

# ASI update

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AuSES Queensland Branch  
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# Summary



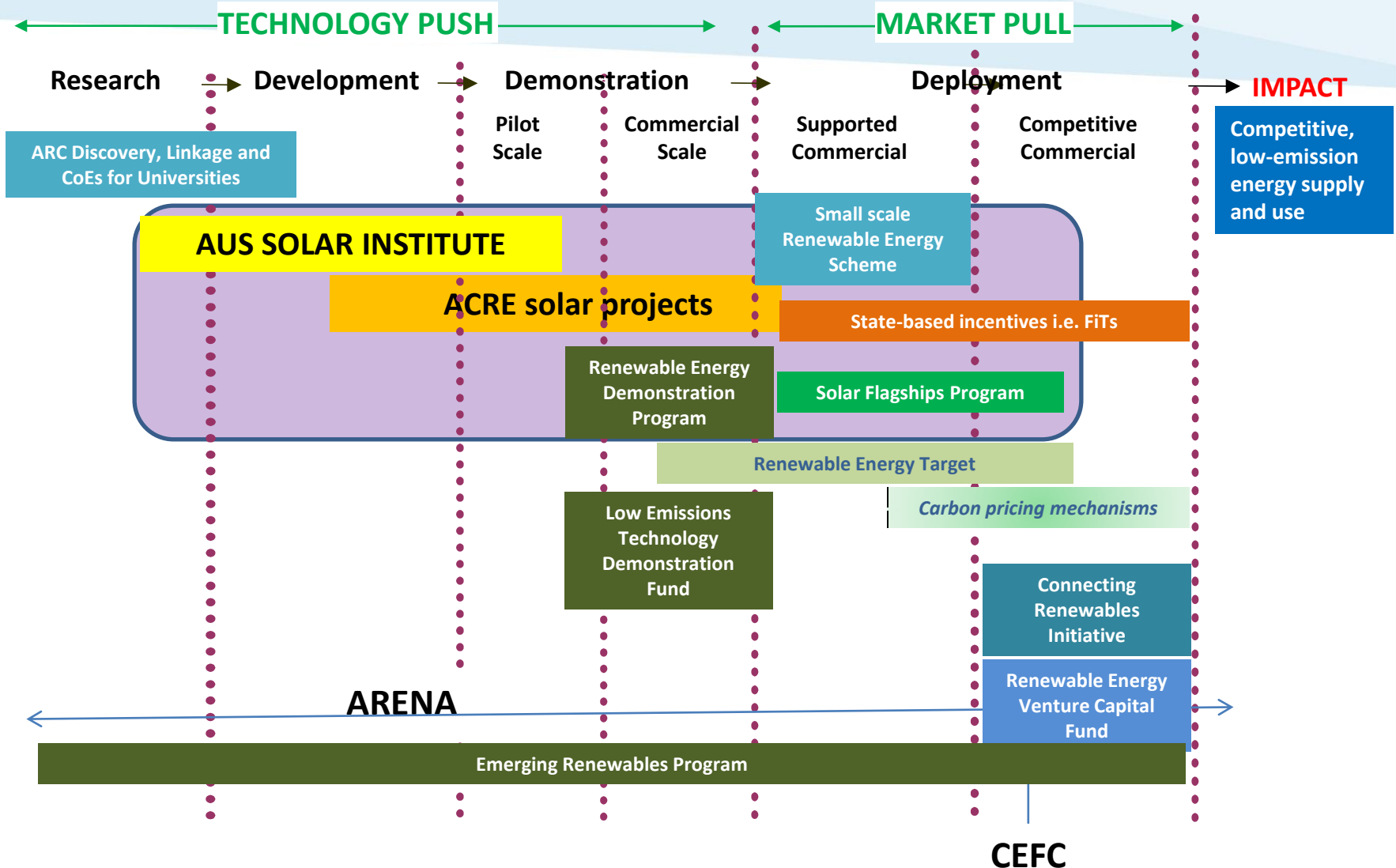
- About the ASII
- Portfolio highlights
- What we've learnt
- 2012 activities and funding opportunities
- Clean Energy Future Package

# Australian Solar Institute



- Australian Government initiative for R&D into solar PV and CSP technologies.
- Newcastle, Australia HQ
- ASI-funded solar R&D projects in research institutions and companies around Australia and internationally, supporting 100+ Australian researchers
- c\$220m portfolio of projects leveraged by c\$75m of Australian Government funding at ratio of 2:1+
- Australian Government's \$1.5b Solar Flagships Program – sharing learnings
- International engagement – USASEC; Fraunhofer Institute MoU; DLR MoU; strategic engagement with Asia

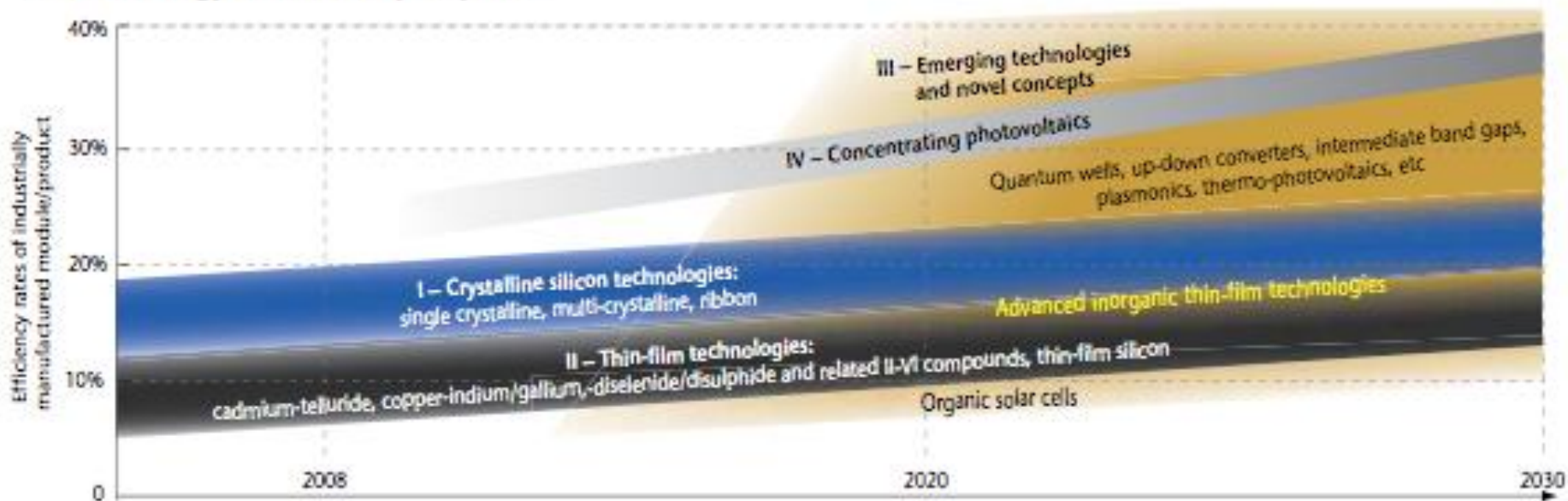
# Policy framework- market drivers



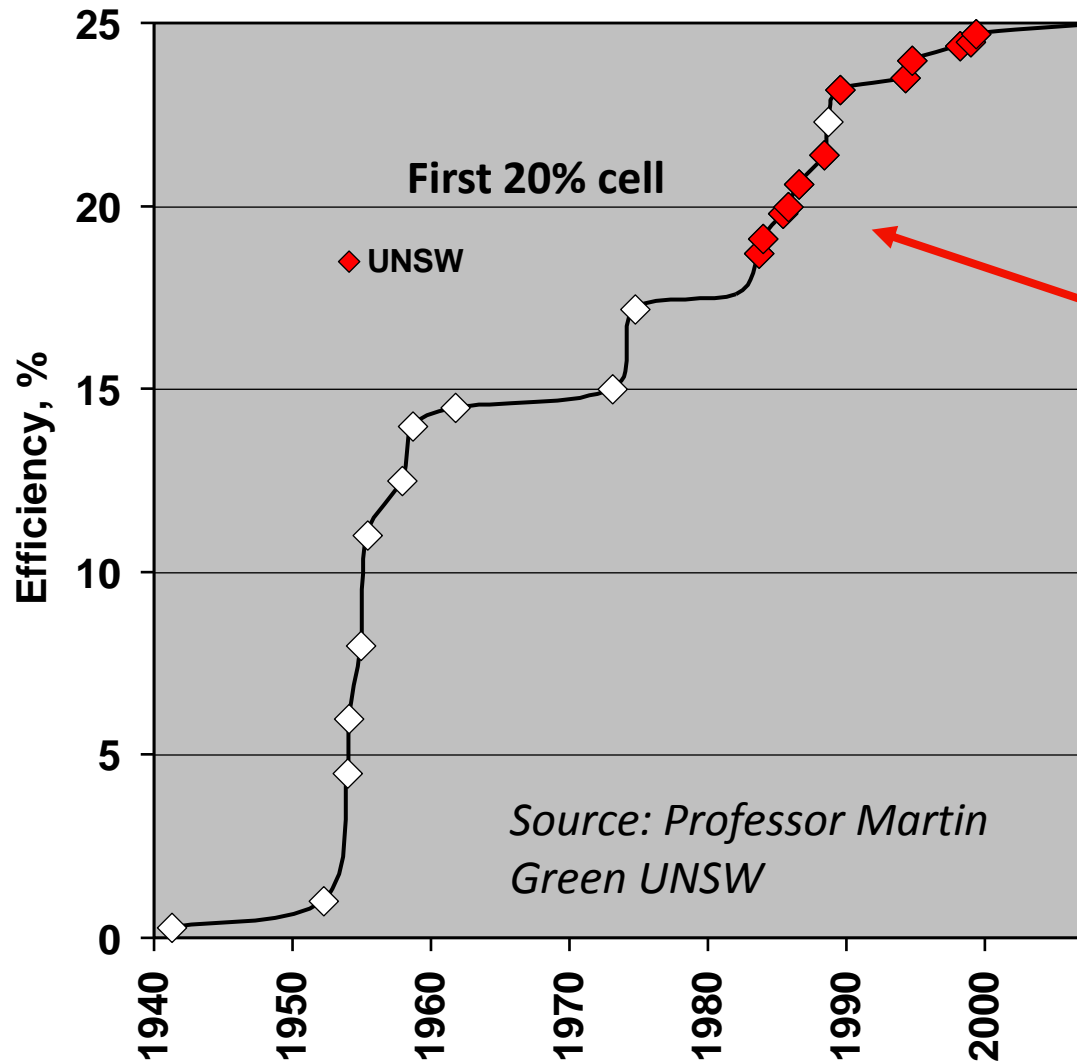
# High-level strategic technology roadmaps are in place

- Today's technology will continue to evolve – lowering costs and increasing efficiency
- New technology emerging that will accelerate trends

**PV technology status and prospects**



# Australian technology and research capability world leading



# Australian alumni now leaders in a global industry



UNSW **Tech Transfer**

Trina, Solarfun CTO

Suntech/ Sunergy/ JA Solar/ Sunrise Global



JA SOLAR



ANU CoE



UNSW PV CoE/ Suntech CTO



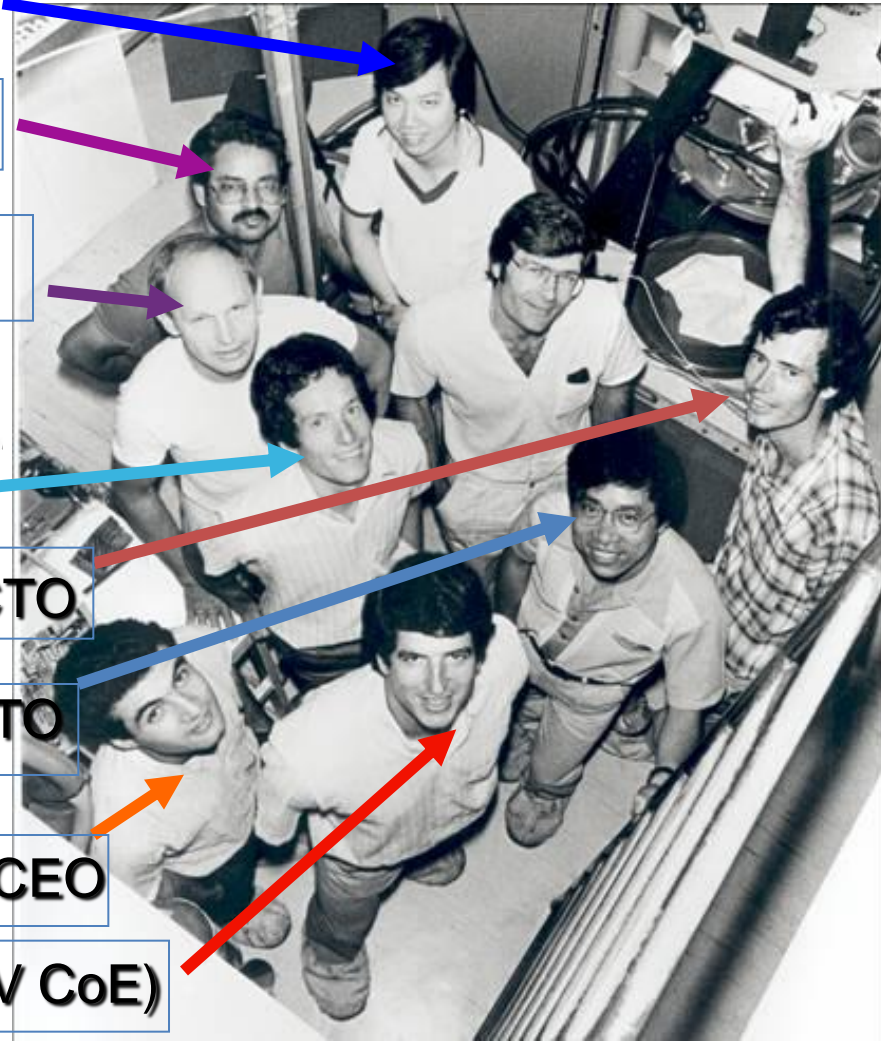
China Sunergy CTO



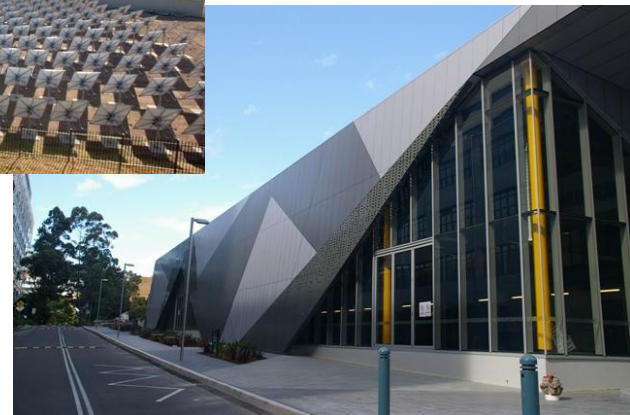
CSG Solar CEO



PV Centre of Excellence (PV CoE)



# Laying the Foundations



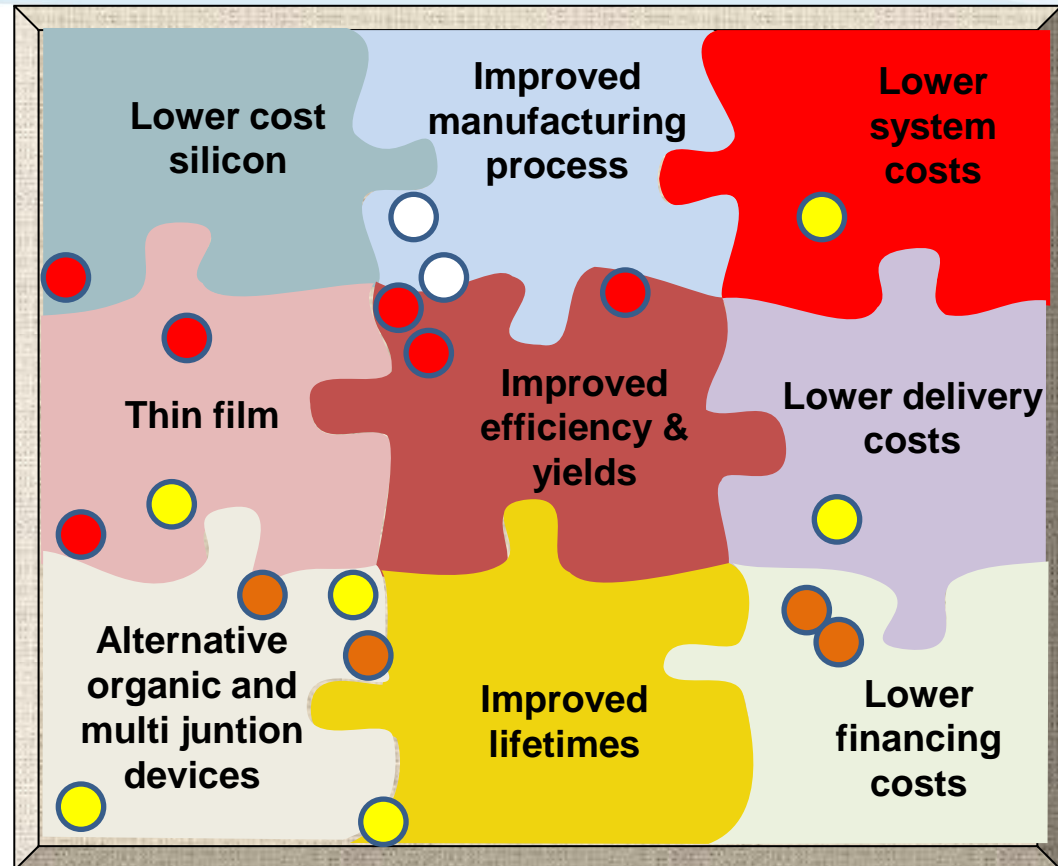


# PV R&D Portfolio Mapping

ASI cA\$47m leveraging cA\$159m



- Foundation Projects
- Round 1
- Round 2
- USASEC



Full details on ASI Website – R&D Projects

# Case study: Industry ready n-type silicon solar cells led by ANU

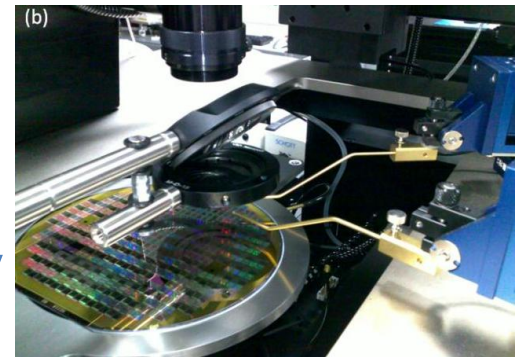


- \$3.3m ASI funding for \$10.3m project combining existing fast and inexpensive methods used to make today's standard p-type silicon solar cells, with the latest advances in higher efficiency n-type silicon cells
- 3 parts:
  - Developing 20% efficient n-type cells with Trina Solar
  - Improving standard p-type cell to 19% with Trina Solar
  - In collaboration with UNSW, developing industry-ready n-type cells with >22% efficiency

# Case study: A high-efficiency integrated solar module on a transparent substrate led by Silanna



- Leader in silicon-on-sapphire manufacturing processes across a range of applications
- With ASI funding of \$2.3m for \$10m project they applied their expertise to solar PV in partnership with ANU/ Macquarie University
- Phase one – ‘proof of concept’
- Resulted in thin film cells fabricated on SOI wafers, with 22% conversion efficiency



# Case study: New materials and architecture for organic solar cells- beyond the Shockley-Queisser limit



- Almost \$1m ASI funding for almost \$2m project to help UQ develop new materials and designs for organic solar cells
- Long range project- defining the 2<sup>nd</sup> generation of OPV
- Reduce \$/watt cost by reaching maximum cell efficiency (SQ limit) with a low manufacturing overhead
- Recent activity focused on creating and characterising materials for improving multiple and structured junction cell performance

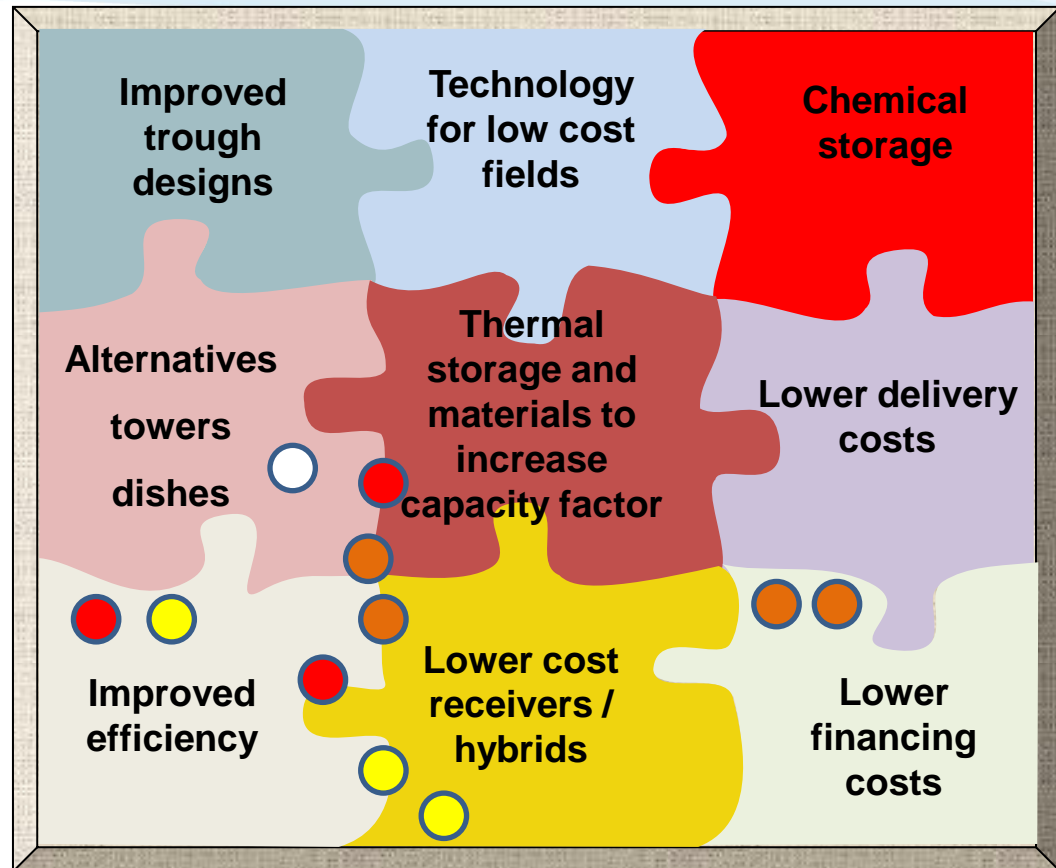


# CST & Enabling R&D Portfolio mapping

ASI cA\$28m leveraging cA\$60m



- Foundation Projects
- Round 1
- Round 2
- USASEC



Full details on ASI Website – R&D Projects

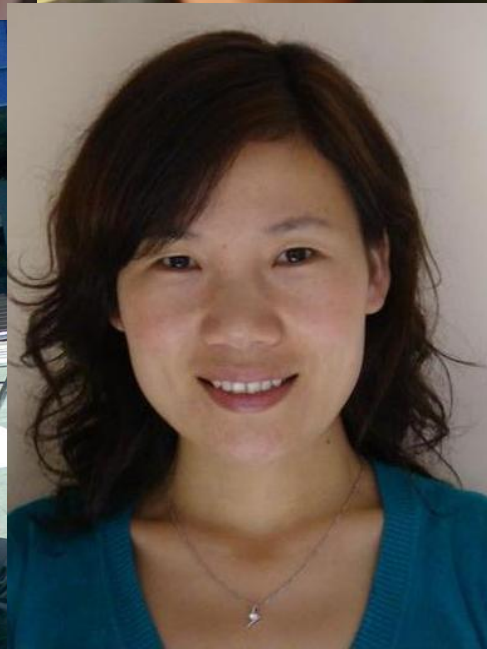
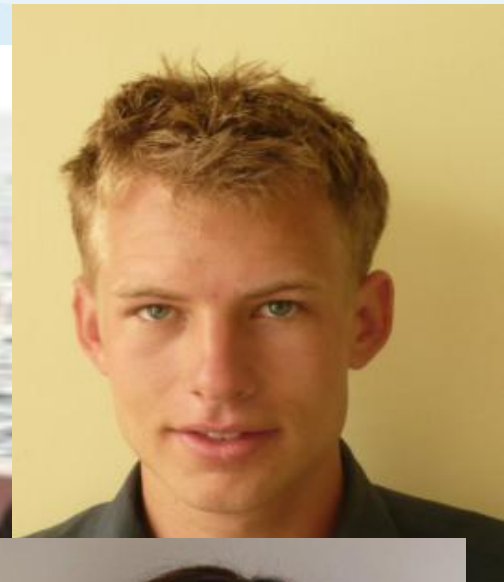
# Case study: CSIRO Solar Thermal Research Hub



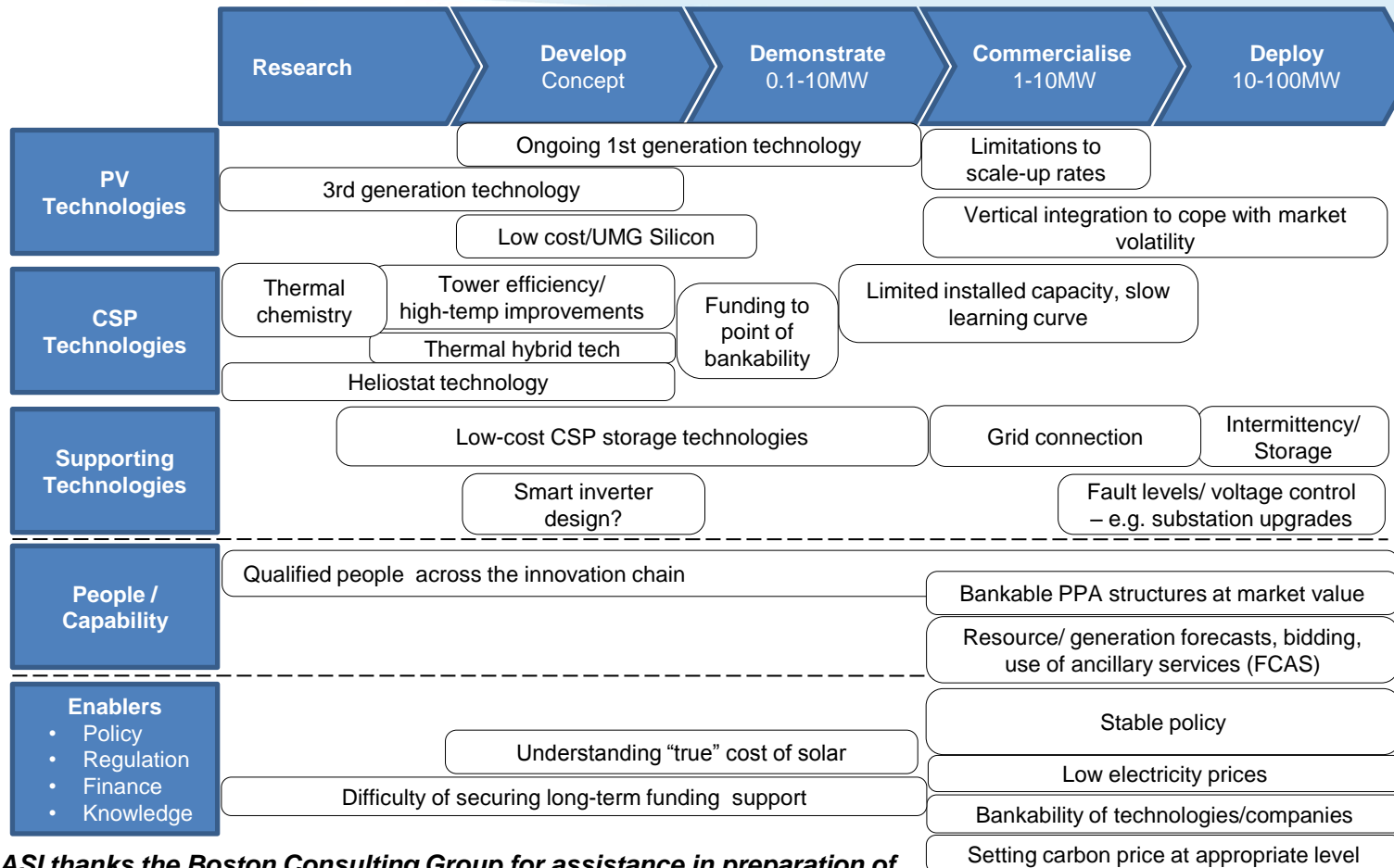
- Largest of its kind tubular receiver solar air turbine system, which doesn't require water
- Aiming to prove that a target of 10-14 cents/kWh is achievable in commercial CST deployments- required to compete with wind generation
- Systems approach focused on increasing the efficiency of CST systems options (higher temperatures at the receiver) and proving storage while at the same time reducing capital and operating costs
- \$5m from ASi



# Skills Development – PhD Scholars and Postdoctoral Fellows



# Summary of barriers on the solar innovation chain



**ASI thanks the Boston Consulting Group for assistance in preparation of this slide: in particular Philip Hirschhorn – Principal, Energy Practice**



# Enabling research and capacity building



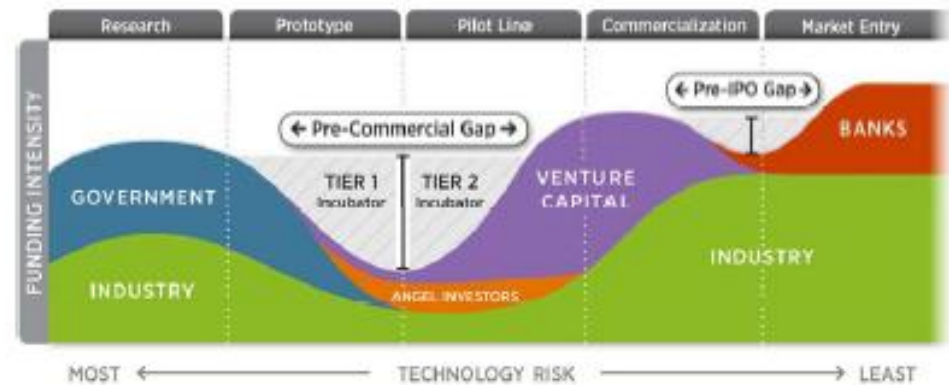
- CSP Review
- Solar resource forecasting
- Electricity markets and solar revenues
- Solar / diesel hybrids in remote applications
- Catalysing private sector finance for solar technology R&D, demonstration and deployment

# New technology requires demonstration to gain bankable capital market support – e.g. CSP Tower

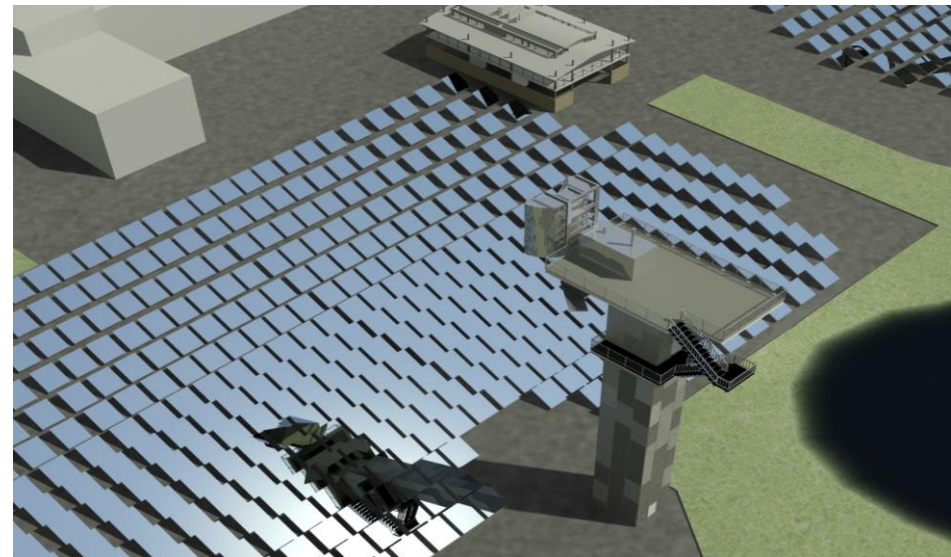


- **R&D Pilot Phase (c\$5m)**  
400kW - prove basic operation
- **Phase 1 Demonstration (\$10m)**  
1MW - prove yield
- **Phase 2 Pre Commercial Demonstration (\$30m)**  
4-5MW - prove reliability & revenue stream
- **Phase 3 Early Commercial Operation (\$200m)** 50MW - prove financial return

Capital Finance Key Barrier



Source : US DoE 2011



*Prize – Competitively priced solar electricity with hybrid / storage integration to provide firm supply*

# Financing solutions – a public sector perspective



How can the public sector best catalyse and leverage private sector \$? Ideally:

- mitigate risks and generate appropriate returns for risk exposure
- be suited to stage of technology development (R,D,D,D)
- help create revenue streams that provide a sustained incentive for private investment
- be flexible and innovative – accommodate changing market circumstances
- minimise administrative and financial complexity

# 2012 Activities and Funding Opportunities



- Open Funding Opportunities
- International partnerships (USASEC, Germany, Asia)
- Sharing knowledge
  - Solar portal
  - Workshop and seminar series
- ASI to form part of the Australian Renewable Energy Agency (ARENA) by 1 January 2013

# United States – Australia Solar Energy Collaboration



- Open Funding Round
  - Funding for excellent solar R&D projects in collaboration with U.S. research institutions and / or industry
  - Proposals may be led by Australian research institution or industry
  - 8 March deadline for Expressions of Interest
- Strategic Research Initiative
  - Funding for two long-term collaborative national research programs - one in PV and one in CSP - aimed at “over the horizon” technologies not yet commercially viable
  - Supports a strategic long-term national approach to solar R&D that includes collaboration with U.S. institutions and alignment with US Department of Energy programs

# Australia-Germany Collaborative Solar R&D Funding Call



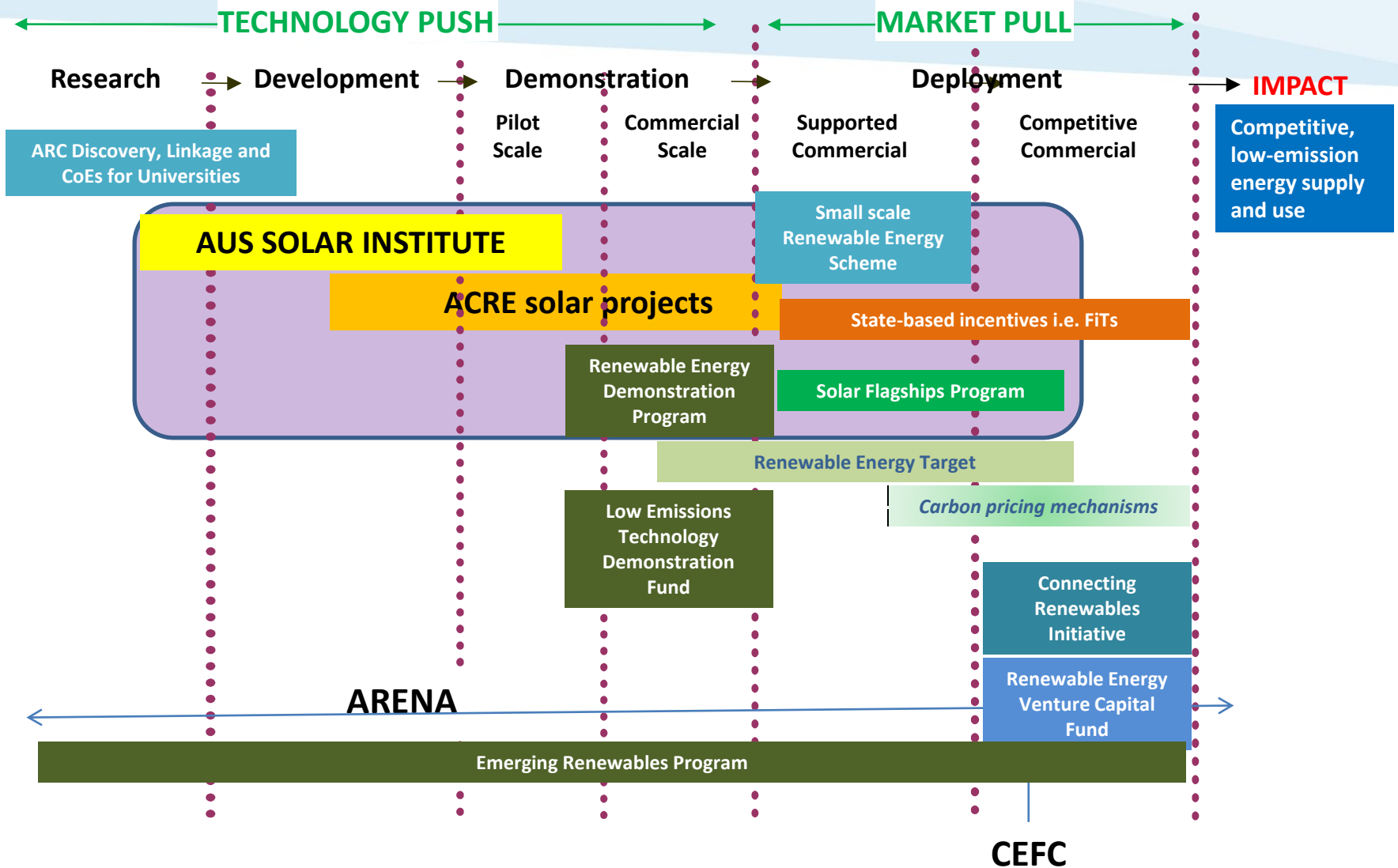
- Funding for excellent solar R&D projects in collaboration with German research institutions
- Australian solar researchers and industry working with Fraunhofer Institute, DLR and academic institutions in Germany encouraged to apply
- Applications accepted on ongoing basis with assessment at bi-monthly intervals (29 Feb, 25 April, 27 June, 29 August)

# PhD Scholarships, Postdoctoral Fellowships and International Research Exchange



- Applications accepted on ongoing basis with assessment at bi-monthly intervals (29 Feb, 25 April, 27 June, 29 August)
- International Research Exchange
  - High calibre Australian candidates from research institutions and industry to participate in International Research Exchange activity, whose research in collaboration with an international partner will lead to the advancement of innovation in Australian solar research, development and industry
  - Up to 12 months at international research institution; short-term programs for industry participants

# Policy framework- market drivers





# Clean Energy Future Package



- ARENA
  - \$3.2 billion investment to promote R&D, demonstration, commercialisation and deployment of renewable energy projects
- CEFC
  - \$10 billion for investment in commercialisation and deployment of ***renewable energy***, energy efficiency and low-pollution technologies, and ***manufacturing businesses providing input into these sectors***
  - Debt and equity financing



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