



Heliogen’s Lancaster testing and demonstration facility proving ground for next-generation solar thermal technologies

Lancaster testing facility specs

- Heliostat field size..... ~1.5 acres
- Tower size 55ft tall
- Number of heliostats.....~500 heliostats
(multiple generations)

Deep in the heart of California’s Mojave Desert — where the weather is reliably dry and sunny — Heliogen’s Lancaster testing and demonstration facility is harvesting concentrated sunlight to produce the renewable energy required to rival the fossil fuels used in heavy industry.

Since 2019, Heliogen has used this facility to implement rigorous demo and testing protocols, continuously optimizing the performance of our solar thermal energy technology in a real-world environment.

Game-changing technology that’s fully tested and ready to deploy

Heliogen’s next-generation concentrated solar energy systems combine small, precise mirrors and long-duration thermal storage with proven technologies like AI and computer vision to deliver dispatchable carbon-free steam, green hydrogen and in the future clean power. We’re creating a simple, affordable path to net zero.

Product testing before it goes out to the real world

Since 2019, Heliogen has used this high desert facility to implement rigorous demo and testing protocols, continuously optimizing the performance of our solar thermal energy technology in a real-world environment.

We conduct real-time aging and wear testing associated with atmospheric conditions. Using a dedicated sample exposure rack and weather station to monitor material degradation, we can assess the wear and tear resulting from a variety of factors. Our systems are built to adapt to most atmospheric conditions, and to reduce maintenance and recalibration for the lifetime of the system.

30-year simulated life stress testing

- Water
- Thermal cycling
- Dust and sand
- Corrosion
- Light exposure
- Atmospheric conditions

To ensure the highest level of accuracy and confidence in our performance models, in addition to wear-and-tear testing, we conduct rigorous testing of heliostat performance. Tracking validation checks record heliostat tracking accuracy throughout the day. This practice



ChariotAV

Conceived in Lancaster — ChariotAV — our first production-ready autonomous vehicle — uses AI control software, sensors, and robotics to keep a field of thousands of heliostats clean. Super-smart and independent, it's equipped with LIDAR sensors and cameras, which allow ChariotAV to see what's going on around it — ChariotAV can clean row after row of heliostats on its own, after dark, to minimize business disruption.

Using AI, ChariotAV will learn how to maneuver through the field, and move from one heliostat to the next, removing dust to keep them operating at peak performance.

fortifies confidence that these performance models will accurately predict the performance of larger projects in the future.

Materials and component-level testing also take place on the Lancaster site. As part of our development process, we gain knowledge through field use of thermal energy storage materials, solar absorber materials, and optical performance cameras. Heliogen's engineers, fabricators, and operators sign off on comprehensive field-testing results for reliability, durability, and ease of installation and maintenance.

Improving deployment, maintenance, and operation processes

At our Lancaster facility, repeated installations and de-installations allow us to test and innovate our field deployment processes, including site preparation, automated base installation, and mirror placement. In the control center, system operators initiate and monitor energy collection, creating operational data used to tune product parameters, as well as inform safety procedures and operator protocols. Starting in December 2022, our field operations team began using our automated cleaning vehicle, ChariotAV, to clean heliostats and provide feedback on daytime and nighttime cleaning performance to product development teams.

Lancaster achievements

- 2022** • Achieved calcination of valuable minerals on site
- 2021** • Demonstrated green hydrogen production capabilities with Bloom electrolyzer
 - Produced overnight steam from thermal energy storage
- 2019** • Concentrated solar energy above 1,500 degrees Celsius
 - Reached absorber temperatures over 1,000 degrees Celsius

Expanding the green energy footprint

The Lancaster testing and demonstration facility is an important part of the process to create our reliable, durable, and easy to maintain concentrating solar thermal energy system. We encourage you to contact us to experience this innovative site and join us in looking forward to a sustainable future.

Heliogen

To learn more, contact us at:
sales@heliogen.com