

Solar X

Concentrated Solar Thermal Power Plant

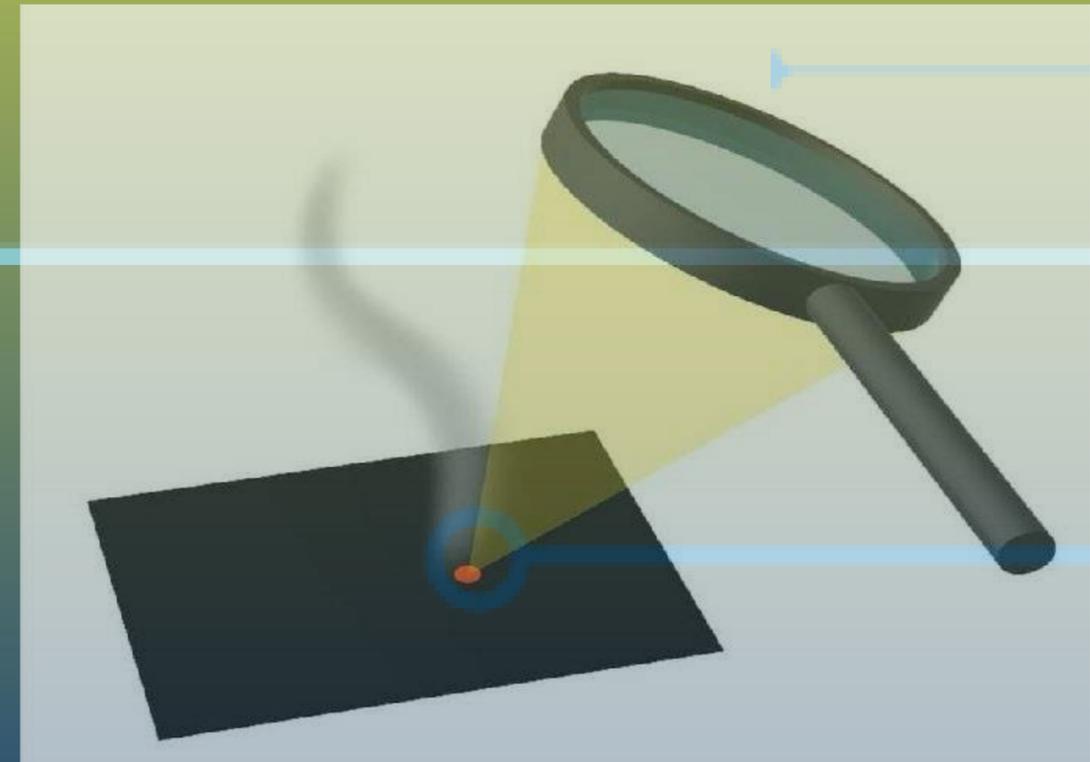


Concept & Product Presentation

August 2024

What is concentrated solar thermal energy?

Energy derived from using concentrated solar thermal power using mirrors or lenses to focus sunlight onto a smaller area to significantly boost the efficiency of solar panels which create heat to produce energy. This concept is the same as when a magnifying glass is placed under sunlight to light a fire but on a much larger scale.





CONCENTRATED SOLAR THERMAL ENERGY SYSTEMS

SolarX Integral Components

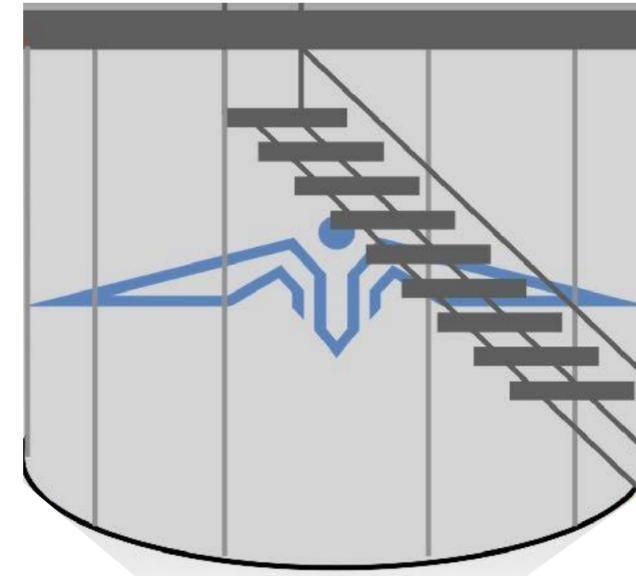
Parabolic Solar Collector



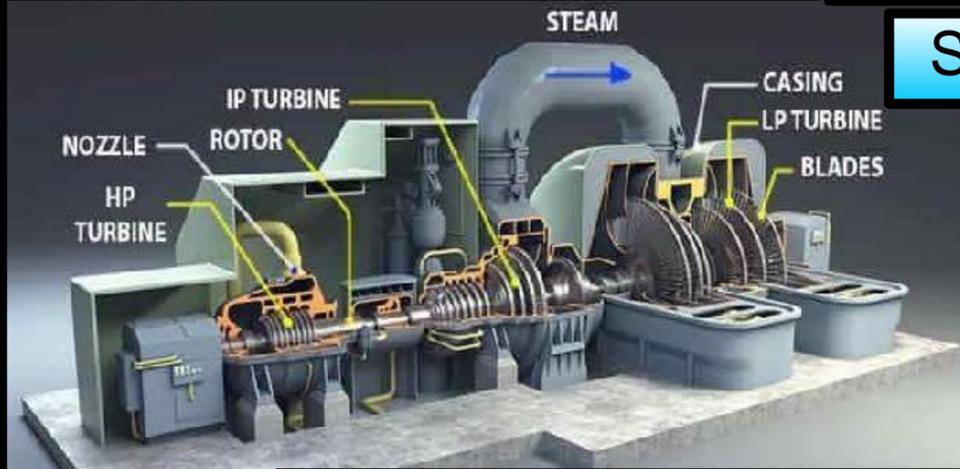
Steam Turbine



SolarX Silicon Battery



Steam Turbine System

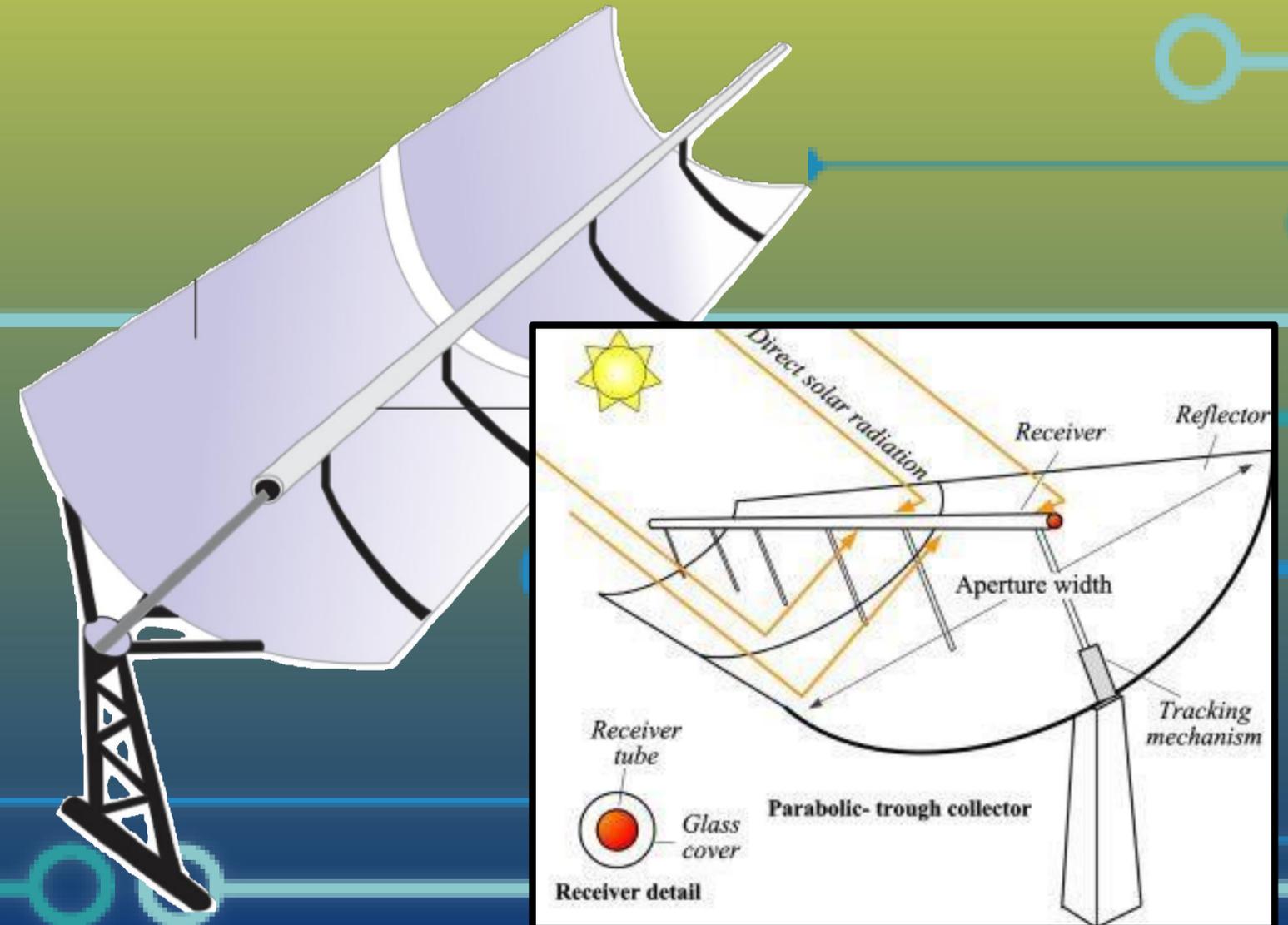


Solar Heat Exchanger



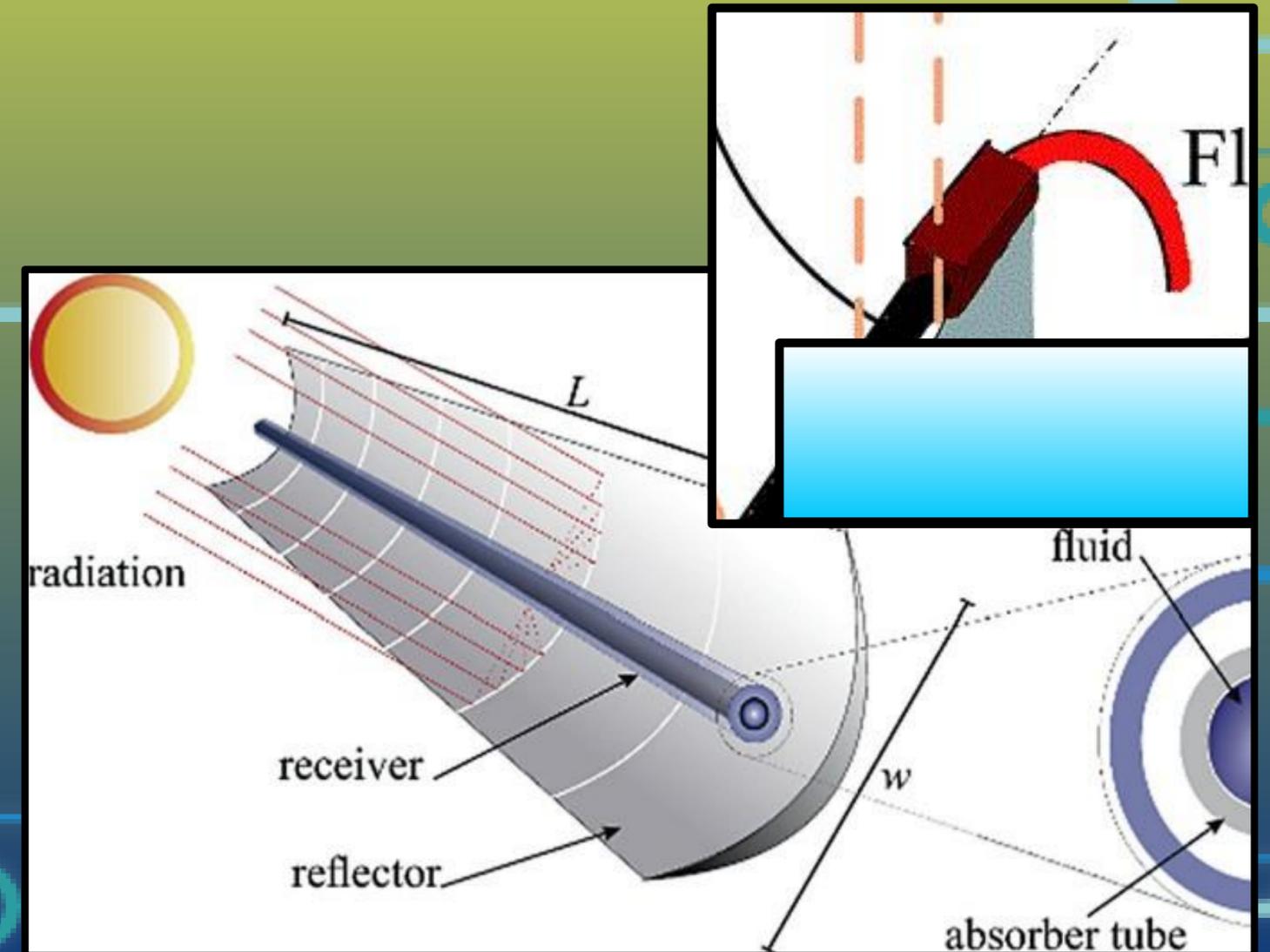
SolarX parabolic solar collectors (also referred to as trough reflectors) capture direct sunlight radiation over a large surface area and focus onto a small focal point receiver where the sunlight is converted to heat, which increases the overall efficiency of the collector panels by over 400% over the traditional PV panels (conventional PV panels have an average of only 20% efficiency while SolarX collectors have over 80% efficiency). This significantly increases the production of overall heat from direct sunlight.

How SolarX System Works



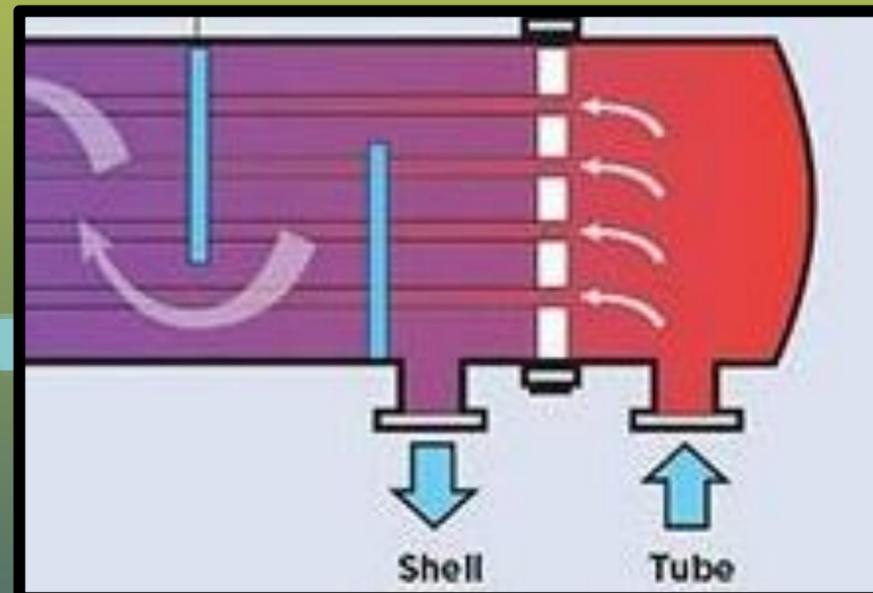
SolarX Heat Transfer

Within the solar collector's focal point is a heat transfer fluid (HTF) that absorbs the heat energy and transfers it to a working fluid, or the medium itself can perform the work directly to generate power. In the absence of solar heat, the silicon battery provides backup heat that will be transferred directly to the turbine or hydraulic pumps in a sealed, closed circuit.



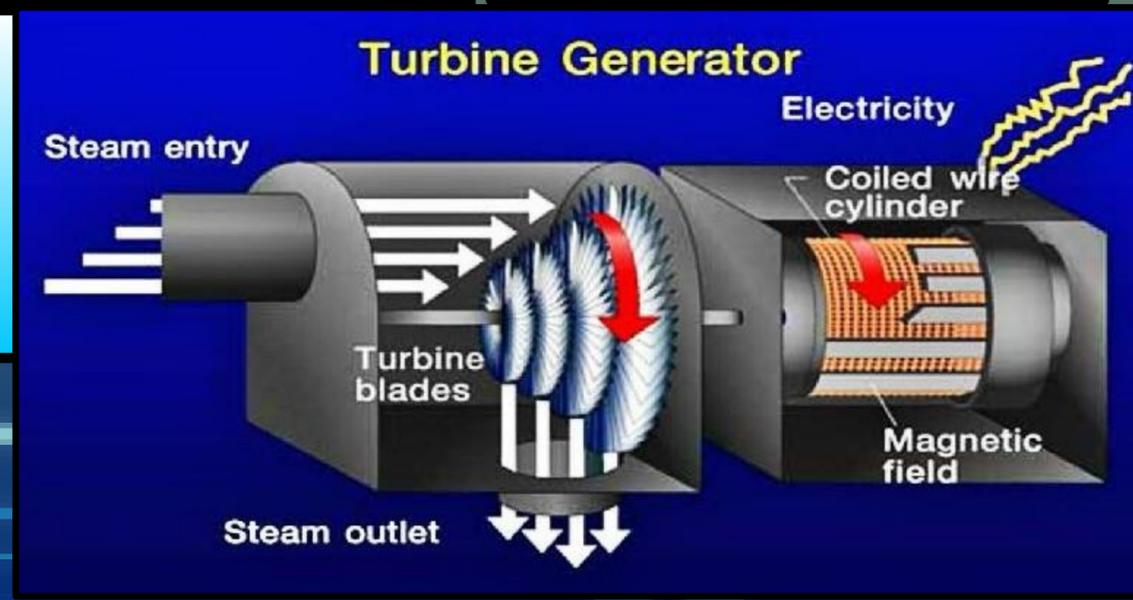
SolarX Pressurized System

The superheated working fluid turns to steam and builds pressure in the sealed system that powers a high-efficiency supercritical steam turbine generator.



Cross-section of simple steam turbine

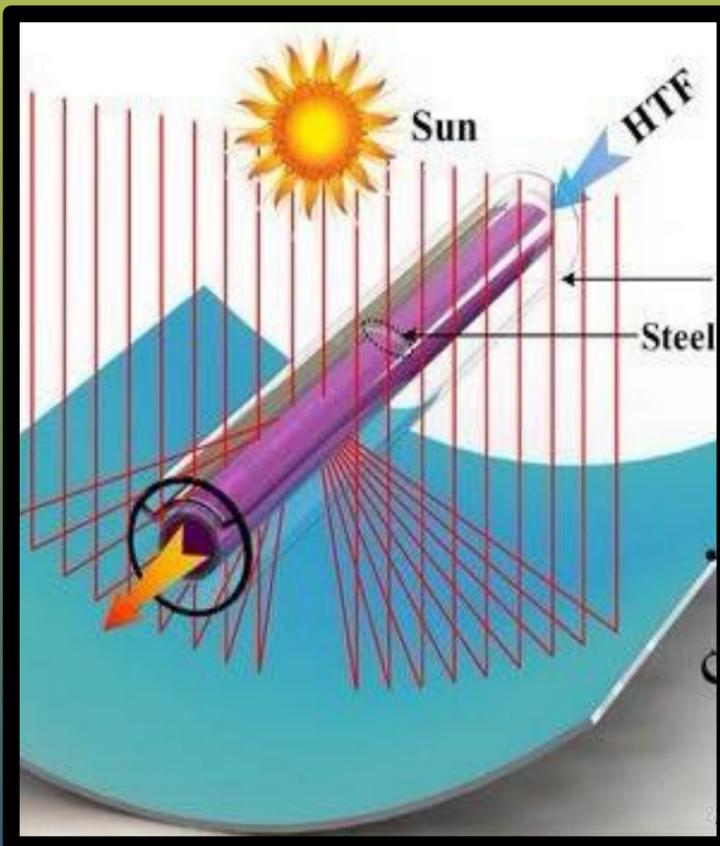
Superheated transfer fluid provides drive heat to the working fluid.



SolarX

CONCENTRATED SOLAR THERMAL ENERGY SYSTEMS

Innovative Technology with Superior Results



SolarX has perfected the thermal concentrated solar power technology. Using a proprietary gas mixture that absorbs and transfers more heat than any other medium or fluid yet discovered, SolarX thermal power generators produce more usable power with a smaller footprint (1/20th the size) of conventional PV systems and exceed their performance by an 80% efficiency factor!

SolarX

CONCENTRATED SOLAR THERMAL ENERGY SYSTEMS

SolarX System Features



SolarX Modified Steam Turbine

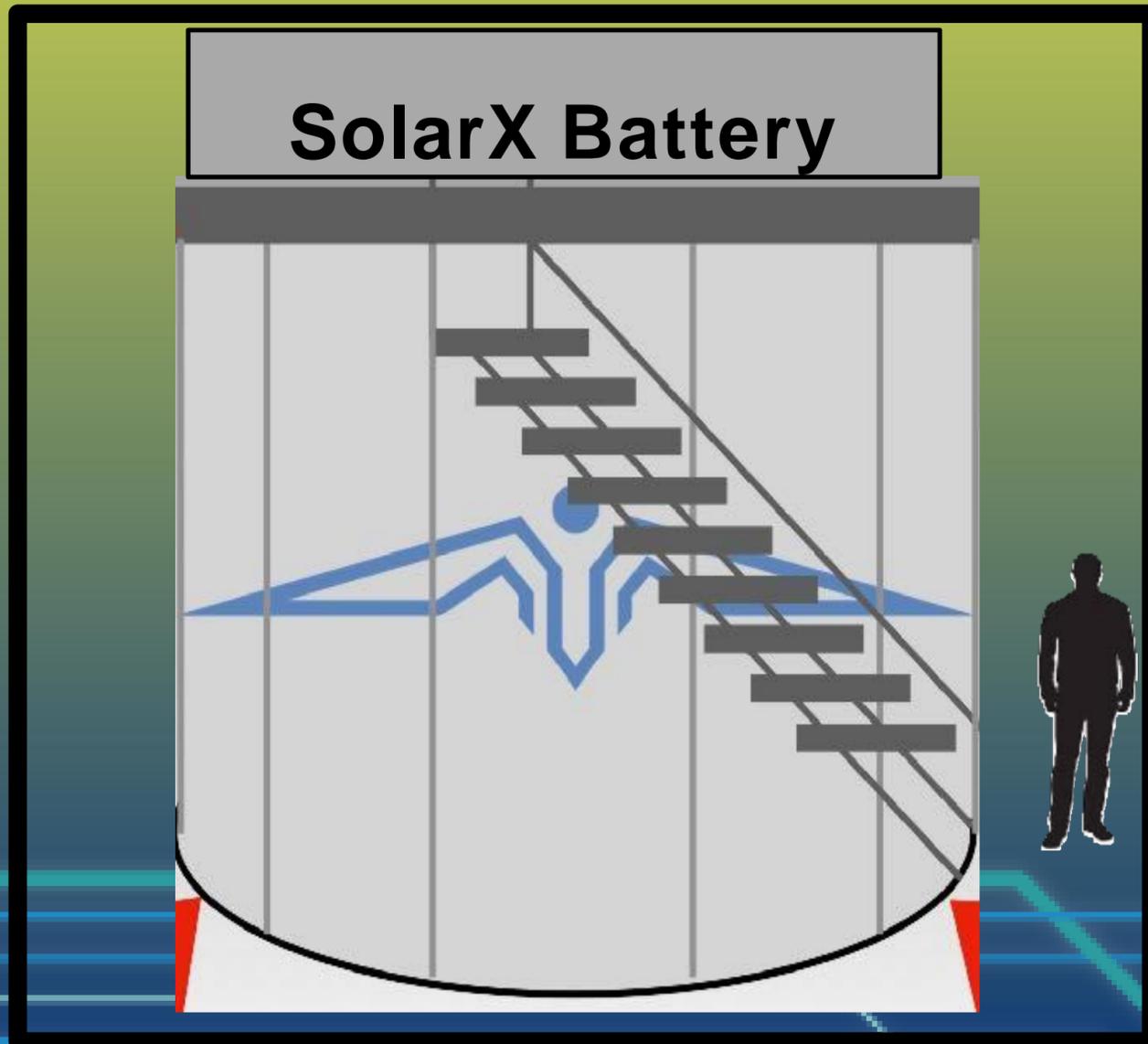


- Fully customizable utility-scale power generation of minimum 10MW of available energy.
- Made in U.S.A.
- UL listed components and parts.
- All Stainless-Steel Collector Construction
- All Stainless-Steel Piping for gas systems.
- Proprietary Blend of Supercritical Fluid.
- Mirrored Concentrating Solar Collectors.
- SolarX Modified Turbine, seal-less, magnetic drive, magnetic bearings, pre-piped and pre-wired.
- Electronic monitoring and controls, custom colors.
- Any voltage or phase (50 or 60 Hz.), including condenser.
- Includes fused disconnect outdoor rated electrical panel.

SolarX

CONCENTRATED SOLAR THERMAL ENERGY SYSTEMS

SolarX Battery



SolarX Battery Features

- Silicon Battery
- Insulated Silicon Storage
- Fully Scalable Power Storage
- All Stainless-Steel Structures and Piping
- 10 MW to 100 MW_{th}

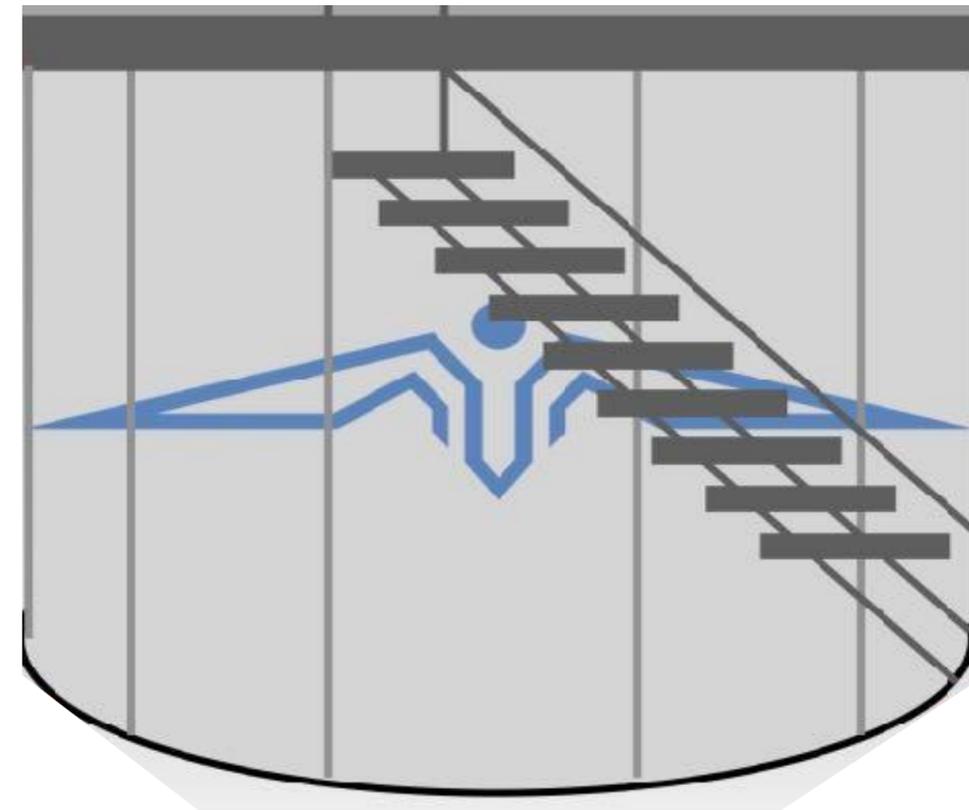


CONCENTRATED SOLAR THERMAL ENERGY SYSTEMS

SolarX Battery: Superior Power Storage

The proprietary gas mixture developed by SolarX generates more power during any specific time than any other PV system. It boosts the charging speed for the SolarX Battery, leveraging that advantage by allowing more electricity to be generated when drawing power from the battery source. SolarX is the best choice for utility-scale solar power generation.

SolarX Battery



CONCENTRATED SOLAR THERMAL ENERGY SYSTEMS

Photovoltaic System vs. SolarX Thermal System



PROS

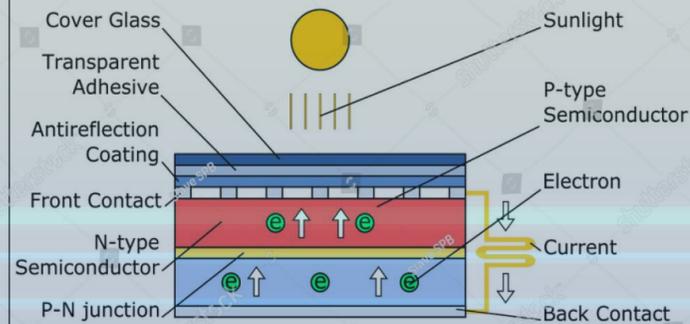
- Lightweight
- Self Contained electricity generation
- Relatively simple installation
- Highly scalable

PROS

- High Efficiency 80%
- Useable AC straight from the system
- Low Maintenance
- Large output



PRINCIPLE OF OPERATION OF PHOTOVOLTAIC SOLAR PANELS



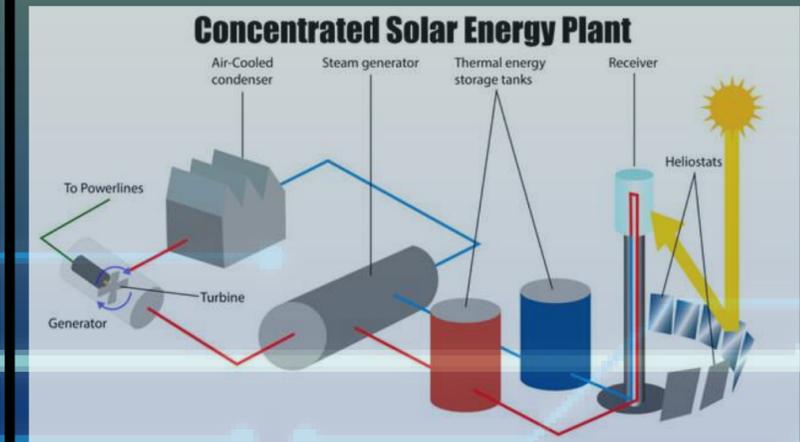
Solar cells are composed of two layers of semiconductor material with opposite charges. Sunlight hitting the surface of a cell knocks electrons loose, which then travel through a circuit from one layer to the other, providing a flow of electricity.

CONS

- Heat lowers energy generated
- Requires inverter
- Drops in efficiency over time

CONS

- Only feasible at Industrial, Commercial, and Utility Scale





CONCENTRATED SOLAR THERMAL ENERGY SYSTEMS

Operation & Maintenance

Owner's Operation & Maintenance
Manual included

Factory Startup Included (Delivered in
Operational Condition)

System provides electronic monitoring,
remote control, and remote monitoring

All-Weather Housing

Estimated Maintenance Cost is
US \$0.0025 per KW

Periodic Cleaning of Collectors –
Required only once per month

SolarX

CONCENTRATED SOLAR THERMAL ENERGY SYSTEMS

System Portability Option

SolarX System can also be Trailer-mounted for mobility and portability requirements.

The SolarX System is Industrial, Commercial, and Utility Scale, yet has a much smaller footprint than traditional PV Systems.





CONCENTRATED SOLAR THERMAL ENERGY SYSTEMS

SolarX Additional Geothermal Backup Heat Option

SolarX can provide an additional geothermal well option for additional backup heat on systems that are 10 MW or larger





CONCENTRATED SOLAR THERMAL ENERGY SYSTEMS

SolarX Parts & Labor Warranty

SolarX provides a warranty on all of its systems:

- Guaranteed output performance
- Five -Year Parts
- One-Year Labor
- Subject to additional warranty terms and conditions (Equipment must be properly maintained and used pursuant to operational manual.)





CONCENTRATED SOLAR THERMAL ENERGY SYSTEMS

Competitive Pricing

Complete SolarX System is very competitively priced for Industrial, Commercial, and Utility-Scale Systems

- Standard Minimum Output = 10 MW
- Smaller Sizes may be considered, customized system and pricing
- Financing available for qualified customers





CONCENTRATED SOLAR THERMAL ENERGY SYSTEMS

Contact Information

For additional information please contact
Don Hermann
President
Innogen Energy
435.300.1374