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Shaping Australia's future hydrogen market

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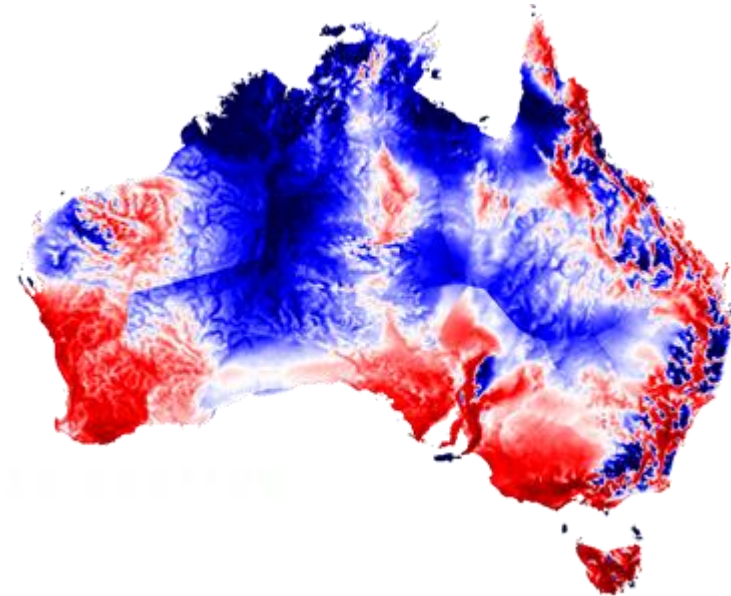
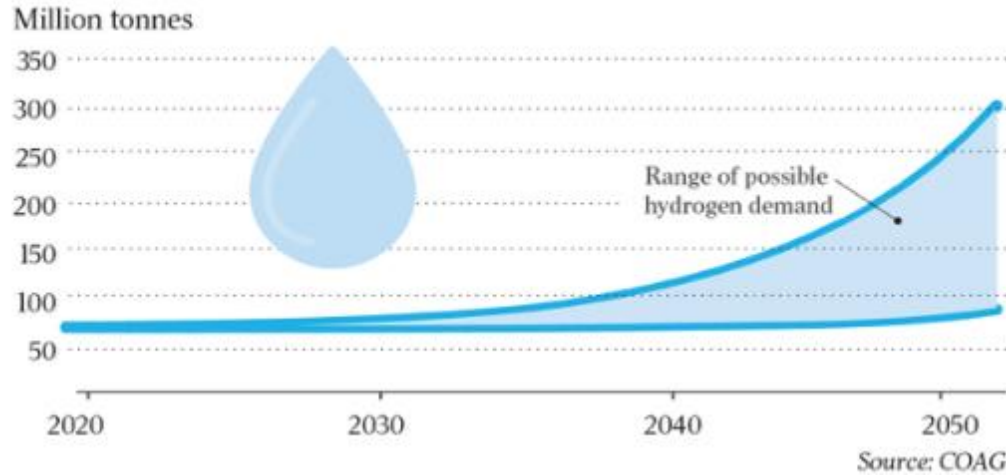
Market Shaping

the purposive actions of an actor or a collective of actors to “change market characteristics by re-designing the content of exchange, and/or re-configuring the network of stakeholders involved, and/or re-forming the institutions that govern all stakeholders’ behaviors in the market”

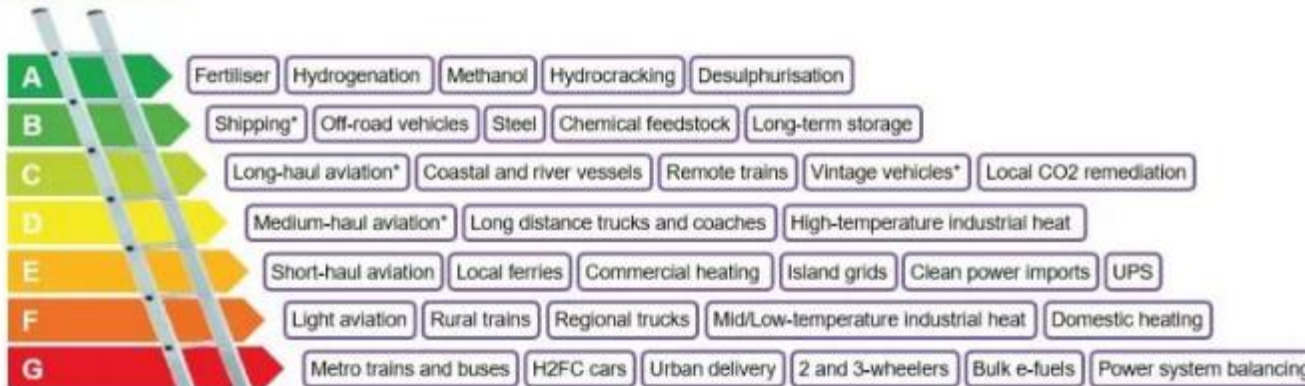
(Nenonen et al., 2019, p. 618)

Future Hydrogen Market

Long-term hydrogen demand



Unavoidable



Uncompetitive

* Via ammonia or e-fuel rather than H2 gas or liquid

Source: Liebreich Associates (concept credit: Adrian Hiel/Energy Cities)

State of the Market

Updated info:

● Giga-scale production
 ● Large-scale industrial use
 ● Mobility
 ● Integrated H₂ economy
 ● Infrastructure projects

310 projects¹ announced

Preliminary studies or press announcement stage

● 42
 ● 171
 ● 46
 ● 20
 ● 31



214 projects in feasibility studies

● 48
 ● 112
 ● 22
 ● 21
 ● 11



117 projects in FEED studies

● 24
 ● 45
 ● 29
 ● 12
 ● 7



370 projects committed

FID taken, under construction or operational

● 7
 ● 173
 ● 109
 ● 48
 ● 33



1,011 projects with full or partial commissioning (COD) by 2030

+407 projects without specified COD or COD post-2030 (not shown)



Research Areas:

- 1. Identify business customers' perceptions of challenges and drivers of the hydrogen transition**
- 2. Identify industry actors' expectations and plans for the hydrogen transition and adoption of hydrogen technologies**
- 3. Recognise perceived role of hydrogen hubs and sector coupling in shaping hydrogen demand and new market opportunities**

Methodology

I. Literature Analysis

Source	Documents
Academic	54
Industry	83
Media Reports	Area 1: 5178 Area 2: 5680 Area 3: 7200

II. Qualitative Interviews

Organisation Category	Organisation Type	Interviews
Industry 17	Chemicals	2
	Transport & Logistics	3
	Hydrogen Production & Export	3
	Mining and Resources	1
	Manufacturing & Engineering	3
	Energy & Utility	3
	Oil & Gas	2
Government 5	National	1
	State	3
	Local	1
Thought Leadership 12	Consultancy	4
	Advisory / Think Tank / Peak Body	6
	Research	1
	Law	1
Total		34

Clean Hydrogen Transition Drivers

- **Climate-related**

Decarbonisation; Shift to Net Zero; Lack of Alternative; Climate Change Realisation

- **Market Forces**

Prospective Market Opportunities; Fear of Missing Out

- **Government Policy**

Government Stimulus; International Competition

“I think decarbonisation probably says it all. I think the decarbonisation drivers what is propelling hydrogen into everyone's first priority”
- Manager, Chemicals Industry

Clean Hydrogen Transition Barriers

Market Uncertainties

- Offtake Uncertainty; Lack of Existing Customers

Cost Barriers

- Uncompetitive Price; CAPEX

Australia-specific Barriers

- Lot of Talk, No Walk; Insufficient Government Support

Knowledge

- Unrealistic Expectations; Lack of Hydrogen Knowledge

Industry Maturity

- Technology Immaturity; Supply Chain Constraints

“I think the market is not here yet, it's very hard to find offtakers in Australia, which are willing to pay the green premium. So basically, the private sector doesn't want to pay more for the green technology”
- Manager, Manufacturing Industry

Active / Internal Solutions

- Cross-sector collaboration
- Community engagement
- Lessons Learned
- Information Sharing
- Focus on existing demand

Passive / External Solutions

- Scaling Technology
- Technology Breakthrough
- Crisis
- Embedded carbon intensity

“To actually be able to get someone to pay that green premium, there needs to be a greater level of collaboration across the whole project from the raw materials, to processing, to transporting, to the end user, and possibly the end consumer and all the different parts of the value chain along that way, including state governments, federal governments, foreign governments, to de-risk these projects, to actually get to FID.”

- Manager, Federal Government Agency

Nascent Market Perspectives

Producer Perspective

*“the chicken and egg argument about getting a project up: to offset the cost and then investment as a private developer you need sufficient scale, but you're very unlikely to get sufficient scale as a **first mover** because there will not be the offtake”*

Customer Perspective

*“our journey in hydrogen so far has been minimal, to be honest with you. And the reason being is because whilst we've got very strong and good intent to move into that hydrogen world, the equipment that's necessary to do that **doesn't exist**”*

Industry Lobby Perspective

*“In an industry where there is **no market** like green hydrogen, it's going to take collaborative and innovative business models to get these things up. So that's why you've got to bring different people to the tables to try and get this moving”*

Role of Government

Financial

- Government subsidies
- Government project funding
- Revenue support mechanisms

Regulatory

- Government mandates
- Coordination of regulation
- Creating policy

Strategy

- Local leadership
- Focus on domestic consumption
- Updating strategic priorities

*“And it doesn't mean that the government has to do it themselves. But **they need to** incentivise industry and seed projects, **they need to** incentivise private sector to build the hydrogen refuelling network. And then **they need to** also support it for a number of years afterwards, because it will be a loss maker for quite a few years until there's a critical mass of vehicles on the road.”*

- Sustainability Manager, Transport & Logistics Industry

Natural Competitive Advantage

Great Export Potential

Value-added Manufacturing

Poor domestic performance

Superior international performance

**US Inflation Reduction Act*

“Last year we had the Inflation Reduction Act, the Japanese Green Transition Roadmap, European Green Industrial Deal, the Canadian 40 cent production tax, etc, etc, etc. So I think the world is no longer an even playing field and I think it does require substantial government support”
- Energy Sector Consultant

Contrasting Perspectives

Picking Winners
vs.
Distributing Money

Market Activation
vs.
Developing to Scale

Domestic Focus
vs.
International Focus

Decarbonisation
priority
vs.
Techno-economic
priority

*“I understand that **economics and finances are important** from a **private organisation’s** point of view. But if what we as a **society** are trying to achieve is ultimately environmental **outcomes**, then that's what we need to keep in mind as our ultimate goal and that's what we should be working towards”*

- Senior Manager, Transport & Logistics Sector

Study Context

[Interviews conducted February - May, 2023]

- 16 August 2022, U.S announce Inflation Reduction Act
- 24 February 2023 – Aus Gov announced review of 2019 National Hydrogen Strategy
 - Consultation Period 7 July - 18 August
- May 2023 – Aus Gov announced \$2 billion funding for Hydrogen Headstart Program
 - 7 July to 3 August Consultation
 - October EOI
 - December shortlist



Review areas:

- Decarbonisation
- Targets & mandates
- Supply chain risks
- Investment
- Wider benefits
- Infrastructure
- Export

‘Fuzzy Front End’ of Market Shaping multiple market images coexist and unclear directions as to how they can be realised (Kindström et al 2023)

Competing visions vary in:

- scope
- timeframe
- sentiment
- relationship to status quo
- stakeholder support



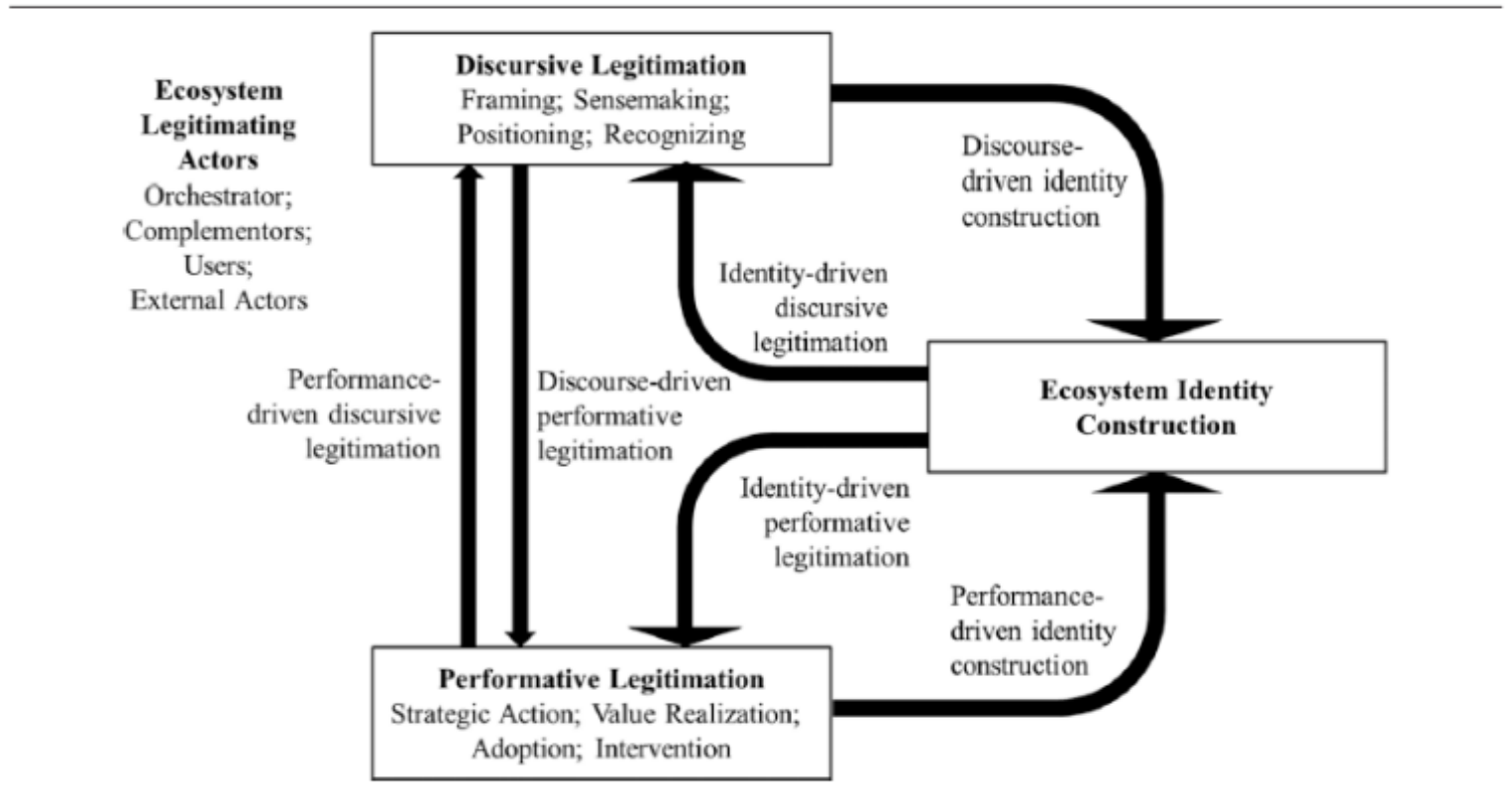
influence present
market shaping actions

Ecosystem Identity Construction (Thomas and Ritala, 2021)

the emergence of a set of mutual understandings among ecosystem participants regarding the central, enduring, and distinctive characteristics of the ecosystem value proposition legitimation processes (1) promote ecosystem acceptance and comprehensibility; (2) demonstrate ecosystem viability and (3) develop common views of what and how goals are achieved.

Identity Legitimation

A Process Model of Ecosystem Legitimacy Emergence



1. Categorise discursive practices within participant interviews to identify institutional work practices around shaping **a)** desired market direction **b)** perceived roles and responsibilities **c)** legitimisation processes

2. Extend study to shaping outcomes and influence on government policy
 - I. Analyse industry submissions to strategy review
 - II. Analyse updated National Hydrogen Strategy and Hydrogen Headstart Program (released sometime in 2024)
 - III. Conduct follow-up interviews to identify changing perceptions



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Thankyou

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