Jupiter Ionics: Decentralised, Net-Zero Ammonia

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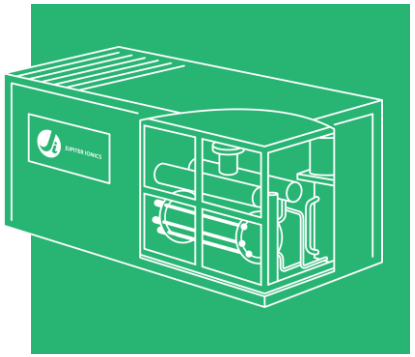
Jupiter Ionics was formed around an opportunity at the intersection of three megatrends

- Emergence of distributed, variable renewable electricity as the cheapest form of primary energy
- Rapidly growing interest in clean ammonia as a pathway to address decarbonisation
- Developments in fundamental chemistry of nitrogen activation at near-ambient conditions

We envision a solution where our core technology will underpin a distributed ammonia manufacturing model

Renewable Energy
(Grid or islanded)

Demand
side
response



Jupiter Ionics modular ammonia production plant
(Up to 30 MW; regionally located)

Local fertilizer application

Local industrial use (e.g. water treatment, mining)

Fuel/Energy store

<u>Decentralised</u> production model wins due to:

- Decentralised nature of key input (renewable electricity)
- Less cost & risk in long ammonia supply chains
- Lower offtake hurdle to underwrite plant

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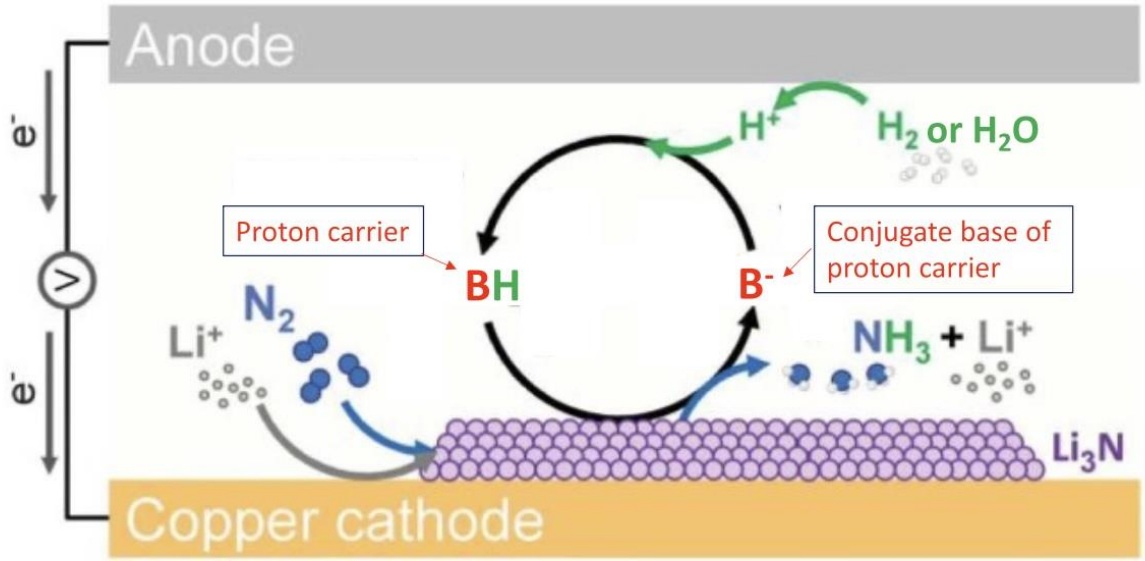
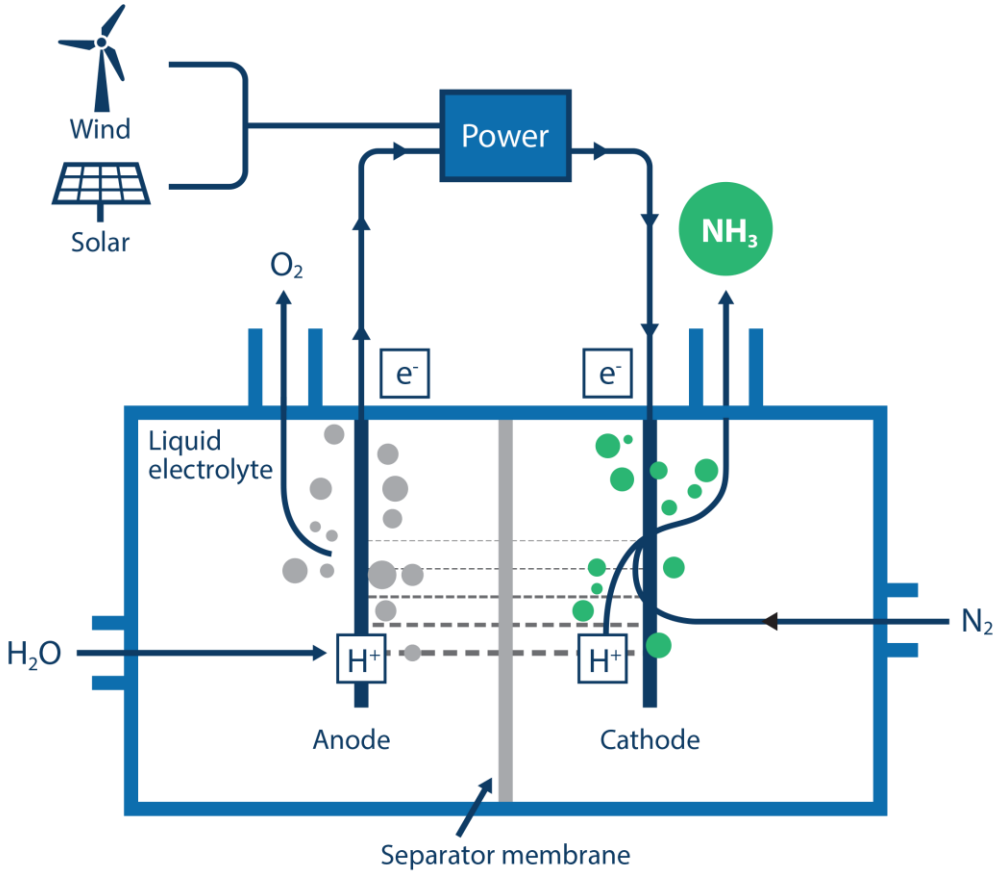
Our focus is on commercialising the lithium-mediated nitrogen reduction reaction

Li-mediated Nitrogen Reduction Reaction





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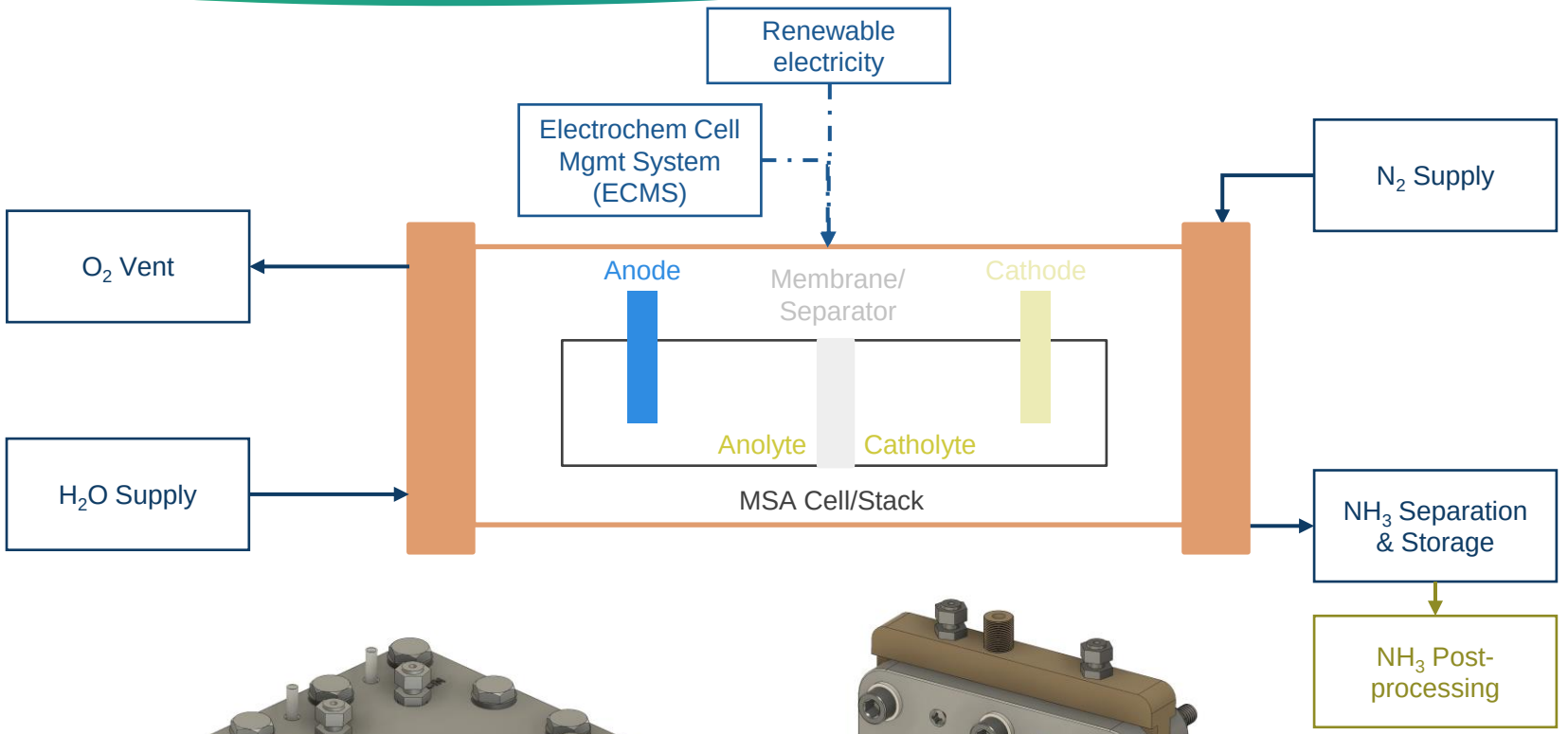
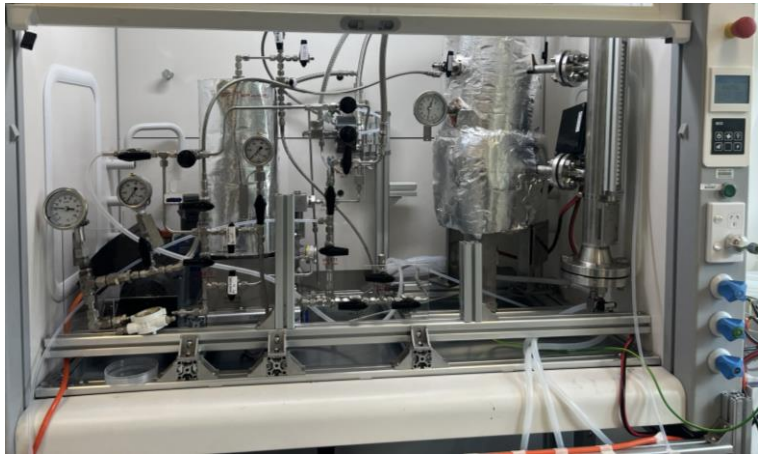
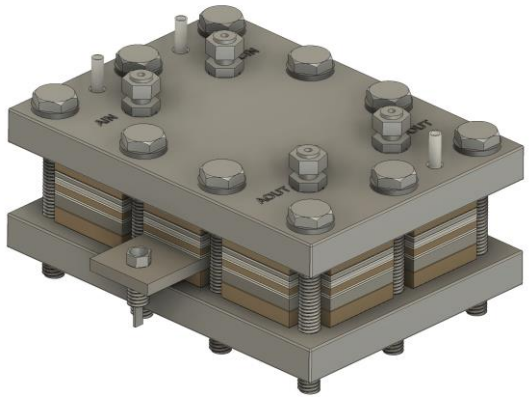
Source: MacFarlane et al (2024), *J. Phys. Energy* 6 (2024) 021501

Currently focused on system integration at kg/day scale







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We are employing multiple strategies to refine our technology as we scale

1. Alternative metal mediation processes, which can reduce energy consumption

2. Optimising proton transport through the reactor to deliver yield & selectivity

3. Adapting a range of cell designs (liquid fed, GDE) and Balance of Plant to optimise capex/ efficiency trade-off

We have established key relationships to accelerate development

- Investors: Angels/HNW, VCs, Strategics
- Core R&D partner: Monash University
- Engineering/FEED partner: Synertec
- Product development and prototyping partners (as part of Aust Govt CRC-P grant):
  - Fortescue Future Industries
  - Wesfarmers Chemicals, Energy & Fertilisers
  - SJDC Produce
- Continuing to engage with potential additional partners

MONASH University

tenacious ventures

SJDC PRODUCE PREMIUM AUSTRALIAN FRESH

CIMIC

Wesfarmers Chemicals, Energy & Fertilisers

Australian Government
Australian Renewable Energy Agency
ARENA

FORTESCUE FUTURE INDUSTRIES

Australian Government
Department of Industry, Science, Energy and Resources
AusIndustry
Cooperative Research Centres Program

BREAKTHROUGH VICTORIA

SYNERTEC

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Opportunity areas for future engagement

- Complementary R&D/Engineering capabilities
- Supply chains for electrochemical systems
- Agronomic and emissions implications of decentralized production and use of ammonia
- Pilot-scale deployment opportunities in novel use cases
- Investment

Thank you

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The views expressed herein are not necessarily the views of the Australian Government. The Australian Government does not accept responsibility for any information or advise contained within this document

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