



## Focused Sun

460 Avis Rd., Las Cruces, NM 88007  
PH 575-541-7472; [www.focused-sun.com](http://www.focused-sun.com)

*Note: This paper will soon be available in Arabic and Spanish as well.*

## 20 kW CSP Solar Heat Plant

Focused Sun's latest product is a 20 kW Solar Heat Plant that produces heat and stores it for immediate or later use. It stores heat for up to a day, delivering heat day and night.

Assembled, the plant has 15 collectors mounted on the roof of the container. Mounting collectors on the container's roof saves space and reduces the plant's footprint. The plant ships in a 40' container for on-site assembly. Just add concrete.



Collector Array

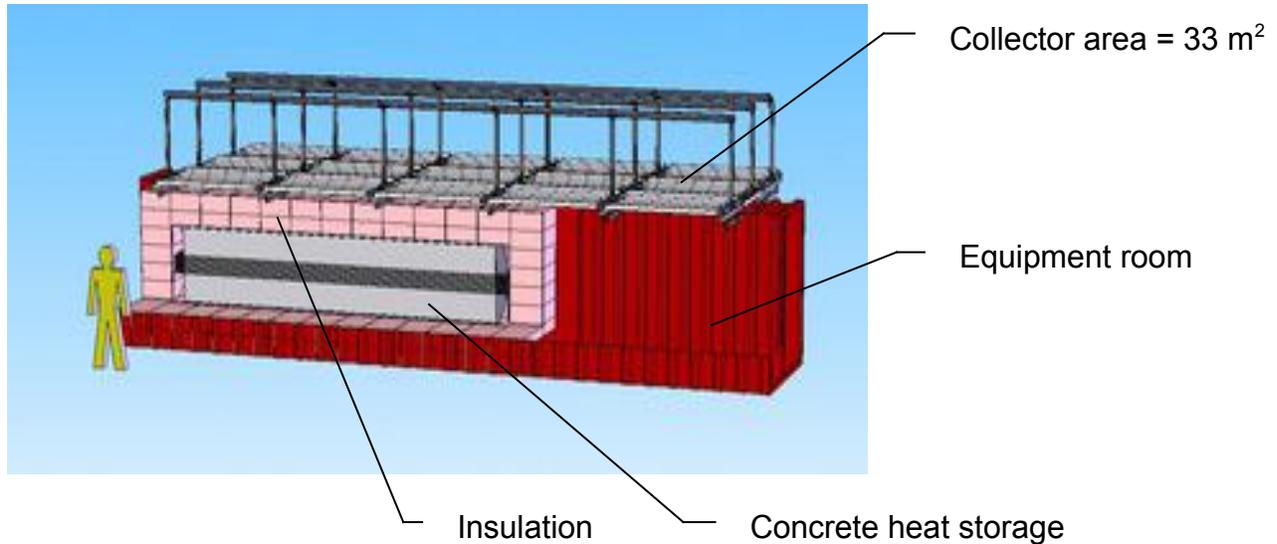
Heat storage and equipment

The cutaway below shows the layout of the plant's internals. The same container that it ships in becomes the weather cover for the plant's thermal heat storage. Heat is stored in a cylinder of concrete poured into a metal form on-site. Heat transfer tubes embedded in the concrete heat the concrete and use that heat for other purposes. Also inside the container is an equipment room for auxiliary equipment such as chiller, desalination or turbo-generator.

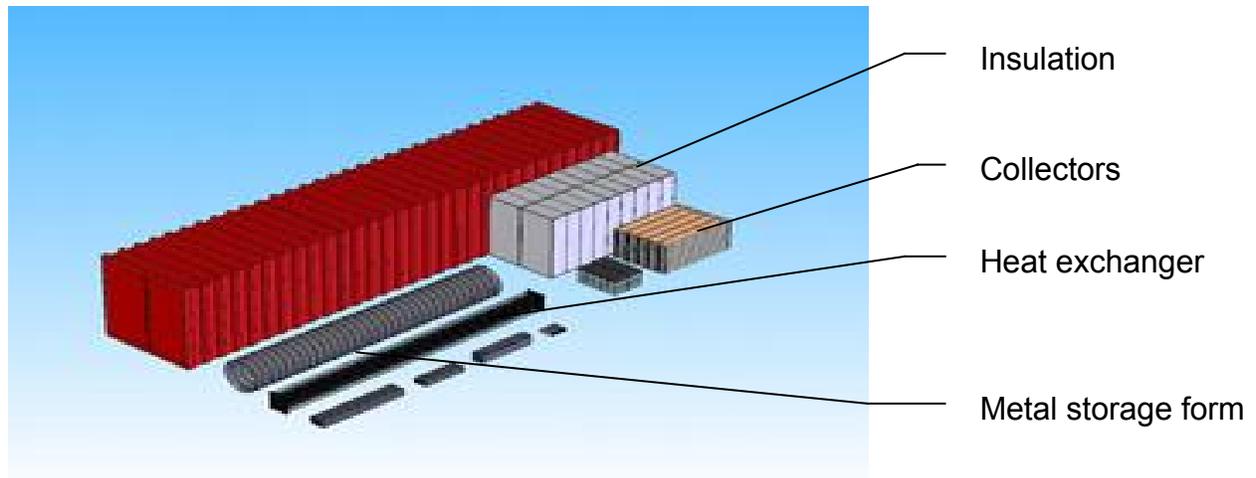


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The plant ships with all the required parts inside the container. Once on site, the collectors are assembled and mounted on the roof. The metal form with its heat exchanger is filled with concrete; after curing it is surrounded by insulation.



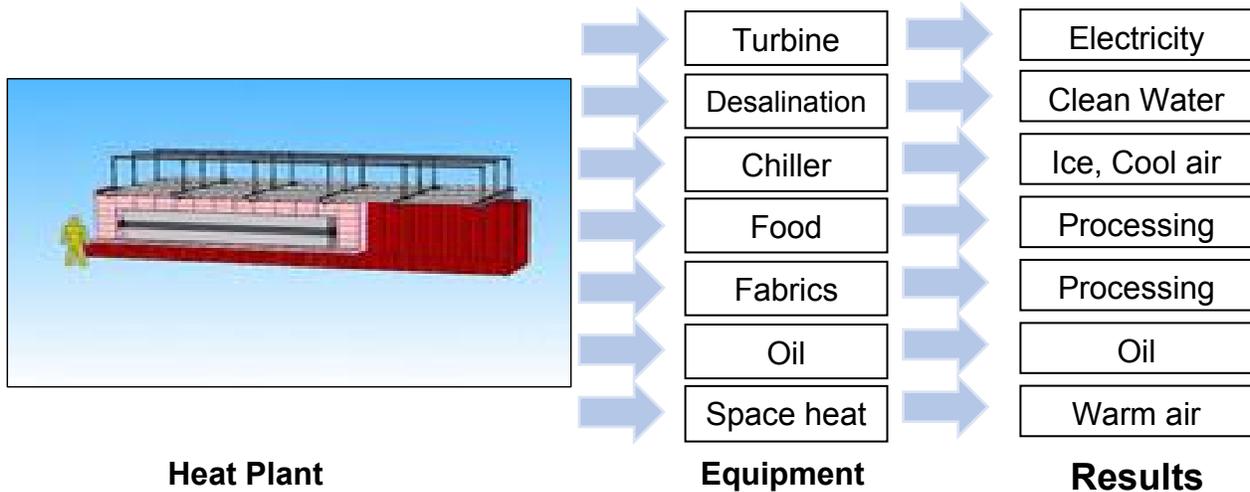
Factory workers travel to Las Cruces, NM, USA for a 2-week training program. They build the plant's collectors and other parts, then pack them into the container for shipment. On arrival in-country, the workers set up the plant as they were trained in the U.S. Each factory is licensed to make other plants and factories, so long as they



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maintain the Focused Sun brand. The local factory sells, manufactures, installs and maintains the heat plant portion of a complete system.



**Electricity:** In the table above, the heat plant both collects and stores solar energy. Various heat processes can use this heat. One application is producing electricity with a turbo-generator. Using the 20 kW plant, as much as 4 kW of electricity can be produced. Larger turbines require more heat: a 1 MW electric plant requires 6 heat plants.

**Desalination:** Another application is making clean water from either salt, brackish or produced water. Multiple Effect Distillation (MED) equipment can efficiently use the plant's heat to make clean water. Even the left-over heat from a turbo-generator can make clean water since MED operates at a low (70°C/158°F) temperature. A 1 MW MED desal plant can make 60 m<sup>3</sup>/day of clean water – enough for thousands of people – while also generating up to 1 MW of electrical power.

**Chillers:** The plant's heat can cool buildings or make ice with a chiller. A chiller is industrial equipment that converts heat to ice or cool air, using absorption methods much like the "kerosene refrigerators" of the last century. Ice can keep fresh produce from rotting during transport to markets; cool air is being demanded more and more by people in equatorial countries.



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**Food and Fabric Processing:** Industrial uses for the heat include food and fabric processing. These typically use “low grade” heat (<100°C/212°F). Heat from a turbo-generator is low-grade heat making the combination of electrical generation plus food and fabric processing particularly economic. “High grade” heat (>100C/212°F) drives the turbine; its left-over low-grade heat provides food or fabric processing.

**Enhanced Oil Recovery (EOR):** Heavy oil is oil that is too viscous to pump from the ground. By pumping steam into the well (EOR), the oil becomes less viscous and can be pumped out more easily. Some wells have quadrupled their output with steam injection. This is one of the simplest applications of the heat plant since no storage or turbo-generator is required.

**Space Heating:** At higher latitudes or higher elevations, space heating is required. If heating is needed at night, heat storage provides it even after the sun goes down. Hot water for hotels and laundries also falls into this category. When combined with a turbo-generator, the heat plant captures 4 times more heat energy than electrical energy.

**Jobs:** These applications provide local jobs to our partner factory. These are not “one-off” jobs that last for a few months. Rather they are jobs that last decades as the local factory sells, makes, installs and maintains solar plants.

Focused Sun is a licensing company. We do not set up projects in-country. Rather, we partner with a local factory to whom we license our technology. Sheet metal or HVAC shops have equipment and workers that can quickly come to market. Factories typically have 5 to 10 workers because they need to be small enough to be close to the customers.

The partnership also needs to hire a mechanical contractor and/or consultant to design, purchase, install and test the auxiliary equipment needed (e.g., turbo-generator, MED desalination). We have several independent consultants that can provide this service. In addition, Focused Sun works with several competent companies that can design and install larger systems. The partnership will also require 100,000 USD for purchasing



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manufacturing equipment such as installation vans, shears, bending brakes and foam cutters plus fees to license our technology.

On large projects, the design and order procurement for equipment (turbo-generator, MED desal, chiller) can begin after funds are released. A 1 MW turbo-generator typically has a 6-month delivery, longer if it is a custom unit. That is enough time for Focused Sun to train workers to make the collectors and to begin in-country collector manufacturing.

Focused Sun will require 100% up-front money for any purchasing we do since most suppliers will demand those terms. Consulting we do for the partnership also requires full payment in advance.