



Australian Government
Australian Renewable
Energy Agency

ARENA

Iron/Steel & Hydrogen R&D ROUND LAUNCH

6 June 2024 | Sydney





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Welcome

Presented by Lisa Randone (ARENA)



Agenda

- R&D round launch (ARENA)
- From R&D to commercialization (ARENA)
- ARENA supported R&D projects (ARENA)



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Welcome to Country

Presented by Aunty Joan Bell

ARENA acknowledges the Traditional Custodians of Country across Australia and their continuing connection to land, sea and community. We pay our respects to Elders past and present.



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R&D round launch

Presented by Zoe von Batenburg (ARENA)



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From R&D to commercialisation

Lessons learnt

Presented by Tom Campey (Hysata)



Lessons Learnt. From R&D to Commercialisation.

Tom Campey

Chief Product Officer

06.06.2024



Agenda

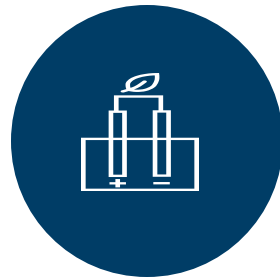
- 1 About Hysata
- 2 Our growth journey
- 3 Eight lessons on our journey

Hysata is commercialising the world's best electrolyser



Market

Exponential



Technology

World's first,
highly
differentiated



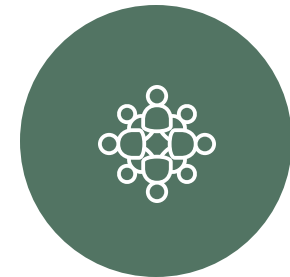
Traction

Partnership with
blue chip
customers and
investors



Scalability

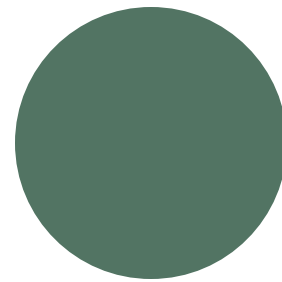
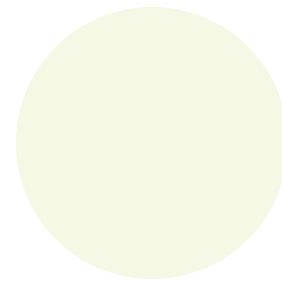
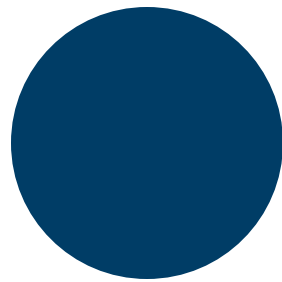
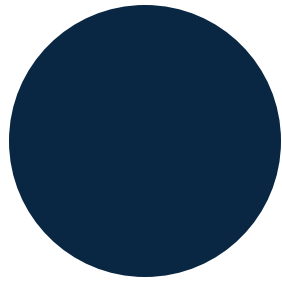
Designed for
mass
manufacturability



Team

Right skills,
underpinned by
great culture

CONFIDENTIAL



Officially founded in 2021, Hysata has rapidly grown



1

Understand the market

Ensure you're developing something people actually want



2

Build a techno-economic model early

Understand what your product will cost and the value it will create

3

Protect your IP

Understand the IP landscape and protect your most important asset





4

Identify and prioritise key technology risks

And have a plan to eliminate them

5

Bring in the right people and partners

Know your strengths and fill the gaps





6

Invest in culture

You'll need a strong culture to go the distance – nurture it

7

Think like an investor

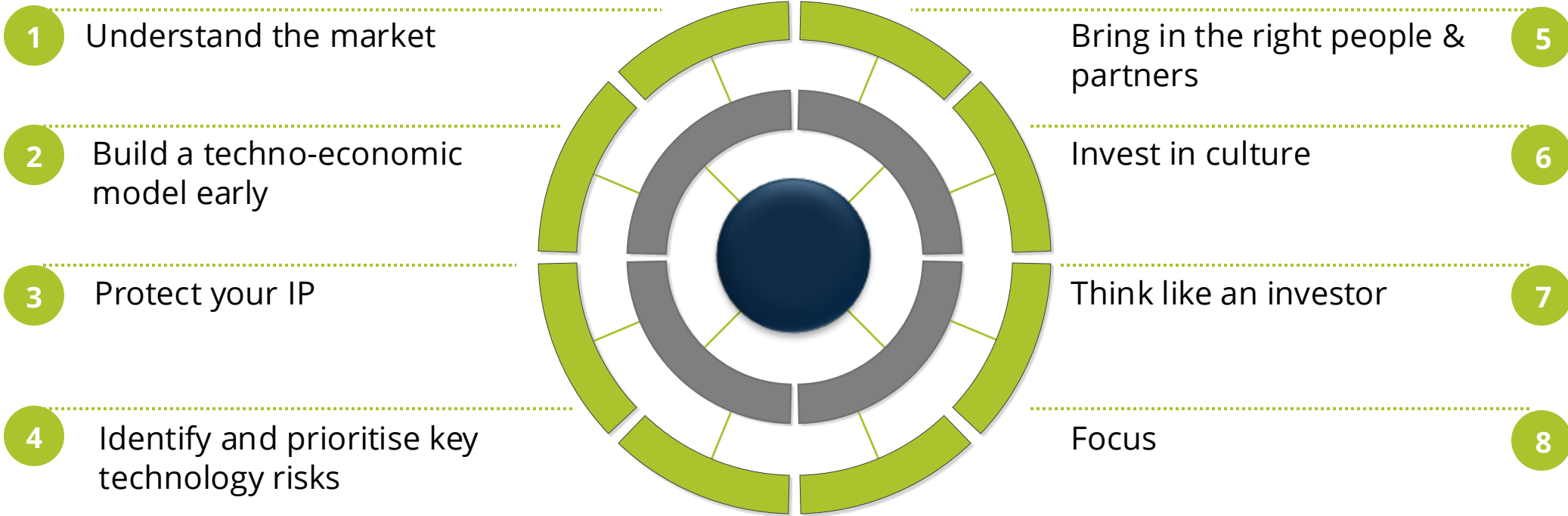
Think ahead to your next raise and be clear on what you need to be able to show investors

8

Focus

Work out what's critical path and eliminate distractions

In summary







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Q&A

From R&D to commercialisation

Lessons learnt

Presented by Tom Campey (Hysata)



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ARENA-supported R&D projects

Presented by Tanya Hodgson (ARENA)

Iron and steel and hydrogen research boost:


\$59.1 million
of R&D funding



- 17 recipients
- \$1.3 - 5 million grants

21 Projects

- 10 Universities
- 3 Research organisations
- 4 Start-ups / companies

\$24.6 million 
of iron and steel funding

unlocking **\$103** million

“ to accelerate novel and **innovative low emissions** iron and steel technologies **using Australian iron ore.**

\$34.2 million 
of hydrogen funding

unlocking **\$100** million

“ to accelerate **innovative, renewable** hydrogen technologies (**production, storage and distribution**) with a path to commerciality.



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ARENA hydrogen research funding to date:

\$22.1 million
of R&D funding

16 Projects; unlocking

\$56.6 million

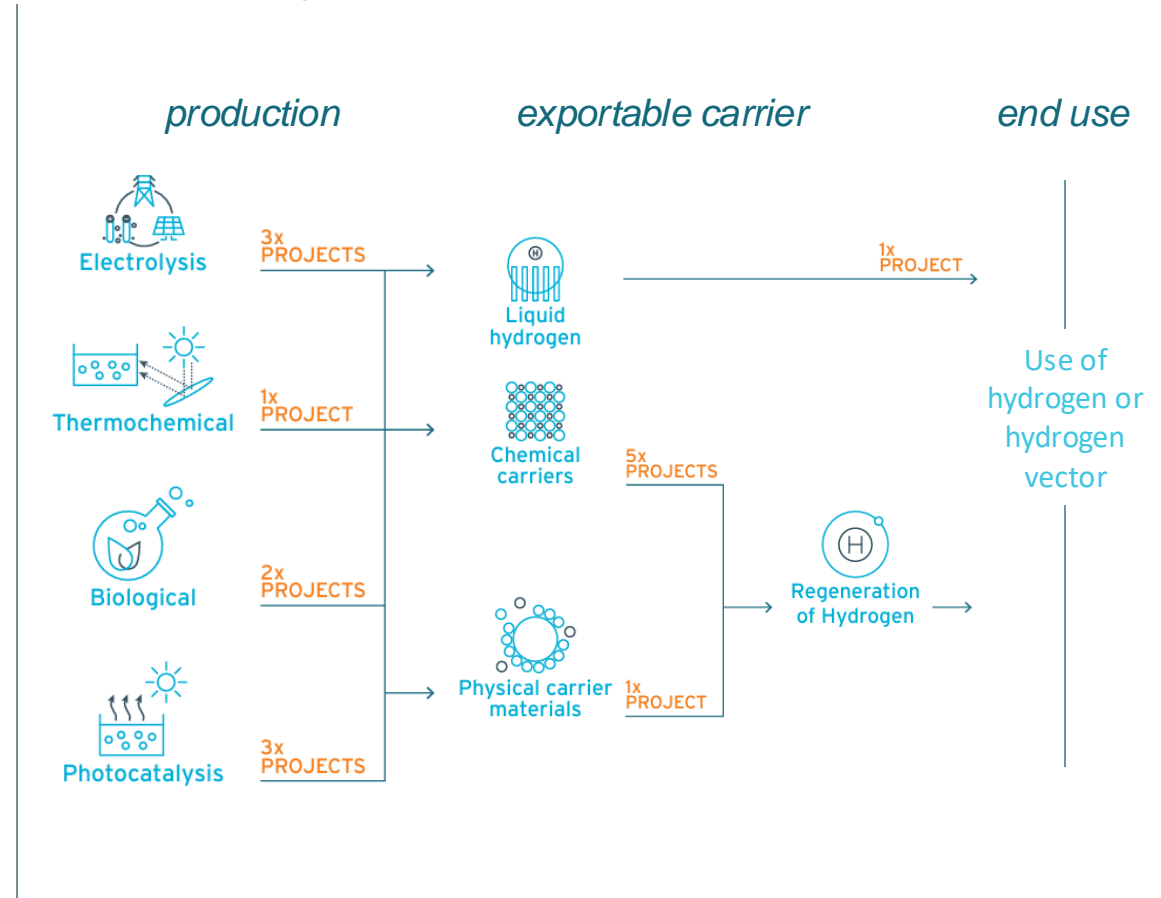
**H2 for
export**



**Diverse technology
representation**

(e.g. ammonia electrolysis,
methane fuel carrier)

\$ across the value chain



lessons learned

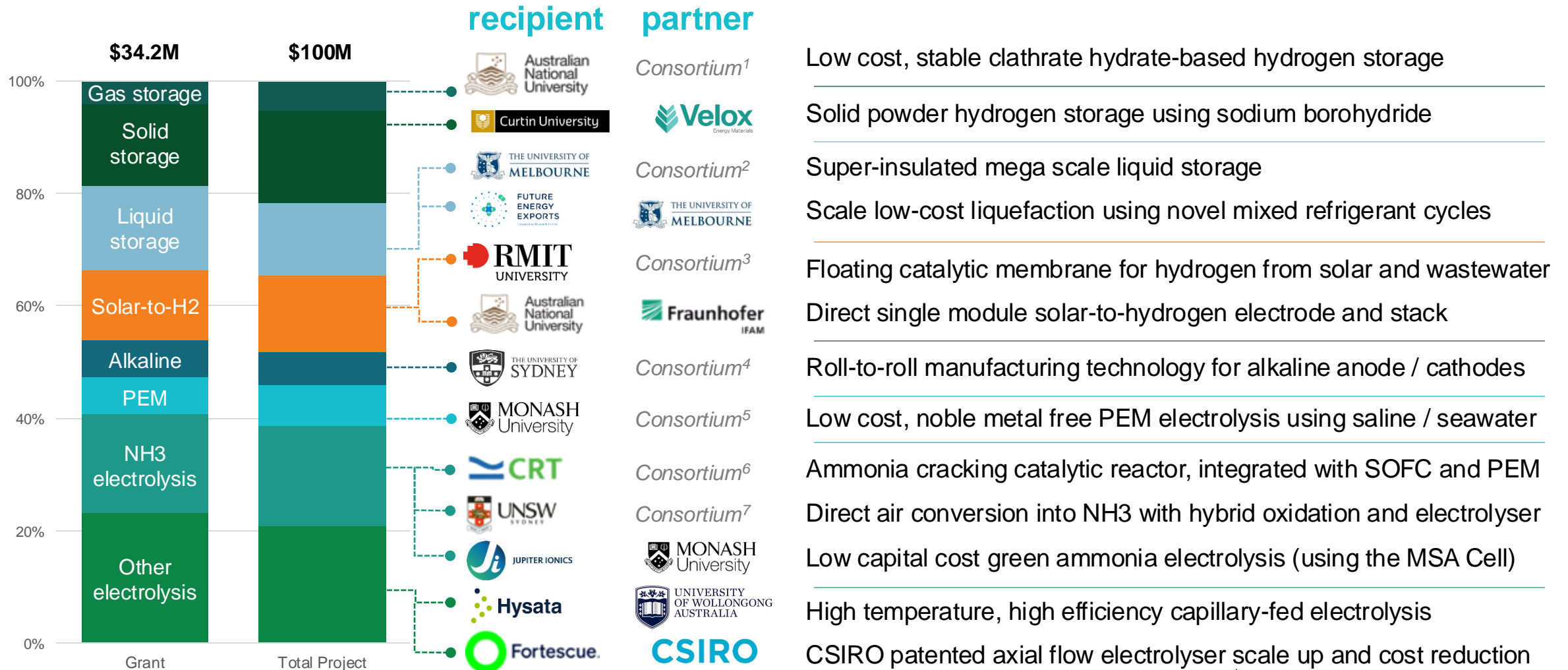
- ✓ **Lack commercialisation resources and funds = 'valley of death'**
- ✓ **Industry hesitance in engaging with academia** created scale up uncertainty
- ✓ **Economics highly sensitive** to forecast uncertainty in key metrics
- ✓ **Long testing periods** to validate experimental results
- ✓ **Interim tech scale-up key** prior to pilot plant demo



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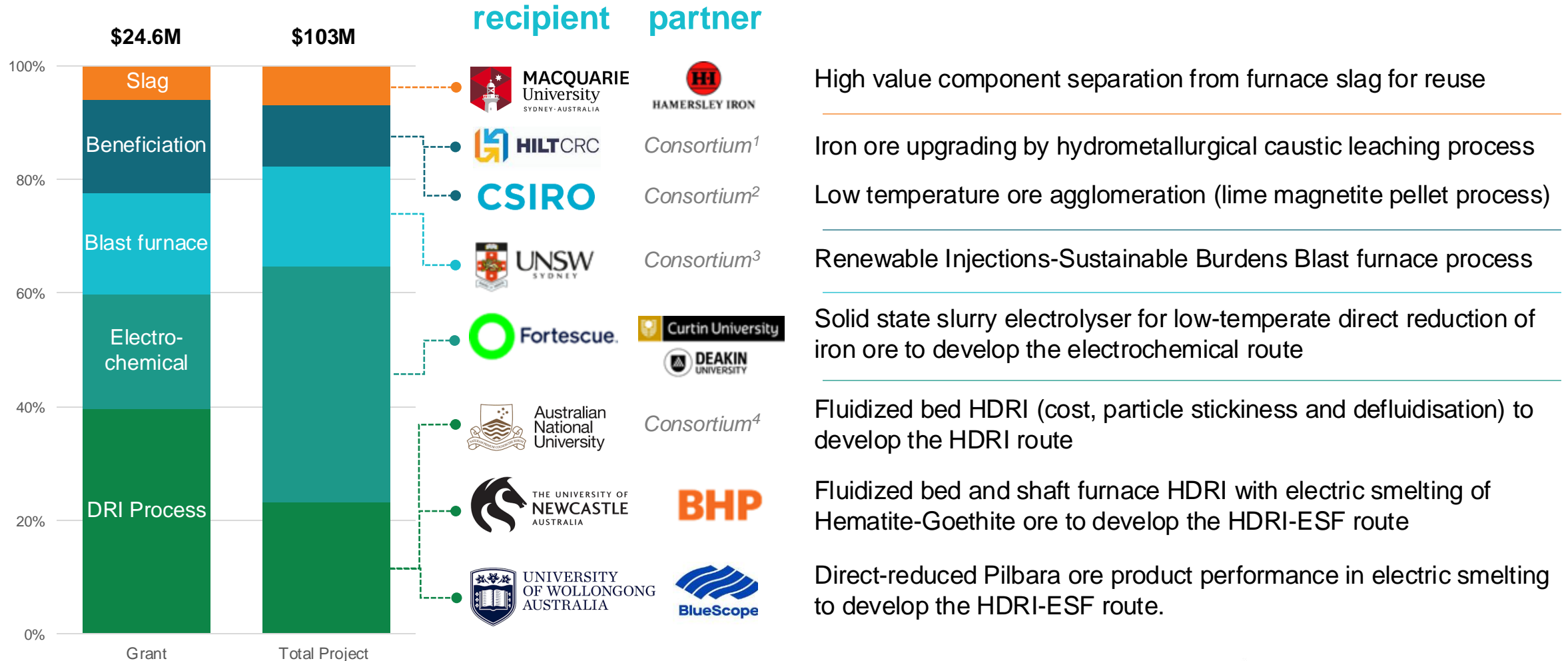
\$34.2 million for low-cost hydrogen & vectors:



- Low cost, stable clathrate hydrate-based hydrogen storage
- Solid powder hydrogen storage using sodium borohydride
- Super-insulated mega scale liquid storage
- Scale low-cost liquefaction using novel mixed refrigerant cycles
- Floating catalytic membrane for hydrogen from solar and wastewater
- Direct single module solar-to-hydrogen electrode and stack
- Roll-to-roll manufacturing technology for alkaline anode / cathodes
- Low cost, noble metal free PEM electrolysis using saline / seawater
- Ammonia cracking catalytic reactor, integrated with SOFC and PEM
- Direct air conversion into NH₃ with hybrid oxidation and electrolyser
- Low capital cost green ammonia electrolysis (using the MSA Cell)
- High temperature, high efficiency capillary-fed electrolysis
- CSIRO patented axial flow electrolyser scale up and cost reduction

Note: (1) Ardent, Dimer, Stiebel Eltron, University of Exeter, University of Bristol, Nanjing Normal University; (2) GenH2, Energy Evolution, Omni Tanker, Rotark AU; (3) University of Technology Sydney, UNSW, Clayton, Beyond H2, Advanced Carbon Engineering, South East Water Corporation; (4) UniSA, Swinburne, Monash, entX, (5) Monash: The University of Sydney, CSIRO, Woodside, Ixom Operations, Endua; (6) ANU, RMIT, Northwest University (USA), Emerson Australia; MSA Cell - Macfarlane Simonov Ammonia Cell.

\$24.6 million for low emissions iron & steel:



Note: (1) Curtin, Fortescue, Roy Hill, The University of Adelaide, MRIWA, BG&E Resources, MRIWA; (2) Grange Resources, Roy Hill, Swinburne; (3) Rio Tinto, BlueScope, UoN, UoQ, University of Tech Sydney, Cleantech Energy (4) Swinburne; UoN; HILT CRC; FMG; Grange Resources; Roy Hill; Primetals Tech.



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