

Paraboloid Dish for Stirling Engine



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Paraboloid Dishes with Stirling Engine at Point Focus



100 m² Dishes with Stirling Engine by SES for
500 & 800 MW plants at Mojave Dessert, US

Paraboloid Dish with Point Focus

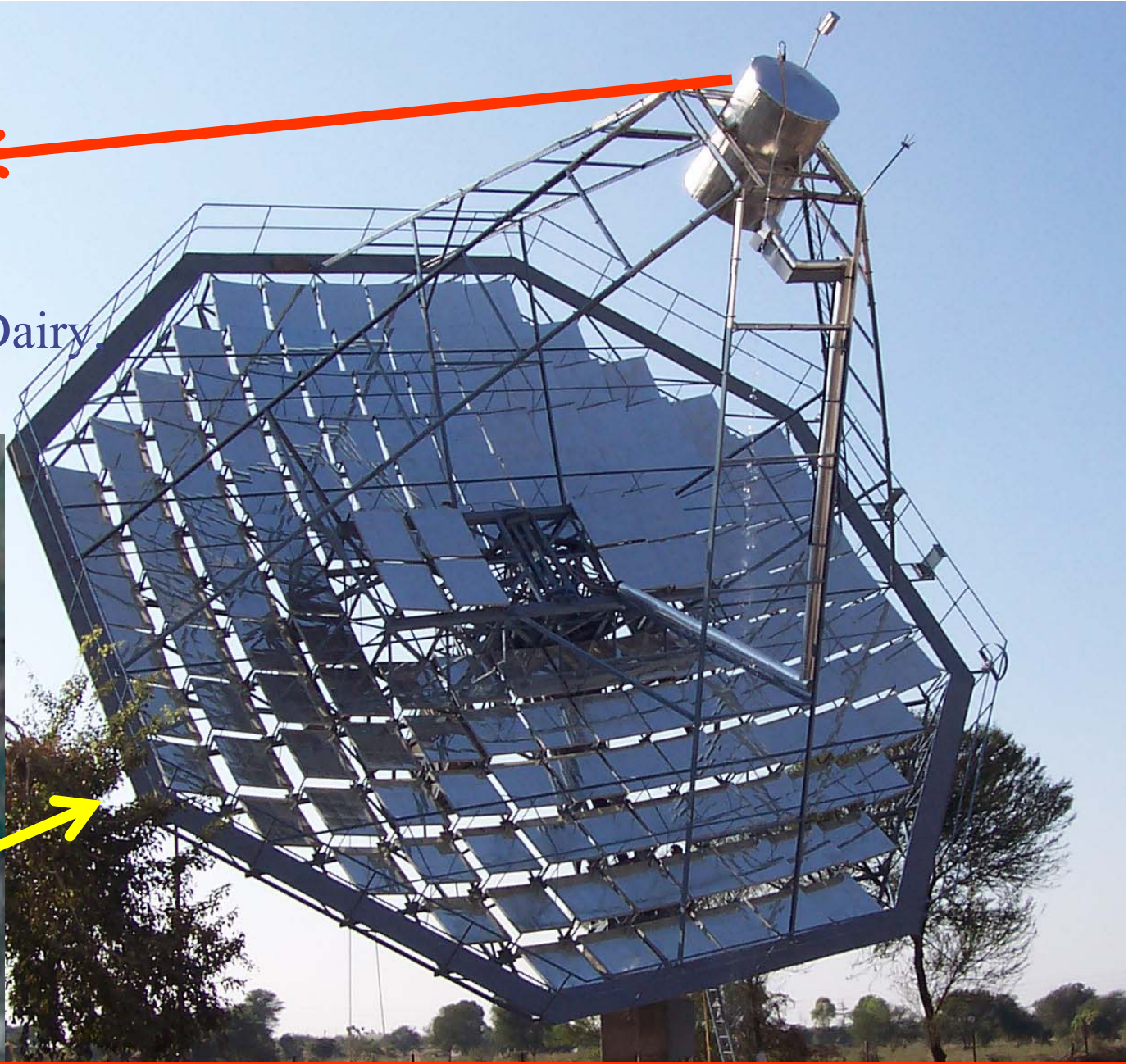


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56 m² Dish with Stirling Engine at VIT, INDIA



Arun at Mahanand Dairy,
Latur, India



$$\eta = 0.75 - \{0.4 + 2.4 \times 10^{-5} (T_m - T_{amb}) + 0.9 \times 10^{-3} (\sin \theta_z)\} (T_m - T_{amb}) / I_{bn}$$

Large Solar Concentrator with Stirling Engine :

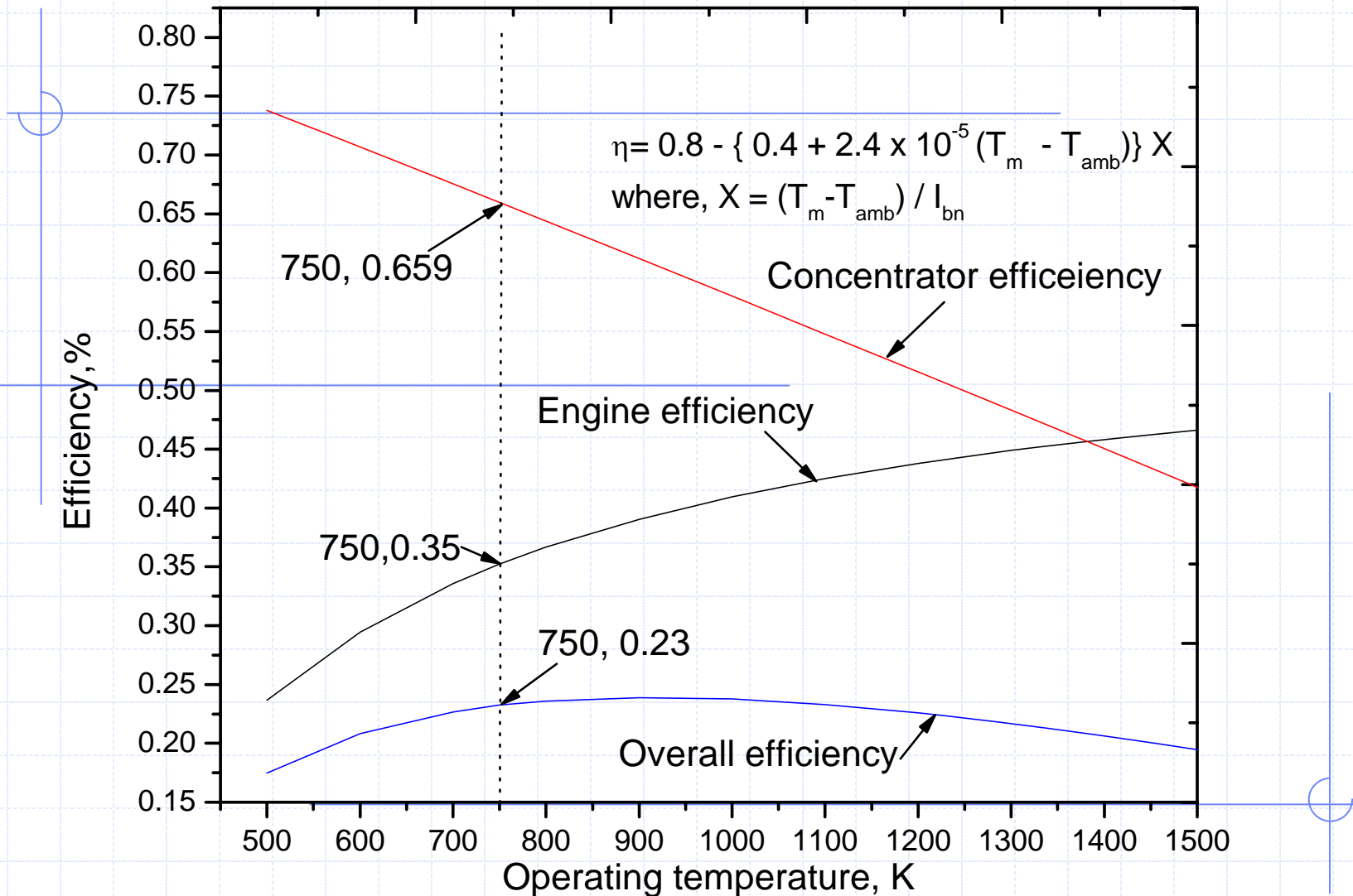
The indigenous design

- ◆ ARUN can be fitted with Stirling engine to supply electrical power.
- ◆ Stirling engine will have to be imported presently or indigenous development required.
- ◆ The power generated may require 50% to 70% of the capital investment compared to Solar Photo-Voltaic installations and may work with capacity factor of 150 to 200%.
- ◆ Solar farm for power generation is feasible.

Issues related to R and D

- ◆ Matching the dish with stirling engine for optimum operating temperature
 - Efficiency of dish decreases with temperature
 - Efficiency of engine increases with temperature
- ◆ Dish can be improved for achieving higher temperature
 - Improved optical efficiency
 - Reduced loss coefficient
 - Increased concentration ratio
- ◆ Design of solar receiver integrated with stirling engine
- ◆ Material limits for higher temperature

Matching the dish with stirling engine: Optimum temperature

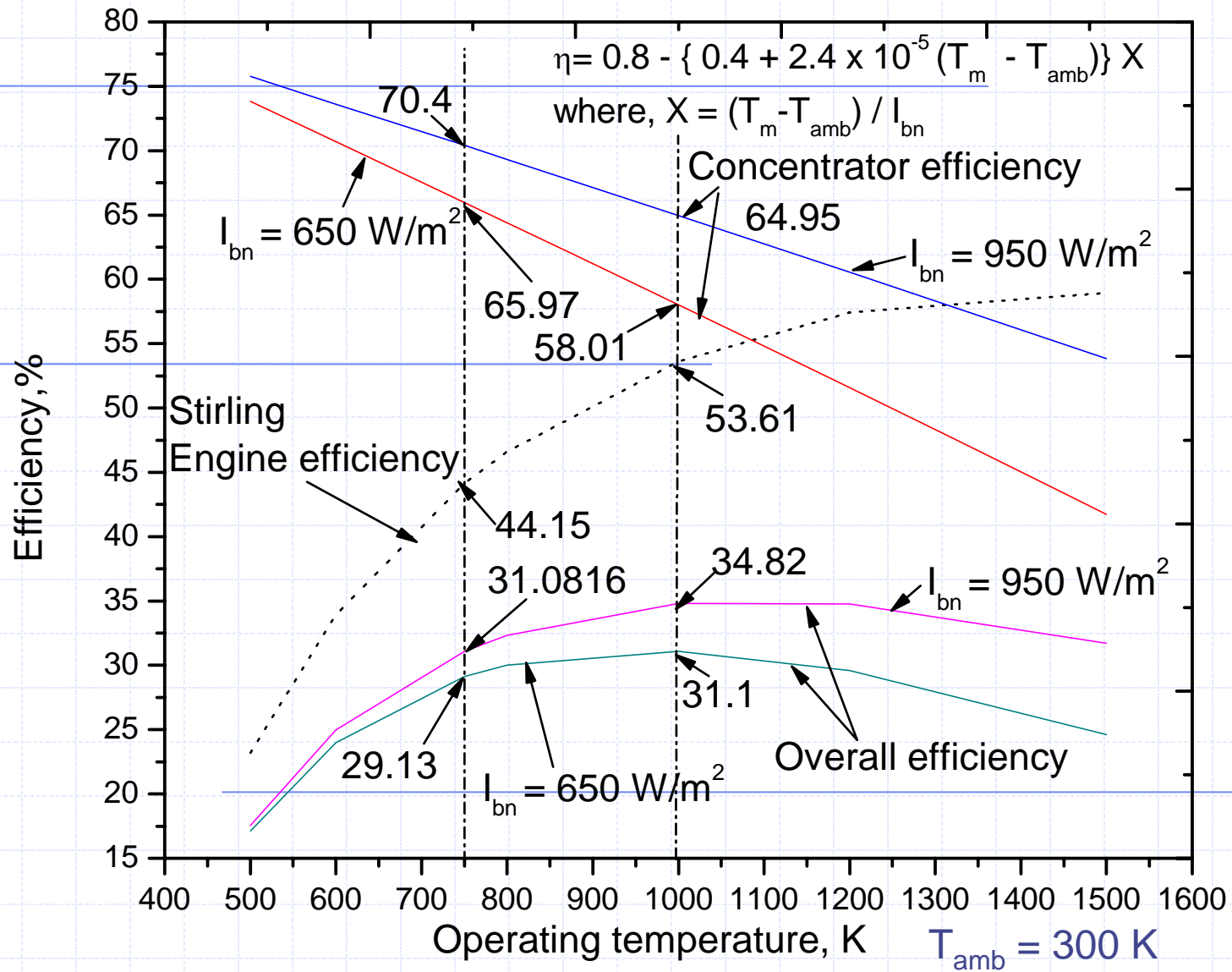


$$\eta = 0.8 - \{ 0.4 + 2.4 \times 10^{-5} (T_m - T_{amb}) \} X$$

where, $X = (T_m - T_{amb}) / I_{bn}$

$T_{amb} = 300 \text{ K}$
 $I_{bn} = 650 \text{ W/m}^2$

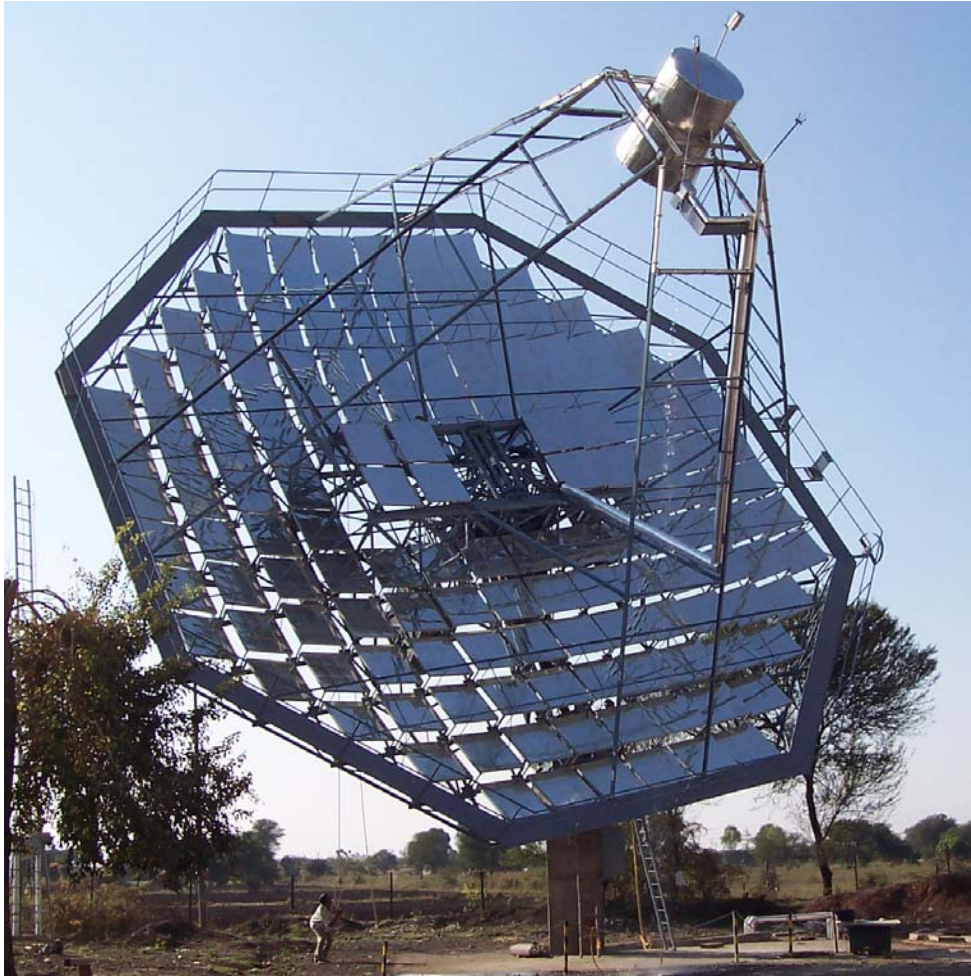
Matching the dish with stirling engine: Optimum temperature



Large Solar Concentrator ARUN with Stirling Engine

ARUN160 fitted with Stirling engine

	ARUN160
Ap. Area	169 m ²
Electrical Power	25 kW _{elect}
Operating hours	2500 (6-9 h/d; 300-340 d/yr)
Annual Electricity generated, kWh	60,000-75,000 Units / year



Thanks

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