



# Process Heat for Commercial and Industrial Applications

Fort Bliss · El Paso, Texas · USA · 84 MicroCSP Collectors · 219kWth Process Heat Generation · 8,568 square feet

## APPLICATIONS FOR EMISSION-FREE PROCESS HEAT

Substitute use of non-renewable fossil fuels with MicroCSP technology for the following industrial and commercial applications:

- Food & beverage preparation processes (e.g. steam, boiling, blanching, pasteurizing)
- Industrial processes (e.g. distillation, drying, catalytic, sterilization)
- Pharmaceutical and biochemical processes
- Material drying
- Water heating
- Pre-heating makeup air, water or fluid to improve plant efficiency
- Textile cleaning and drying

## Overview

Micro-scaled Concentrated Solar Power (MicroCSP) is a member of the Concentrating Solar Power (CSP) technology family that has been redesigned for installation in smaller, modular projects. By reducing the traditional CSP trough to one-third of its size, MicroCSP technology can be cost-effectively deployed to on-site markets for distributed power generation or industrial and commercial applications such as air conditioning and process heating.

## MicroCSP for Process Heating

Average energy use of solar concentrating technologies such as parabolic trough solar collectors has emerged as a cost-competitive solution to replacing natural gas and fuel oil for heating - producing very low levels of greenhouse-gas emissions and proving strong potential in mitigating climate change.

Sopogy's high performance MicroCSP parabolic trough technology delivers safe, affordable, and reliable high-temperature process heat for industrial, agricultural or manufacturing processes requiring large volumes of hot water or steam in the range of 200–500 °F/ 93-260 °C.

The market for CSP as a renewable solar resource for process heating is particularly promising in rural, agricultural and industrial sectors—including food processing operations where use of steam boilers is prevalent.

## Advantages of MicroCSP Technology for Process Heating

- Supplements heat and reduces the load on your usual heating equipment, which can lower maintenance costs and significantly extend the life of the unit.
- Produces emissions-free heat for process heating and offsetting other heating fuels such as propane.
- Decreases the building's overall energy requirements and ultimately reduces a building's operating costs.
- Applies to both new and retrofit designs for roofs, free-standing structures, and building re-skinning applications.
- Uses standard plumbing and heating components.

# Process Heat » Specifications

## APPLICATION EFFICIENCY

SOPOGY » PROCESS HEAT			
Direct Solar Radiation on a Clear Day*	850 W/m <sup>2</sup>	269 Btuh/ft <sup>2</sup>	
Temperature to Application	150°F-250°F	250°F-350°F	350°F-450°F
	65.5°C-121.1°C	121.1°C-176.6°C	176.6°C-232.2°C
Solar to Thermal Efficiency, Collector Only**	61.5%	58.8%	55.2%
Available Thermal Energy for Process after Losses	523 W/m <sup>2</sup>	500 W/m <sup>2</sup>	469 W/m <sup>2</sup>
Average Output per Panel	2.72 kW	2.60 kW	2.44 kW
	9,286 Btuh	8,878 Btuh	8,335 Btuh

## DIMENSIONS/PANEL CAPACITY

SOPONOVA		
Length	3.66 m	11.99 ft
Width	1.65 m	5.42 ft
Center to Center Spacing	2.59 m	8.5 ft
Actual Area	6.04 m <sup>2</sup>	64.94 ft <sup>2</sup>
Reflector Aperture Area	5.21 m <sup>2</sup>	56.04 ft <sup>2</sup>

## APPLICATION DATA

150°F-250°F					
Hourly Thermal Requirements (mmBtu)	1	5	10	20	50
Hourly Thermal Requirements (Therm)	10	50	100	200	500
Hourly Natural Gas Displaced (cu. Ft)	970	4,850	9,699	19,399	48,497
Number of Panels	112	560	1,120	2,240	5,600
SPACE REQUIREMENTS (Only Solar Field Area)					
square feet	11,424	57,120	114,240	228,480	571,200
square meter	1,061	5,307	10,613	21,227	53,066
acre	0.26	1.31	2.62	5.25	13.11
hectare	0.11	0.53	1.06	2.12	5.31

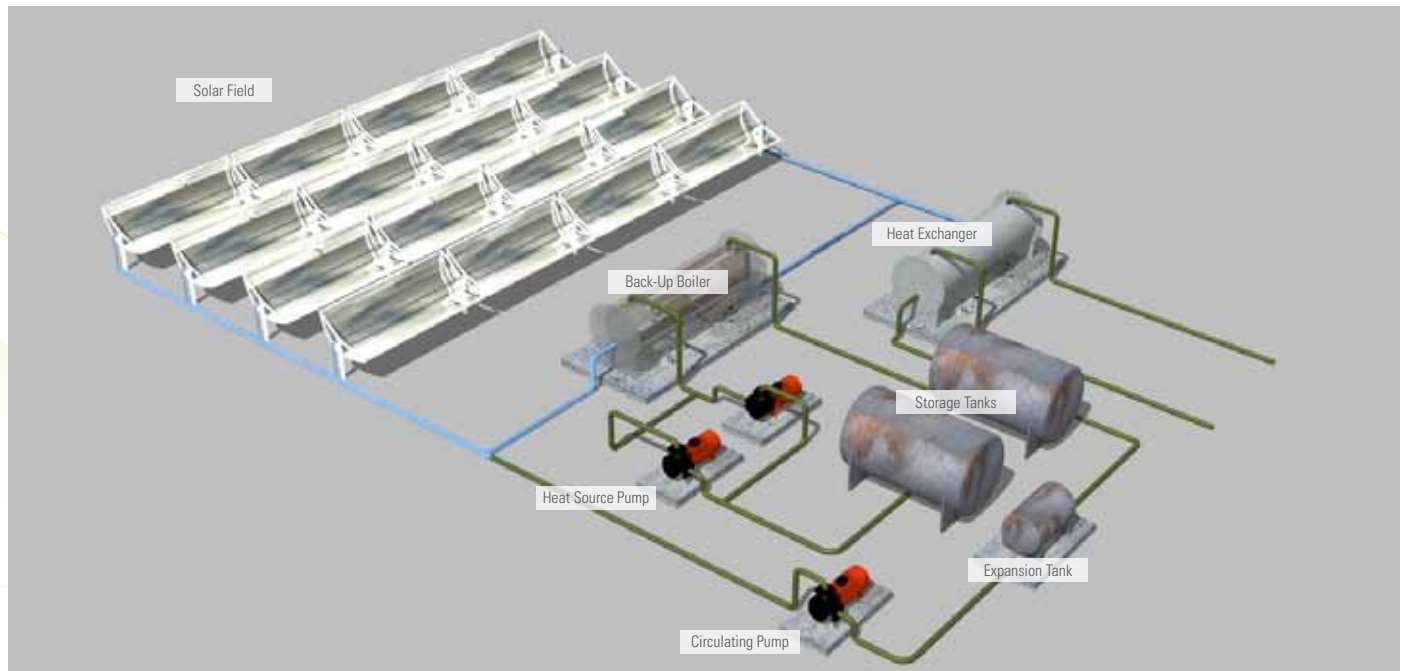
250°F-350°F					
Hourly Thermal Requirements (mmBtu)	1	5	10	20	50
Hourly Thermal Requirements (Therm)	10	50	100	200	500
Hourly Natural Gas Displaced (cu. Ft)	970	4,850	9,699	19,399	48,497
Number of Panels	120	600	1,200	2,400	6,000
SPACE REQUIREMENTS (Only Solar Field Area)					
square feet	12,240	61,200	122,400	244,800	612,000
square meter	1,137	5,686	11,371	22,743	56,857
acre	0.28	1.40	2.81	5.62	14.05
hectare	0.11	0.57	1.14	2.27	5.69

350°F-450°F					
Hourly Thermal Requirements (mmBtu)	1	5	10	20	50
Hourly Thermal Requirements (Therm)	10	50	100	200	500
Hourly Natural Gas Displaced (cu. Ft)	970	4,850	9,699	19,399	48,497
Number of Panels	128	640	1,280	2,560	6,400
SPACE REQUIREMENTS (Only Solar Field Area)					
square feet	13,056	65,280	130,560	261,120	652,800
square meter	1,213	6,065	12,129	24,259	60,647
acre	0.30	1.50	3.00	5.99	14.99
hectare	0.12	0.61	1.21	2.43	6.06

\* At zero degree incident angle

\*\* Thermal losses estimated at 80°F ambient air temperature with wind speeds of 6mph

## PROCESS HEAT SYSTEM LAYOUT



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