

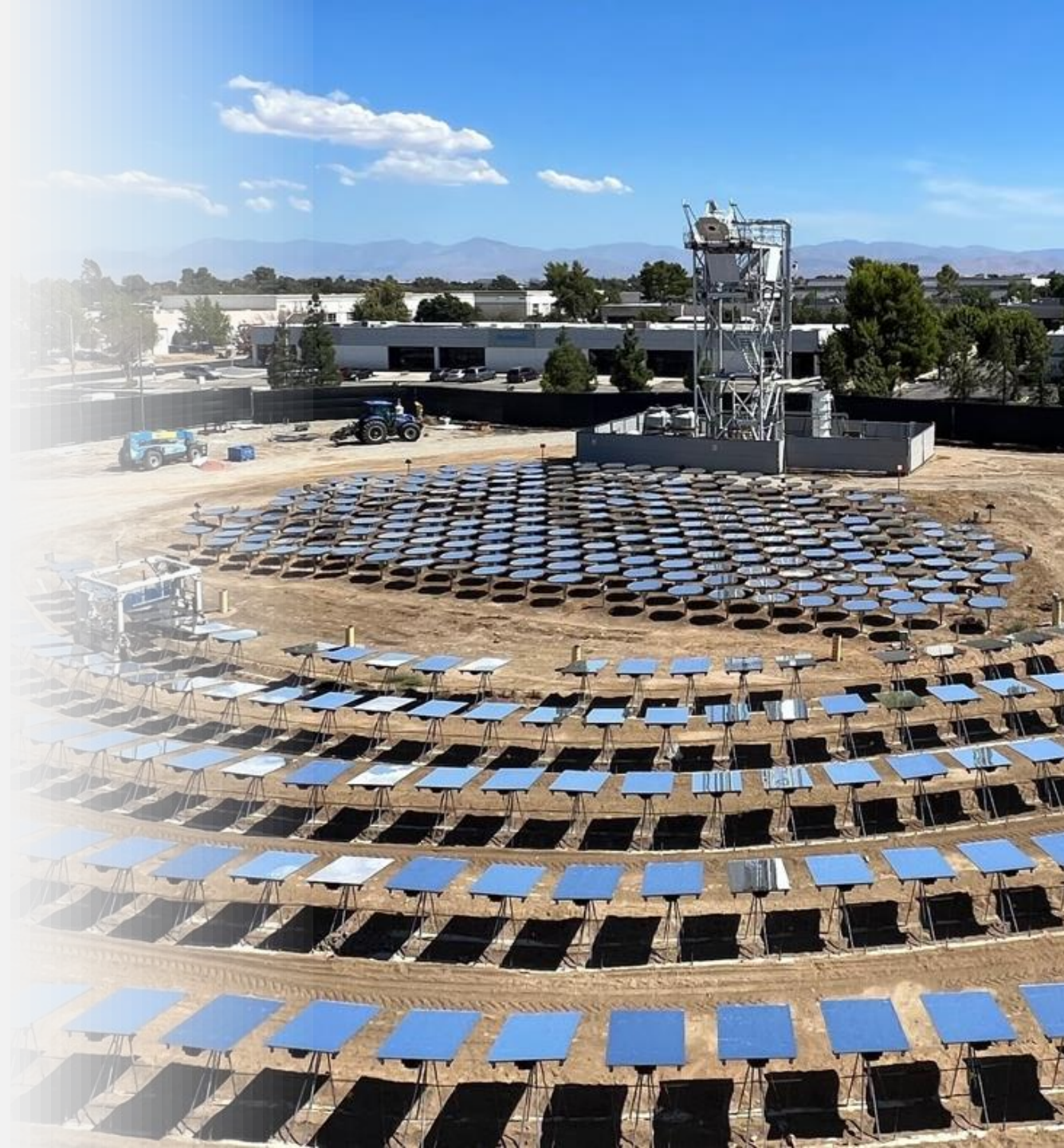


Applications & End Users:

sCO₂ Power Cycle Applications for Concentrating Solar Power Deployment

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Acknowledgements/Disclaimers

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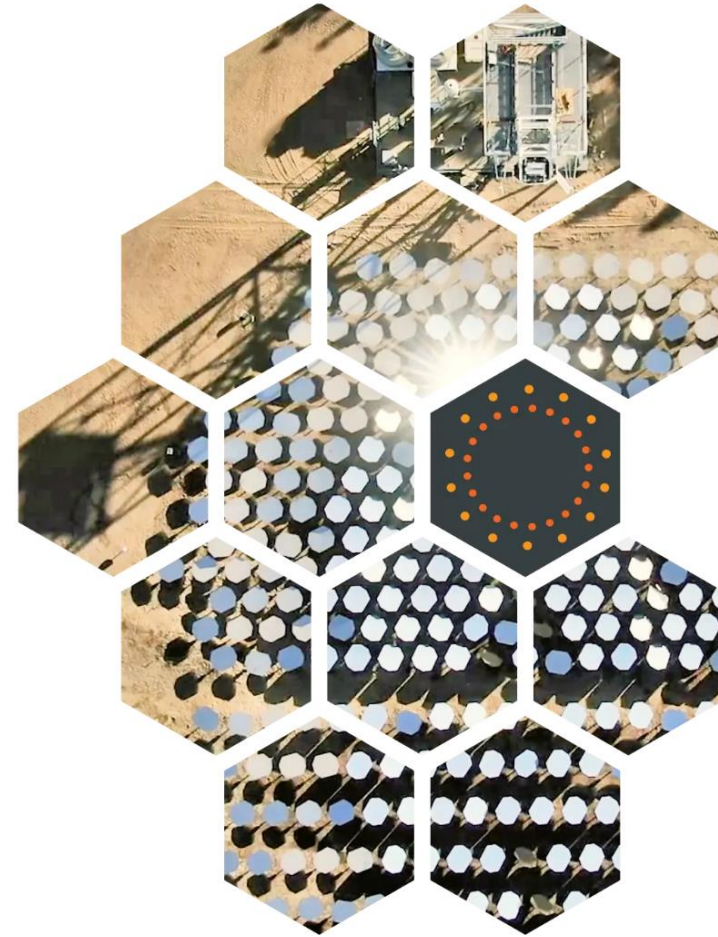
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Heliogen's Mission

Heliogen is a California-based renewable energy technology company on a mission to help industry achieve net zero emissions. By combining solar thermal technology with artificial intelligence and thermal energy storage, we aim to support a sustainable future – starting with our solutions for clean industrial steam and green hydrogen.



“Generation 3” Concentrated Solar Power

Innovation that will disrupt the industry

Case Study: Project Capella

- + Validate integrated operation of an sCO₂ power cycle with a thermal energy storage system charged from concentrating solar thermal heat to demonstrate commercial readiness for full scale plants.

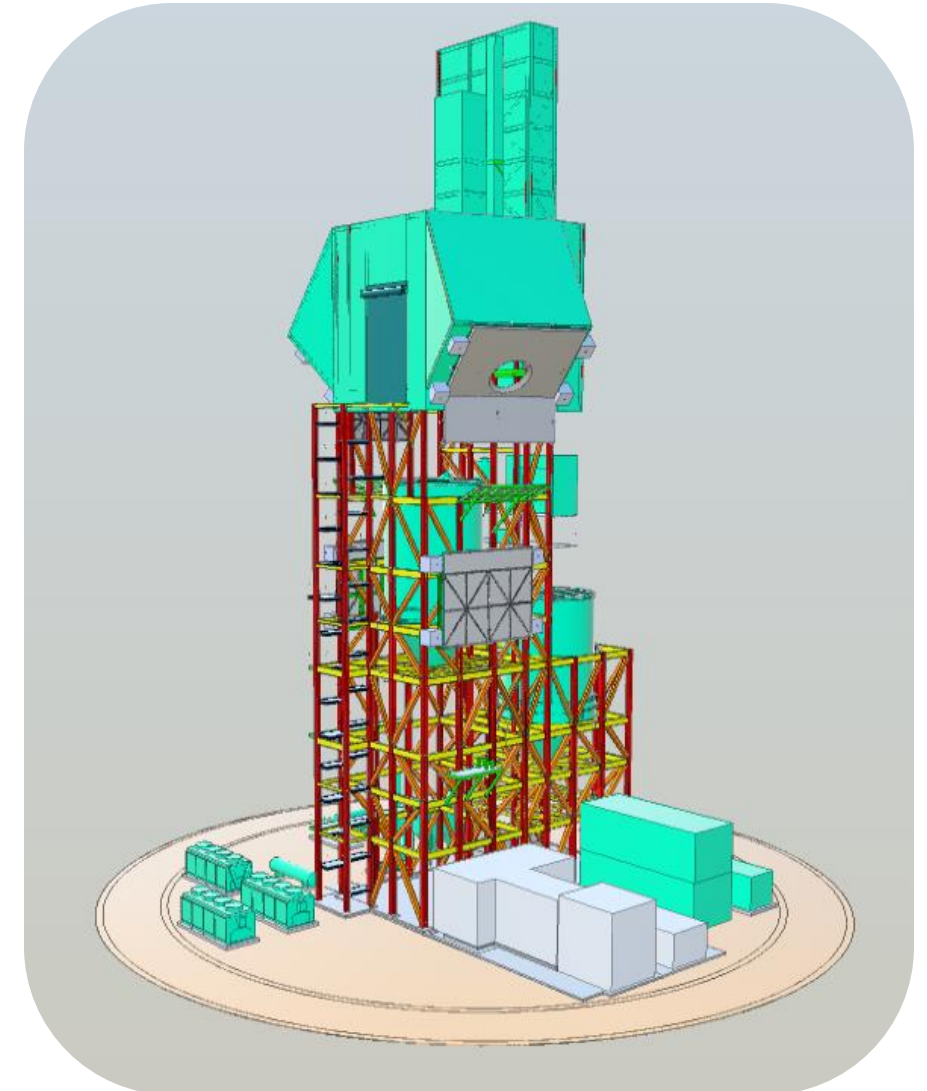
Investors



	Current Solution (Hybrid PV + CSP)	Next Generation (Gen 3 CSP)	Innovation
Overview	PV generates daytime power while CSP acts as a battery	High-capacity factor CSP + high temperature storage	Lower LCOE, smaller modular tower drives flexibility and greater gross margins
Power Conversion Cycle	Steam	Supercritical CO ₂ (“sCO ₂ ”)	High thermal efficiency, for a single tower, even at smaller scale
Thermal Energy Storage	Molten salt	High-temperature solid particles	Higher storage temperatures enables high efficiency power generation and high temperature industrial processes
Heliostats	Heliogen’s Gen 4	Heliogen’s Gen 5	Significant reduction in manufactured + installed cost improves gross margins

Overview

Project Name	Capella
Location	Kern County, USA
Technology	Particle Power Tower and sCO ₂ Power Block (Gen 3)
Nominal Capacity	5 MWe
Status	FEED Completed
Key Stakeholder	Woodside Heliogen U.S Department of Energy
Offtake Agreement	No Export (Test Facility)



Plant Configuration

RECEIVER UNITS 1 AND 2

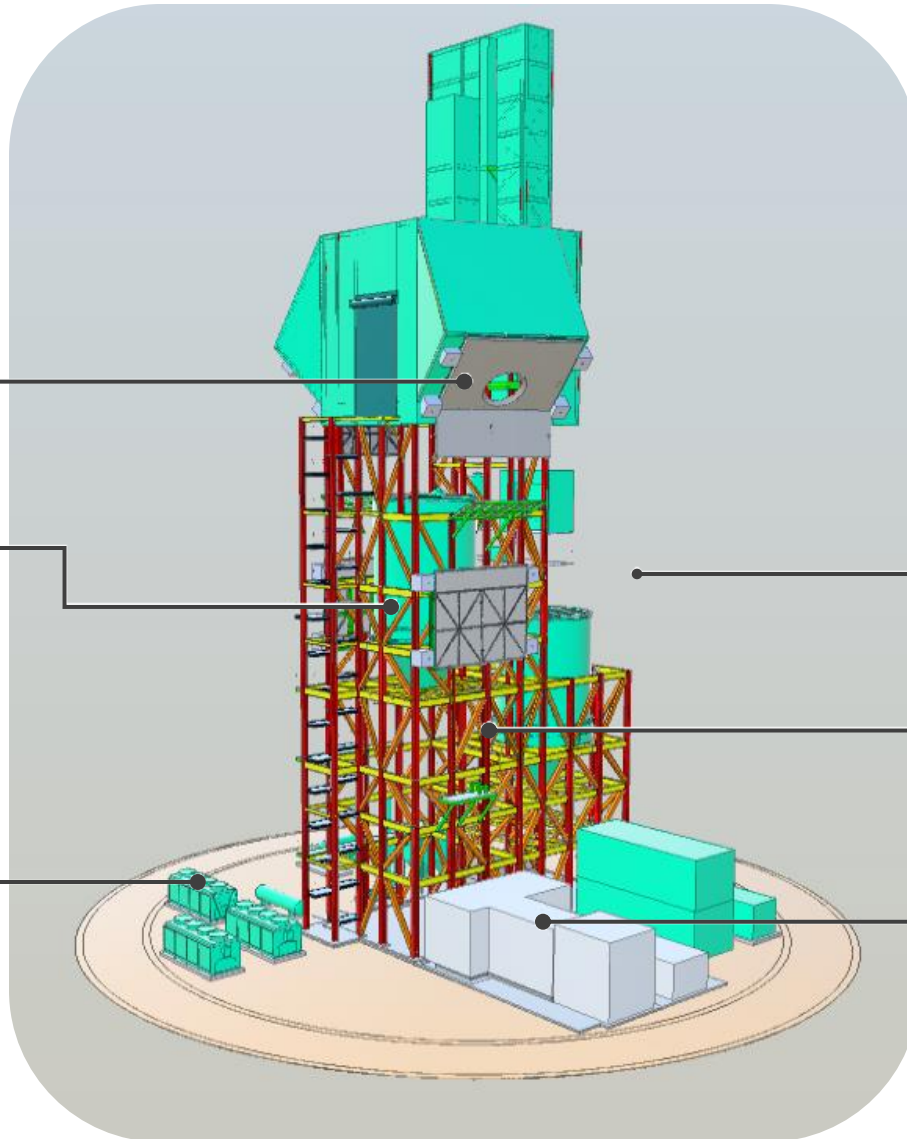
Aimpoint Height (m):	43.3
Receiver Manufacturer:	Heliogen
Receiver Configuration:	Centrifugal Cavity
Aperture Diameter (m):	2.6

THERMAL ENERGY STORAGE

Storage Capacity:	4 hours (60.2 MWh)
Temp Range:	470 to 670 °C
Thermal Storage Media:	CARBO HSP 16/30

COOLER UNITS 1-3

Cooling Type:	Hybrid (Adiabatic)
Number of Coolers:	3 units, 4 fans each



HELIOSTAT FIELD

Solar Field Aperture Area (m ²):	33,024
# of Heliostats:	17200
Heliostat Manufacturer/Model:	Heliogen / Gen V
Control System Provider/Method:	Heliogen / Closed-loop (SOHOT)

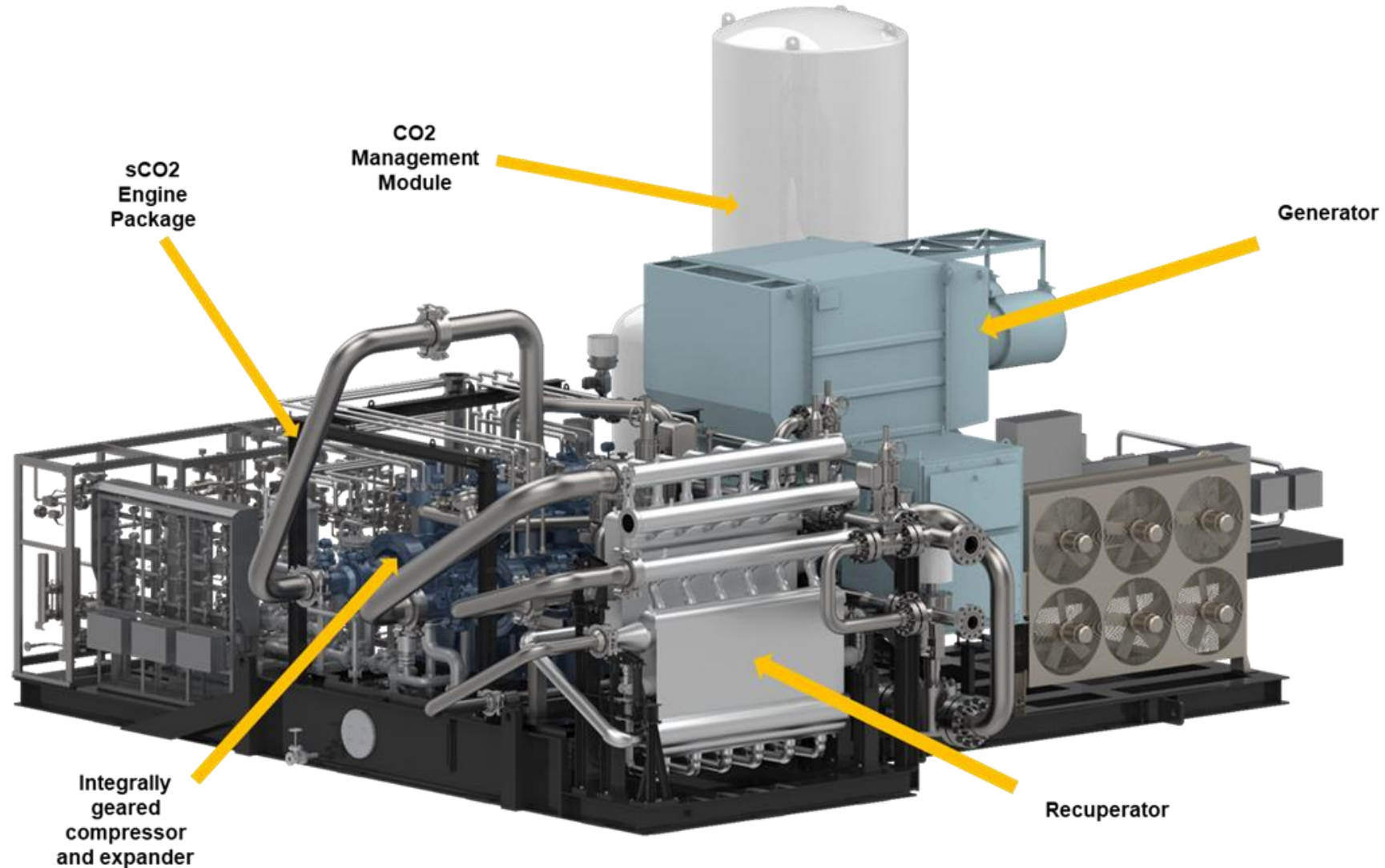
PRIMARY HEAT EXCHANGER (PHX) UNIT 1

Nominal Thermal Duty (MWh):	13.4
Heat Exchanger Manufacturer:	VPE/Solex
Heat Exchanger Construction:	Diffusion bonded Parallel plate

POWER BLOCK UNIT 1

Nominal Power Cycle Capacity:	5 MWe
Power Block Manufacturer:	HPS
Power Cycle:	sCO ₂ / RCBC
Turbine Inlet Temperature (°C):	600

Skid-based sCO₂ Power Block



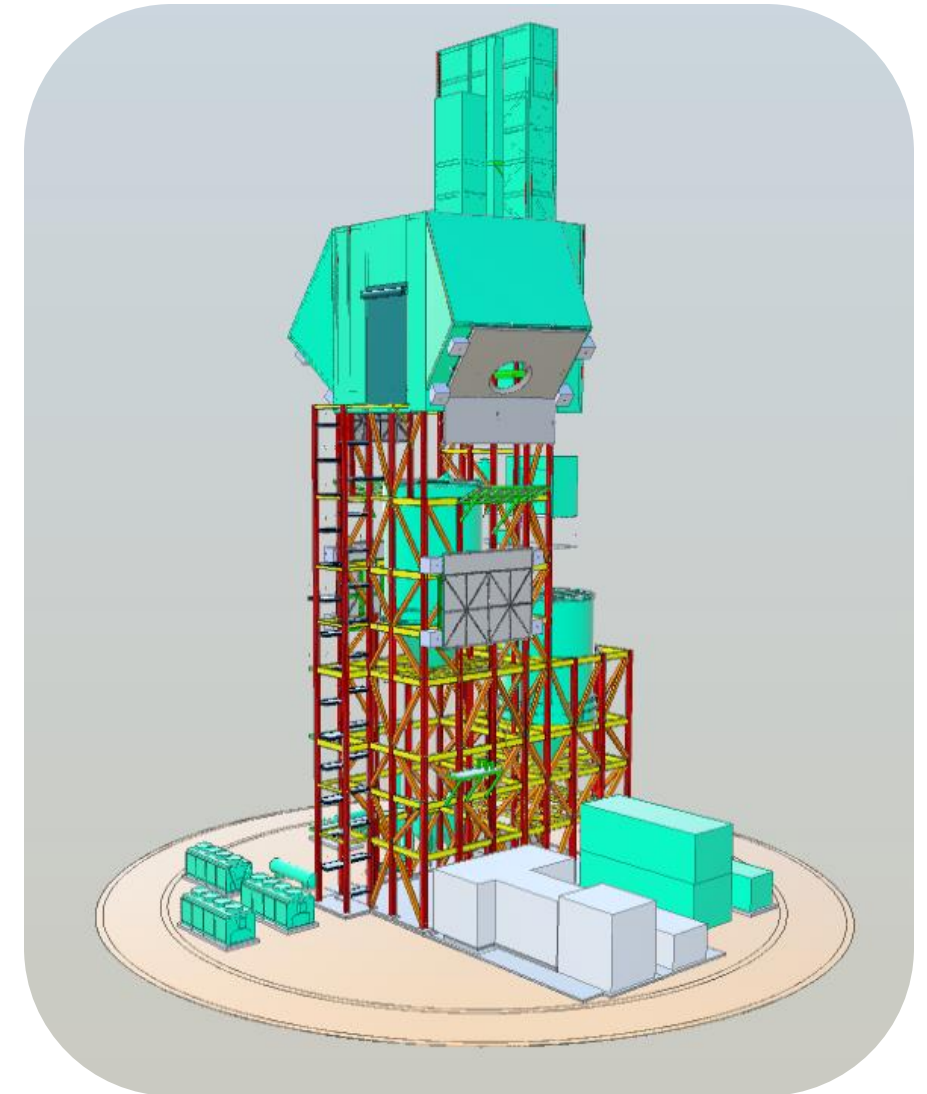
Key Requirements

Parameter	DOE 2030 [1]	Heliogen Gen3 [2]
Net Efficiency	40%	>40%
Power Block Cost	\$700/kW _{ac-gross}	<\$800/kW _{ac-gross}
Primary HXer Cost	N/A	<\$150/kW _{th}
Cooler Cost	N/A	<\$75/kW _{th}
Turbine Inlet Temp.	700 °C	<650 °C
Primary HXer Temp.	N/A	>750 °C
Primary Hxer ΔT	N/A	>200 °C
Cooling Method	Dry	Hybrid
Packaging	N/A	Skid-based
Weight	N/A	<100 mt

[1] <https://www.energy.gov/eere/solar/articles/2030-solar-cost-targets>

'2030 Low-Cost' parameters for a 100 MW CSP system with 14 hours of storage

[2] Preliminary targets pending further system optimization and product development



Heliogen