

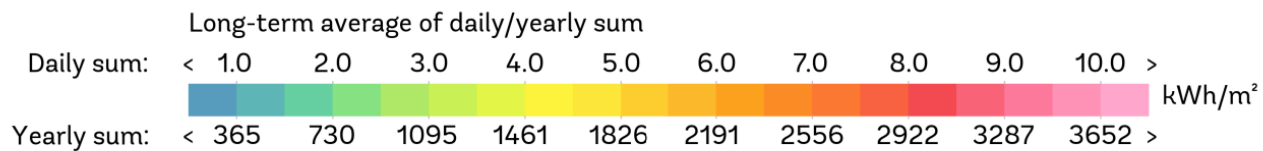
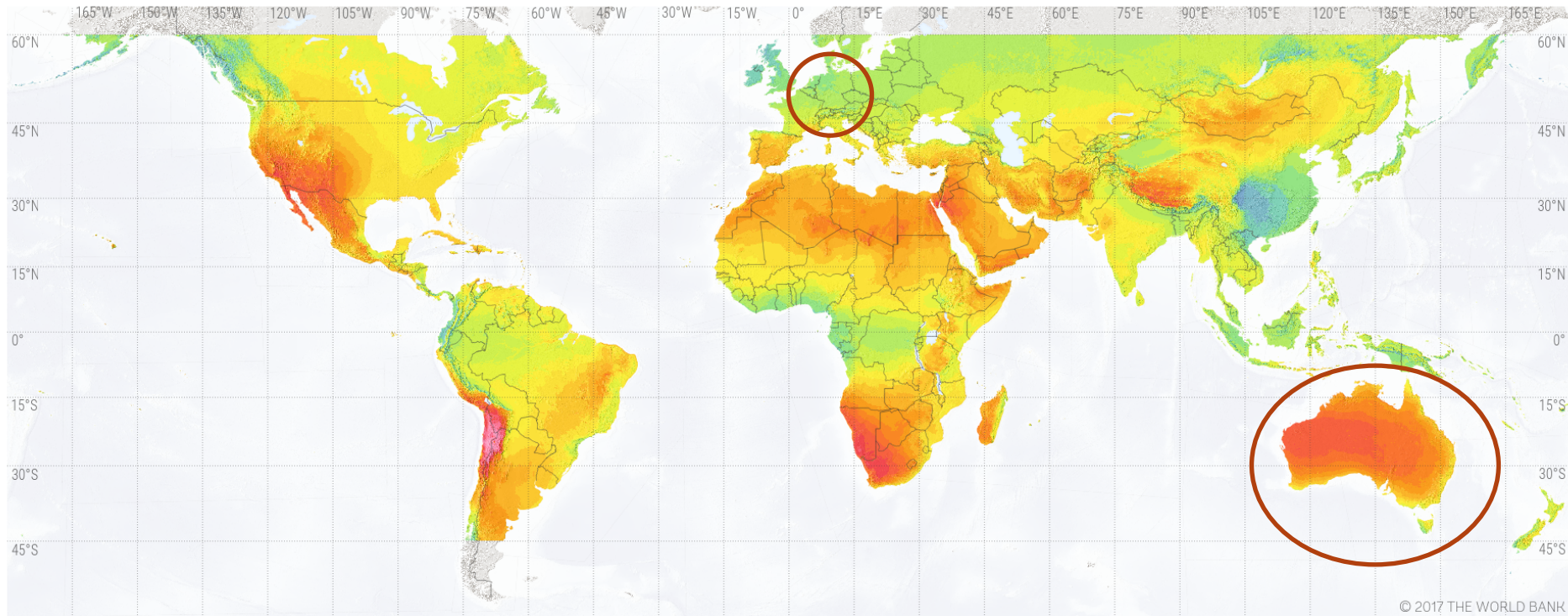


Concentrated Solar Thermal for Australia

Dietmar Tourbier | ASTRI Director, CSIRO Energy
August 2018

Solar Irradiation – World

SOLAR RESOURCE MAP DIRECT NORMAL IRRADIATION



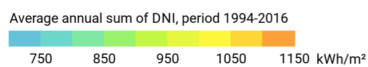
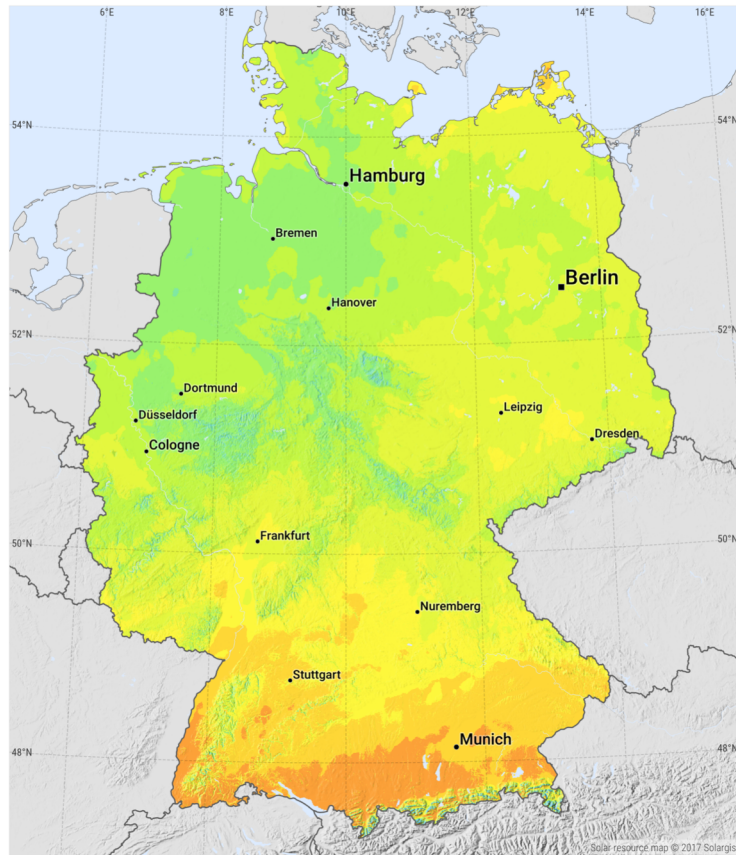
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Solar Irradiation Germany & Australia

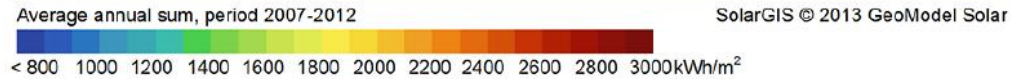
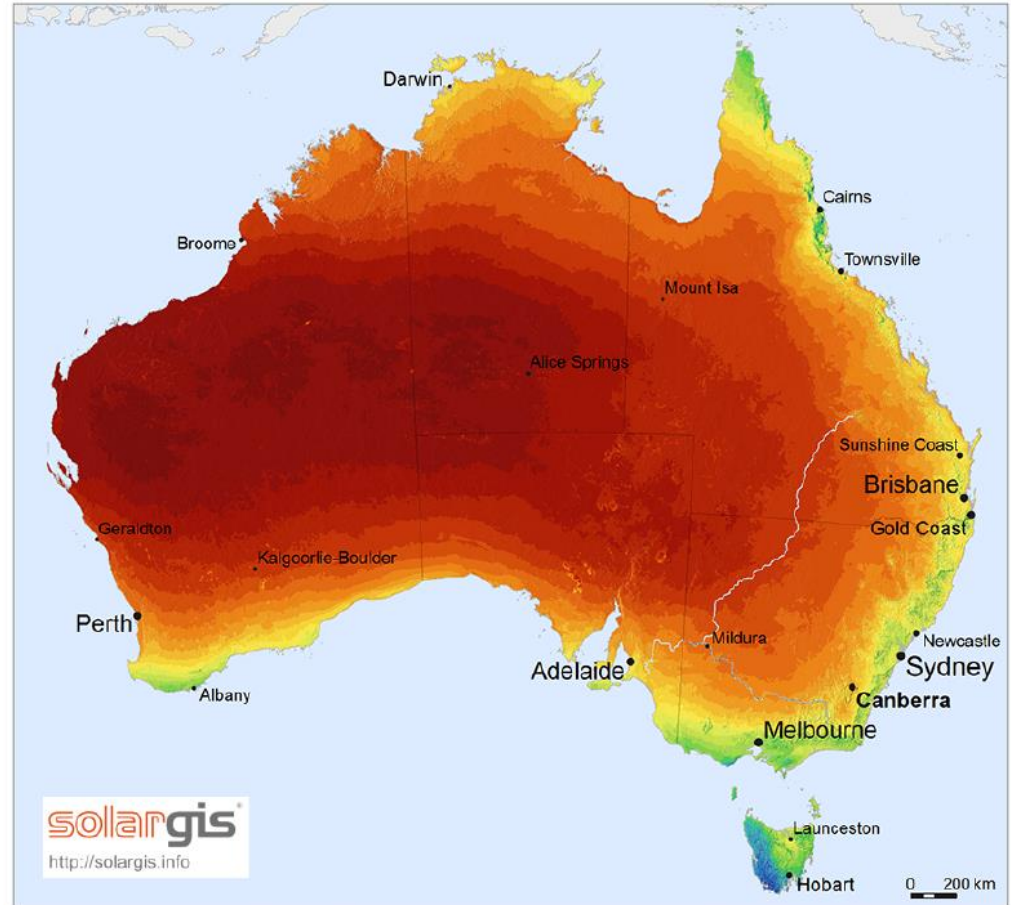
DIRECT NORMAL IRRADIATION

GERMANY

SOLARGIS



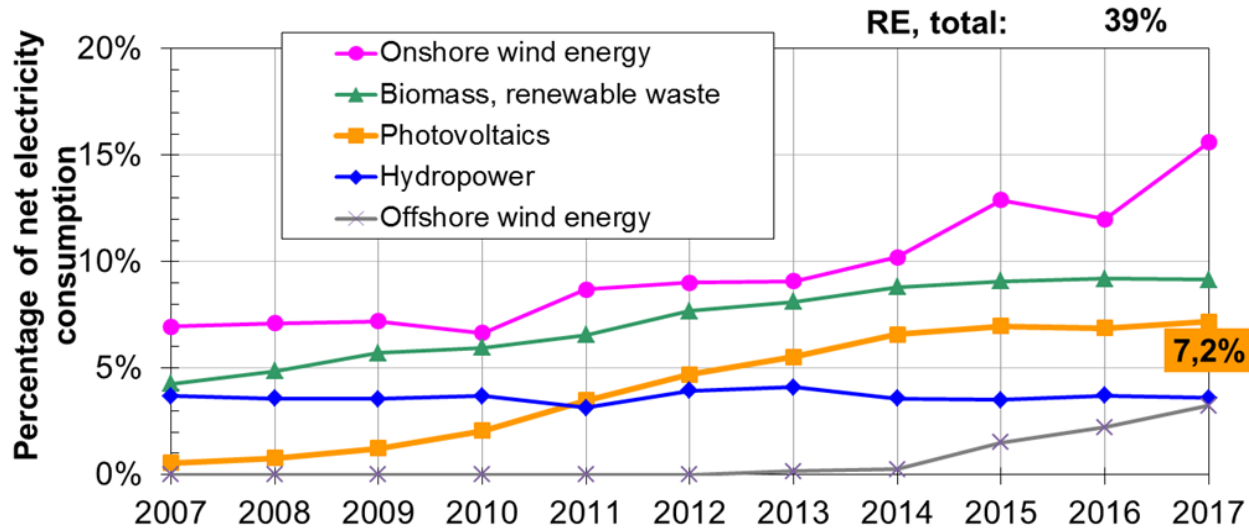
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Average annual sum, period 2007-2012
SolarGIS © 2013 GeoModel Solar

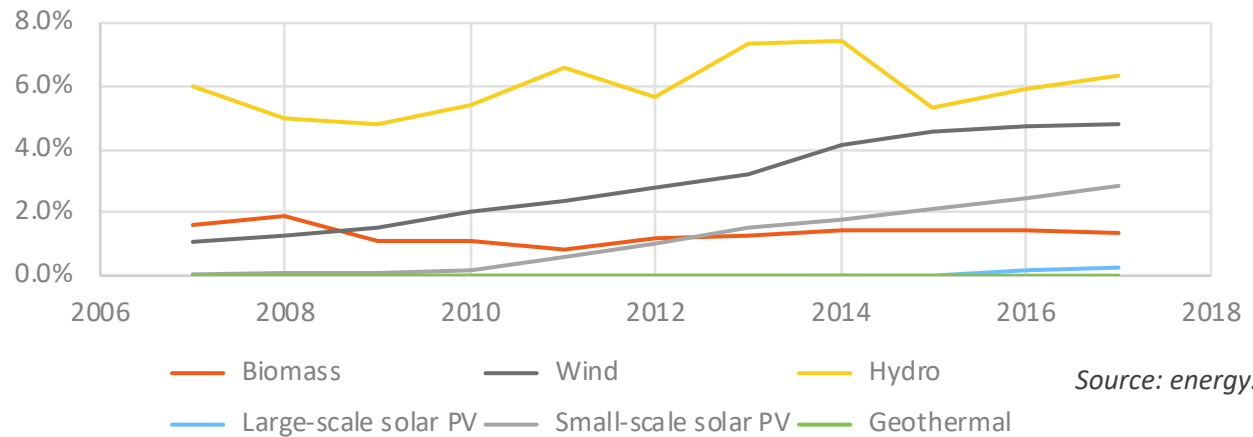
Source: Solargis.com

Solar Energy Germany vs Australia



Source: bmwi.de

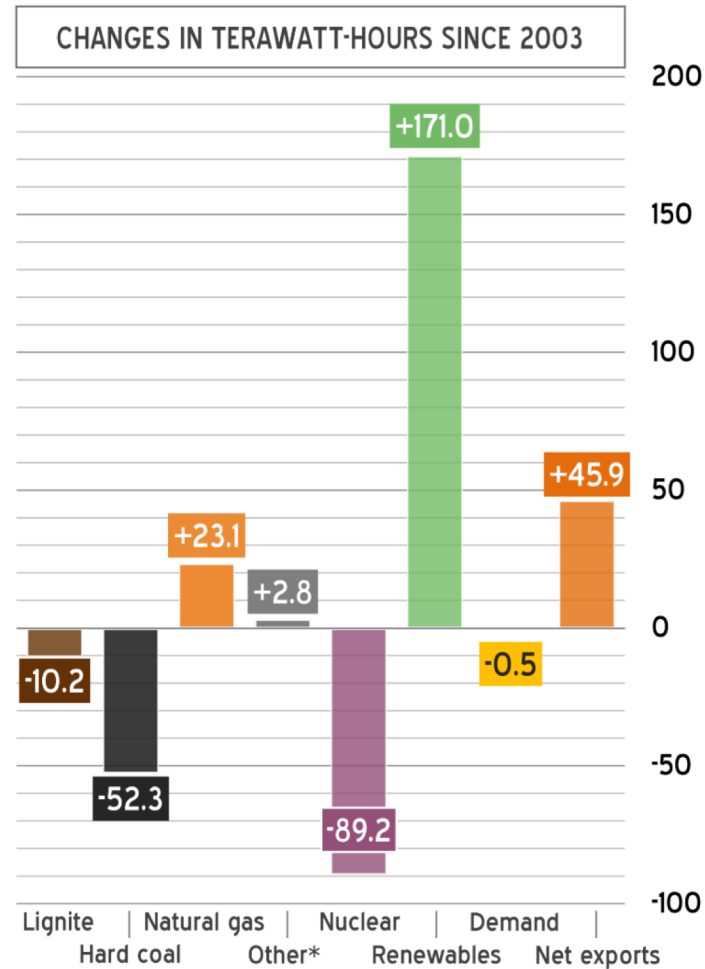
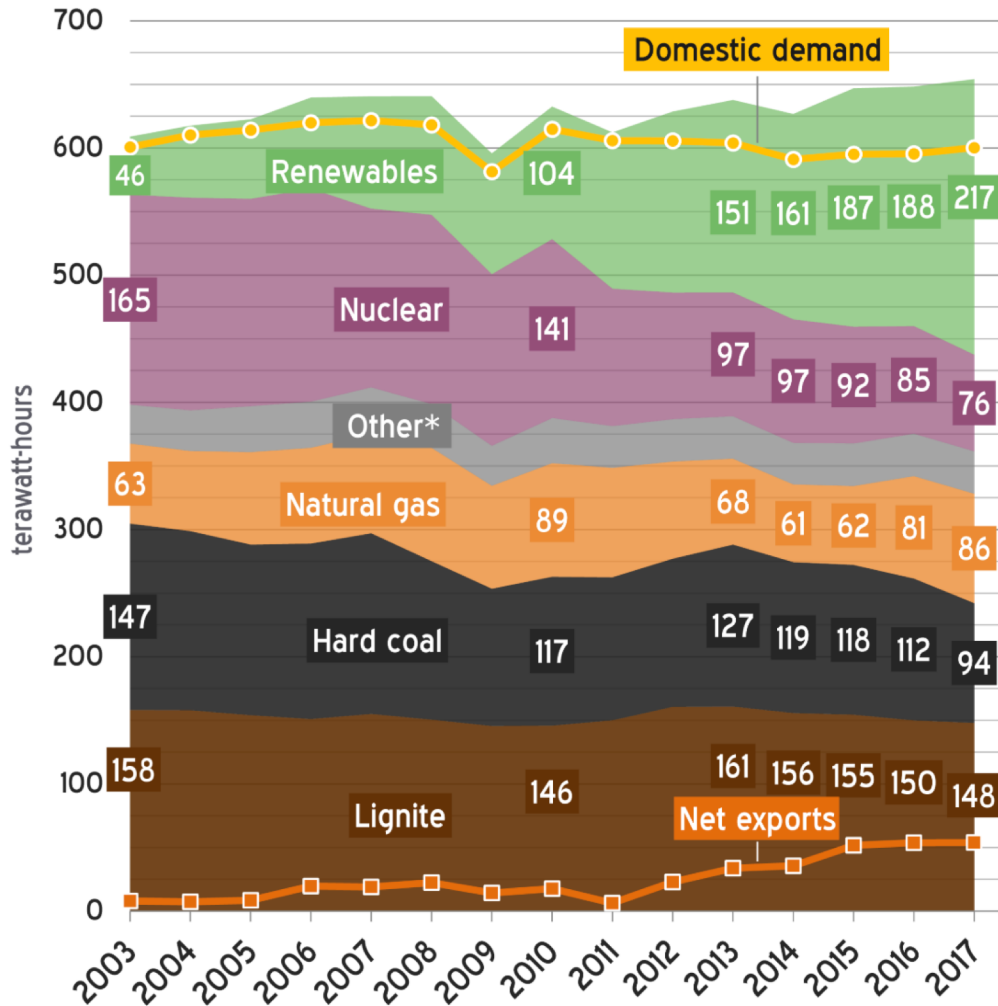
Renewables in Australia



Source: energy.gov.au

Total Energy Mix Germany

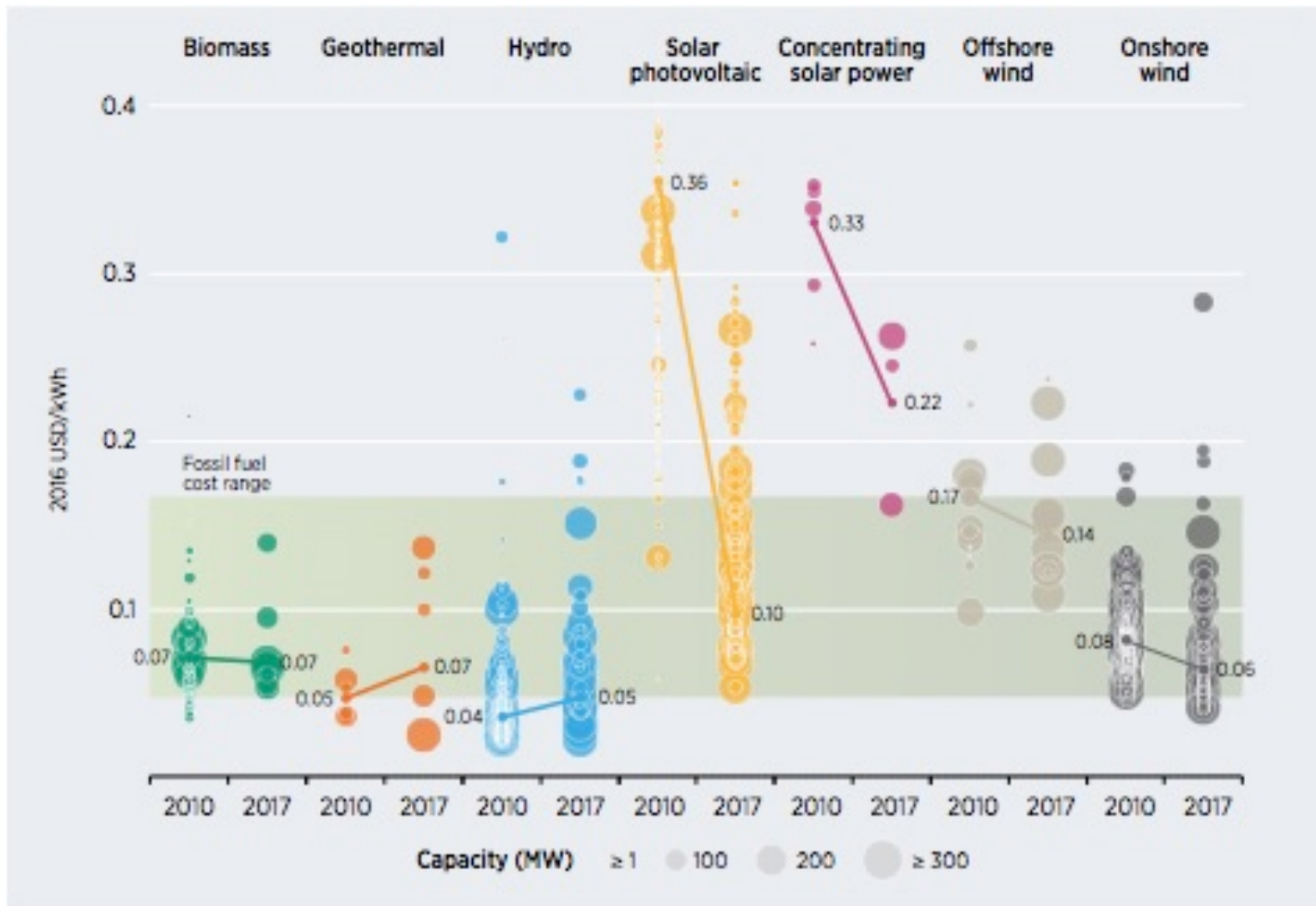
Source: AGEB (August 2017) | *Oil, waste, etc



Energy Transition
The Global Energiewende

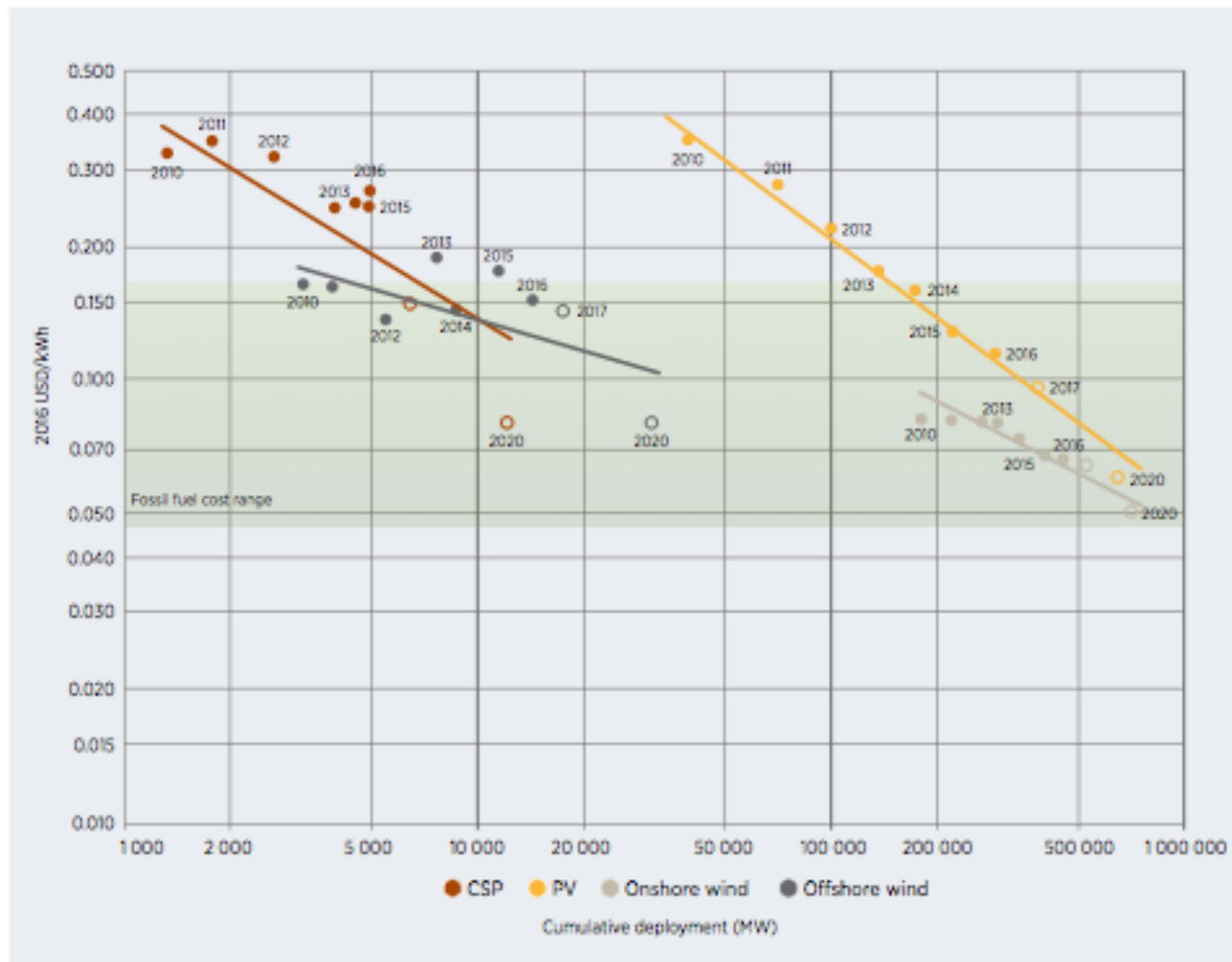
energytransition.org (CC) BY SA

Renewable Cost Trends 2010 - 2017



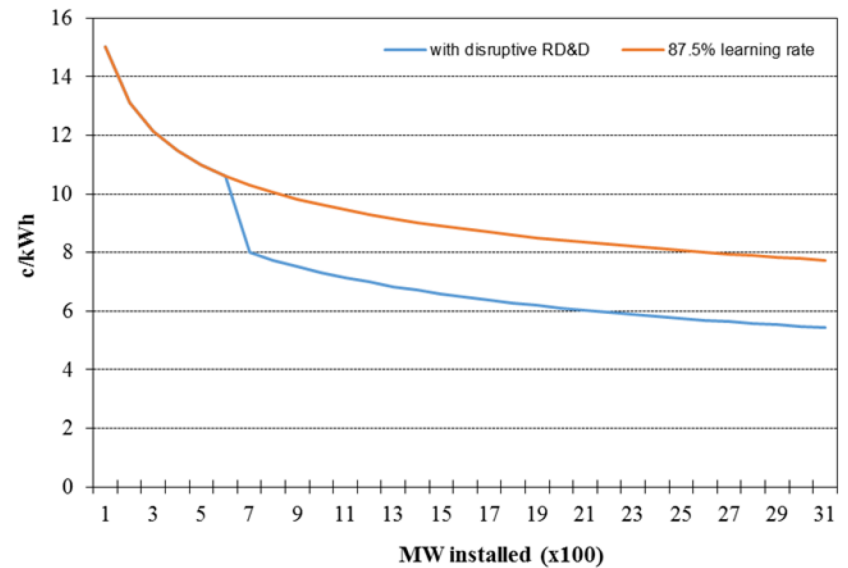
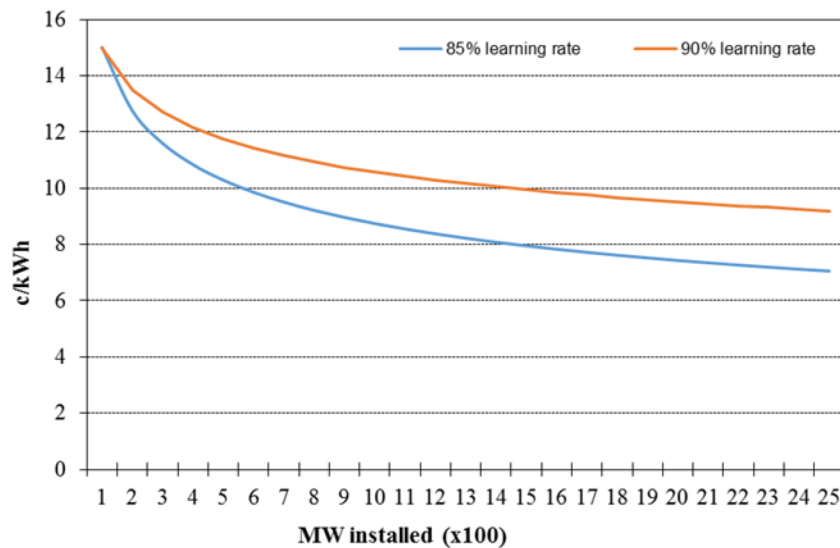
Source: IRENA Renewable Cost Database.

The Power of Volume

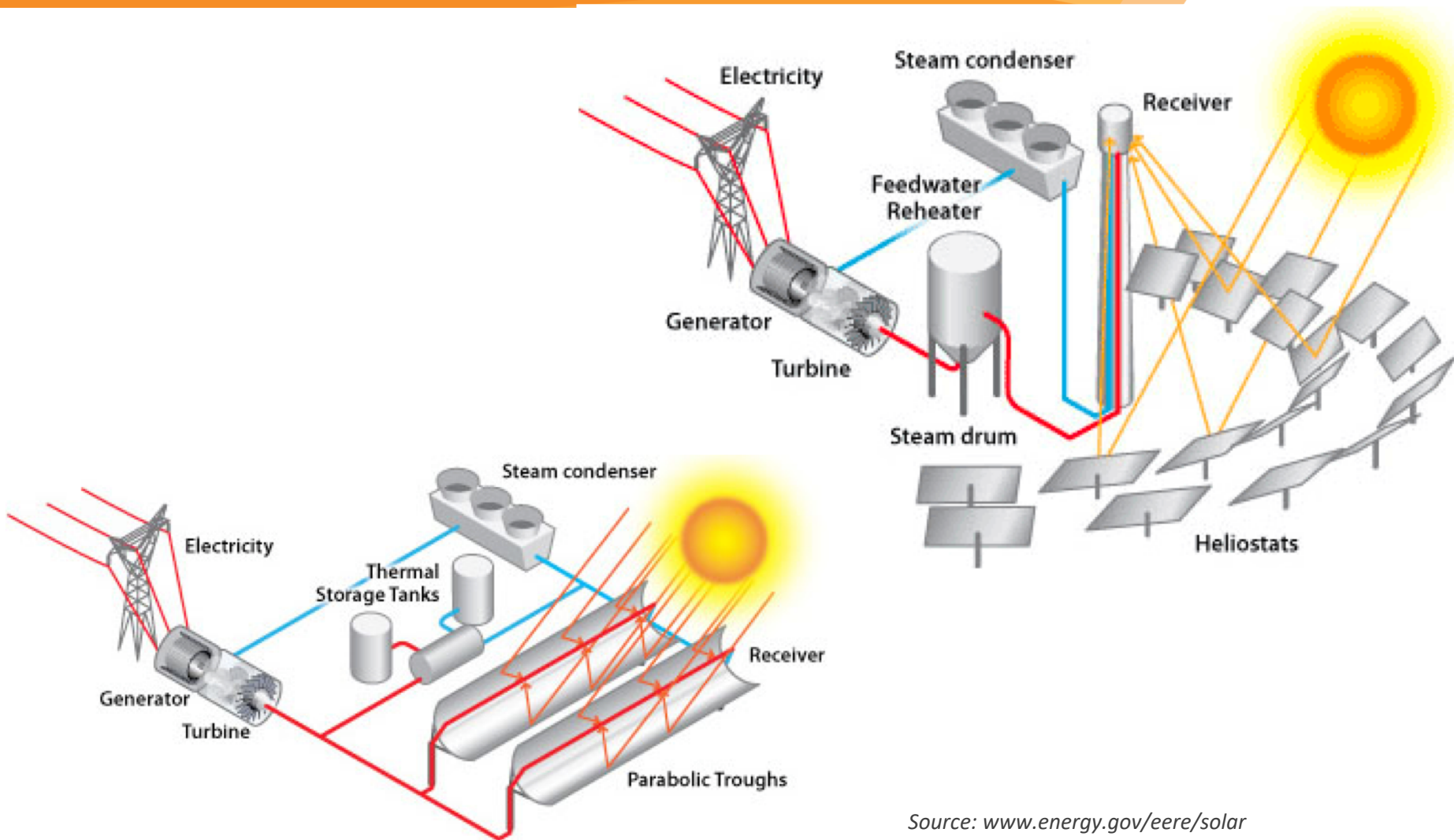


Based on IRENA Renewable Cost Database and Auctions Database; GWEC, 2017; WindEurope, 2017; MAKE Consulting, 2017a; and SolarPower Europe, 2017a.

The Value of R&D for CSP

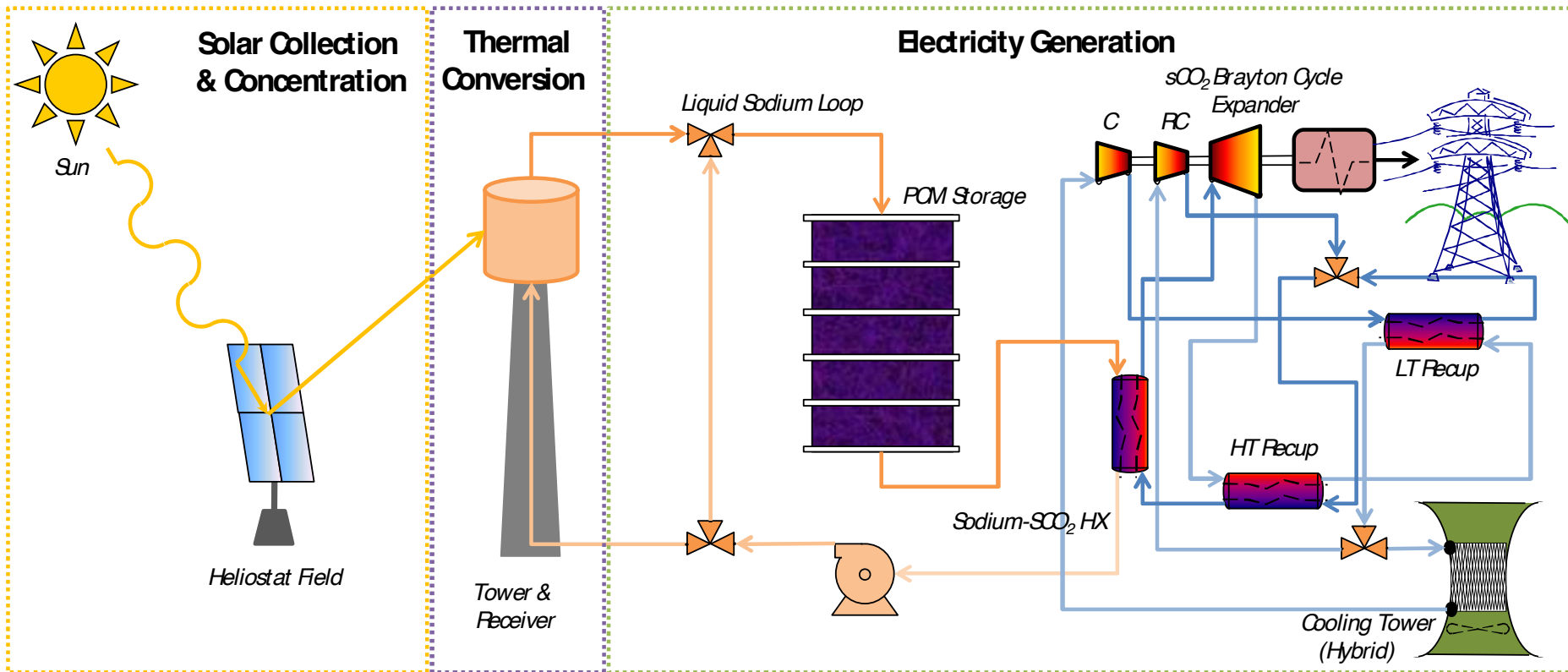


Conventional CSP Systems

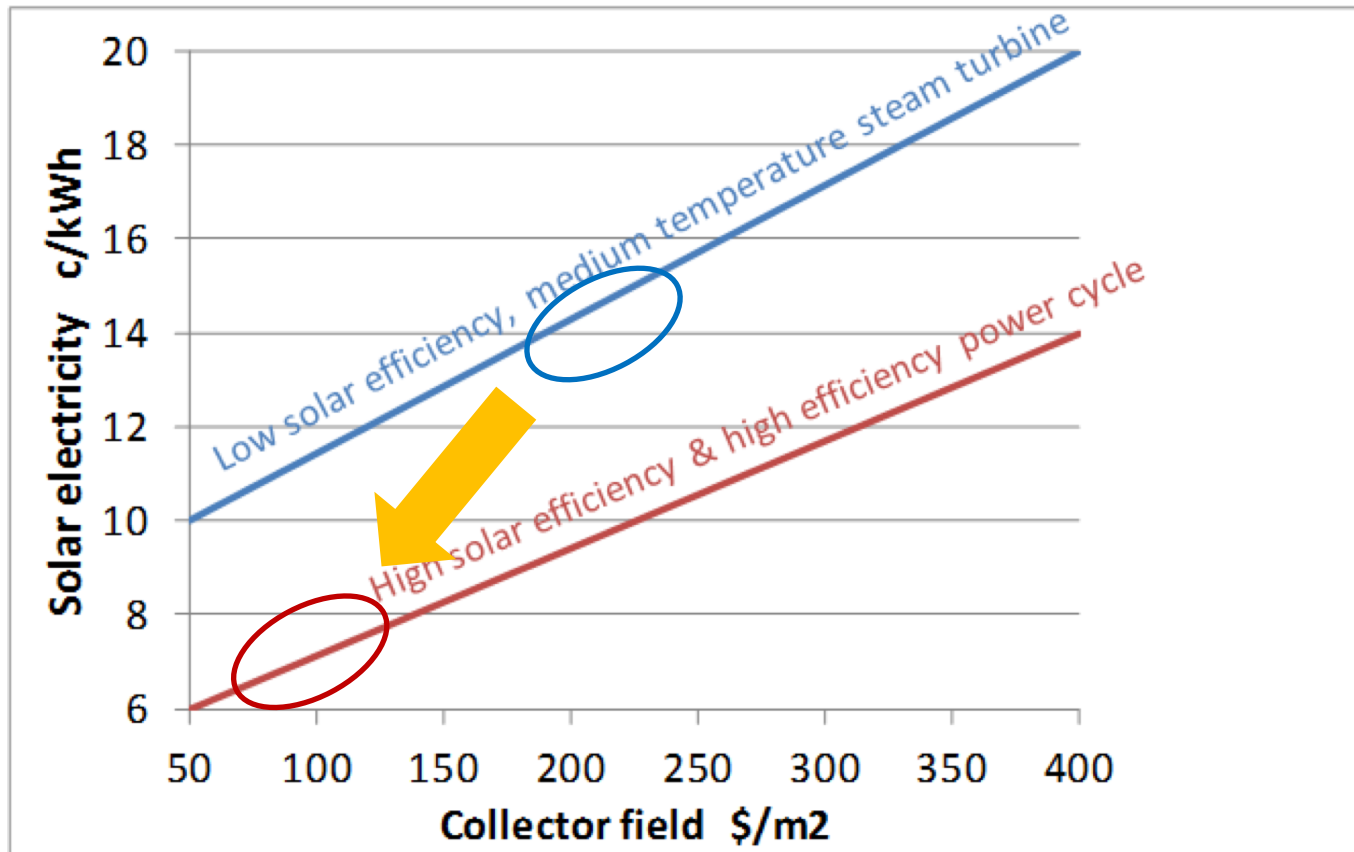


Source: www.energy.gov/eere/solar

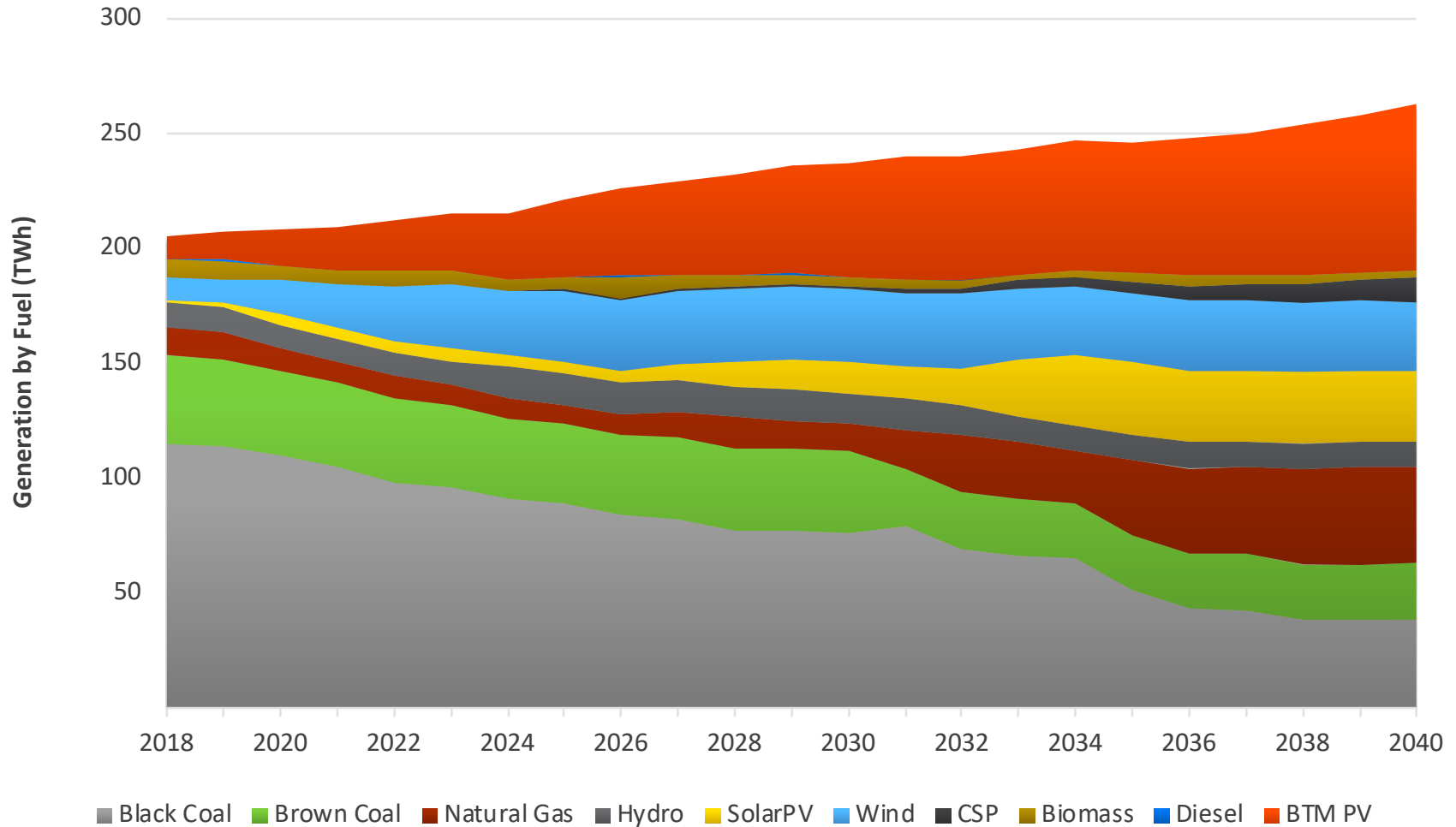
High-Temperature CSP



Target Example for CSP

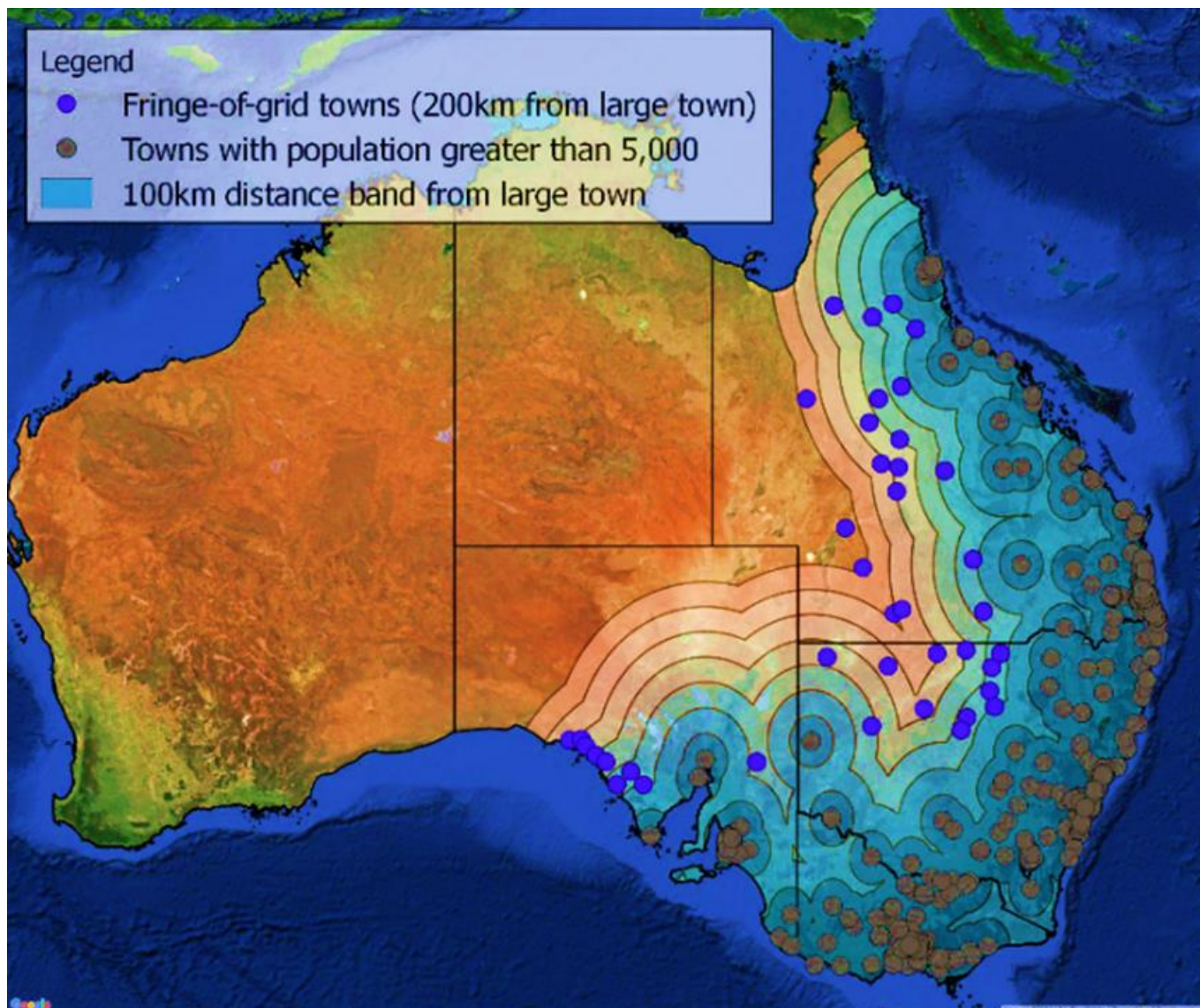


CSP Forecast In the Australian Energy Mix



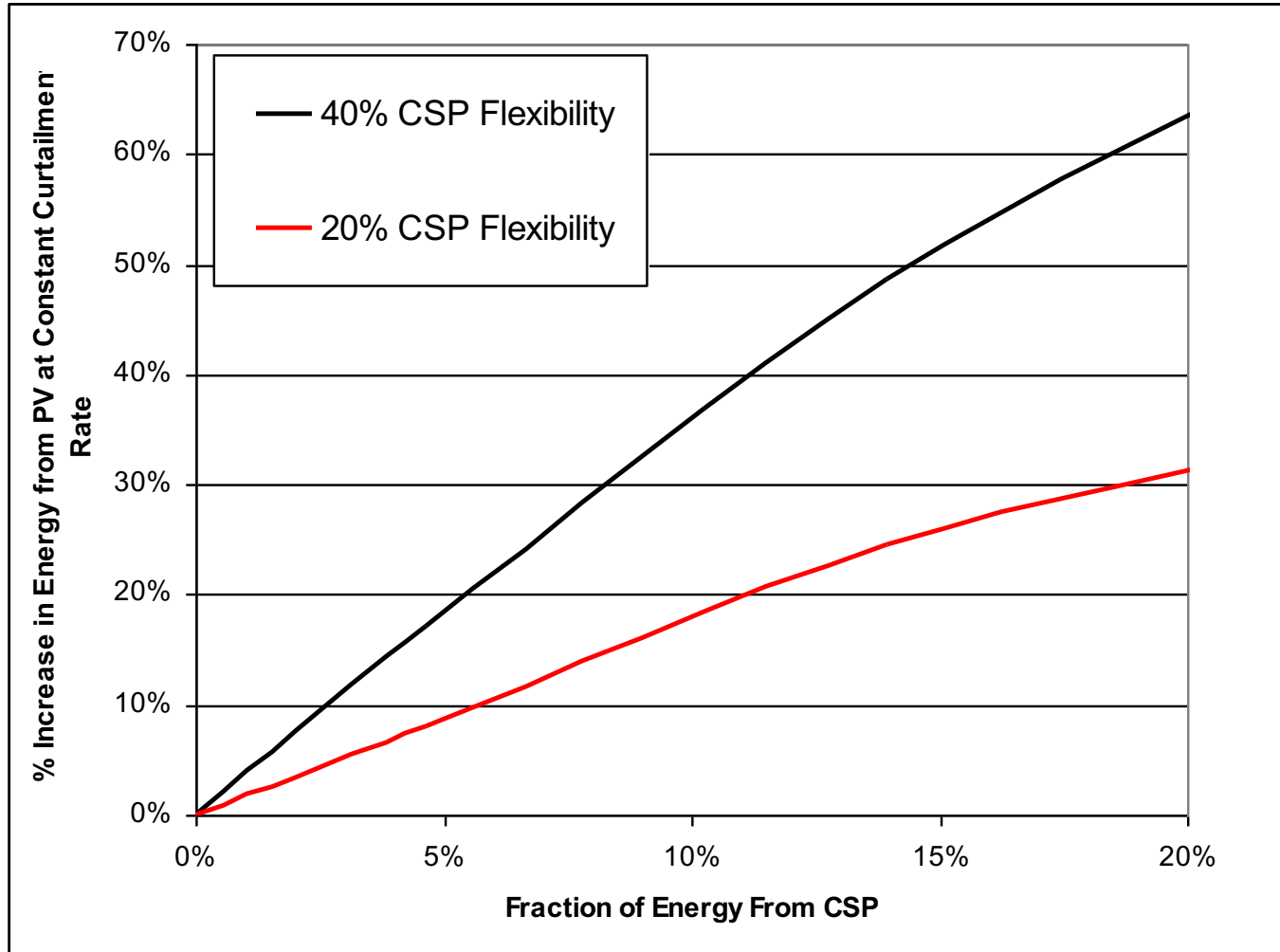
Source: Energeia

Potential Locations for CSP in Australia



Source: Energeia

CSP and PV are not Competitors



Increase in PV penetration as a function of CSP penetration assuming a maximum PV marginal curtailment rate of 20%.

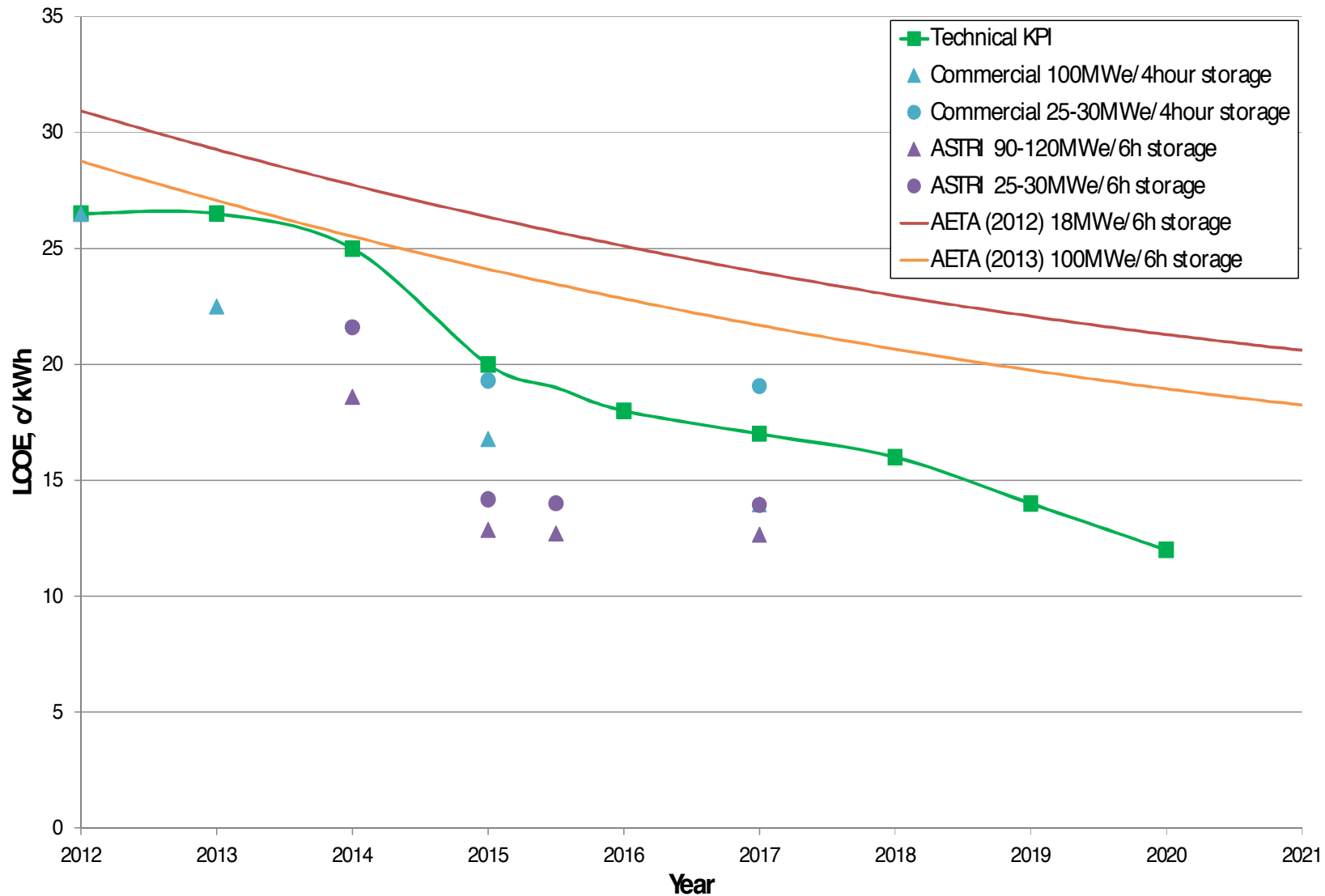
Advantages of CSP for Australia

- Low cost integrated storage
- Fully dispatchable
- Synchronous power generation --> Grid stability
- High local content (vs PV)
- Potential for using high-temperature process heat directly
- Applicability of CHP

Challenges to CSP

- Perceived complexity
- Perceived high cost
- Low Technology Readiness Level (TRL) of high-temperature solution
- Larger plant size to achieve low LCOE
- Low amount of install base (reference plants)

ASTRI Development



ASTRI Role for CSP in Australia

- Increase TRL for component technologies for Hi-T CSP
- Build Integration Test Facility to demonstrate component performance and operability in integrated system
- Continue to build CSP capability in Australia
- Connect with international CSP community
- Engage industry partners to accelerate commercialization of CSP in Australia
- Advise ARENA on future project funding in CSP
- Advise industry on CSP commercialization path

ASTRI Partnership

Funding partner

ARENA



Australian Government
Australian Renewable
Energy Agency

Australian partners



Australian
National
University



Flinders
UNIVERSITY



THE UNIVERSITY
of ADELAIDE



University of
South Australia



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Acknowledgements

ARENA



Australian Government

**Australian Renewable
Energy Agency**

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Thank you

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