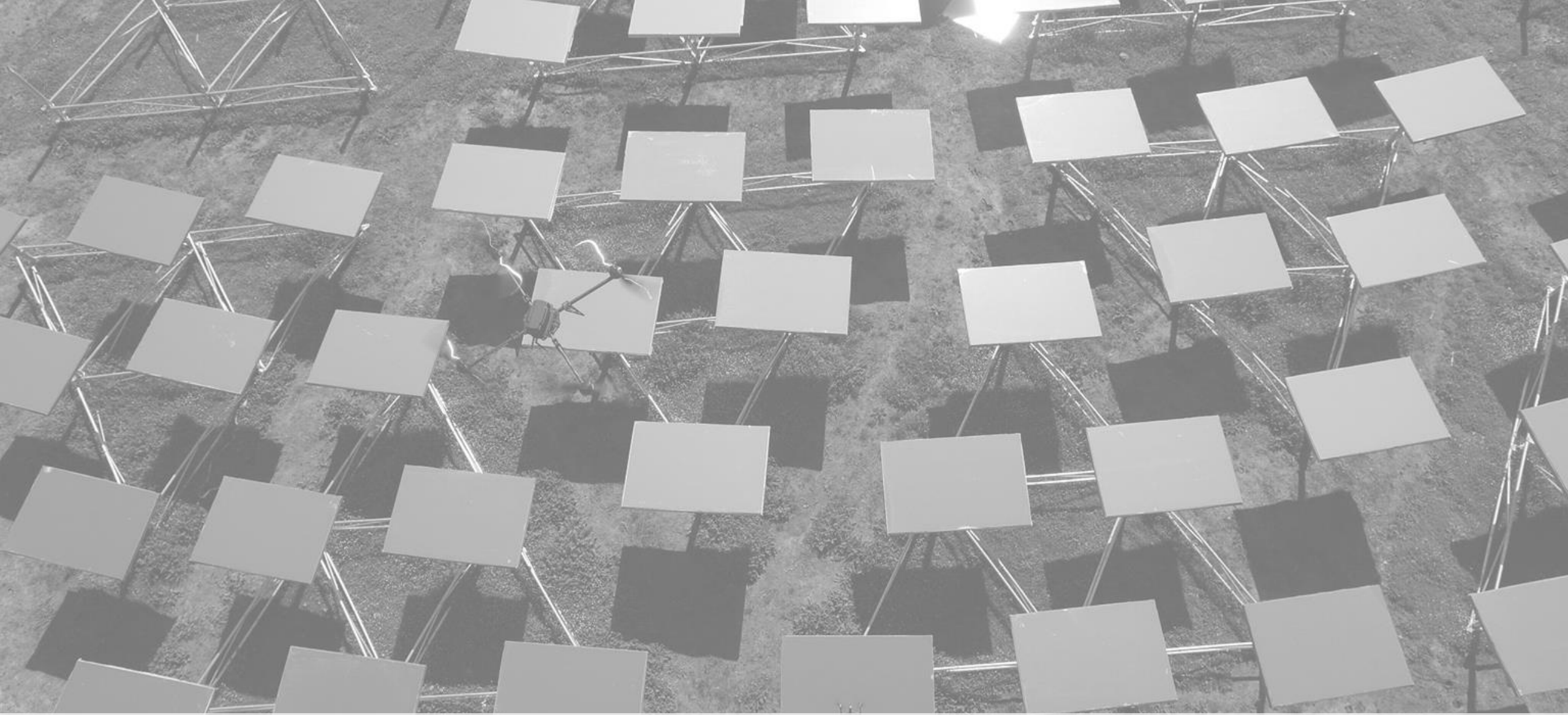

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www.stellenergy.com

helio100.sun.ac.za

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HelioPod
Heliostat System for MGT CSP

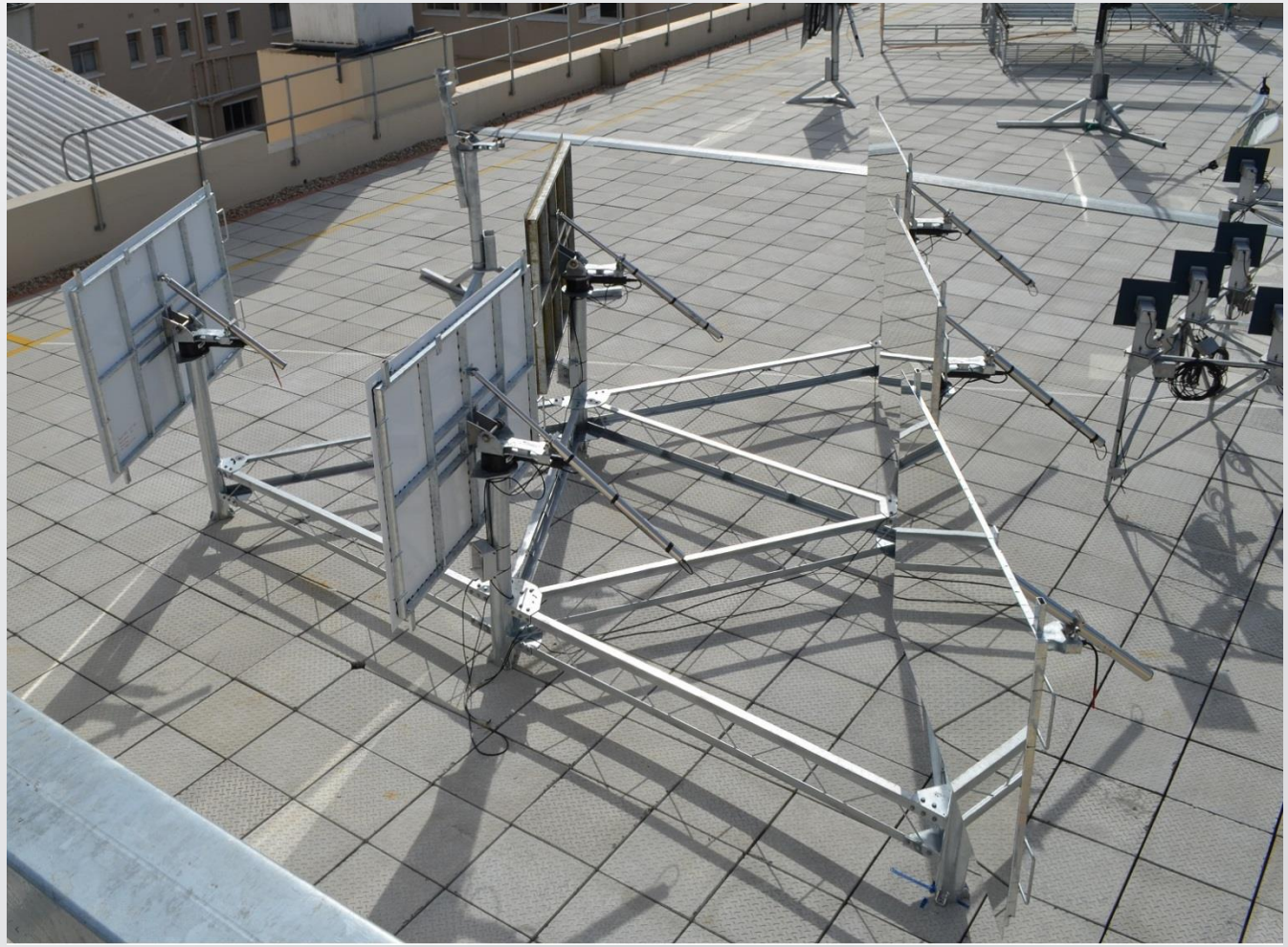
Willem Landman

STERG Symposium - July 2016

Content

- Background to Stellenergy (Pty) Ltd and Helio100
- The value proposition of MGT CSP
- Overview of the heliostat technology
- Our current status

Helio40



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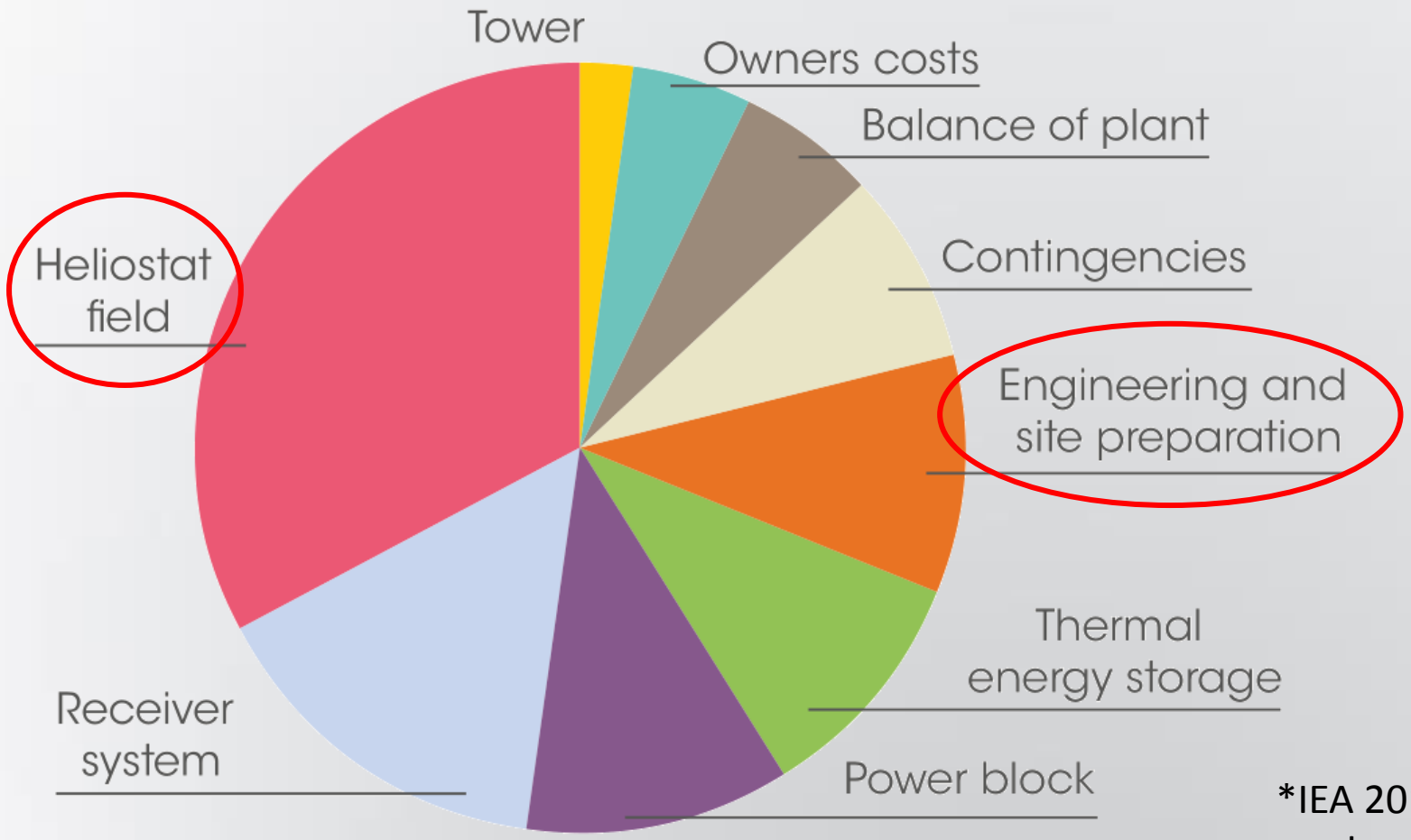
Typical central receiver CSP CAPEX split



Together ~50% = USD 2.15 trillion*

*IEA 2014 Solar Roadmap for cumulative value of CSP at 11% of world electricity

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Background


technology innovation
AGENCY


RENEWABLE & SUSTAINABLE
ENERGY STUDIES


STERG
SOLAR THERMAL ENERGY
RESEARCH GROUP


HELIO100


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Key facts

- Startup out of Stellenbosch University in 2013
- From STERG – One of biggest CSP university groups
- Key leadership
  - Paul Gauché: 20 years in tech-dev, mostly semiconductor industry in USA. Founder and first Director of STERG. Advisor for CSP and solar energy to government, industry and IEA. Founding ExCo – SASTELA.
  - Multiple PhD and Master grads
  - Senior advisors and partners for management and business development

Helioteam (Key technical staff)

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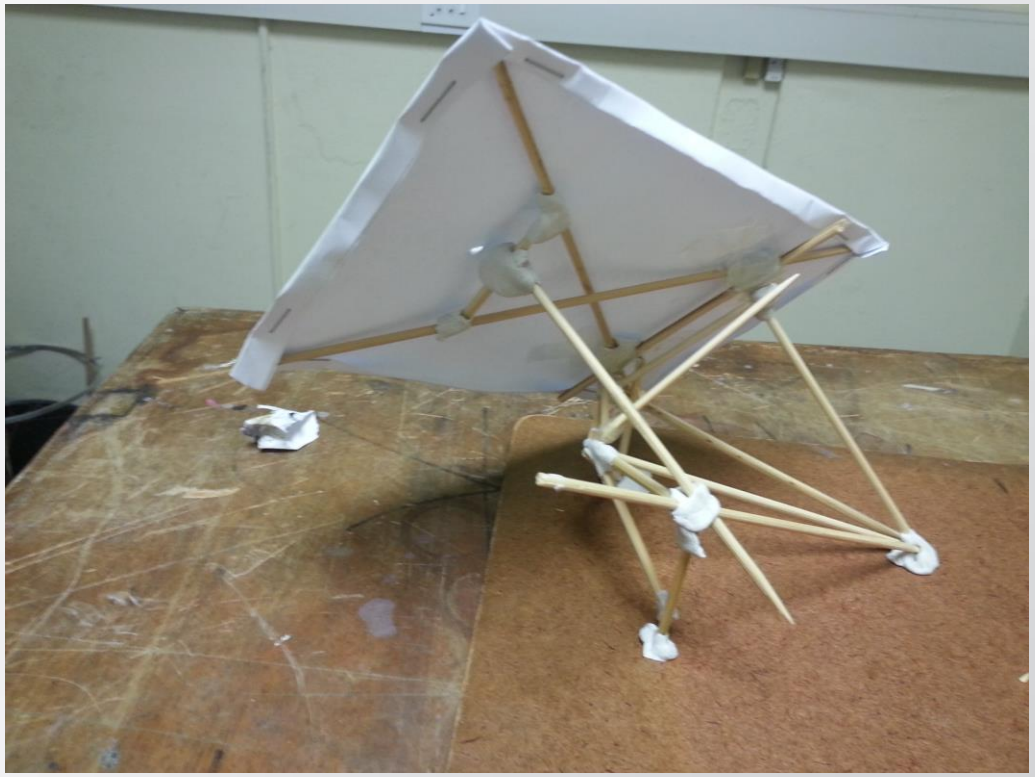
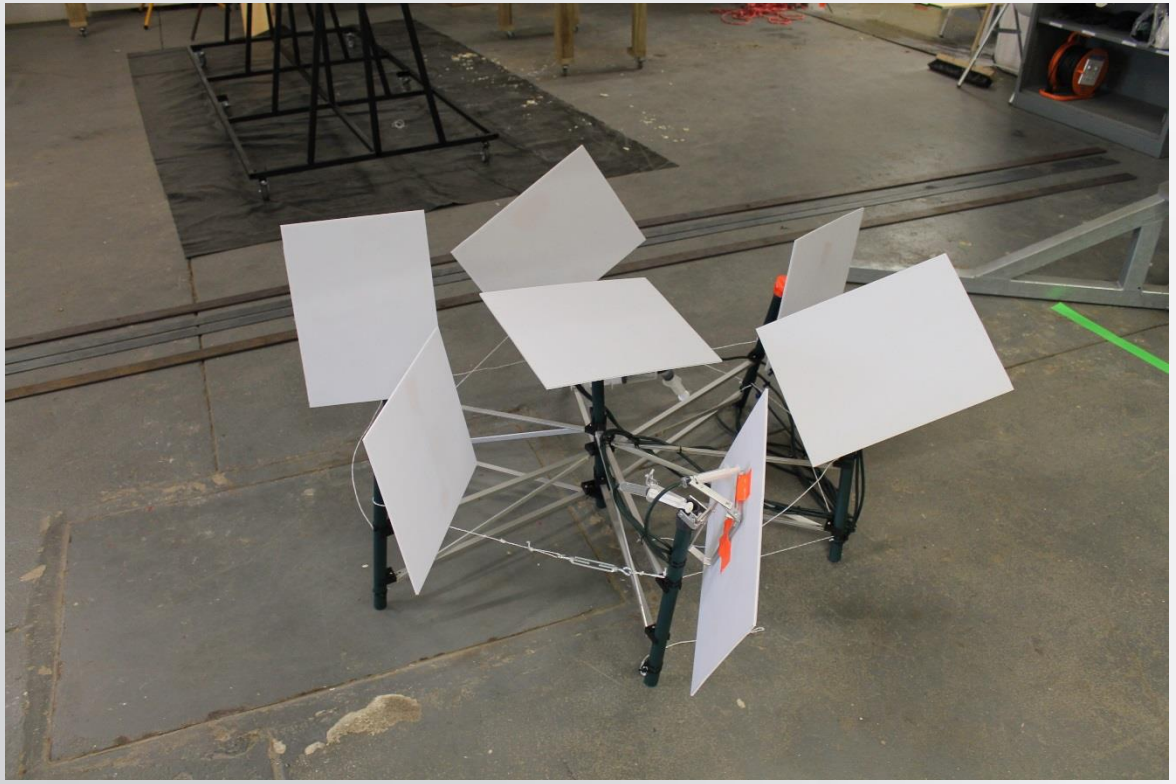
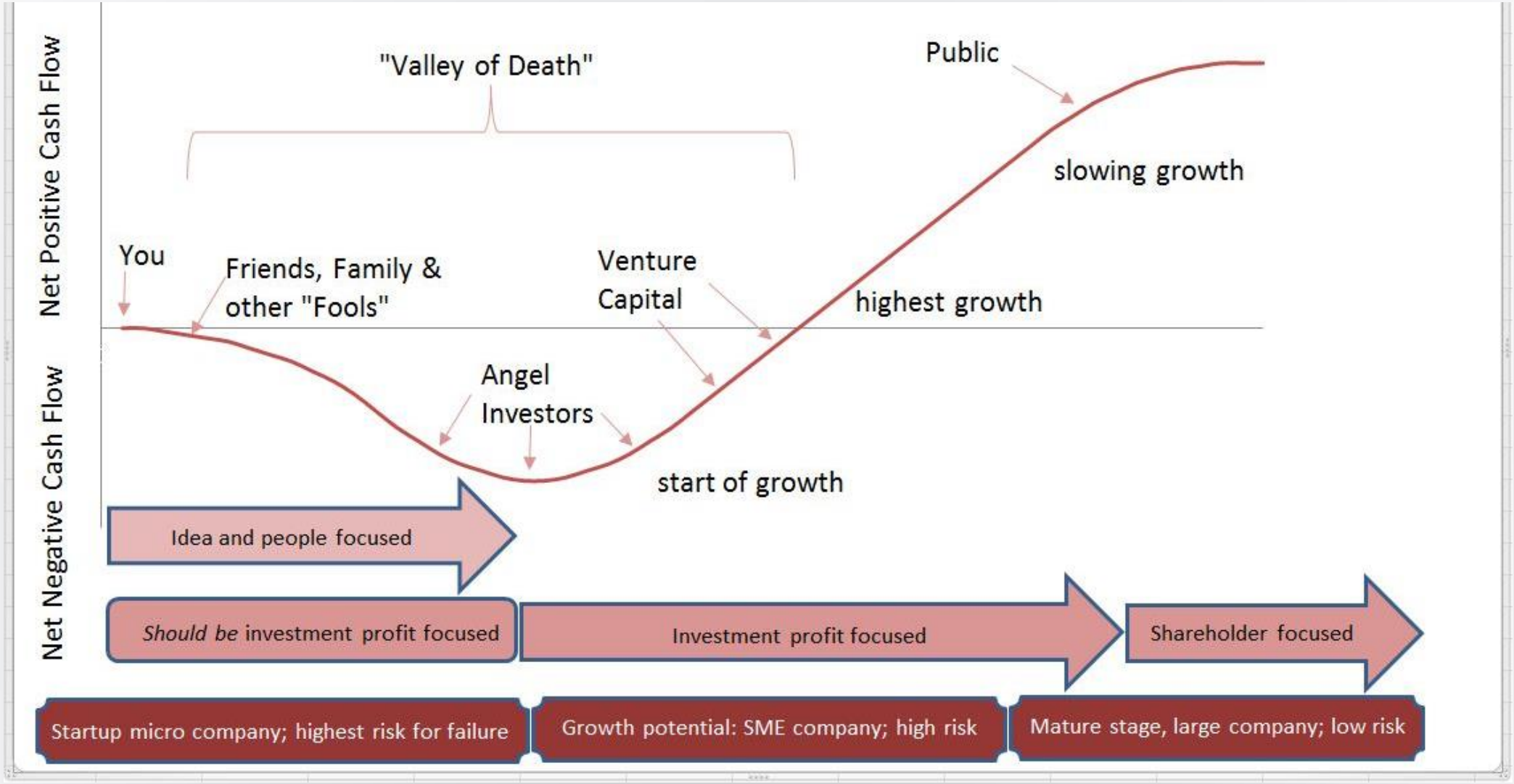
DST/TIA flagship project

Thinking Different





Valley of Death



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The value proposition of MGT CSP

- Lowering of perceived financing risks through staggered market entry
- Small modular units => production economics
- Distributed power generation
- Independent of water and grid access constraints
- Reduced footprint constraints
- Hybridisation
- High temp Brayton cycles => high efficiency

Heliostat Requirements for MGT CSP

- Higher flux requirements
- Small scale deployment
- Low cost
- High accuracy optics

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IP, Products & Services: Pod

Heliostat technology & Pod design

- Own facet design and customizable to alternative designs
- Can reach over 90% local content
- Optical measurement system
- Heliostat designed for gas turbine
- Minimal field preparation needed
- Minimal disturbance and low installation cost
- Installable by two people
- Own ultra-low-cost local controller
- Completely wireless
- Self-developed wireless software
- PV optimizer and battery charger
- Small heliostats drive higher volumes quicker
- Small heliostats low-cost tracker with wider application, e.g., CPV, PV, small and large CSP
- Can industrialize 100% drive train local manufacture

South African heliostat technology development

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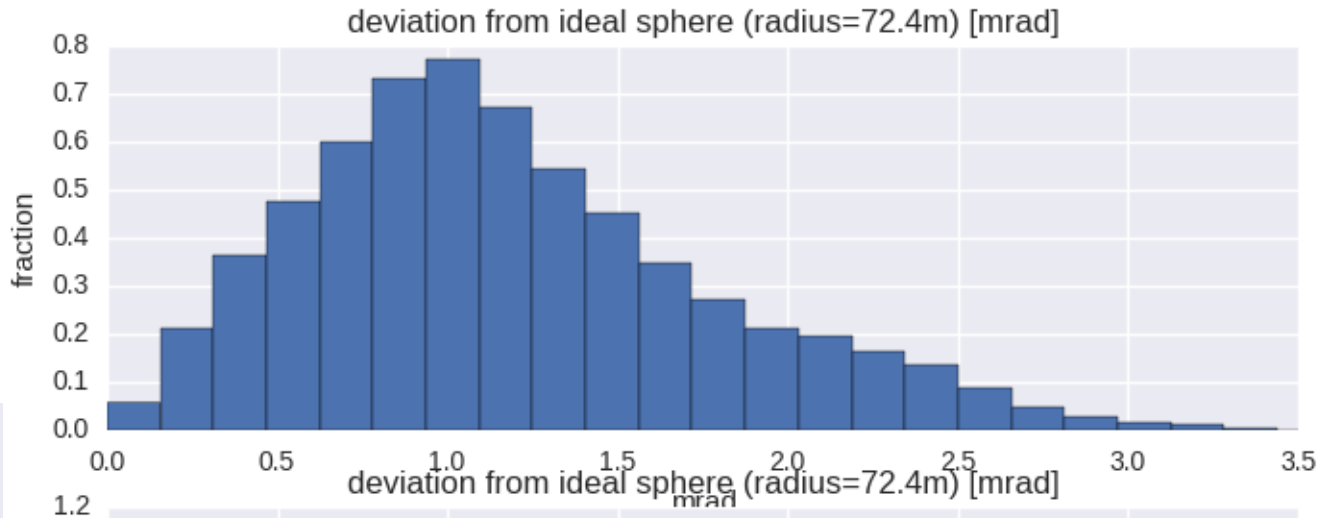
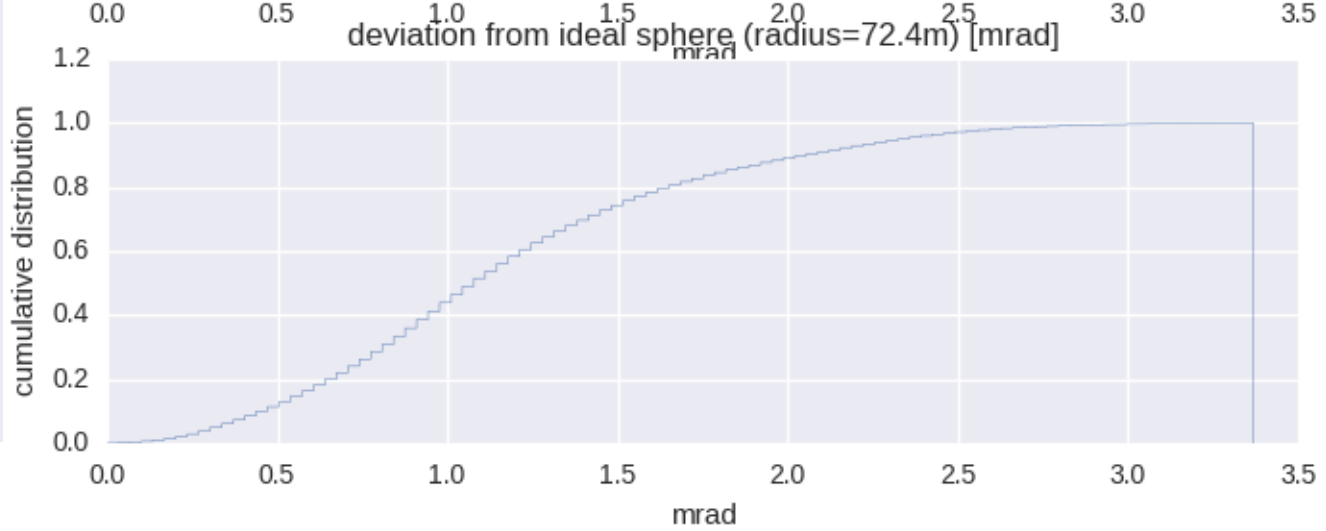
QA system: Zebra





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Pre-field assembly (Jun 2015)

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Pod assembly

Field assembly (Jul 2015)

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Field assembled (Jun 2015)

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Helio100 System in Operation

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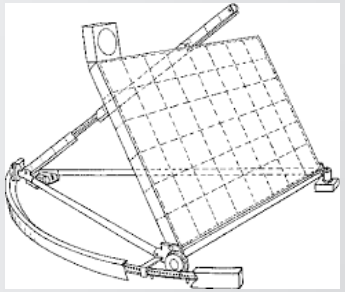
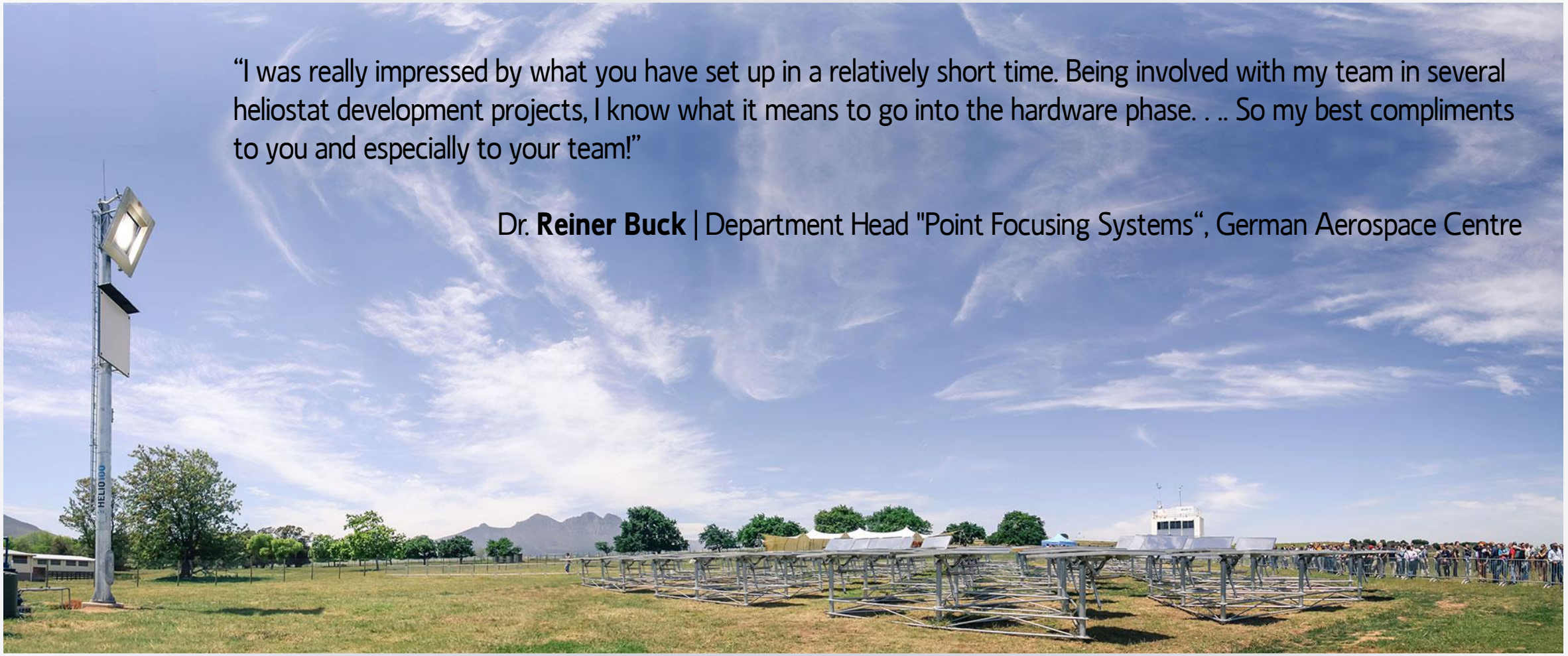
Small, Low-cost, Accurate.

- Glass inherently has 0.7mrad error…we are achieving 1mrad
- It’s a non-trivial problem which no one is able to get right (with all heliostats) let alone for MGT CSP



SolarPACES 2015



SolarPACES 2015 in Cape Town

SBP Stellio

- SolarPACES 2015 Technology Award
- Certified by CIEMAT and CSP Services as best performing heliostat ever tested.
- Would like to incorporate the Stellenergy control system – we are invited to consortium

Image used with permission from sbp gmbh.

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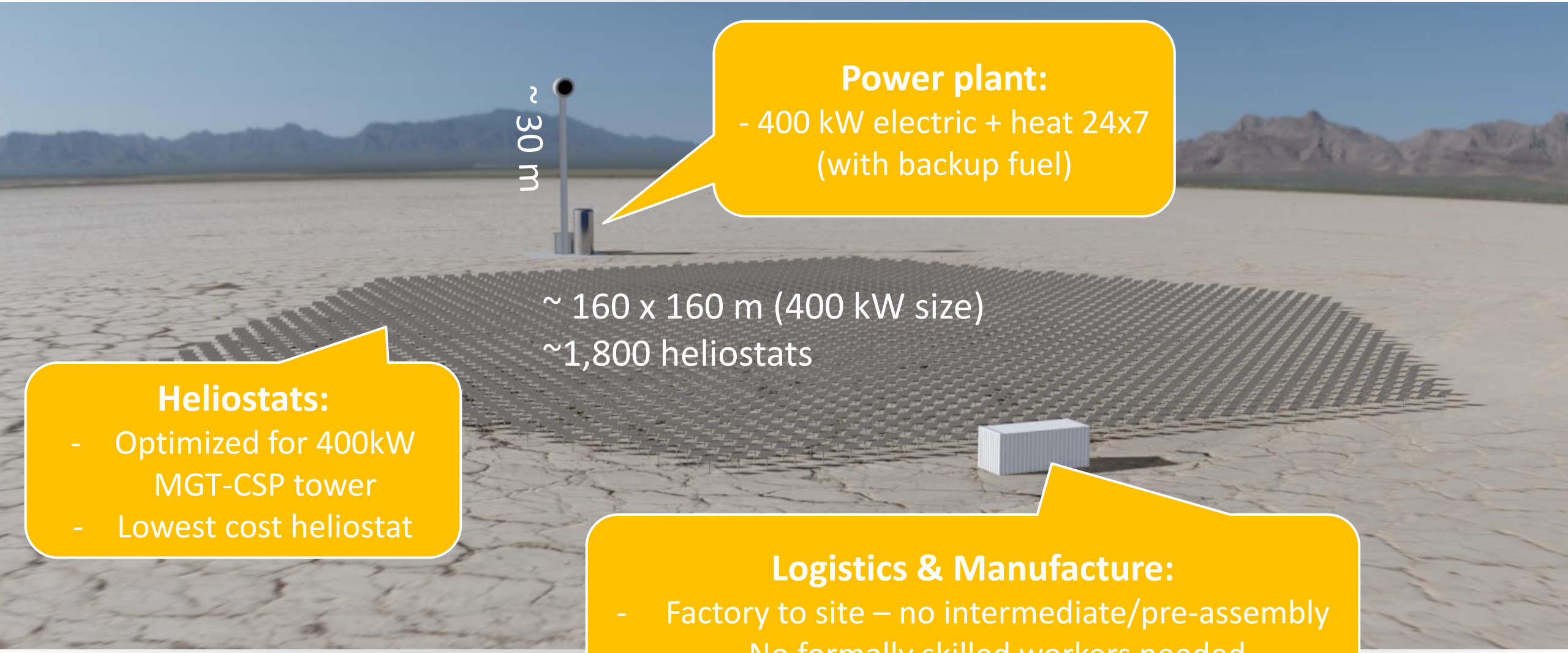
Stellenergy view of a 247Solar unit



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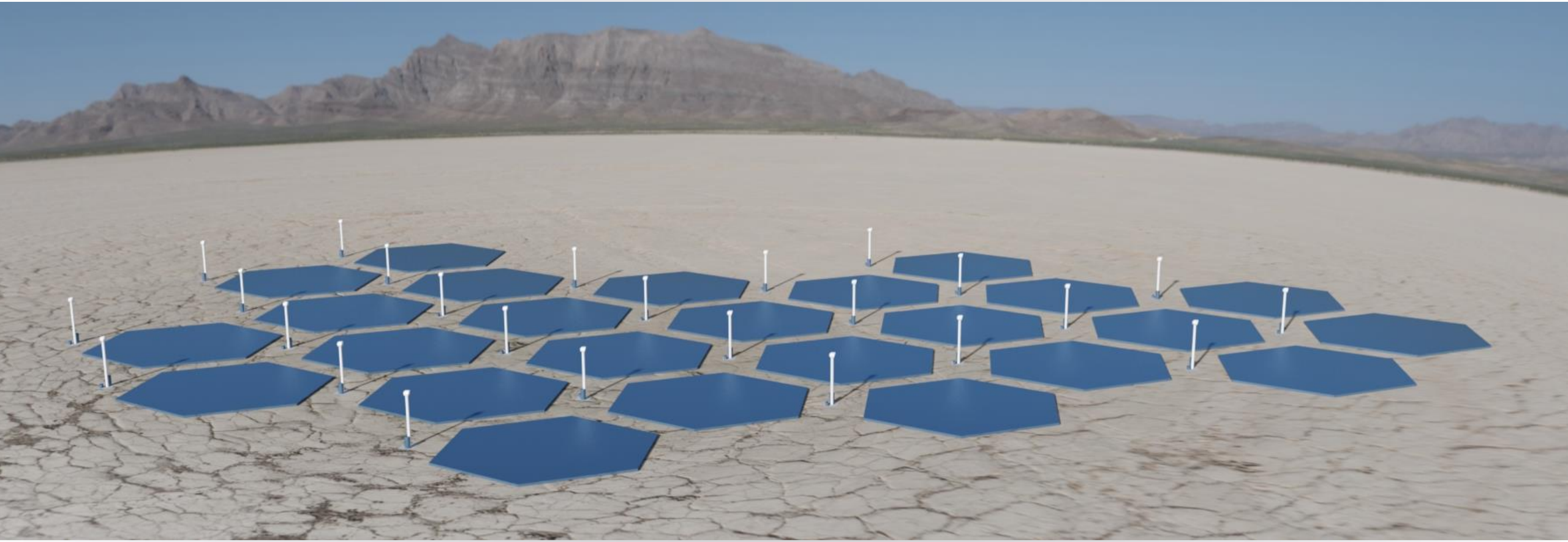
Modular rollout: 10MW example



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Thank you/Questions

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