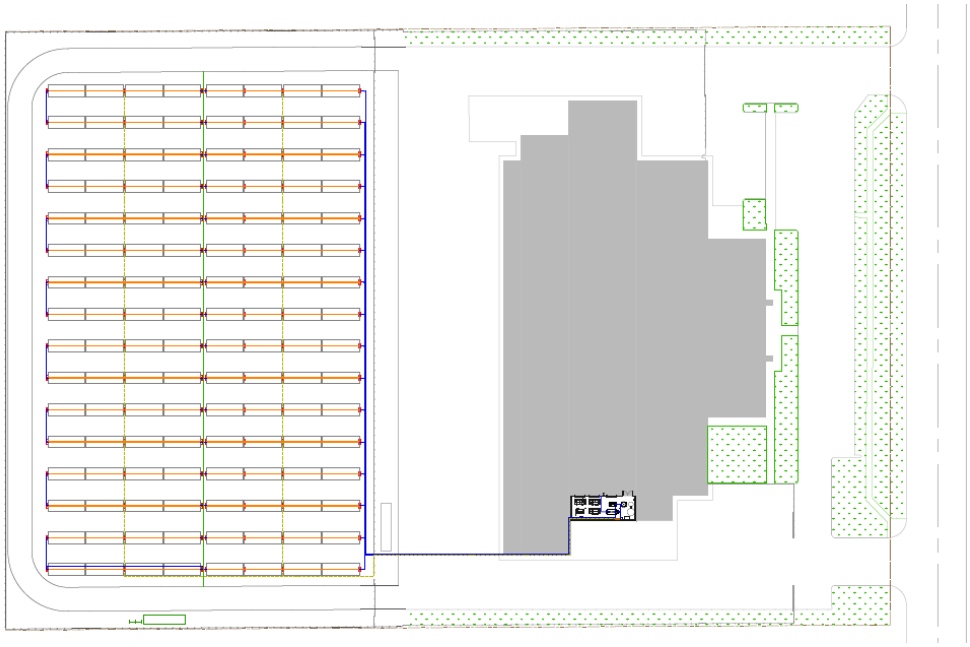
Industrial Solar Steam Achieves a 50% Greenhouse Gas Reduction

FOOD PRODUCTION INVESTMENT PROGRAM

Sunvapor's Solar Boiler project for California Custom Processing received a $3.9 million FPIP Grant from the California Energy Commission. "While the Energy Commission gives preference to projects for processors in capped facilities emitting greater than 25,000 metric tons of greenhouse gases, the CCP-Sunvapor project stood out for its uniquely high sustainability impact." - Kevin Uy, Team Lead with Energy Commission's R&D Division.

DEMAND RESPONSE

The food processing facility operates every day of the year. The size of the solar field is designed to minimize curtailment of solar steam while enabling 50% of the annual steam consumed to originate from the sun. The opportunity to use a solar boiler led to a demand response where three operating shifts were reduced to two without impacting annual almond production.



California Custom Processing (CCP) awarded Sunvapor with a contract to provide a turnkey Solar Boiler to supply steam for its 57,300-sq.-ft. food safety almond processing facility in Madera, CA. After the project is completed in 2021, 100 per cent of the steam consumed at the plant will be generated from Sunvapor's Solar Boiler when operating at full capacity in clear sky conditions. Sunvapor's steam generator achieves an industry-leading 75 per cent thermal conversion efficiency of sunlight to process steam. In Sunvapor's patent-pending process design, parabolic trough collectors concentrate sunlight on specially-coated tubes through which pressurized water circulates in a closed loop.

The heat gained by the flowing fluid is supplied to a heat exchanger in the boiler room to generate 100 psig steam pressure, identical to the steam produced by the existing natural gas boilers - except with zero emissions. Conventional parabolic trough systems use flammable, non-food grade thermal oil instead of water as the heat transfer fluid. The Figure above shows the four-acre solar field to the north (left) of the processing building. All the mechanical equipment associated with the solar boiler are located in the plant's existing boiler room. Solar steam takes priority over natural gas steam, and the two steam sources cooperate so that demand is always met.

STATE OF CALIFORNIA ENERGY COMMISSION

SUNVAPOR
RENEWABLE PROCESS HEAT

Demand Response

OWN FACILITY OR PURCHASE STEAM

The host customer can choose to own the solar steam facility or purchase steam under a Heat Purchase Agreement (HPA). For this project, CCP elected to own the system.

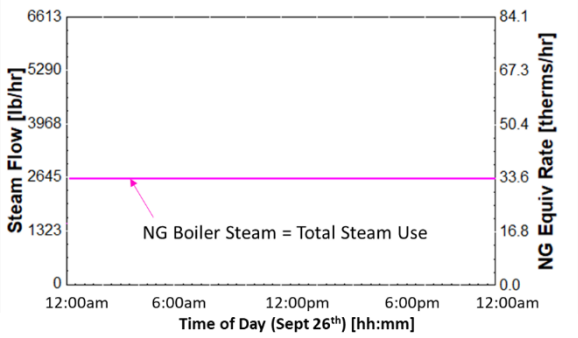
TURNKEY SOLUTION

Sunvapor, with its contractors, delivers the complete project, including engineering, permitting, construction , commissioning, measurement & verification, operations & maintenance.

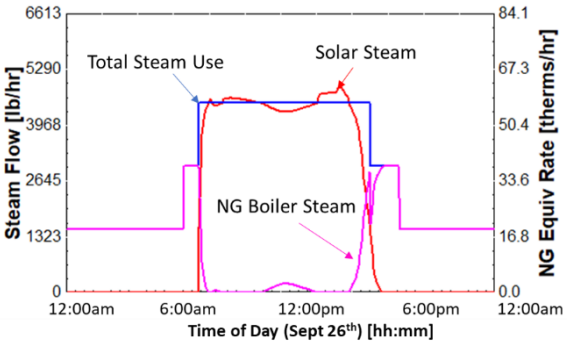
ABOUT SUNVAPOR

Sunvapor is a technology and project developer that delivers deep decarbonization solutions to commercial and industrial customers. Sunvapor has been awarded four grants from the U. S. Department of Energy and two from the California Energy Commission for innovations related to solar energy generation and storage.

For more information:
www.sunvapor.net



The upper Figure illustrates the typical demand profile at the processing facility as it exists today. Steam is consumed for pasteurizing and blanching. The existing demand profile calls for constant steam flow at 2,645 lb/hr throughout the day. There was a desire to carry out all of the pasteurization during the daytime but there was insufficient boiler capacity even with three gas boilers.



Adding a 230 Boiler Horsepower Solar Steam Boiler from Sunvapor enabled CCP to compress its three-shift pasteurization process to only two daytime shifts while reducing their annual gas consumption and emissions by half. The lower Figure shows a plot of the steam demand and the steam supplied from sunlight and natural gas for a typical autumn day. This plot shows how the natural boilers become auxiliary to the primary solar boiler, with very little solar energy curtailed. The solar boiler produces 100 per cent of the steam consumed during clear sky conditions.

Consumer-driven steam technology

"Our growth has been driven by our discerning customers from the United States and abroad who value our organic and conventional processing of almonds. Many of them have sustainability goals that are demanding reductions in greenhouse gases from their suppliers. Sunvapor's technology provides the best solution for us, and we would be excited to serve as a showcase for other processors to follow our lead" - Grant Willits, co-owner of CCP.

SUNVAPOR
RENEWABLE PROCESS HEAT

Sunvapor, Inc.
145 N Sierra Madre Blvd. Suite 3
Pasadena,CA 91107
Phone 650.625.7818

ccp California Custom Processing
CUSTOM ALMOND BLANCHING AND MANUFACTURING