Industrial Solar Steam

Maximizing its large potential

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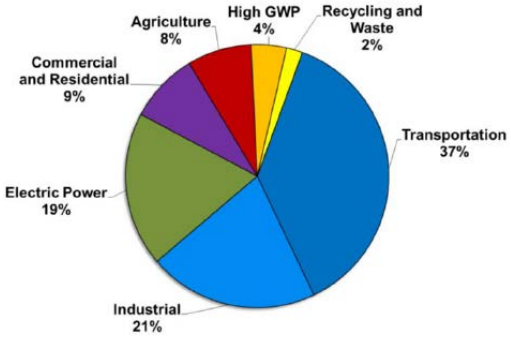
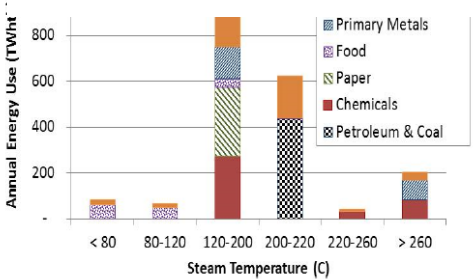
Significance of solar steam

- 21% of GHG emissions from industry
- 2/3 of industrial energy is process heat
- Modern boiler efficiency 90%
- Potential deep GHG reduction through solar thermal steam generation

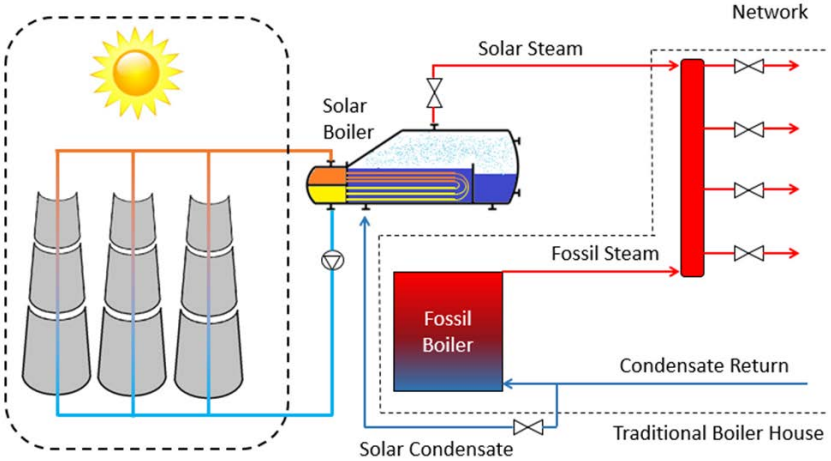




California Greenhouse Gas Emission Inventory: 2000 – 2015, Kurup and Turchi, "Initial Investigation into the Potential of CSP Industrial Process Heat for the Southwest United States", NREL, 2015

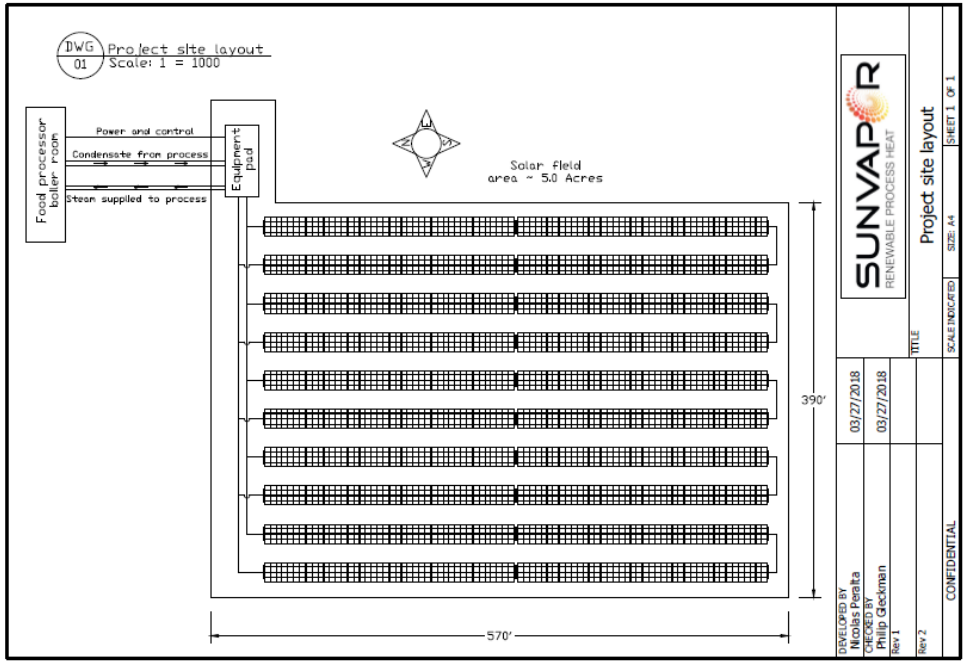
How solar steam works

Concentrated solar thermal energy



Video:
Sunvapor's collector at Horizon Nut Company

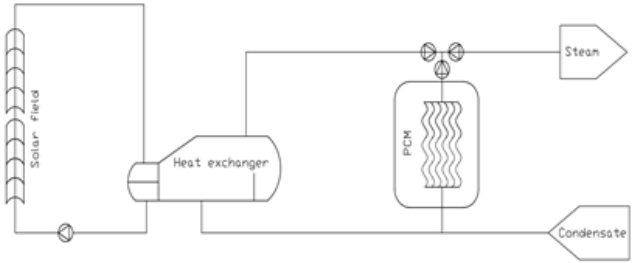
Benefits (per 5 acres)



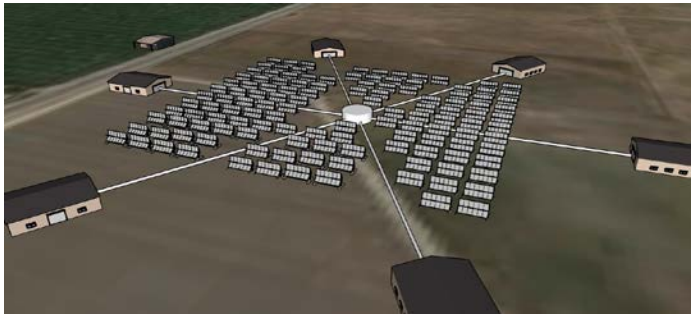
- Fresno County
- Capacity: 11 tons per hour @ 150 psig
- Up to 1,900 tonnes per year CO_2 avoided
- Up to $290,000 nat gas savings per year
- Attractive payback or steam price with CSI or FPIP

Maximizing impact

Challenges	Potential solutions
Incentives sunsetting	Aggressive levelized cost of heat
High capital costs	Heat purchase agreements
Solar fraction for 24 hour operation	Thermal energy storage
Land constraints	Rooftop space
Seasonal operations	Additional off-season processes



Steam generator with storage



Solar steam hub

ETCC EMERGING TECHNOLOGIES COORDINATING COUNCIL

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