



**Fast Forward to the
Solar Future!!**





Our Mission



We are the proud recipient of **CLIMATE SOLVER AWARD 2013** by WWF - India









Value Proposition



Save the **FUTURE**, without sacrificing anything **TODAY**



-  **Reduce Emissions**
-  **Enhance your Brand Image**
-  **Set an example for others**
-  **Save Fuel Cost**





Why Solar Thermal?

- Invest in energy security today and enjoy solar energy at approx. Rs 1 per KWH (maintenance cost) for 20-25 years (asset life)
- Pay for the investment from tax savings and fuel savings during the first few years without affecting your cash flows or bottom line.
- Help the country save on foreign exchange.
- Help the country meet its carbon emission reduction commitments.
- Protect our future generations from climate change and adverse weather conditions.
- Save Earth.





All Solar Not Equal

	PV (Electricity)	CSP Thermal	AEPL Thermal
Cost per MW	Rs 8 Crore	Rs 6 Crore	Rs 3-4 Crore
Cost per unit during pay-back	Rs 11 per KWH	Rs 8 per KWH	Rs 4.0-5.0 per KWH
Payback period	10 to 15 years	4 to 5 years	2 to 3 years
Cost per unit after pay-back (Maintenance)	Rs 2.2 per KWH	Rs 1.6 per KWH	Rs 0.8 to 1.2 per KWH





CSPs Limitations



- Parabolic dish : 16 sq.m - Requires min. 35 sq.m of space between each dish.
- Arun dish : 160 Sq.m - RCC required to withstand 15 Ton concentrated load within 3 sq.m
- High cost per MW, Poor pay-back period. Cannot mount on factory roof tops

Arun Dish

Parabolic Dish





AEPL Thermal?



Roof Top Mounted AEPL Thermal Collectors



ETC Glass Tube – 170 C





How we achieve?

We achieved higher temperatures by innovative additions to existing technologies and design..

- ETC-HX[™] , ETC-U[™] & ETC - CPC[™]
- Integrative Concentration[™]
- StayLiquid[™] : Pressurized
- FlexiFlow[™] : Forced circulation & Flow Engineering
- HybriHeat[™] : Switches from Solar to Fuel & vice versa based on temperature.

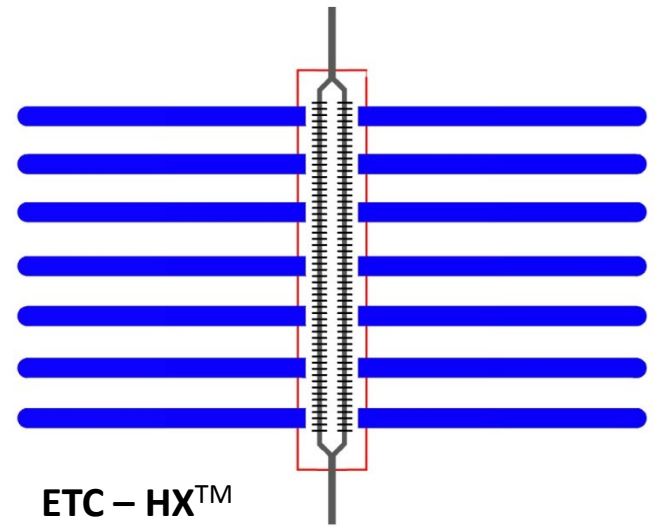




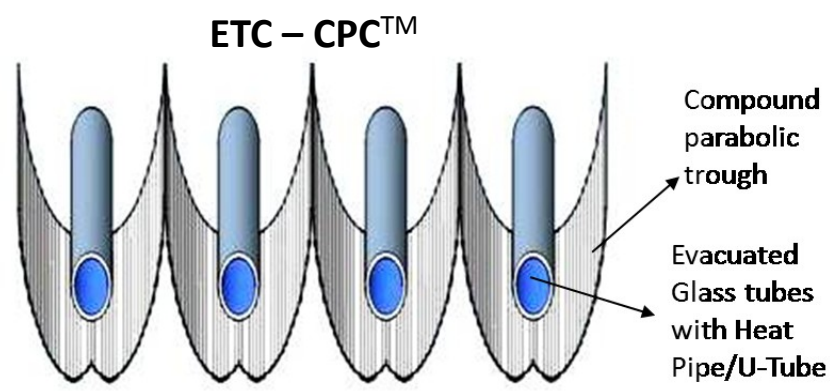
ETC U CPC HXTM



ETC – 'U'TM Tube



ETC – HXTM



ETC – CPCTM

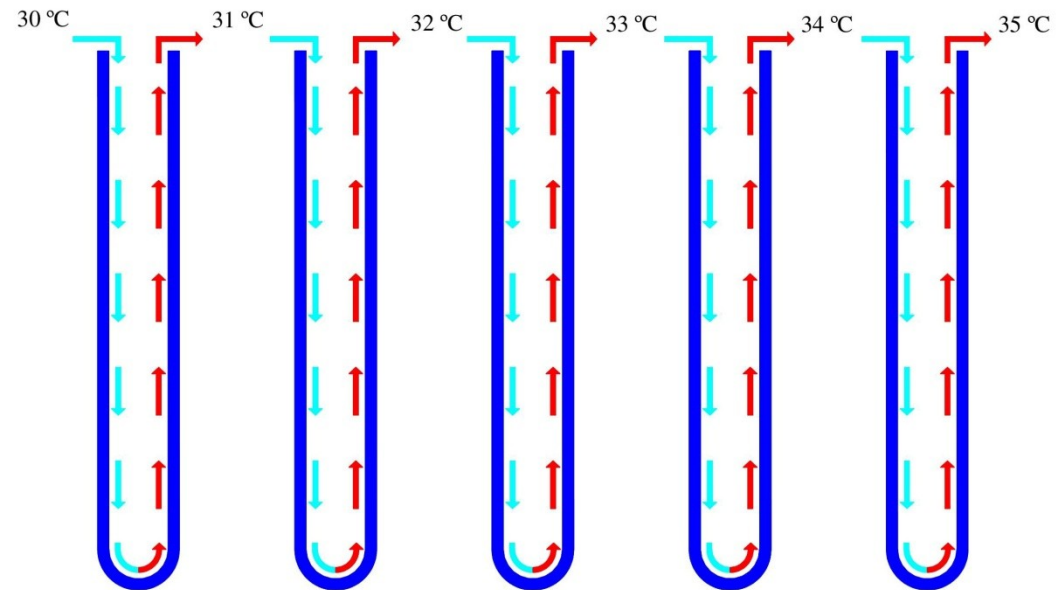




Integrative Concentration™

Integrative Concentration

- To achieve 90 -120°C for a given load, we have designed the solar thermal modules in series - parallel combination through which the desired temperature and flow is attained.





StayLiquid™ Pressurized

- At higher temperatures vaporization happens and problems like steaming, cavitation and stuttering occur. To avoid this we need to pressurize.
- We operate the generator side secondary circuit with pressurized hot water system up to 4 Bar.
- This is then coupled to the customer's process side through heat exchangers like Plate Heat Exchanger, Serpentine coil type, Immersion plate heat exchanger and radiators.
- The process fluid may be air, water, chemicals etc.





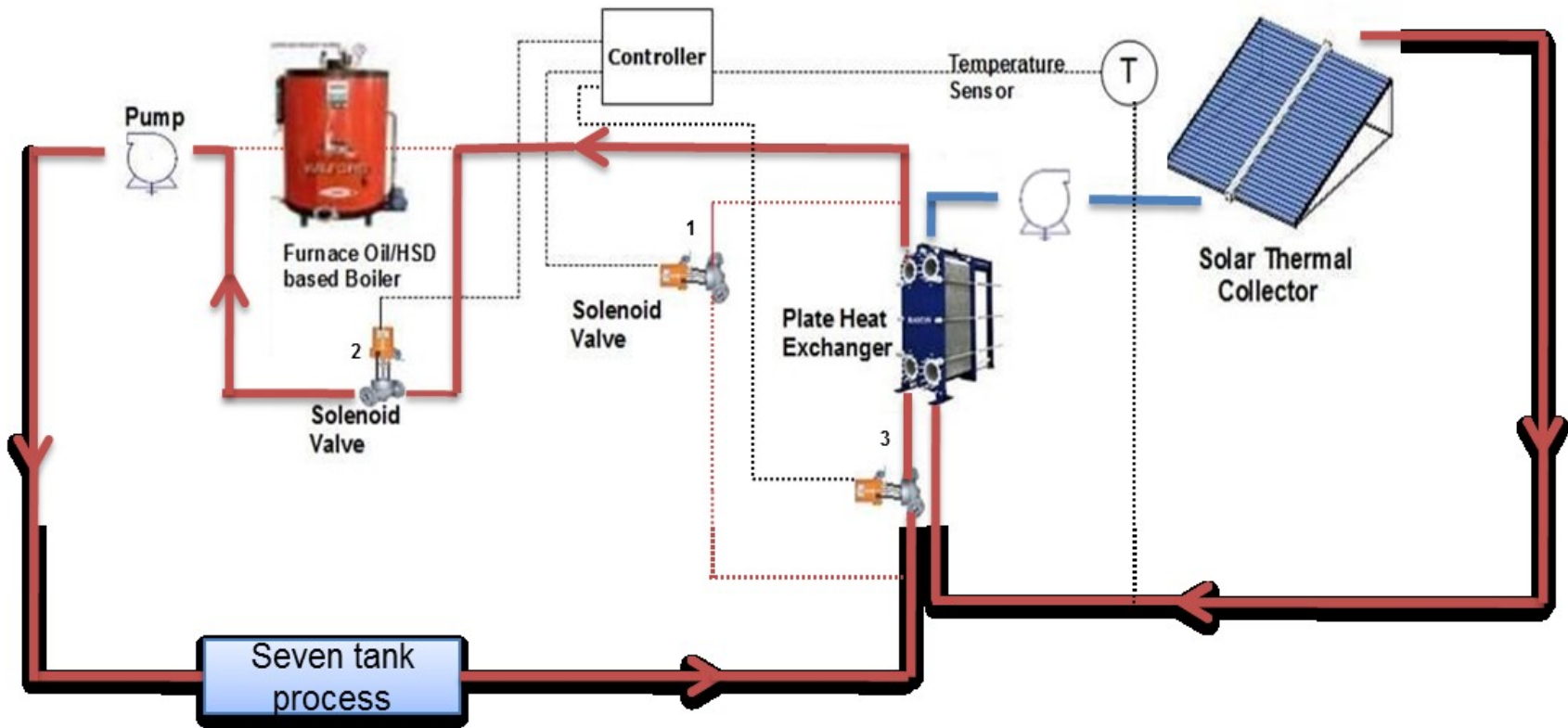
FlexiFlow™

- We need to manage the series parallel connections well, by managing the flow. We do this by careful calibration, adjustment of flow in each of the circuit.
- We use a pump on the generator / collector side to create forced circulation of the pressurized hot water.
- The flow, temperature and pressure are measured and controlled, so that we are able to achieve higher temperature, as well as maintain the required temperature more accurately.





HybriHeat™

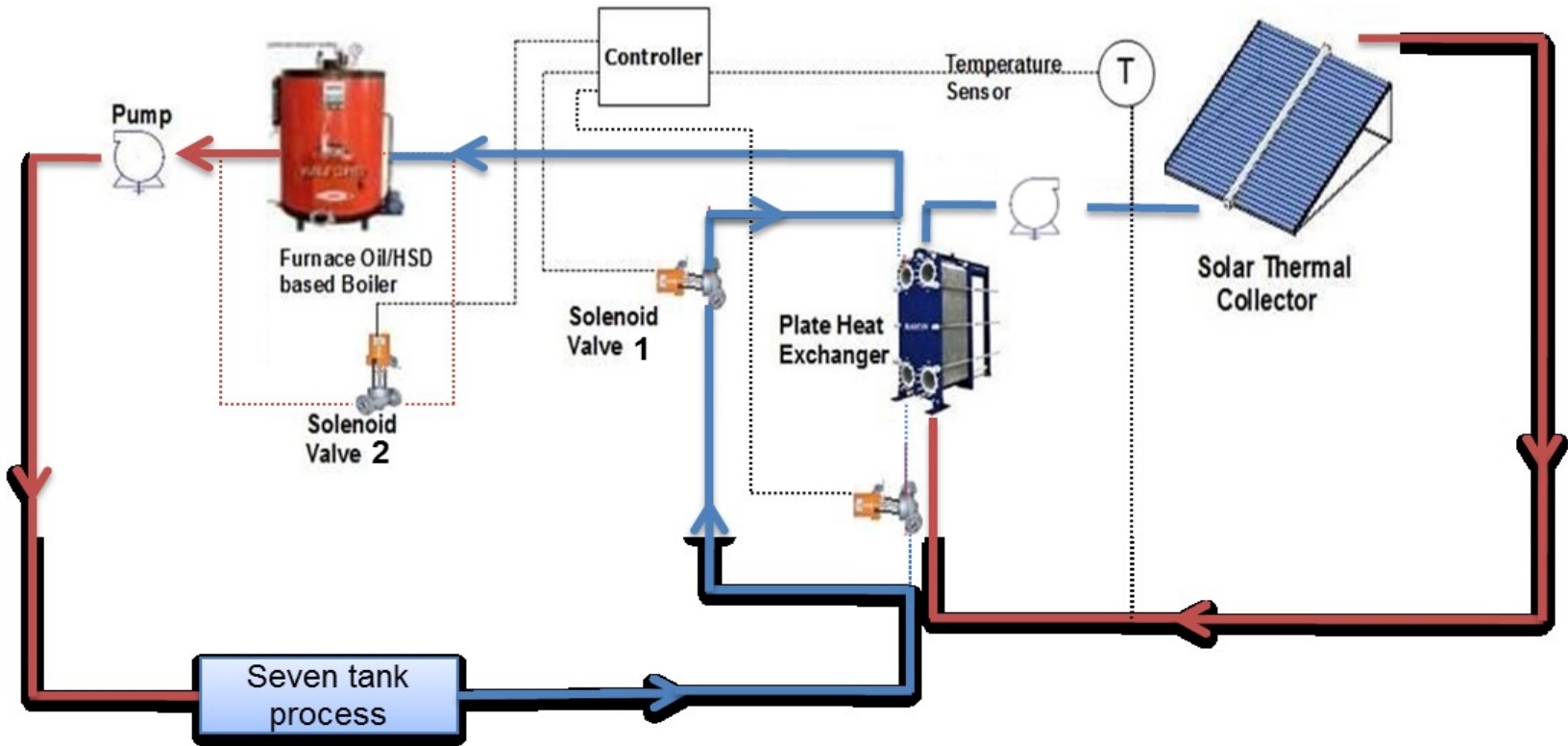


During Sunshine hours the heat energy flows as shown through the red line, through solenoid valves 2 and 3 (1 is off)





HybriHeat™



During Non-Sunshine hours the heat energy flows as shown through the blue line through solenoid valve 1 (2 and 3 off)





Technology Summary

AEPL ETC and ETC (U,CPC,HX)	CSP (Concentrators)
Fitted on factory trussed roof top	Cannot be fitted on factory roof top*
Up to 120 C without tracking mechanism	Requires tracking mechanism
Low cost per MW and less maintenance	High cost per MW and high maintenance





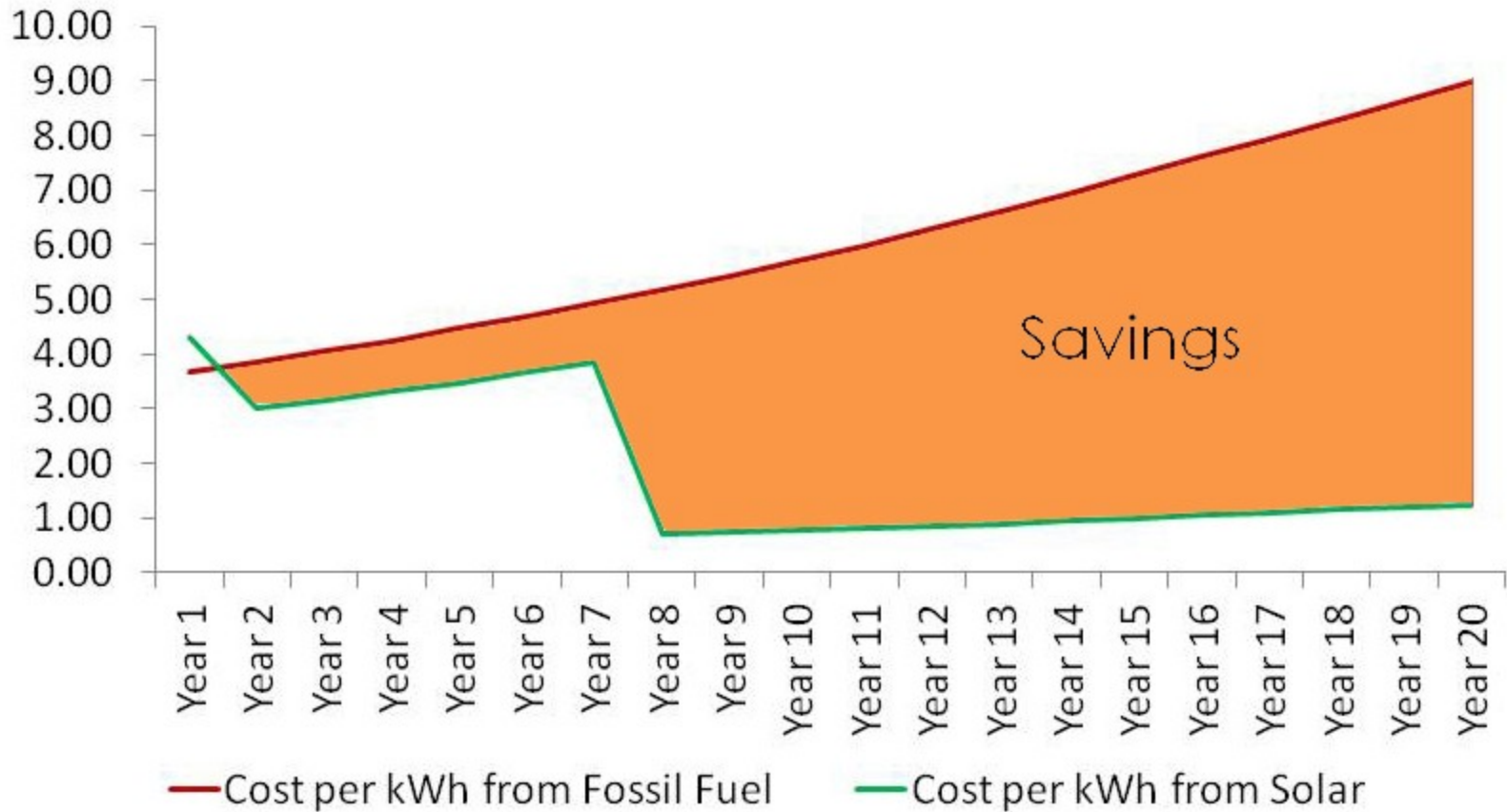
Our Economics

	60 to 90 Deg Celsius	90-120 Deg Celsius
Average cost	Rs 3 Crores per MW	Rs 4 Crores per MW
Net Investment (System cost minus 100% accelerated depreciation)	Rs 2 Crores per MW <u>Subsidy is not considered</u>	Rs 3 Crores per MW <u>Subsidy is not considered</u>
Fossil fuel savings per year	Rs 75 - 100 Lacs per MW	Rs 75 - 100 Lacs per MW
Pay back period	1 - 2 years	2 - 3 years
Cost per unit during pay back	Rs 4.0 per KWH	Rs 5.0 per KWH
Cost per unit after pay back (Maintenance cost)	Rs 0.8 to Rs 1.2 per KWH	Rs 0.8 to Rs 1.2 per KWH





Energy Security (PAYS)





Success Stories

Installation ----->	Wheels India Limited	Sona Koyo Steering Systems Limited	Harita Seating System limited
Project size & type	630 KWth - Auto Hybrid	210 KWth - Auto Hybrid	360 KWth - Auto Hybrid
Solar thermal energy produced	3780 KWh / day	1260 KWh / day	2160 KWh / day
Fossil fuel saved	383 liters / day	120 liters / day	198 Kg / day
Fuel replaced	Furnace oil	Diesel	LPG
Total savings on fuel per year	Rs. 48,60,000/-	Rs. 16,20,000/-	Rs. 53,46,000/-
Annual carbon abatement	2,80,800 Kg	97,000 Kg	160,380 Kg
Application	Pre-treatment process	Pre-treatment process	Pre-treatment process





FOR CFOs : Funding Models

Model Name -->	Outright	PAYS-CO	PAYS-TPOO	Lease Finance
Fuel Savings Performance risk and reward	To Customer	Shared with customer	AE / TPO	To customer
Operations Management	Customer	AE	AE	Customer
AMC cost absorbed by AE	12 months	Monthly fee tenure	Monthly fee tenure	12 months
AMC cost after free period (Per year)	6%	6%	6%	6%
Monthly Fee to AE / Lease Co	NA	Fixed fee PM with annual inflation	80% of actual savings X fuel cost	Fixed lease rental PM
Tenure	NA	60 – 84 Months	60 – 120 Months	60 – 84 Months
Asset Transfer price at the end of Tenure or earlier	NA	NA	Pre-agreed	Market price
Down payment / Security Deposit by customer	NA	10-15%	20-25%	10%
VAT/Service Tax payment and MODVAT Claim	by Customer	by Customer	By TPO	By Lease co
VAT	4%	4%	4%	4%
Service Tax on E & C	12.36%	12.36%	12.36%	12.36%
Service Tax on Monthly Fee	NA	Partial	12.36%	12.36%





FOR CFOs : Funding Models

SAMPLE PROJECT DATA	Outright	PAYS-CO	PAYS-TPOO	Lease Finance
Total Project Value incl E&C	465.00	465.00	465.00	465.00
Funded from tax savings	162.43	162.43	162.43	-
AE's / TPO Investment	NA	257.57	198.14	0
Lease Finance Co Investment	NA	NA	NA	418.50
Net Investment by Customer	302.57	45.00	104.43	46.50
Fuel Savings per month	10.443	10.443	10.443	10.443
Monthly Payment to AEPL / Lease Rental	0	7.83	8.35	9.77
Monthly Payment Duration	NA	84	120	60
Net Savings for customer	NA	3.01	2.08	0.67
Payback for Customer Investment	29 months	17 months	50 months	69 months
Accumulated Savings after Payment Tenure	2204	1629	1253	1880





Photo Gallery



210 KW Solar Thermal System – SONA KOYO STEERING SYSTEMS LIMITED



630 KW Solar Thermal System – WHEELS INDIA LIMITED





Climate Solver Award 2013 – by WWF India



Photo : Bhoovarahan Thirumalai, CEO and Manoharan Head Solar Thermal, receiving the award from The Honourable Union Minister Shri Prakash Javedakar.



Parivartan Sustainability Leadership Award





MNRE ESCO Award



Bhoovarahan Thirumalai of Aspiration Energy was awarded by MNRE for successful development of ESCO projects under UNDP/GEF Global water heating market transformation and strengthening initiative India country program.





Accolades



THE HINDU

Today's Paper » NATIONAL » TAMIL NADU

Going solar, the economical way

R. Srikanth



Shine on: The solar-thermal power plant installed on the roof of Wheels India in Padi has helped save Rs. 48. 60 lakh—Photo: Special Arrangement

That energy systems must go non-conventional is quite apparent. But to do it in a manner that would be cost-effective and actually bear returns on investment would be the challenge. 'Pay as you save' is a concept that's found its place in promoting solar energy in the city, and is generating quite a bit of enthusiasm.

Aspiration Energy, a city-based firm, claims its simple payment mechanism Pay As You Save (PAYS) is becoming quite popular. The company has to chip in with a portion of capital amount of the total budget after deducting the subsidy quotient. The company's CEO Bhoovarahan Thirumalai says the remaining capital amount would be paid as a fixed monthly amount equivalent to price of per Kilo Watt hour (kWh) for a period of five to 10 years. Industries have been keen on taking this up, in order to achieve substantial savings in energy expenditure.

Mr. Thirumalai says this has worked very well in the 630 KW heating plant installed in Wheels India, Padi. Every year, he observed, an amount of Rs. 48. 60 lakh is being saved annually on furnace oil. No wonder he is convinced the system is way ahead of conventional heating technology that uses furnace oil.

Mr. Thirumalai adds that harnessing solar energy for industrial purposes is yet to gain currency mainly due to the fact that it involves huge capital costs and suffers from poor efficiency. This is where the rooftop solar thermal power system, which as is the case in Padi, can be employed for heating operations, comes in handy. The rooftop solar thermal power system is a technology used for high degree heating in several industries including milk, automobile, electroplating and chemical.

Comparing the positive aspects of the solar thermal power system to the PV cells both cost- and efficiency-wise, he points out that the cost works out to only Rs. three per kilo watt and gives 100 per cent heating efficiency, whereas the efficiency level of PV cells is around 12-15 per cent.

Roof-top solar thermal power systems can not only be more efficient but also achieve considerable



इस परिवर्तन-शील समय में निर्वाचन के लिए योग्य होना



निर्वाचनों के लिए योग्य होना

इसमें के लिए योग्य होना



(www.industrialeconomist.com)

March (sector_month.php?m=03&y=2014)

- Outward lo (sector_news.php?page=7&cid=521)
- L&T- the speciality of special purpose vehicles (sector_news.php?page=45&cid=522)
- Padma Bhushan for A Ramakrishna (sector_news.php?page=45&cid=523)
- IAS invades NDDB... (sector_news.php?page=45&cid=524)
- Come elections, come advertisement ents... (sector_news.php?page=45&cid=525)

April (sector_month.php?m=04&y=2014)

- MS installed (sector_news.php?page=7&cid=528)
- Between the bang and the whimper... (sector_news.php?page=13&cid=539)
- Baker's Dozen (sector_news.php?page=7&cid=550)
- Reduce emissions, increase fuel efficiency for sustainable mobility (sector_news.php?page=47&cid=552)
- A rich pool of talent not utilized... (sector_news.php?page=45&cid=553)

May (sector_month.php?m=05&y=2014)

- Baker's Dozen (sector_news.php?)

Aspiring a viable energy solution

With shrill cries over rising fuel prices, with an exchequer bleeding over gas imports, with the depleting non-renewable sources of energy and with the Middle East wars that could strangle fuel supply, what is the way forward?

THE Answer is renewable energy. Not the one that would require high capital and maintenance costs. This new one works and pays for itself along with making a novel difference of saving fuel and your taxes.

An innovative initiative by Aspirations

Energy (AE) in the field of harnessing solar thermal energy has surprised many participants of a workshop on "Solar-Oil Hybrid Systems for Industrial Heating Applications" conducted by the company.

Foremost, this type of solar thermal plant is designed for industrial heat processing of less than 150 degree centigrade for manufacturing concerns that use fuels like LPG, furnace oil and diesel. It saves daytime consumption alone and does not have a system to store energy. A technical improvement by AE through evacuated tube collectors helps produce 70 deg C to 130 deg C while solar heaters traditionally could produce only upto 60 deg C. Adding to this is another advantage that this solar thermal system does not require any vast concrete or other surface. It can be set up on trussed rooftops too, the areas that normally stay unused.



In the next 10 years, we will be able to save roughly about 35-40 per cent, ie Rs 20,000 crore worth of oil at current market prices.

- Bhooma S., AE

Wonder whether this is real?

Following the workshop, a visit to the solar thermal plant at the world's largest steel wheel manufacturing plant, Wheels India Ltd., was enriching. "It is a 630 KWh capacity plant that saves nearly 350 litres of fuel oil per day, providing 27.5 per cent fuel efficiency. It is Asia's biggest (solar thermal plant) on rooftop," said Bhooma S., Executive - New Initiative, AE. The components before painting undergo a 'seven stage' washing process that requires heat for which AE has provided an alternative to the earlier used diesel. Spread over 3600 sq.ft with a life of 20-25 years, Wheels India's solar thermal project is a success story with an annual savings on furnace oil estimated at Rs. 48.60 lakh. What's more, the project spreads its benefits to the environment with annual carbon abatement of 2.6 lakh kg.

As viable as it gets...

"The payback period is usually 2-4 years. In the PAYS model, we ask the clients to pay us anywhere between 60 and 80 per cent of the energy savings. We take the entire performance risk and also provide after sale services for 10 years," explains Bhoocharan Thirumalai (Bhoo), CEO, AE. Bhoo added that the client gets tax benefits through subsidy and accelerated depreciation. In effect the investment can pay for itself.

In the investment model that AE offers, a customer is required to pay 10-15 per cent of the initial investment. There is a government subsidy of 25 to 30 per cent and the rest is funded by the company. Under the PAYS model, the annual payment for Wheels India project is Rs. 28 lakh (roughly 65 per cent of their savings).

Unbounded potential...but limited awareness

"Awareness and credibility are low," Bhoo explains about the hurdles in his industry. He wants the government to promote solar industrial process heater as a financially viable model. He also suggests the new government to implement the transfer of subsidies with ease and transparency.

According to Bhoo, the solar power industry in India is valued Rs 50,000 crore. "In the next 10 years, we will be able to save roughly about 35- 40 per cent, ie Rs. 20,000 crore worth of oil at current market prices," said the enthusiastic CEO. The total installed capacity of AE is 10 MWh valued at Rs 50 crore.





Join this exclusive club of
PROUD PIONEERS



Solar Thermal System Installed on trussed factory roof top.

As a responsible leader and a pioneer in the manufacturing sector, you too can set an example for others to follow, by reducing your fossil fuel consumption and replacing it with Green – Renewable energy. Since the project pays for itself through fuel savings, you do not have to wait for CSR funds, subsidies or interest subvention schemes.

www.aspirationenergy.com

Testimonial



WHEELS INDIA LIMITED
You Name it... We Make it

Manufacturer of wheels for the passenger car and utility vehicle market. Part of \$ 5 Billion TVS



MR SRIVATS RAM *Managing Director*

"When I saw the proposal for 630 KW Solar Thermal system, I found the ROI really attractive. The fossil fuel saving was 360 litres per day. The ROI is quite low for a Solar project of this size."



MR RAJARAM *Vice President Manufacturing*

"We saved 116 KL of Furnace oil during 2013-2014 due to the Solar system, 8% more than what was estimated during the proposal stage. We have now identified a few more applications with similar saving potential."



MR VELUMANI *GM Plant Engineering*

"We were the first to attempt integration of a Roof Top Solar Thermal system with an Industrial Process heating application that runs 24/7. We recently did a workshop to all TVS Group companies explaining about our experience, practical problems and implementation challenges faced and how we overcame them, so that others coming after us can plan their projects better."





Capabilities & Credentials





Capabilities, Credentials – About Us



Clean Energy Vision



▶ **Pioneers of RESCO model** - capex to opex in solar using Pay As You Save and Pay Per Unit

Profitable IT firm

- Revenue run-rate of Rs. 150 Crores in FY 2012-13
- ISO 9001:2008 certified
- A Deloitte and Touche Fast 500 Asia Company Award winner for consecutive 3 years

Vision

- Fast Forward to the Solar Future.





Capabilities, Credentials – Management Team

CEO : Bhoovarahan Thirumalai

- 20+ years experienced Entrepreneur
- Co-founder, Aspire Systems
- Mechanical Engineer from Pondicherry University
- MBA from Kellogg School of Management, Northwestern University, USA
- Certified PV Designer.





Capabilities, Credentials – Management Team



Gowri Subramaniam, Director

- ▶ 20+ years experienced entrepreneur
- ▶ Co-founder and CEO of Aspire Systems,
- ▶ Mechanical Engineer from Pondicherry University
- ▶ MS - Industrial Engineering from Texas A&M, USA

Kasthuri Rangan, Head - Solar PV

- ▶ 35+ years of exp. in leading companies like Lucas TVS, etc
- ▶ Electrical engineer from NIT, Trichy
- ▶ 10+ years Entrepreneurial experience
- ▶ Passionate photovoltaic designer



Manoharan, Head - Solar Thermal

- ▶ 25+ years of exp, in solar thermal and other thermodynamic systems
- ▶ Electrical engineer from College of Engg, Guindy



THANKS

Please write to

info@aspirationenergy.com

[Facebook.com/AspirationEnergy](https://www.facebook.com/AspirationEnergy)

Or call us @ 044-42185301

