



# Heliogen | HelioSteam™

Heliogen channels the power of concentrated sunlight to create carbon-free steam from renewable energy sources to reduce your carbon footprint.

## Heliogen Creates Energy on Demand

Heliogen is a renewable energy technology company on a mission to decarbonize industry. Heliogen's AI-powered modular design uses concentrated sunlight and long-duration thermal energy storage to deliver dispatchable carbon-free steam, green hydrogen and in the future clean power.

### Benefits

- Thermal efficiency
- Lower carbon emissions
- Dispatchable clean steam
- High-efficiency processing
- Scalable system design
- Streamlined deployment
- Automated maintenance

### Industry Opportunities

- Food & Beverage
- Mining & Mineral Processing
- Oil & Gas
- Chemical

## Decarbonize Heavy Industry with Carbon-Free Steam

With almost 80% of industrial primary energy coming from natural gas and petroleum<sup>1</sup>, starting the switch to renewable energy for steam generation is an important step to future-proof your business.

HelioSteam™ provides a robust solution for today's clean energy transition that meets challenging requirements for industrial processes. The solution lowers fossil fuel dependency, helping customers achieve climate targets while mitigating high fuel prices to increase margins.

## High Temperatures Created by Sunlight

Heliogen's solution derives from concentrated solar thermal energy, capable of reaching temperatures over 1,000 °C at the receiver, more than enough to deliver 300 °C steam to your process. Fueling steam generation with thermal energy without an interim step delivers better efficiency and a simpler solution.

## Thermal Energy Storage (TES) for Dispatchable Supply

Concentrated solar thermal energy unlocks the ability to store heat for off-sun operation. When added to the configuration, our TES provides long term energy storage by storing thermal energy to be discharged over 10+ hours at night.

## Computing Power Redefines What's Possible

Heliogen leverages ground-breaking artificial intelligence and computer vision technology to control small, factory-made heliostat mirrors. This design delivers higher temperatures and efficiency with simple components that are easier to install and maintain.

## HelioSteam Solution Quick Reference

Heliogen's steam modules can generate approximately 1,300 MWh of thermal energy per year on each acre of land, depending on local solar resource.

### Tower & Receiver

The modular solution includes a receiver and a tower where concentrated sunlight is captured during the day to generate steam which is either sent directly to the process or sent to a Thermal Energy Storage system where heat is stored to allow for dispatch of carbon-free steam around-the-clock.

#### Central tower

- Tower is shipped in multiple pieces for fast assembly on site

#### Direct Steam Generating Receiver

- Up to 100 bar optional steam pressure, generated using concentrated sunlight, delivered directly to the client or thermal energy storage
- Adjustable pressure letdown to match customer facility needs

#### Thermal Energy Storage (TES)

- Modular storage designed to fit site requirements and ensure optimal process integration

### Heliostats

Built at our highly automated manufacturing facility, small heliostat mirrors are designed for mass production and easy installation. AI-controlled closed-loop tracking allows for improved accuracy.

#### Heliostat mirrors

- ~2 m<sup>2</sup> sized mirrors that are easily shipped and installed on site
- Minimal foundation for easy installation

#### Closed-loop AI-powered tracking and calibration

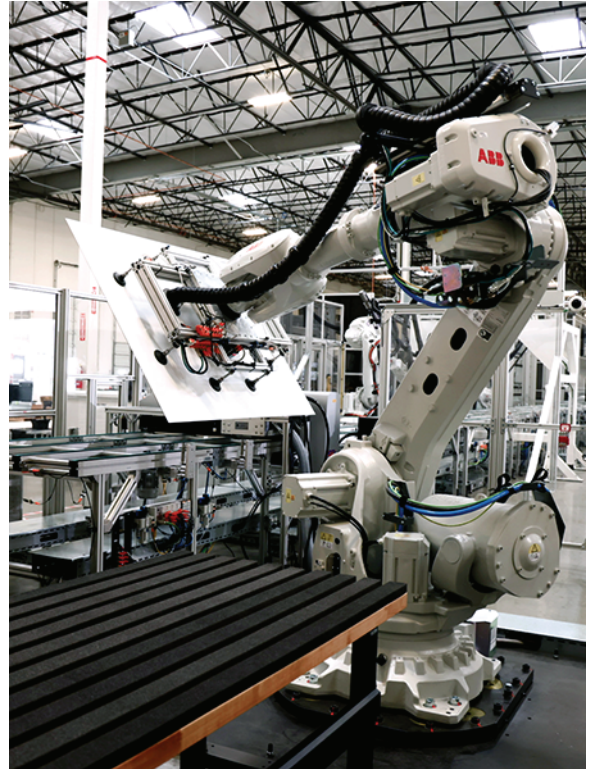
- Improved accuracy over traditional CSP solutions

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#### Automated Cleaning Vehicle (ACV)

- Frequent mirror cleaning for reflectivity optimization
- Night cleaning operations with no impact on steam production
- Reduced water consumption

(Product capabilities and specifications are subject to change without notice.)



Heliostat assembly at Heliogen's manufacturing plant in Long Beach, California

# Heliogen

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