Flexible Assembly Solar Technology

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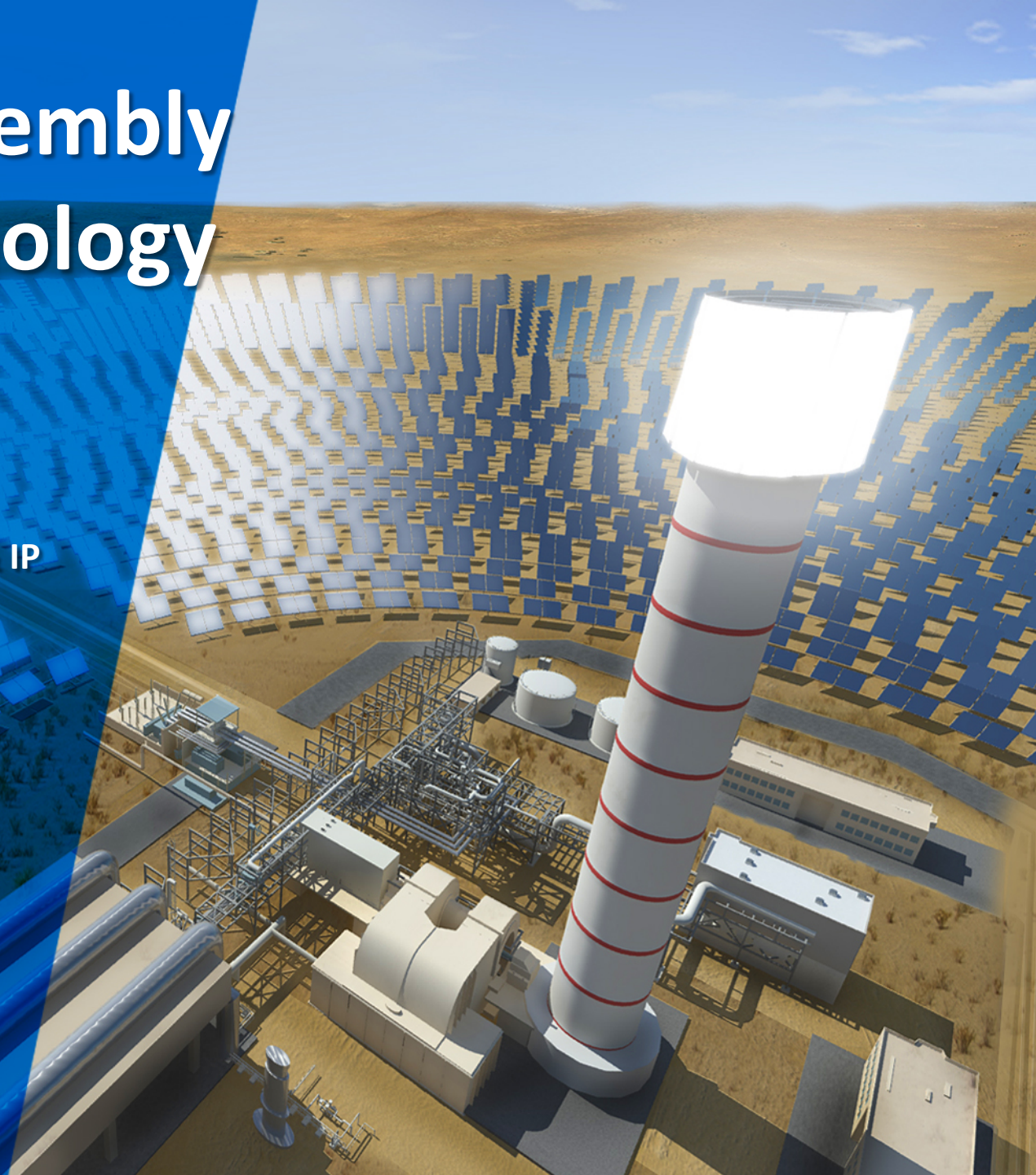
BrightSource
Limitless



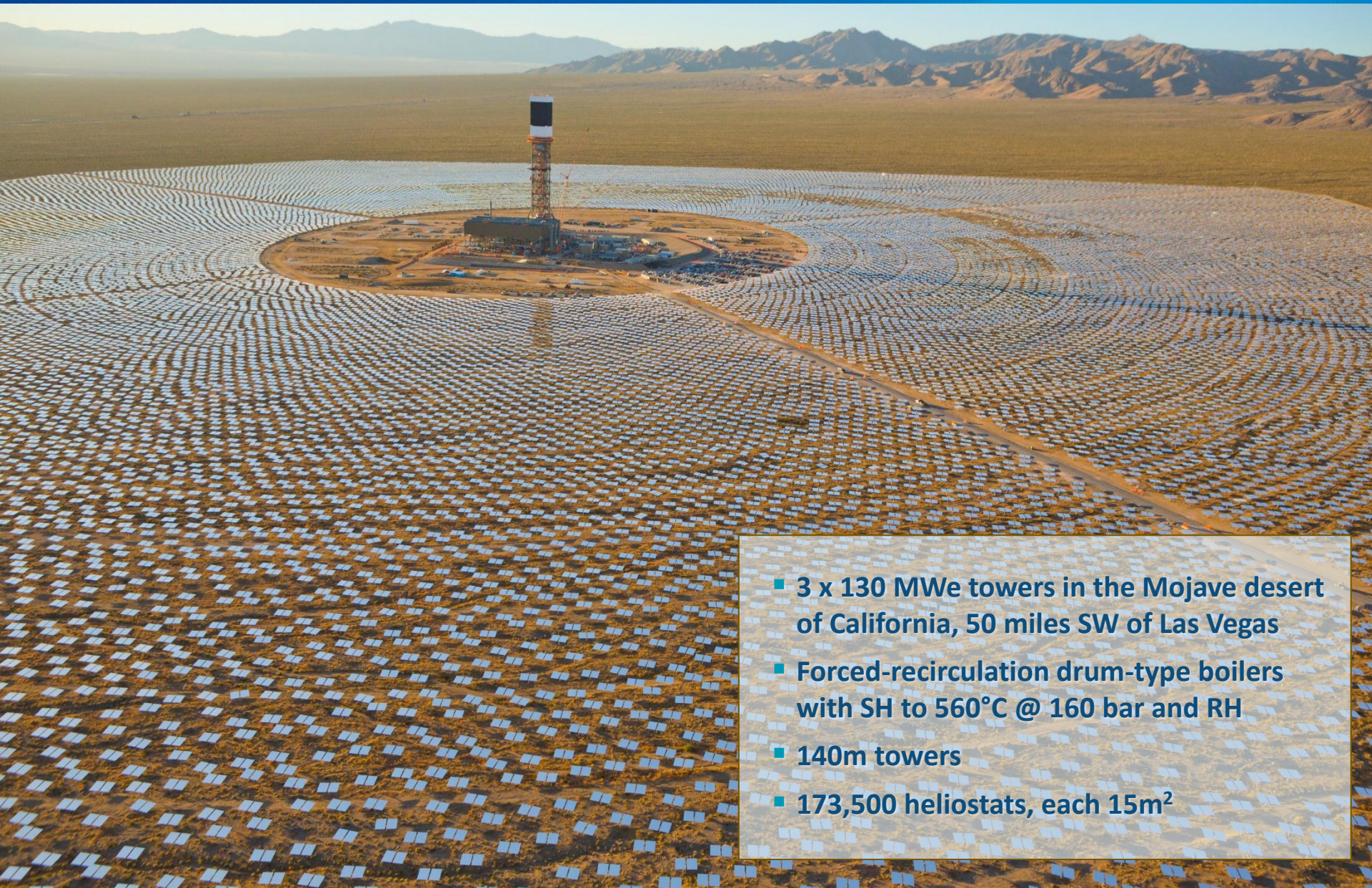
Project Overview

- Project title: Flexible Assembly Solar Technology
- Goals: Develop and demonstrate transportable and field-deployable heliostat reflector assembly systems
- Awardees: BrightSource Construction Management and BrightSource Industries Israel
- Key subcontractor : Grenzebach
- Principal Investigator: Elad Toister, BSII
- Project start date: June 2012
- Current status: preliminary design

About BrightSource Energy

- We develop and build solar thermal projects using our own central tower technology
- Headquartered in Oakland, CA, with R&D, engineering, project management and supply chain management in Jerusalem, Israel
- Founded by key managers of 1980s solar thermal pioneer Luz International

Ivanpah SEGS Complex

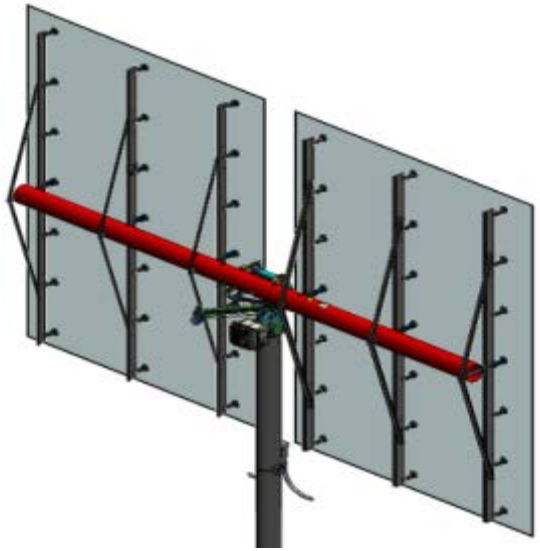


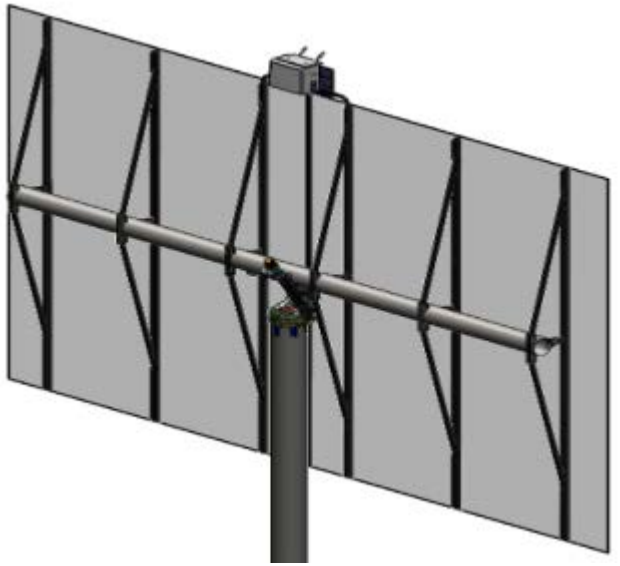
- 3 x 130 MWe towers in the Mojave desert of California, 50 miles SW of Las Vegas
- Forced-recirculation drum-type boilers with SH to 560°C @ 160 bar and RH
- 140m towers
- 173,500 heliostats, each 15m^2

Heliostat assembly at Ivanpah

FAST Project in the context of overall cost reduction

Comparison of LH-2.3 to LH-2.2 (Ivanpah)



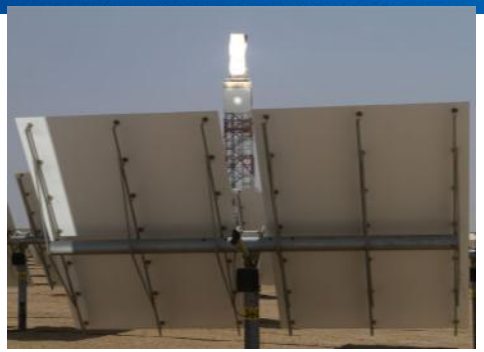


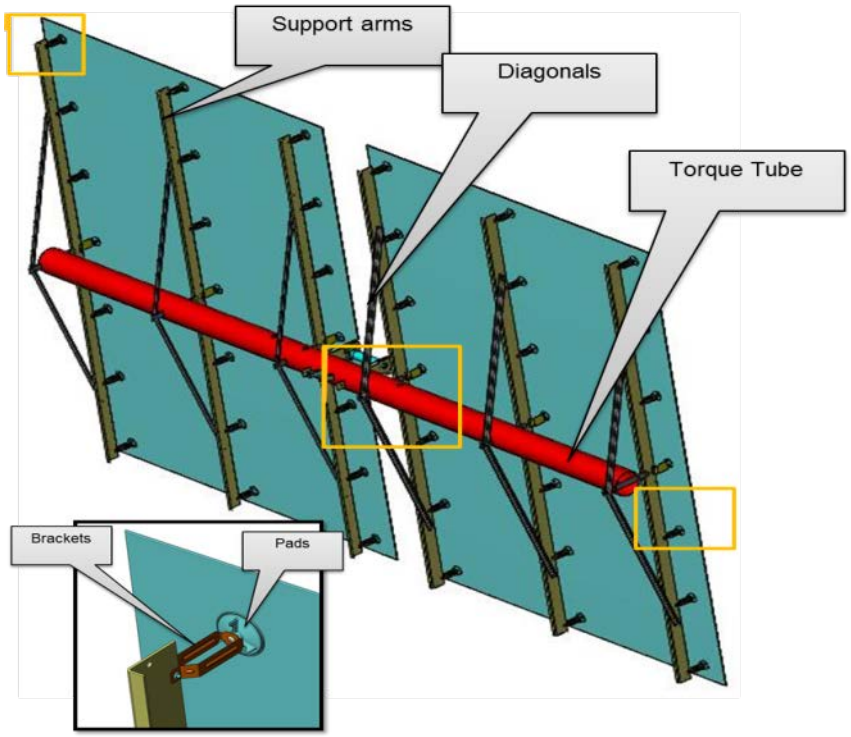
	LH-2.2	LH-2.3	*% change*
Mirror dimensions	2300 x 3300x 4mm	2600 x 3660 x 4mm	
Reflective area per heliostat	15.2 m²	19.0 m²	*+25%*
Gap between mirrors	300 mm	30 mm	*-90%*

Net result: fewer heliostats for same output

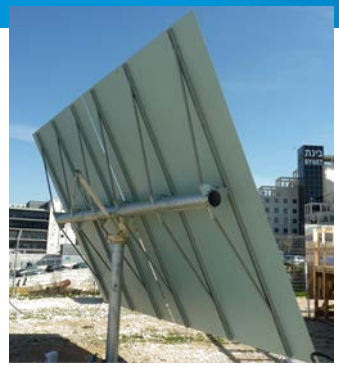
A closer look at the LH2.3 Heliostat Reflector

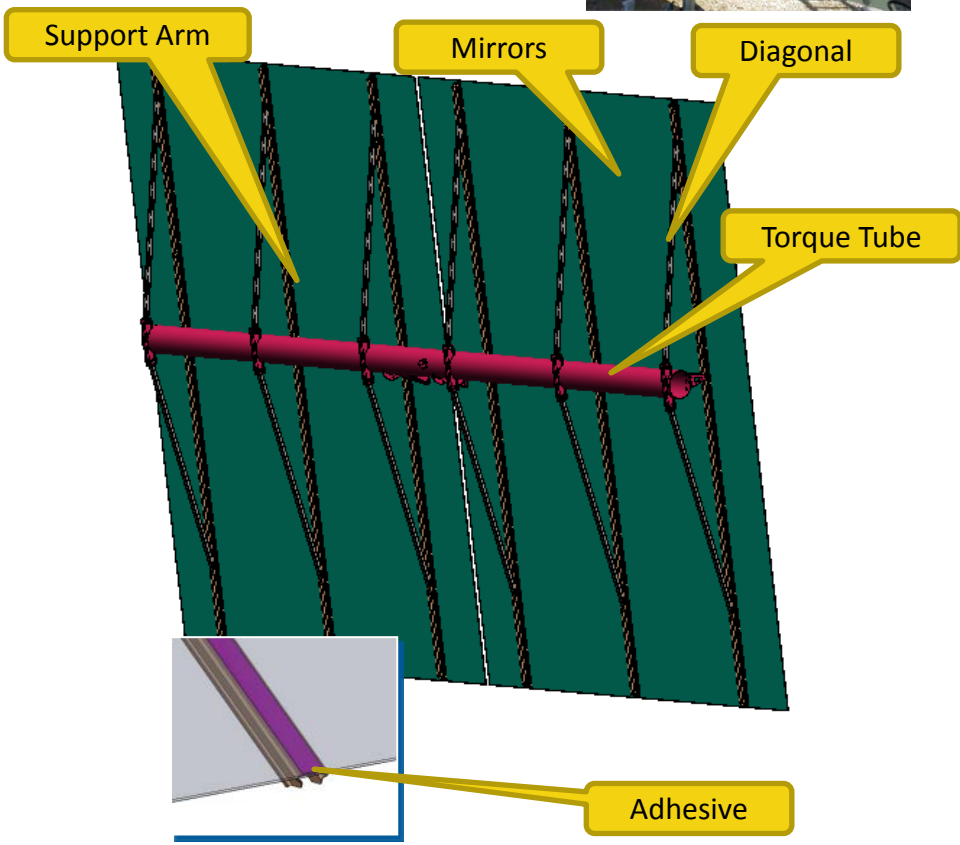
LH2.2





LH2.3





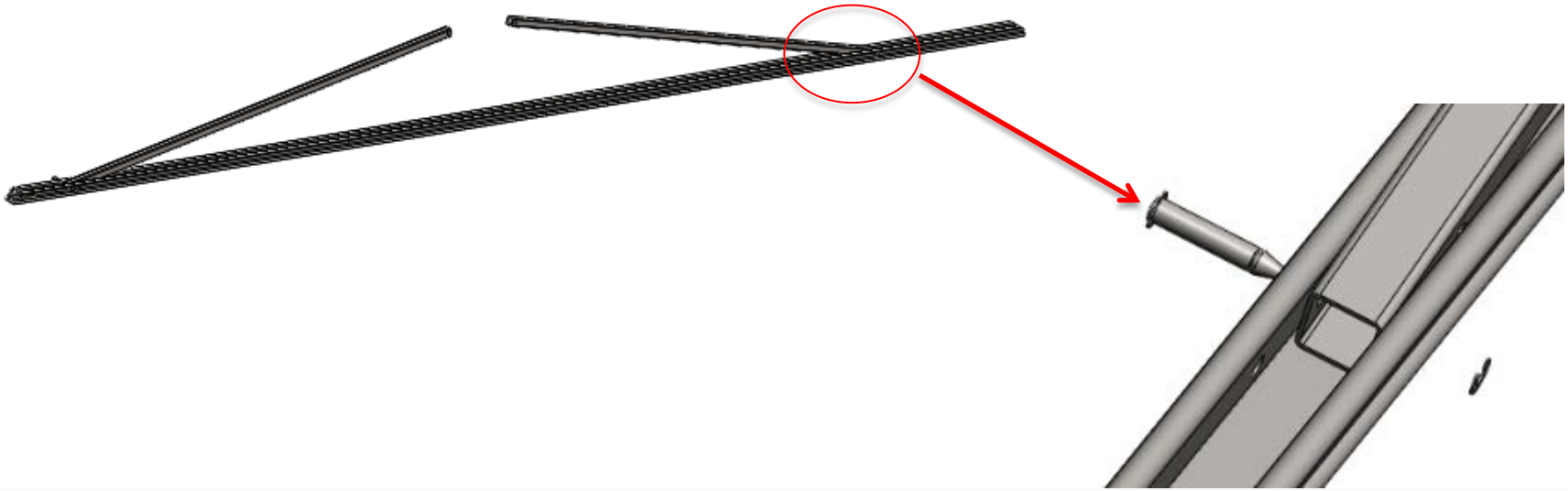
Solar field installation

Major steps:

1. Mirror assembly
2. Flexible on-site reflector assembly
3. Pylon insertion
4. Final reflector installation

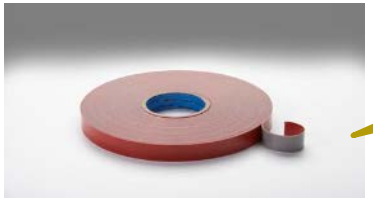
1. Mirror assembly

- Diagonals fold into support arm for transport efficiency
  - Single design supports all focal lengths



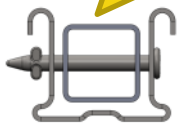
Designed to enable on-site transportability and FAST deployment

Mirror assembly



Adhesive tape

Support Arm Assembly



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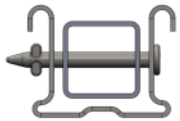

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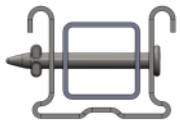

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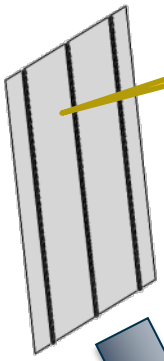
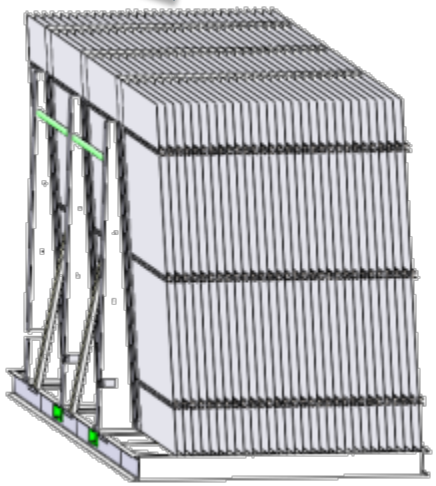
Mirror

"Sub-assembly" Machine

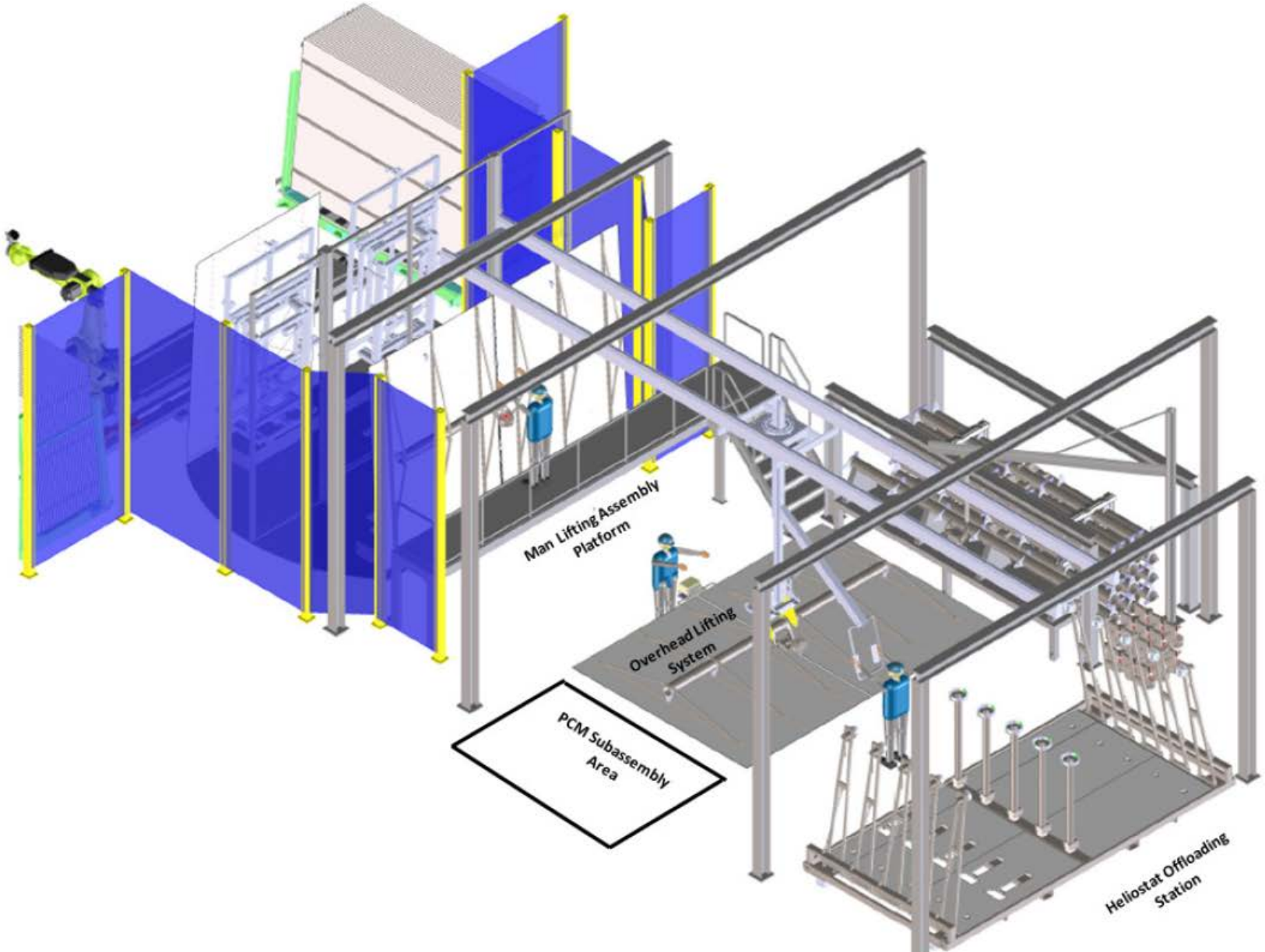


Mirror sub-assembly



30 mirror sub-assemblies/Crate

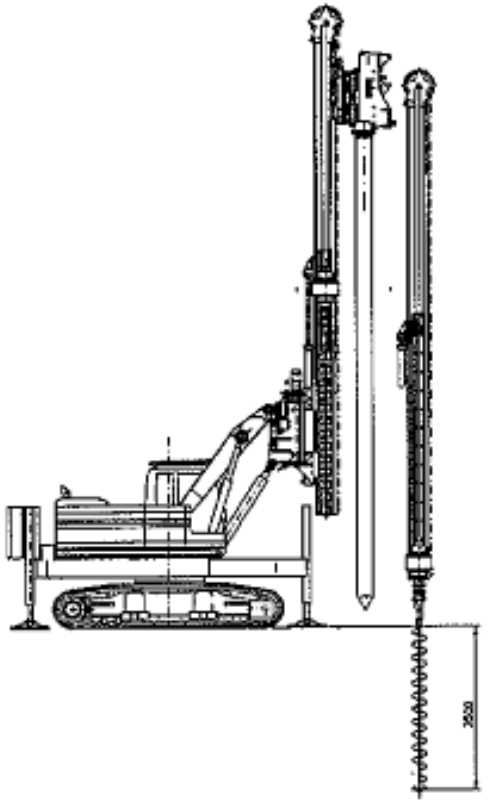
2. Flexible on-site reflector assembly



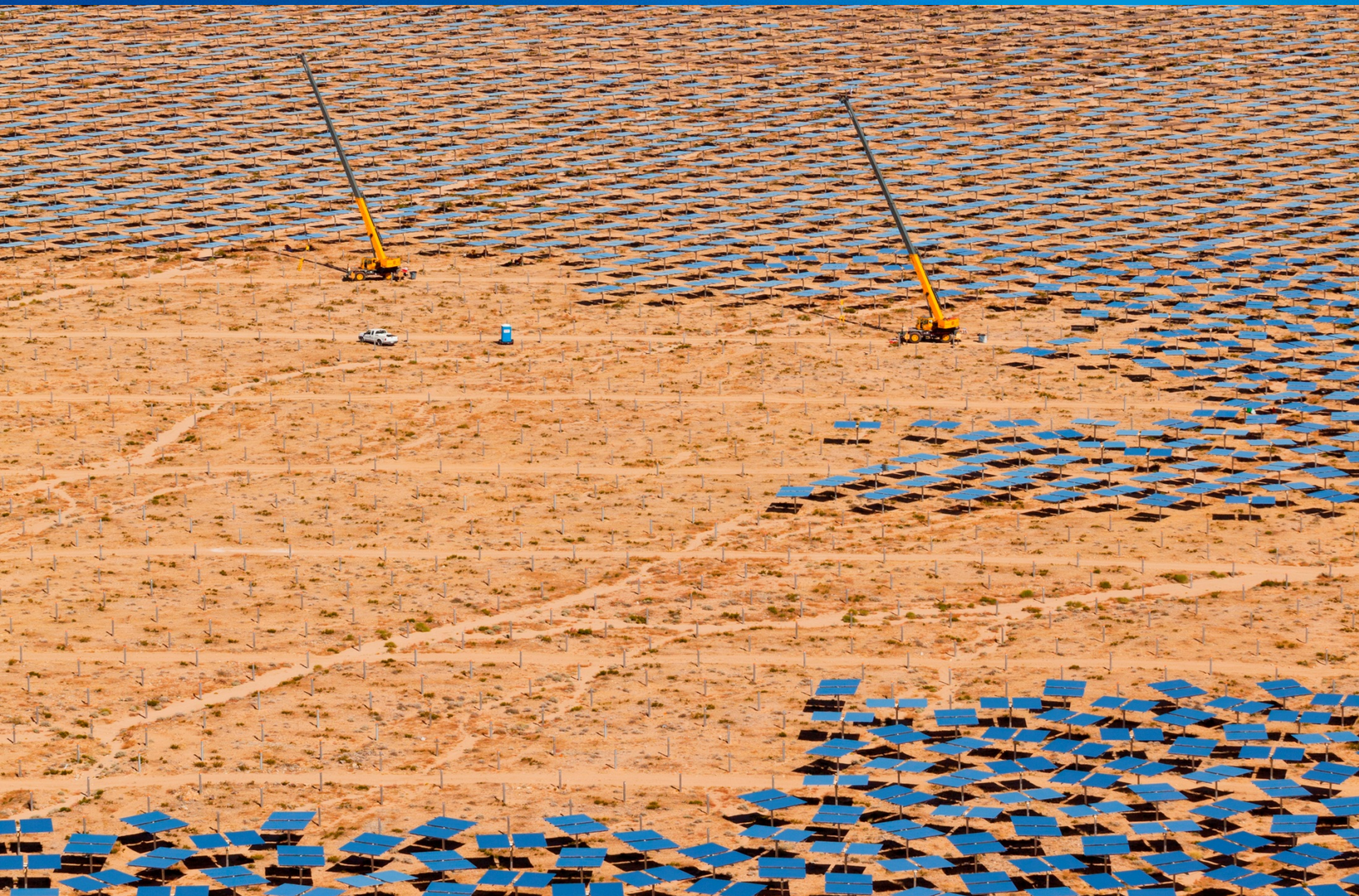
Manual ‘alpha’ prototype used at our test facility

3. Pylon insertion

Ivanpah:
Drilling & Driving – 2 separate steps



4. Final reflector installation



Thank you

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