
Integration on supply level – hot water



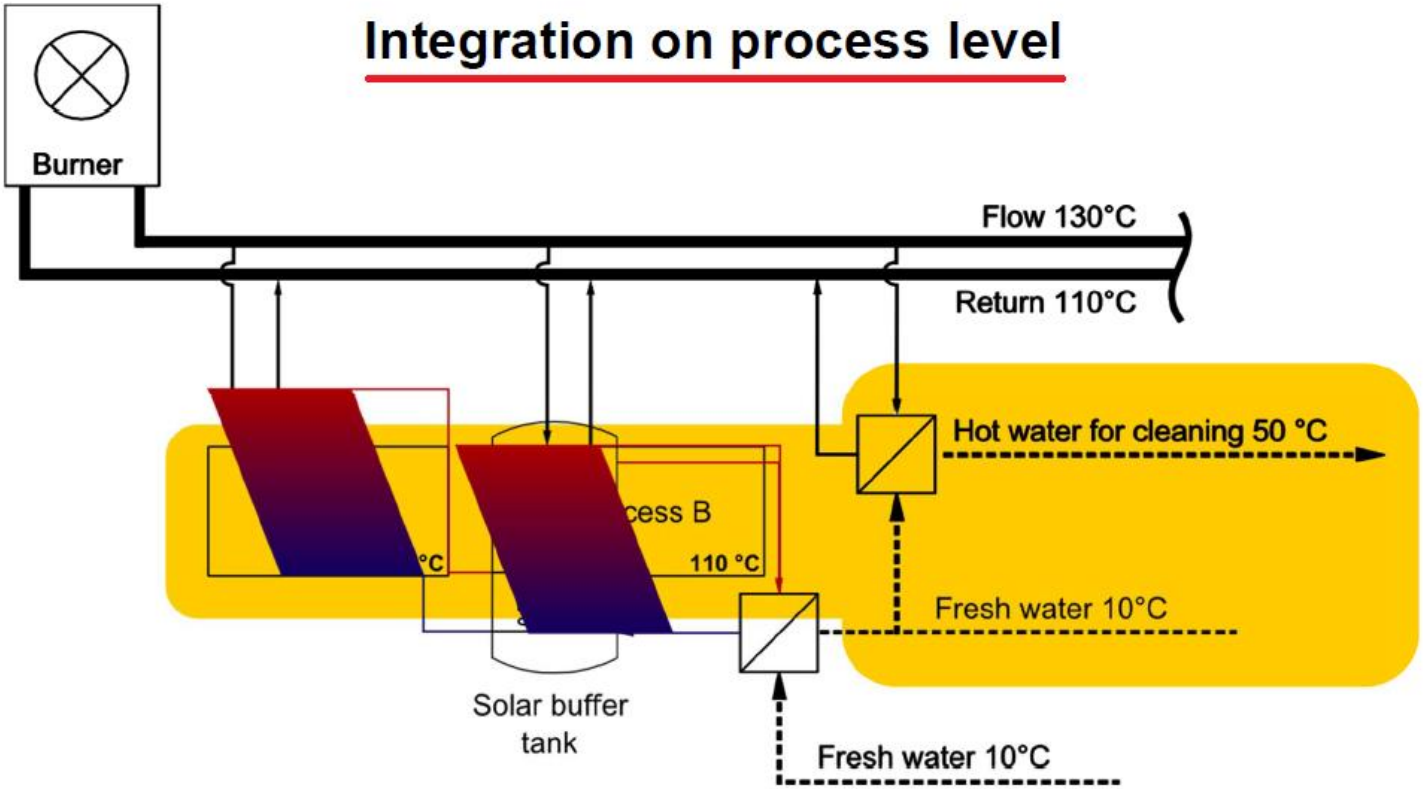
- Feed-in solar energy in heating circuit
- High set temperature
- Simple system integration
- Small number of system layouts

Integration on supply level - steam

Parallel integration or increase of return temperature



Integration on process level



- Solar energy is directly used for the process
- Different system layouts possible
- Often complex system integration

Integration of PTSC in Process Heat Applications

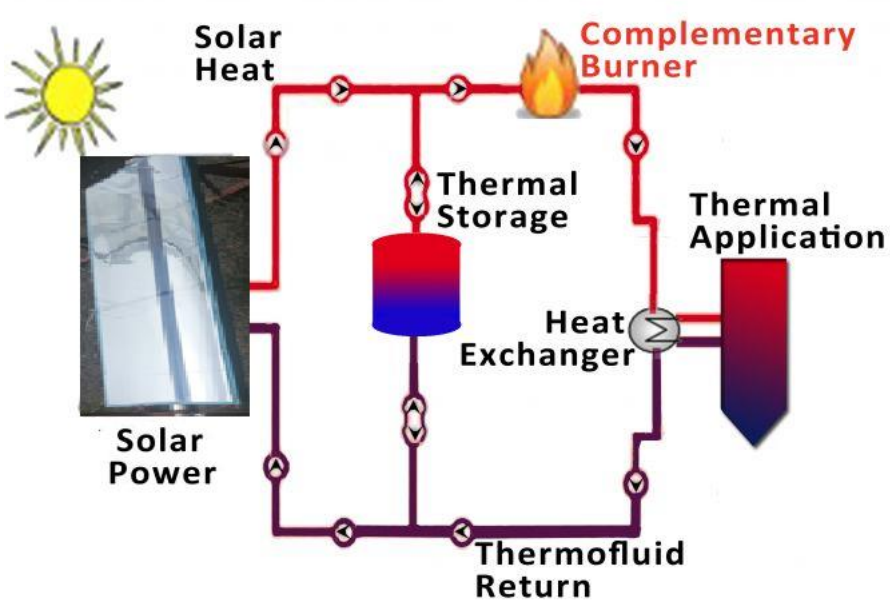
– Low up to 100°C

– Medium up to 200 °C

– Solar Cooling & refrigeration

– Solar desalination

– ETP Drying



Collectors for process heat applications

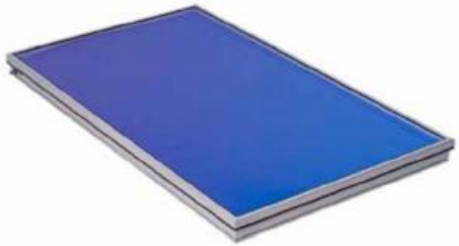
Up to 80 °C

Flat plate collectors

80..120 °C

Vacuum tube

Advanced flat plate collectors



120..250 °C

CPC-, Fresnel-, parabolic through collectors

Challenges & Opportunity in Solar Thermal Applications

1) Process disruption

Solution – Retrofit & Process Automation.

Solar is a complementary solution and can always be reverted to existing system in case of deficiency in Solar Power.

2) Convince Operating Personnel of benefits

Will not burden the operators standing procedures and result in additional work.

3) Cost

Demonstrate challenges to commercial viability

4) Space Availability for mounting PTSC

5) Post-Sales Support

Acclaim
Sun @Work

avon
SEALS PVT. LTD.

Manufacturer of Mechanical Seals

16 Kw Electrical Energy

4 Hot Water Bath of temp between 50 to 70^0 C

Degreasing & Cleaning of Mechanical Seals

Trough Parameters

Measurement/Trough	: 2.00 m x 1.0 m
Weight /trough (Approx weight of 1 Trough)	: 25 Kg
Space Requirement/Trough (Roof Top/Ground/Sheet Top)	: 4.0 Sq.m
Output/trough	: 760 KCal
Standard array (Trough with single axis tracking)	: 7 Max.
Temperatures achievable	: 200 Deg C ±

Benefits

Subsidy	: Rs.5,400/Sq Mtr
Accelerated Depreciation	: 80%
Pay back	: <2 years (For Diesel/LPG)

Cost-Benefit Projection & Payback

Note: The GREY shaded shell can be changed to reflect your actuals		
Parameters Considered		
Diesel used per day	240.00	Ltr
Diesel consumed hour	10.00	Ltr/hr
Cost of Diesel	60.00	Rs./Ltr
Calorific value of Diesel	9,000.00	Kcal/Ltr
Total Energy /hour	90,000.00	Kcal/Ltr
Solar Trough Parameters		
Solar Availability (Sun Hours/day)	6.00	Hours/day
Solar Energy Delivery/Trough	760.00	Kcal
Area Required for mounting/trough	4.00	Sq M
Solar Trough Requirement for client	118.00	No. Of Troughs
Cost of the Plant	44,25,000.00	Rs.
Less Subsidy (Whichever is lower)		
30% of cost OR	13,27,500.00	Rs.
@5,400/Sq Mtr	12,74,400.00	Rs.
Cost of the Plant	**31,50,600.00**	Rs
Year_1 Accelerated Depreciation Benefit (80%)	10,62,000.00	Rs
C2C	**20,88,600.00**	At end of Year-1
Savings Calculation		
Diesel replaced/day	59.79	Ltr/day
Amount spent on Diesel Savied/day	3,587.20	Ltr
Savings per Annum (330 days)	11,83,776.00	Rs
ROI	**1.76**	**Years**

Installation Pictures

Innovative design *using* ***Finite Element methods*** *to withstand wind loads in excess of 100 kmph*

Smaller footprint *(2 m x 1 m) Light Weight Parabolic Trough for medium to small scale applications*

Ground Mounting

or

Roof Top model

- ✓for Concrete Floor
- ✓for Pre-Fabricated Sheets

Very Low Maintenance

Achievements

Velan Hotels Limited –
2.8 Megawatt biomass power with total waste heat recovery

Arashi Hi-Tech Biopower (P) Limited –
1 MW grid linked biomass power

Avon Seals Limited – PTSC for water bath heating

Hindustan Pencil Limited – Captive Gasifier power plant

Apsara Pencil (P) Limited – Captive Gasifier power plant

Industrial Minerals Limited – Captive Gasifier thermal plant

TNPL – Biomethanation of Kitchen and Food waste

Carpalendo Carbons P Ltd – Coconut shell to Shell charcoal

Thyrocare Technologies Limited – Solar rooftop 80 kWp

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