

Advisory Board

Session 4, 9 December 2022

Note: we are publishing these slides consistent with the recommendation of the AER. The purpose of this document was to promote discussion and engagement.

Acknowledgement of Country

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We acknowledge the Traditional Owners of the lands upon which we operate and recognise their continuing connection to land, waters, and culture.

We pay our respects to their Elders past, present, and emerging.

Pictured: artwork by Aboriginal artist Chern'ee Sutton from Mount Isa for our Group's Reflect Reconciliation Action Plan



Welcome

01

Recap of broader engagement program, why we are here and reflections from session 3



02

Clarity on

- role and scope of Advisory Board
- purpose and use of scenarios



03

Develop a common understanding of today's response area



Your Advisory Board Chair



Rosemary Sinclair AM
Chairperson

Your facilitator



Dr Matt Pearce
Partner
KPMG National Lead for Energy & Utilities

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Agenda for today

Topics we will cover

Section 1: Welcome

Acknowledgement of Country

Introduction & agenda for today

Recap of broader engagement program and why we are here

Section 2: Reflections from Session 3

Feedback and responses

Clarifying the purpose and use of the scenarios

What we need from the deep dives

Break

Section 3: Renewable gases

About renewable gases

Network transition for renewable gases

Supporting NSW renewable gas market

Section 4: Session wrap-up and close

Feedback and reflection from today's session, next steps

Duration

20 total

5

5

10

50 total

15

25

10

5

105 total

5 total

In order to...

- 01 Develop a common understanding of each response area
- 02 Capture initial any views or additional information required (which will be revisited in our February, March and April 2023 meetings with the scenario outcomes)

Reminder: This session is being recorded

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Gas Networks 2050



Consumer preferences and considerations

Strategy testing



Articulate the problem in JGN's context and planning horizons

Consider response levers and future scenarios

Identify response combinations or ranges that will serve customers' interests



Expert panel

Scope scenarios

Agree scenario settings and forecasts

Objective: Jemena's 2025-2030 AA engagement can...

Build upon well informed and broadly represented Advisory Board process to target engagement on key response options.

Benefit from Advisory Board communication and evidence feedback for how to engage on these response options.



The **Advisory Board** is made up of customer advocates and specialists, providing a critical lens through which decisions for the future must be shaped.



The **Expert Panel** is made up industry and energy specialists, that are responsible for developing plausible long term scenarios for the NSW energy system and considering the role that gas will play in each. These scenarios will be an important input to Jemena's planning process.



The **Customer Forum** is made up of everyday customers and potential customers working within a deliberative approach to provide guidance and advice to Jemena about what is in the best interest of customers.

In addition to this, our tailored engagement includes:



1:1s and forums with large industrial customers



Smaller forums with Culturally and Linguistically Diverse Communities



1:1s and forums with small and medium enterprises – CALD businesses (SME)



1:1s and forums with retailers



Engagement with young people



BAU engagement with our JGN Customer Council

Role of Advisory Board: Why we are here

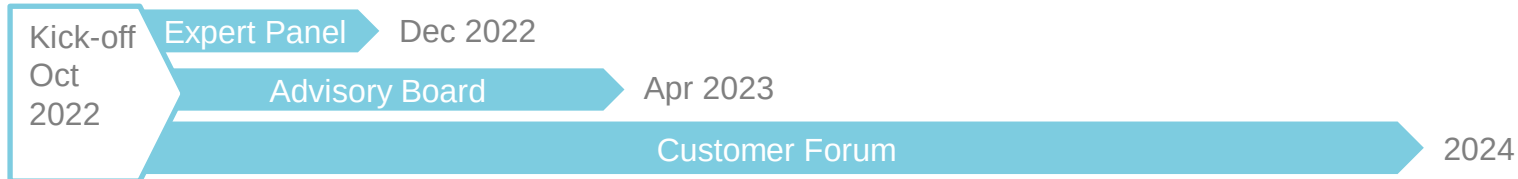
What we will do:

- **Collaborate** with JGN to explore the challenges of the **uncertain future role of gas networks** and the implications for **different groups of customers**, and work through various response options which could form JGN's strategy to take to customers during 2023.
- Have a primary focus on actions JGN can adopt over the period **2025-30** to maintain optionality, as these will flow into **JGN's 2025-30 Plan (regulatory proposal)**.

Where we hope to get to:

JGN's 2023 customer engagement can:

- Build upon well informed and broadly represented Advisory Board process to **target engagement on key response options**
- Benefit from Advisory Board feedback for **how to engage on these options**



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Reflections from Session 3

Reminder...



Working problem statement

We want to explore how Jemena can be a partner to achieve consumers' and community objectives for:

Safe services

Reliable and resilient services

Stable and affordable prices

A decarbonised energy supply

Through a fair return on agreed investments.

Session 3 playback

What we have heard	How we have responded
Customer forums engagement – nature and scope, Advisory Board observers.	• Advisory Board members are welcome to attend and observe the customer forums to understand all views. The purpose of the Advisory Board members observing is so you can hear customer views directly, to support your advice to Jemena. This is not like AER or CCP observers who are there to later assess the adequacy of our engagement. • We're making plans to engage with new and emerging CALD communities in 2023. • We'll work with our engagement partner to ensure customer forum attendees are comfortable with observers, roles are clear and they're respectful to attendees.
Working problem statement – suggestions about resilience, decarbonisation, amenity and environment.	• We heard Advisory Board feedback on the desired outcomes set out in the statement. We will capture this and further feedback throughout the deep dives via a feedback map on the working problem statement to revisit in session 6 after the deep dives.
Scenario planning – questions around criteria for genuinely plausible, preferred outcome for Jemena, hydrogen readiness and the scenarios.	• Today we will provide an overview of the role of scenario planning, walk you through the process from the Expert Panel and recap on the scenarios.

Do you have any questions or comments you want to raise?

The role of gas could vary significantly in the future

Scenarios highlight opportunities & risks to inform strategy in times of uncertainty



Scenario framing ensures that business & industry strategy considers the **possible contextual environment for future success**.

It also:

- Focusses on **uncertainties that are largely external and uncontrollable factors** (e.g. electricity price, decarbonisation, emerging technologies, the future of gas)
- Highlights **how the future may play out** and determines what **strategic decisions today** offer the best chance of **success tomorrow**

- **Use Cases** – consider issues of high uncertainty, high impact and low control
- **Benefits** – identify long term divergent futures and the implications of those futures / identify near term actions to address the futures / identify near term actions common across scenarios (“no regret” decisions)

Formulation of plausible scenarios is key

Scenarios are **consistent**, **plausible** and **challenging** narrative descriptions of situations in the future, based on a selection of key future factors and their interdependencies.



Plausible Scenarios are...

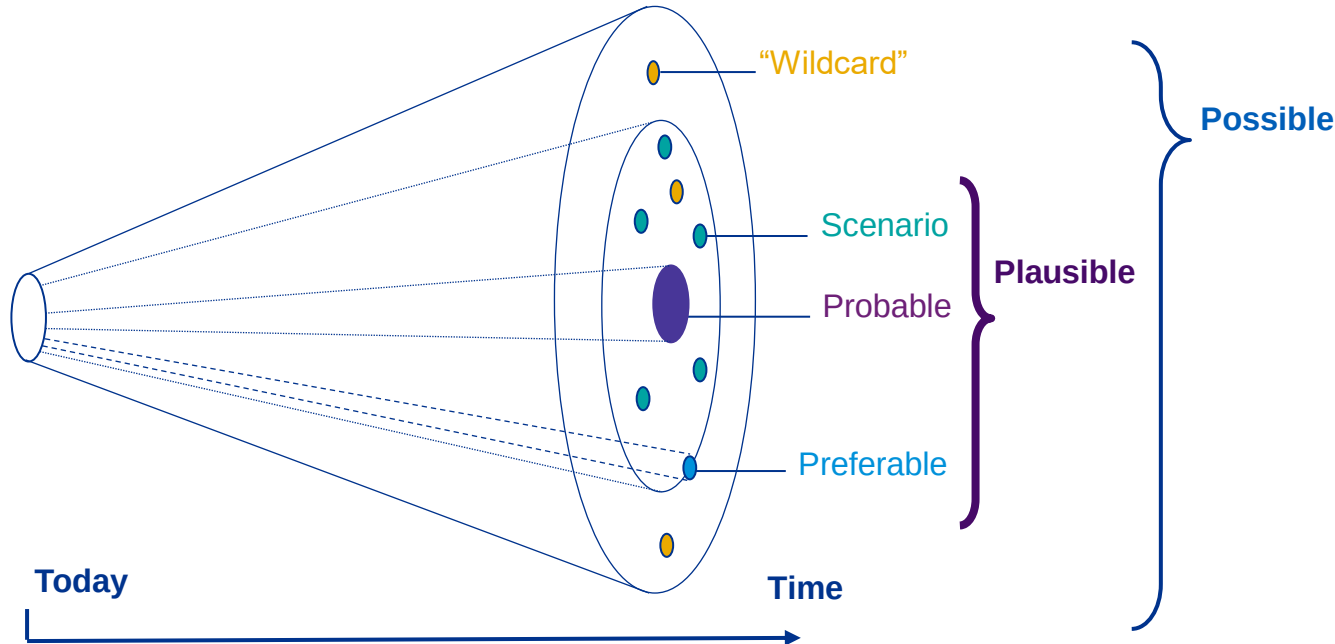
- Credible
- Challenging
- Coherent
- Relevant
- Uncertainties
- Stories describing paths to different futures



Plausible Scenarios are not...

- Predictions
- Projections
- Preferences
- Presumptions
- The obvious
- Strategic positions made on presumptions

Plausible futures omit wildcard outcomes



- **Possible**, that is, it 'might' happen, basically future knowledge
- **Plausible**, something that 'could' happen, and is based on current knowledge
- **Probable**, something that is 'likely' to happen, that is current trends
- **Preferable**, something that we 'want' to happen, and is the result of value judgements

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Expert Panellists



Matt Clemow
*Group Manager Gas Operations
Australian Energy Market Operator (AEMO)*



Dr Patrick Hartley
*Leader of CSIRO Hydrogen
Industry Mission*



Shahana McKenzie
*Chief Executive Officer
Bio Energy Australia*



Andrew Lewis
*Executive Director Energy Consumers and Programs
NSW Department of Planning, Industry and Environment*



Matthew Warren
*Former Chief Executive
Australian Energy Council*

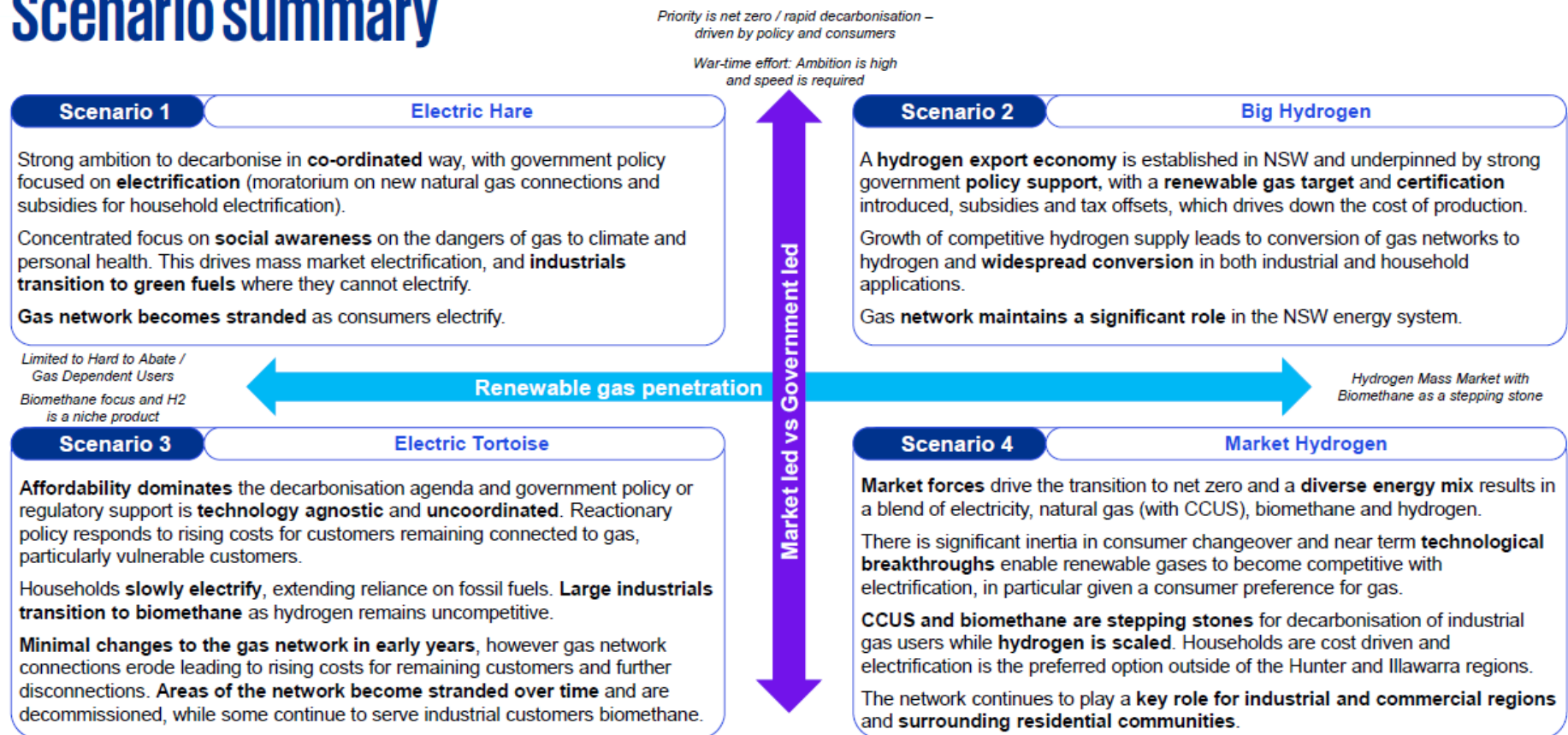


Brian Spak
*Director, Energy System Transition
Energy Consumers Australia*



Shaun Reardon
*Executive General Manager
Jemena Networks*

Scenario summary



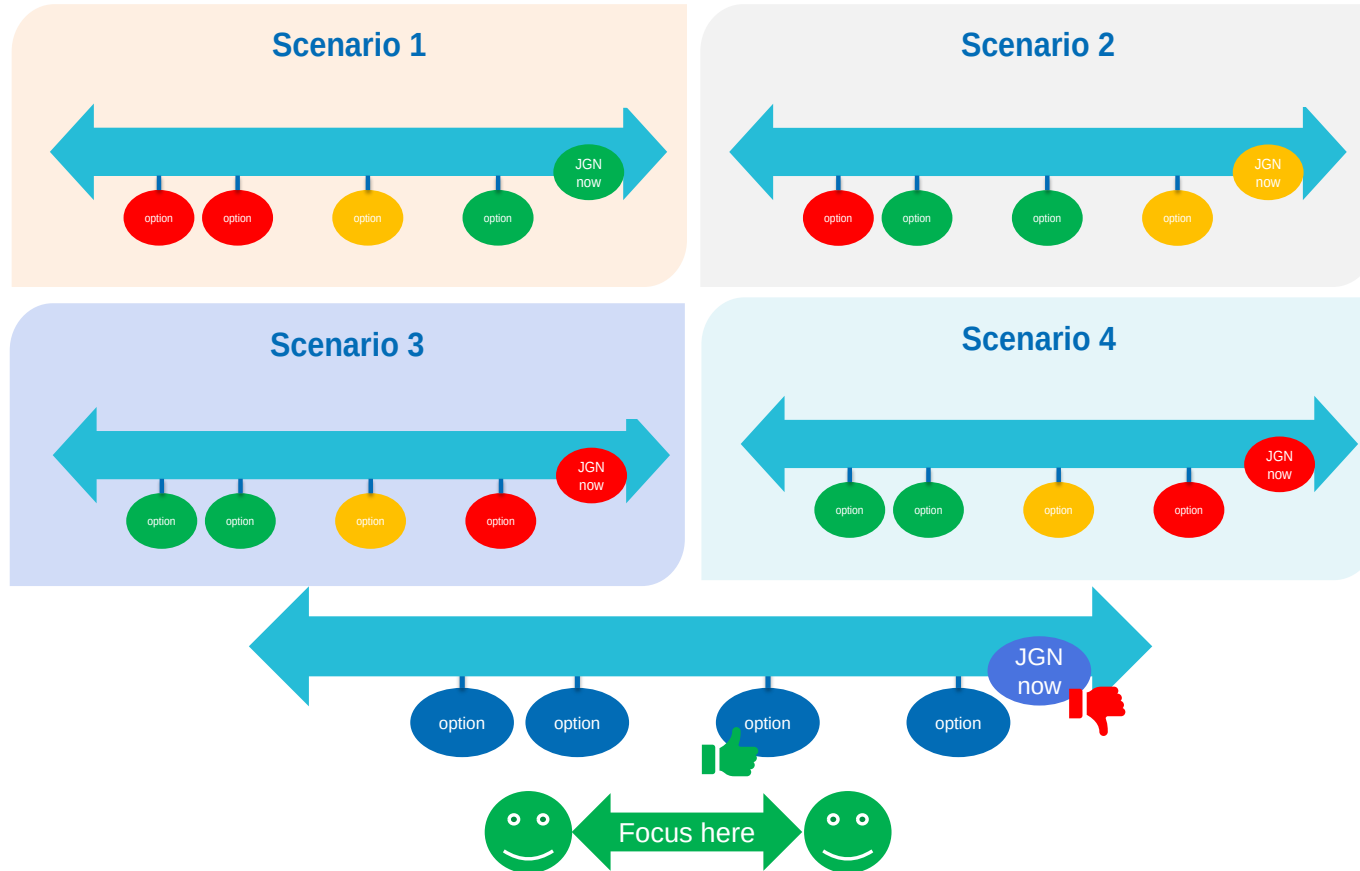
Priority is affordable energy system - least cost transition not any cost

Policy is outcomes-based, low intervention, with focus on economic affordability. Decarb is market driven

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How we'll use the scenarios



What we need from the deep dives

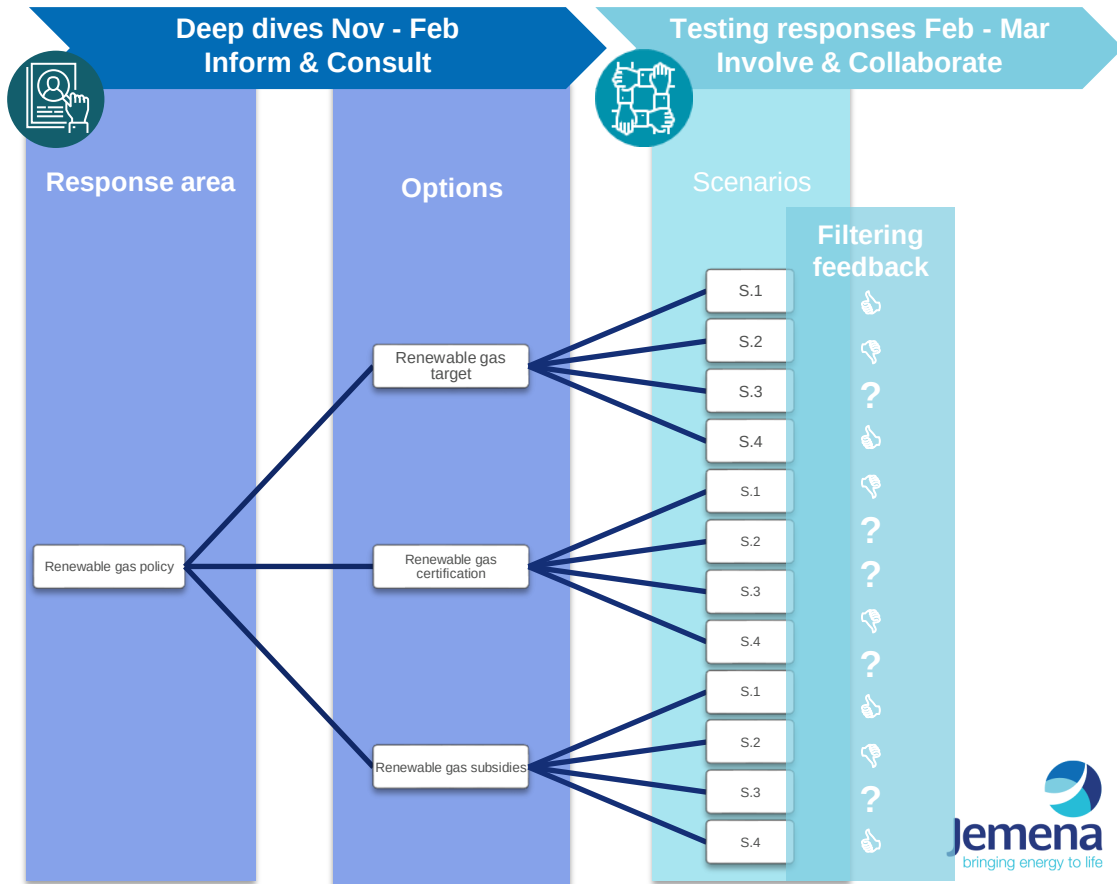


Inform and consult on available responses

Qualitatively and directionally examine:

- What are the responses
- Where are we now and what next
- Any required preconditions for these options
- Customer impacts
- Key time horizons

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Deep dive response areas with simplified options

Response areas

Key response options

Adjusting our asset management approach

Stay in business

Shrink the business

Transition to renewable gases

Supporting renewable gases

Green gas policy

Market making

Supporting renewable connections

Adjusting our connections approach

Increase connection charges

Make connections contestable

Stop connections

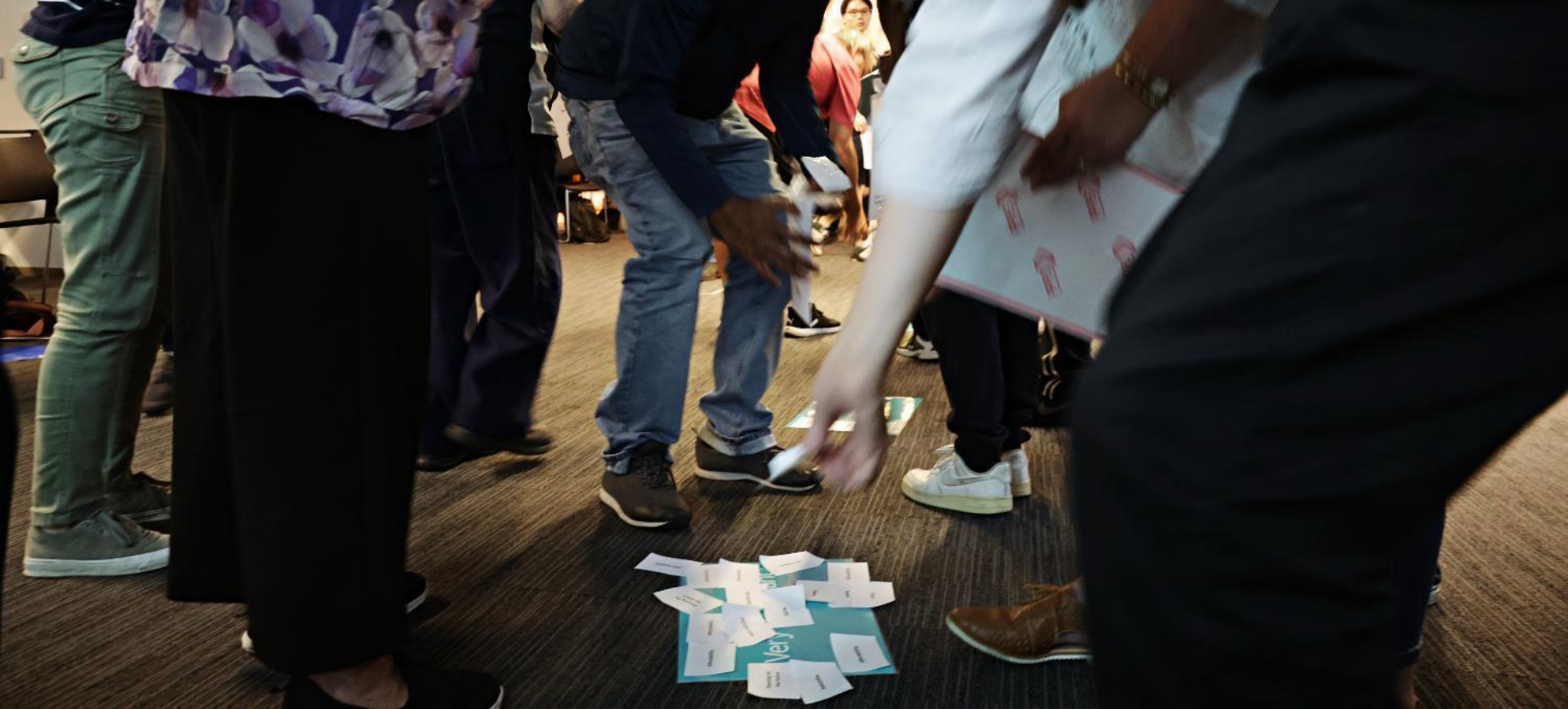
Addressing existing capital recovery

Hasten new capital recovery

Hasten all capital recovery

Compensate recovery risk

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About renewable gases

v1.1

Recap of renewable gases

About renewable methane

- It has the same specification as natural gas
- It requires no customer appliance changes
- Biomethane is a carbon neutral gas which harnesses the energy potential from organic materials such as landfill gas, agricultural waste and sewage
- Synthetic methane is made from hydrogen and CO₂ captured from the air or from exhaust gases

About renewable hydrogen

- Hydrogen can be made using renewable electricity (electrolysis process) to split water into hydrogen and oxygen
- It can either be burnt (producing water vapor) or used in fuel cells which transform hydrogen back into electricity

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What we're doing now

Demonstration project: Western Sydney Green Gas Project

Trial power-to-gas facility to transform (surplus) renewable electricity into hydrogen gas



Demonstration project: Malabar Biomethane Project

Gas is generated by anaerobic digestion of sewage sludge at Malabar, Sydney.

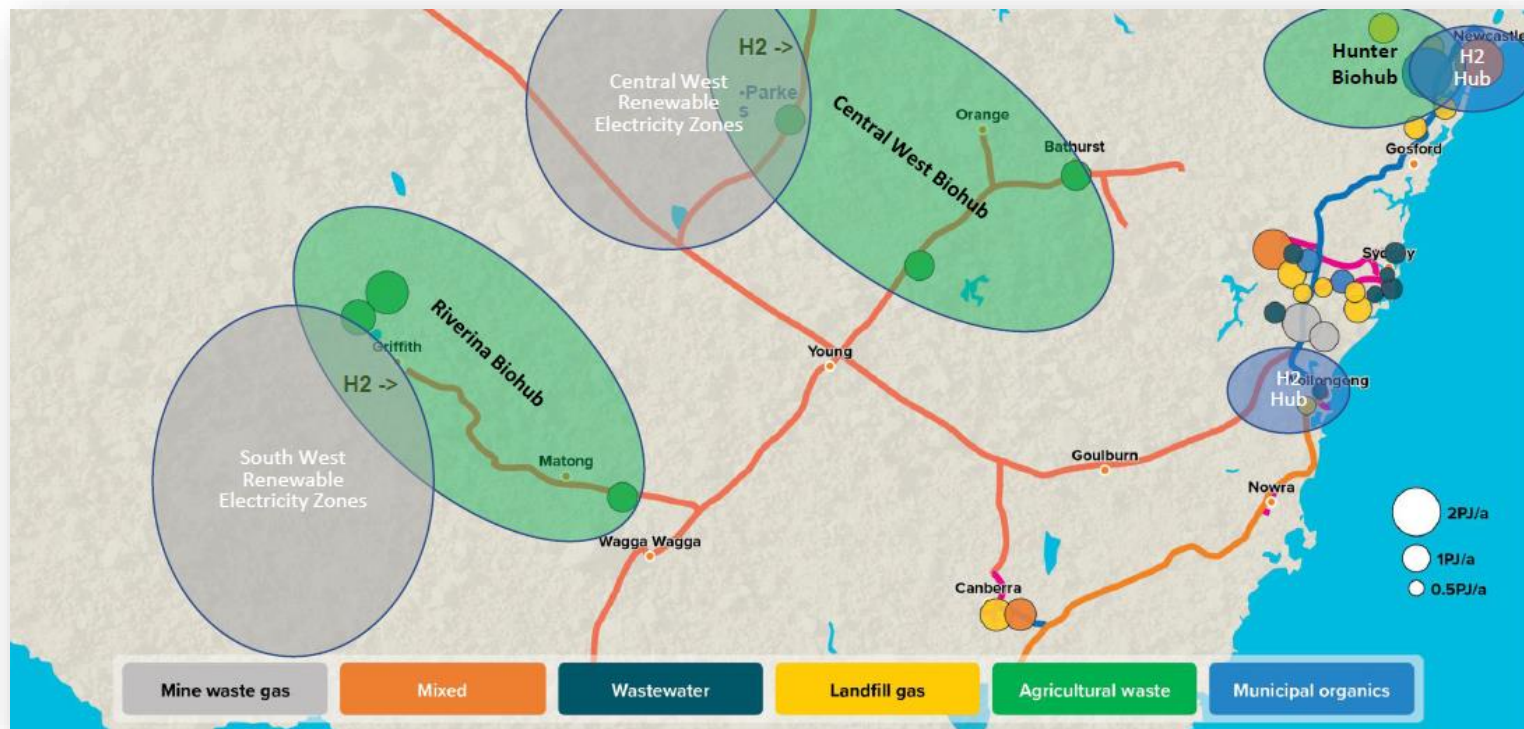
Port Kembla Pipeline*

Designed to meet immediate energy needs for more gas and will be capable of handling hydrogen



*Construction of a 12km underground pipeline has started. When operational, gas from the terminal will be fed into the Eastern Gas Pipeline (EGP) via the new pipe. (Note, the EGP does not form part of the JGN network)

Potential renewable sources for NSW



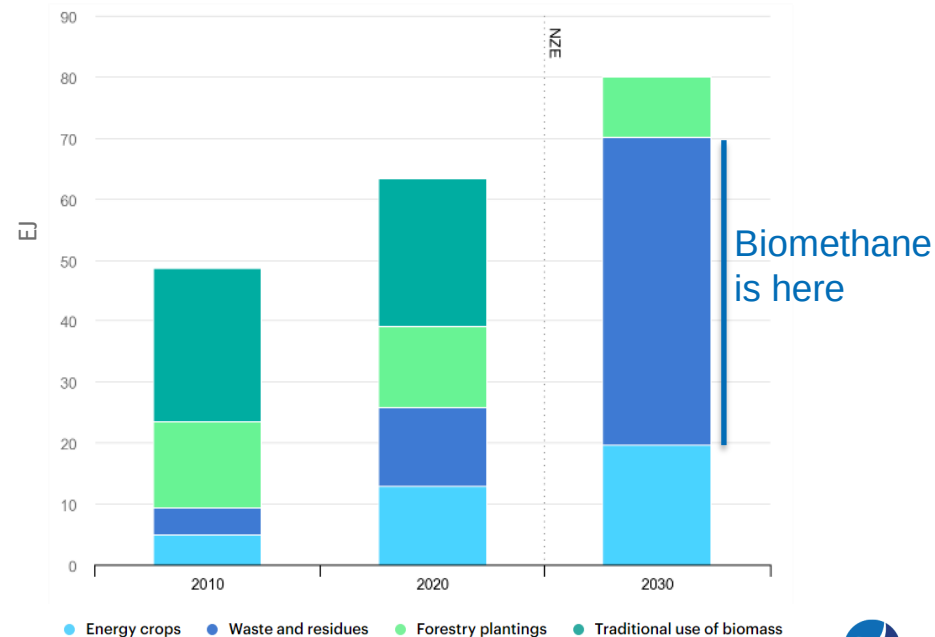
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International settings for bio energy

What IEA thinks of bio energy

- Modern bioenergy is the largest source of renewable energy globally, accounting for 55% of renewable energy and over 6% of global energy supply.
- Net Zero by 2050 Scenario sees a rapid increase in the use of bioenergy to displace fossil fuels by 2030.
- Bioenergy increased ~ 7% per year 2010 – 2021
- More efforts are needed to accelerate modern bioenergy deployment to get on track with Net Zero Scenario, which sees deployment increase 10% per year between 2021 - 2030

IEA Global bioenergy supply in the Net Zero Scenario (Oct 2022)



Source: IEA (2022), Bioenergy, IEA, Paris <https://www.iea.org/reports/bioenergy>, License: CC BY 4.0

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International settings for hydrogen

What International Energy Agency thinks of hydrogen

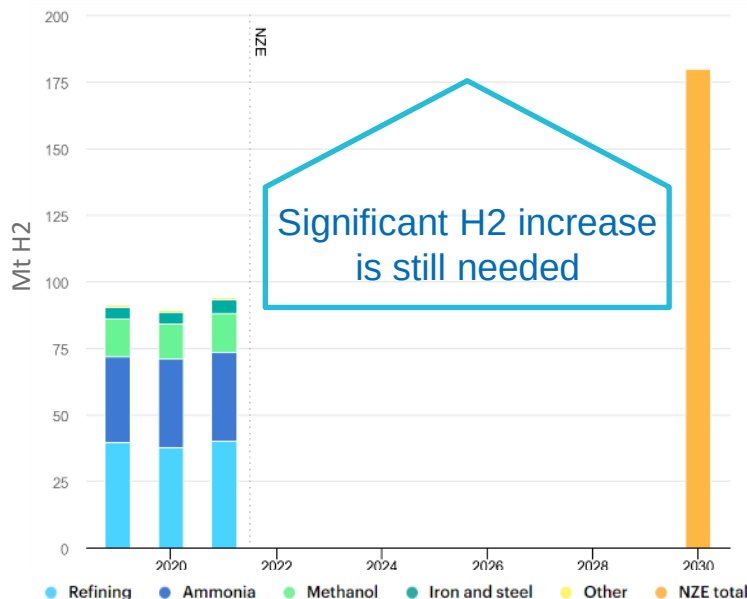
Clean hydrogen can help:

- decarbonise a range of sectors, incl. long-haul transport, chemicals, iron and steel
- improve air quality in cities and energy security
- support electricity system integration of variable renewables, being one of very few options for storing electricity over days, weeks or months.

9 countries covering ~30% of global energy emissions released their national H2 strategies in 2021-2022.

Supply side manufacturing is rapidly growing.

IEA Global hydrogen demand by sector in the Net Zero Scenario, 2019-2030 (Oct 2022)



'Nonetheless, these laudable developments still are below what is needed to get on track with the Net Zero Emissions by 2050 Scenario. Faster action is required on creating demand for low-emission hydrogen and unlocking investment that can accelerate production scale up and deployment of infrastructure.'

Source: <https://www.iea.org/fuels-and-technologies/hydrogen> and IEA (2021), Net Zero by 2050, IEA, Paris <https://www.iea.org/reports/net-zero-by-2050>
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Market settings now recognise role of renewable gases

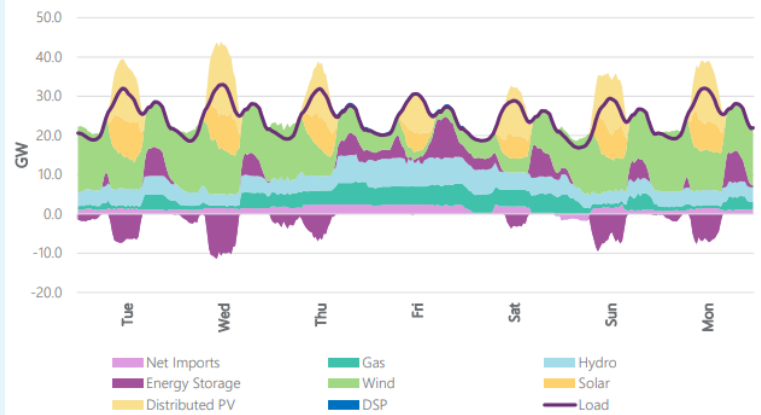
What AEMO thinks

Gas is expected to retain a key role in maintaining reliability and security.

2022 Integrated System Plan (ISP)

System resilience is enhanced through fuel diversity.

Figure 22 A week's dispatch outcomes across the NEM (excluding Queensland), Step Change, June 2040

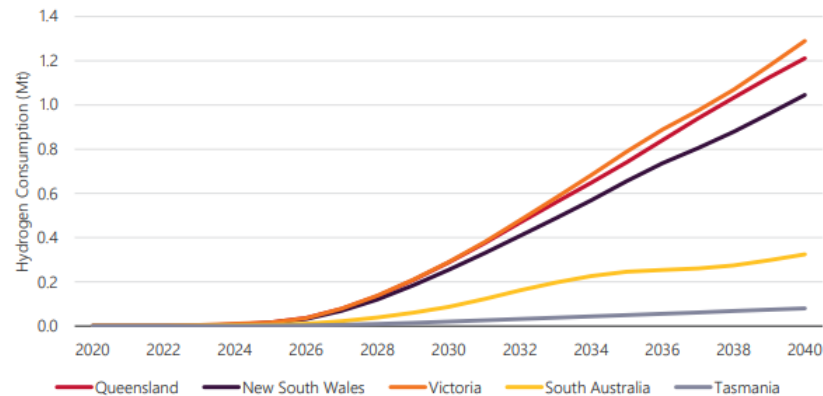


Over time natural gas may be replaced by net zero carbon fuels such as green hydrogen or biogas.

2022 Gas Statement of Opportunities (GSOO)

The gas sector is transforming, with the pace of transformation currently highly uncertain.

Figure 36 Domestic hydrogen consumption per GSOO regions.



The timing, scale, and location of hydrogen facilities are highly uncertain.

Policy settings now promote renewable gases

Targets



- Legislated federal emissions reduction target
- NSW Net Zero Plan
- NSW 10% by 2030 H2 target

Regulation



Energy Ministers direct renewable gas reforms:

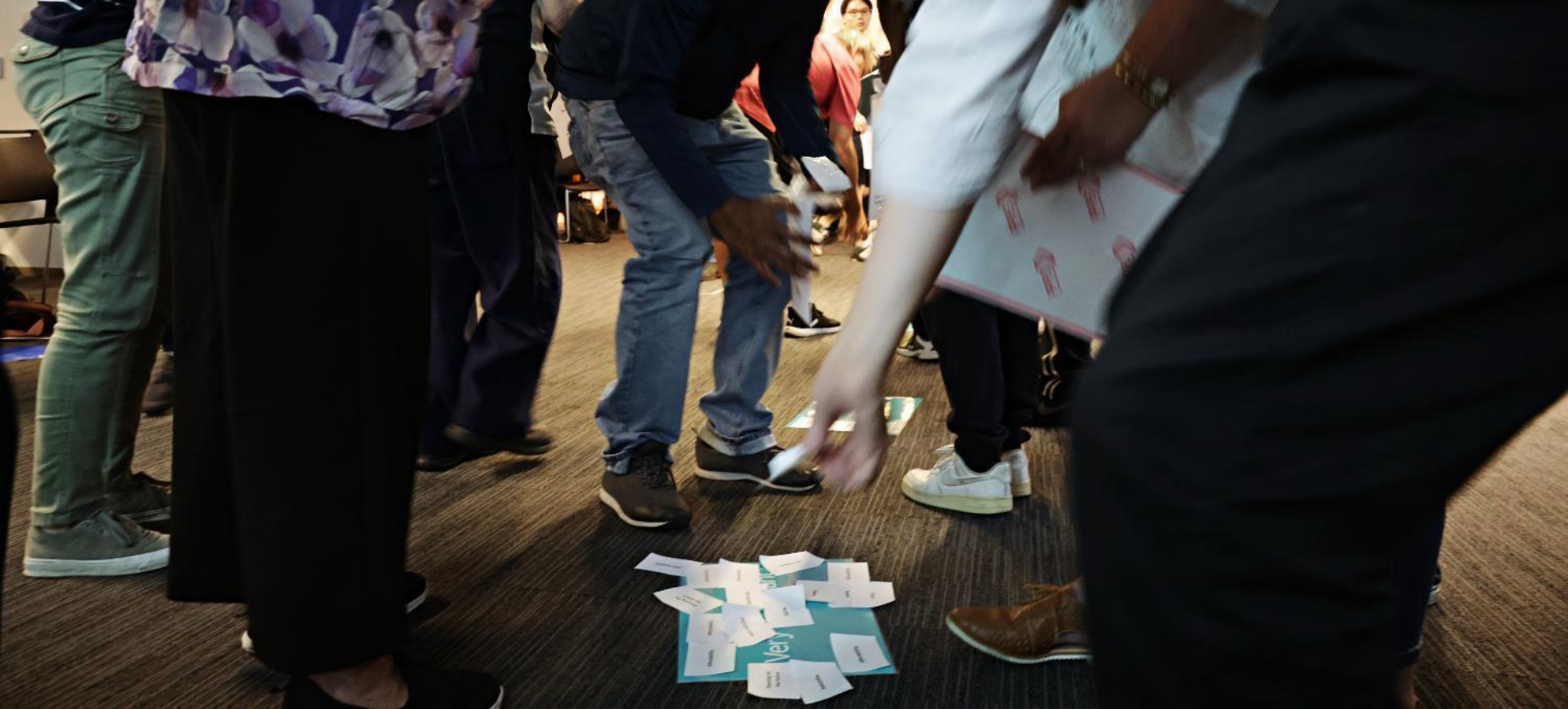
- 2022 AEMC extends regulatory frameworks to ensure gas market, pipeline regulation and consumer protection regimes are all fit for renewable gas and ~10% H2
- 2023 Renewable objective being added in the National Energy Objectives

Funding



ARENA investing in H2:

- 2018 \$22m for 16 H2 research projects
- 2019 \$100m for commercial-scale renewable H2 projects
- 2022 ARENA \$50m and German govt €50m collaborate on the HyGATE Initiative supporting projects along Australia's H2 supply chain



Network transition for renewable gases

v1.1

Recap | What we need from the deep dives



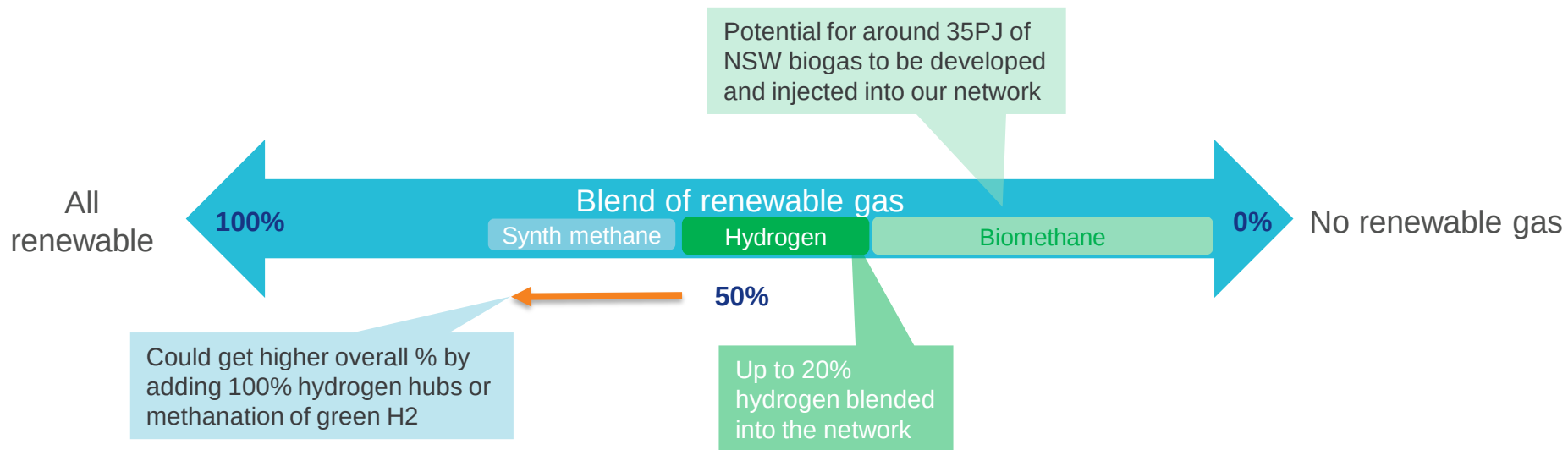
Inform and consult on available responses

Qualitatively and directionally examine:

- What are the responses
- Where are we now and what next
- Any required preconditions for these options
- Customer impacts
- Key time horizons

Possible blending options

Blending hydrogen, renewable methane, and natural gas could decarbonise >50% of the supply without affecting appliances



Green hydrogen = no carbon

Renewable methane = carbon off-set

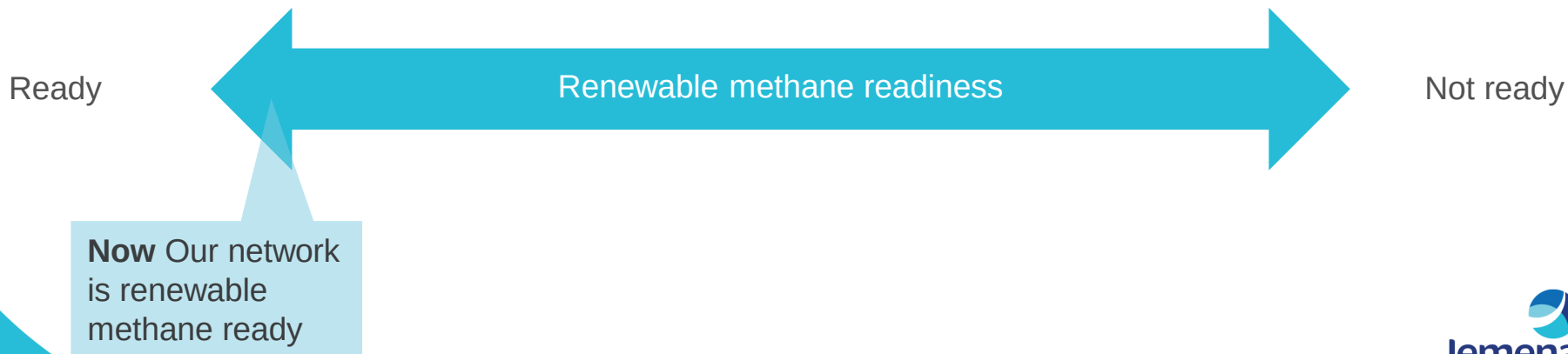
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Renewable methane network readiness

What is the response area?

Reaching our network to distribute renewable natural gas can prolong our asset's useful life and support customer demand by making gas renewable.

What is the option range and where are we now?



Impacts of renewable methane readiness

How can this response impact customer outcomes?

- require no change to customer appliances
- require no additional cost to reconfigure our network
- supports retaining customer demand via decarbonised gas

Are there any preconditions for this response?

The key constraint is a market one, not our network, so:

- increasing availability of production sources connecting to our network is important
- lowering costs of production technologies

We will explore renewable gas market support options next

IEA: 'More efforts are needed to accelerate modern bioenergy deployment to get on track with the Net Zero Scenario, which sees deployment increase by 10% per year between 2021 and 2030'

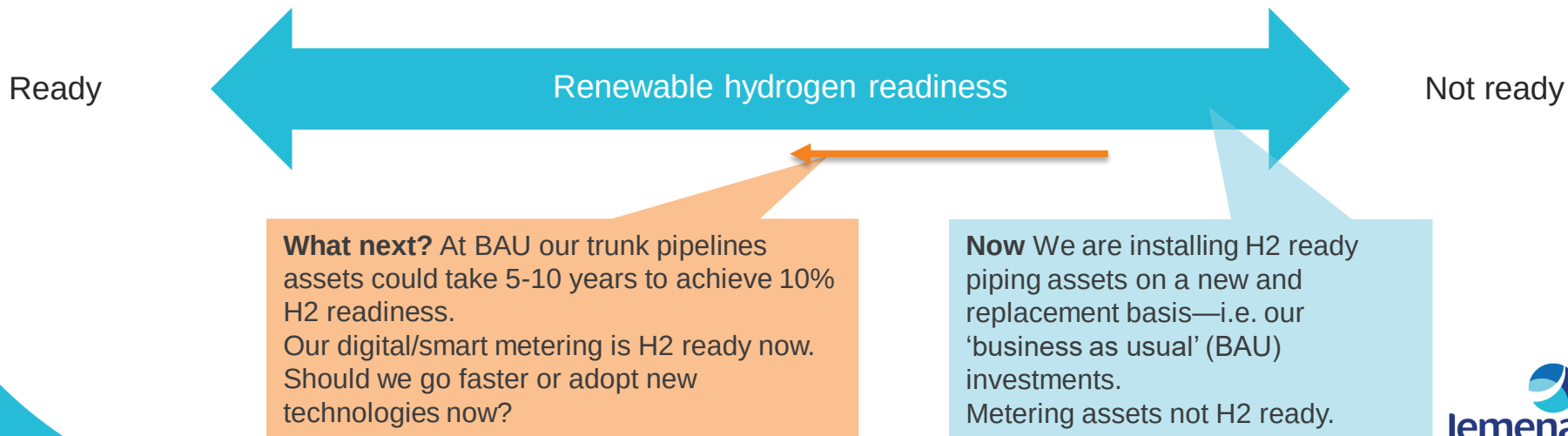
Pace of hydrogen network preparation

What is the response area?

Reaching our network to distribute renewable hydrogen (H₂) can prolong our asset's useful life and support customer demand by making gas renewable.

We can vary the pace and extent of our asset transition to hydrogen readiness.

What is the option range and where are we now?



Our network's hydrogen readiness



Hydrogen Ready
100% Plastic; <20yr old

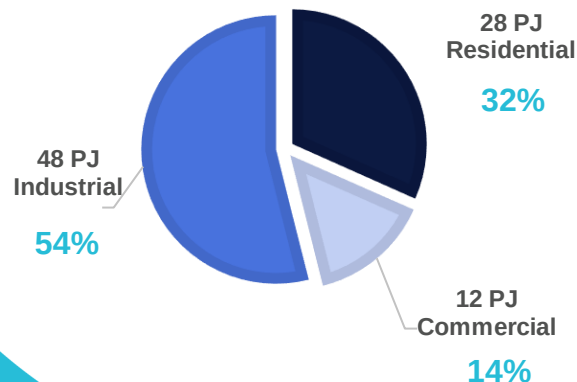
Hydrogen Capable
>=99% Plastic; >=20yr old

Hydrogen Possible
<99% Plastic; >=20yr old

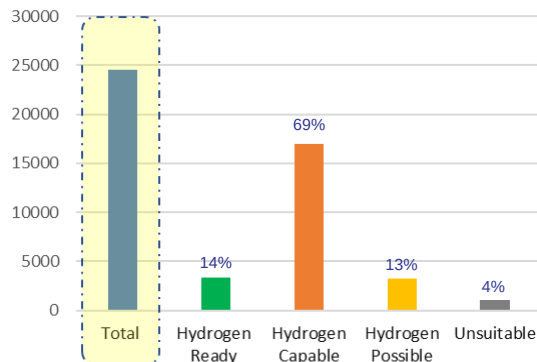
Unsuitable
<90% Plastic; >=20yr old



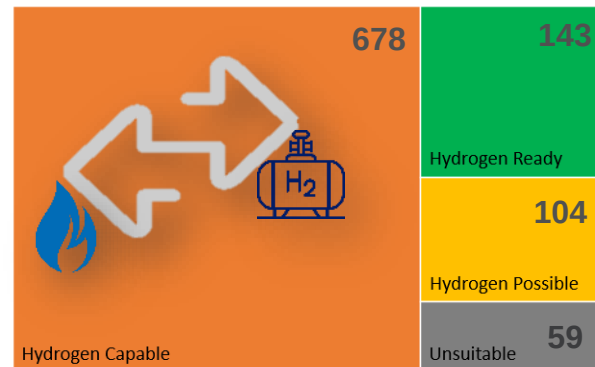
Demand petajoules (PJ) by customer type



Mains Readiness



Suburbs Readiness



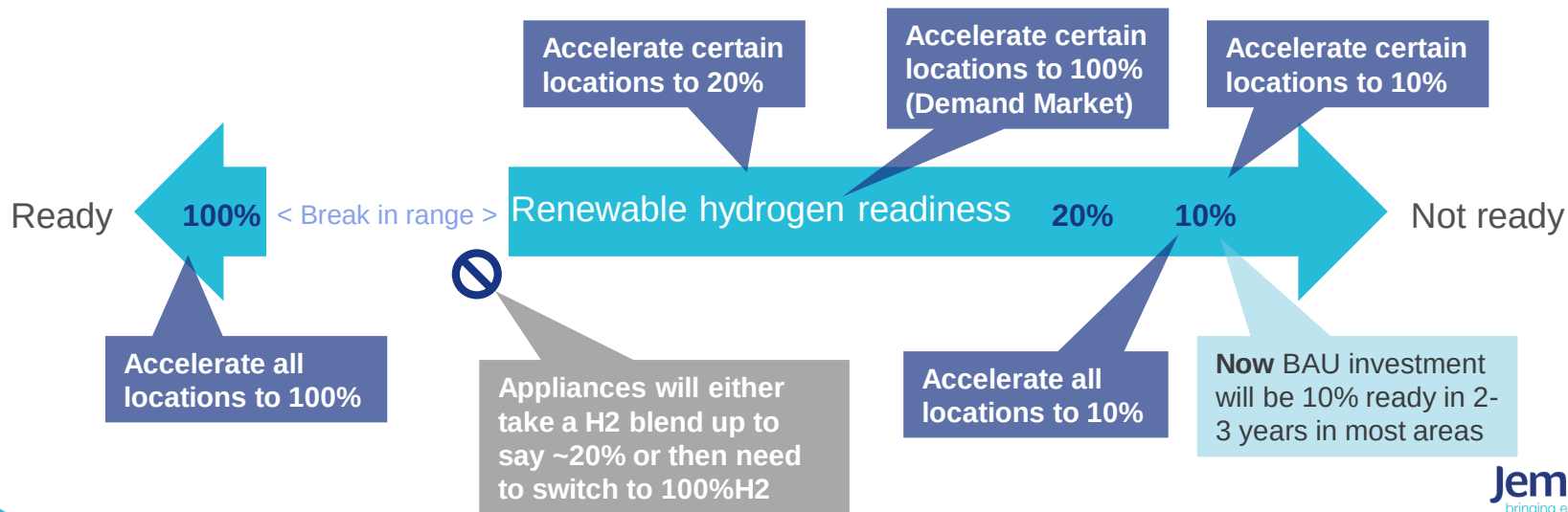
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Possible options

What affects the range of options?

Varying the pace and extent of our transition to hydrogen readiness would affect:

- Our choice of investment materials and components for new and replacement assets (e.g. meters, pipe materials)
- Network configuration decisions (e.g. to support differential blending by location and customer uses)



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Conditional use

Are there any preconditions for this response?

- Requires a sufficiently large market of H2 producers
- Customer appliance changes for H2 > ~20%
- Policy measures could speed this transition up:
 - A Federal renewable gas certification scheme
 - A renewable gas target set by NSW and/or Federal government (could include biomethane and H2)
 - Adding emissions reduction to the National Gas Objective from Aug 2022 Energy Ministers' statement
- Regulatory barriers:
 - Requires a hydrogen pipeline licence from IPART (NSW) to convert a pipeline to 100% H2
 - Energy Minister's and AEMC's 2022 renewable gas rule changes support hydrogen blending



Impacts of hydrogen readiness

How can this response impact customer outcomes?

Higher percentage of H2 blends will require upgrades to existing appliances with costs to customers

H2 hubs are likely to be greenfield so no cost to existing customers

Changing the pace of hydrogen can affect:

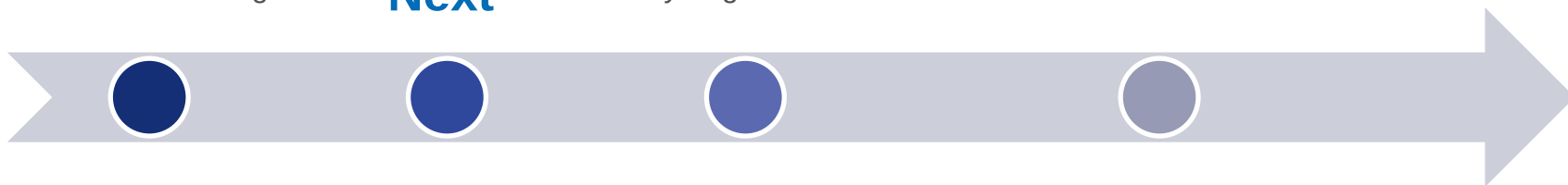
- Renewable gas availability – timing and location
- Achieving NSW emission reductions
- Customer demand and average prices given more renewable gas availability
- Prices through varying the pace of investment

A renewable gas vision

Increased
renewable
methane blending

Next

Dedicated
hydrogen hubs



Now

10% H2 ready
~2030

Future...

>50% renewable gases through H2,
renewable methane and natural gas
blends across whole network + new
dedicated H2 hubs

Let's pause here for a quick break



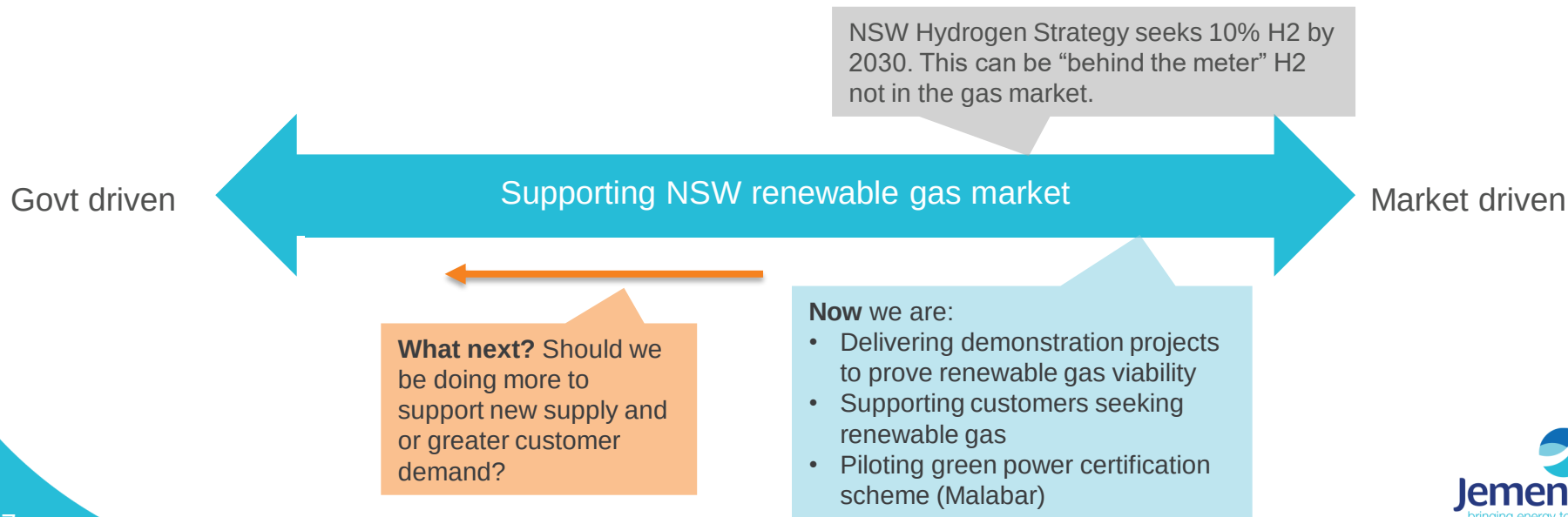
Supporting NSW renewable gas market

Supporting NSW renewable gas market

What is the response area?

We can improve the viability of renewable gas production and customer demand for renewable gas.

What is the option range and where are we now?



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Options

What affects the range of options?

- Measures can support supply (S), demand (D) or both (S&D)

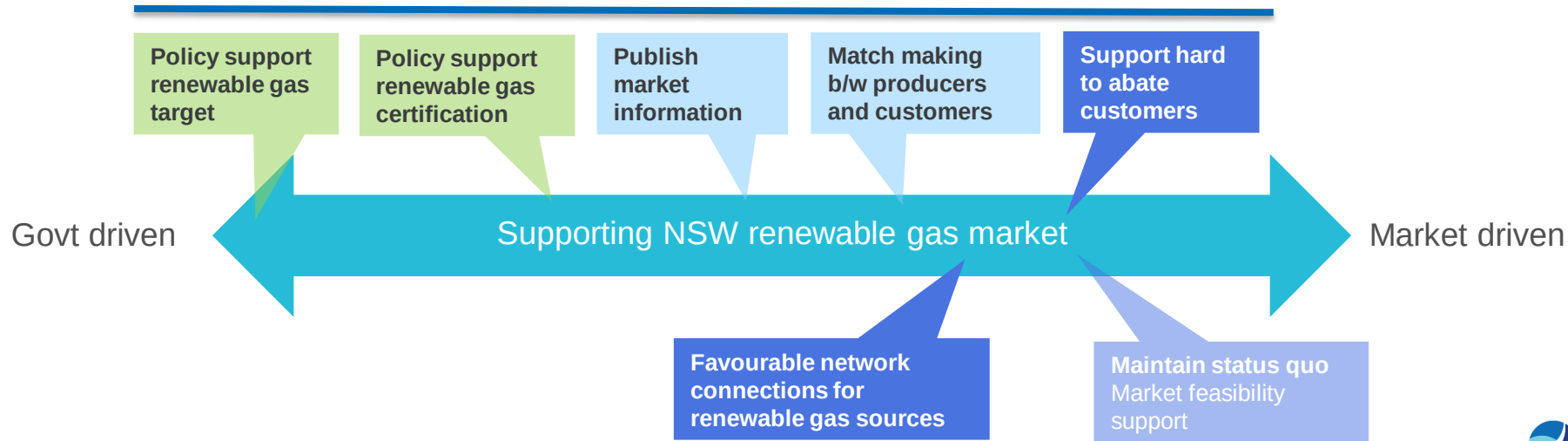
KEY

Green gas
policy

Market making

Supporting
renewable
connections

Responses that support both supply and demand for renewable gas



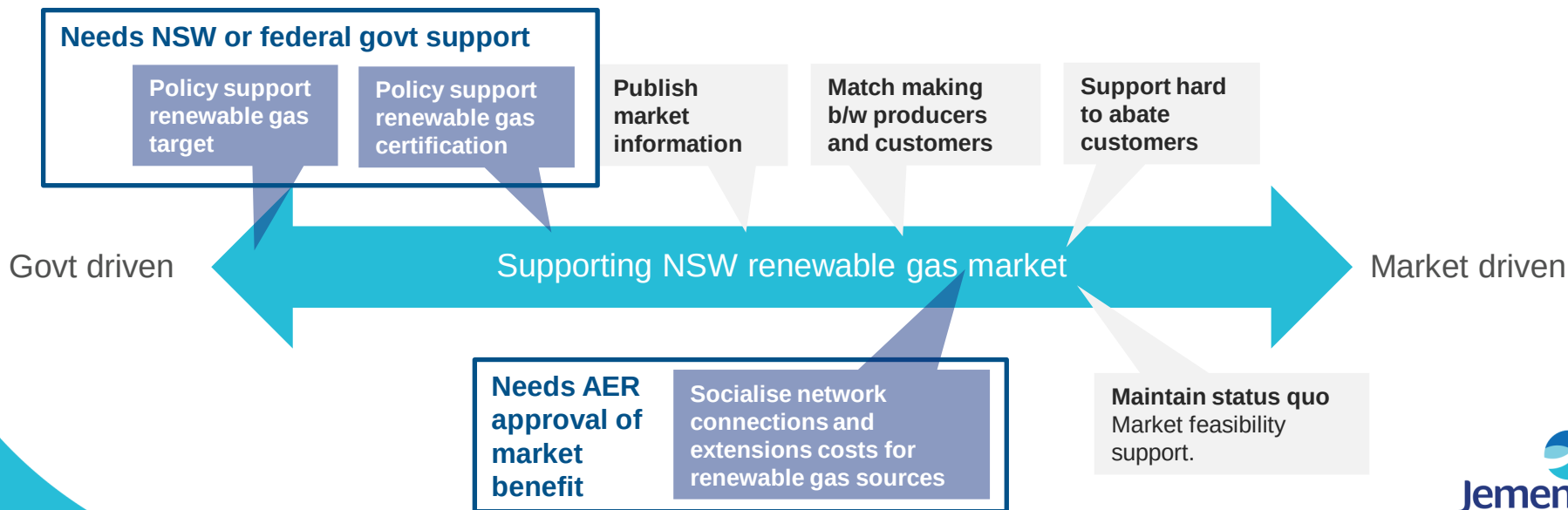
Responses that support supply of renewable gas

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Conditional use

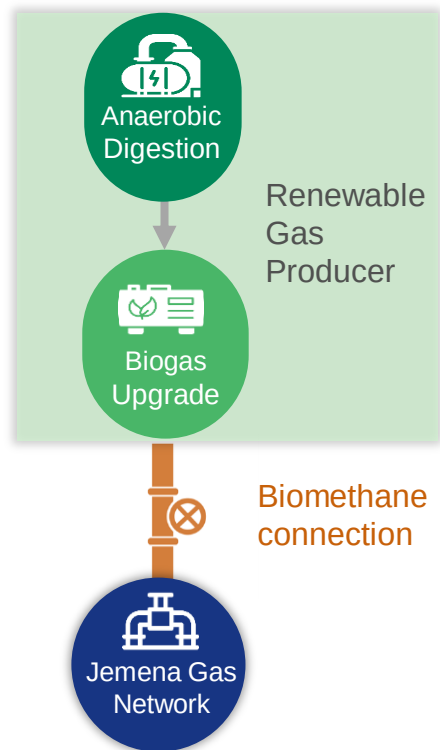
Are there any preconditions for this response?

Some options require others' support



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Connection



Supporting NSW renewable gas market

How can this response impact customer outcomes?

- Access to renewable gas will provide customers with a choice in fuel types while transitioning to, and when we have arrived at, a net zero future
- Can support higher gas demand to lower customer network prices.

The costs for these responses differ by response:

- Our existing team can keep advocating for renewable gas
- Our existing account managers can help match renewable gas customers with suppliers

Timelines for renewable gas market support

Green gas policy

Will there be more than we've seen?

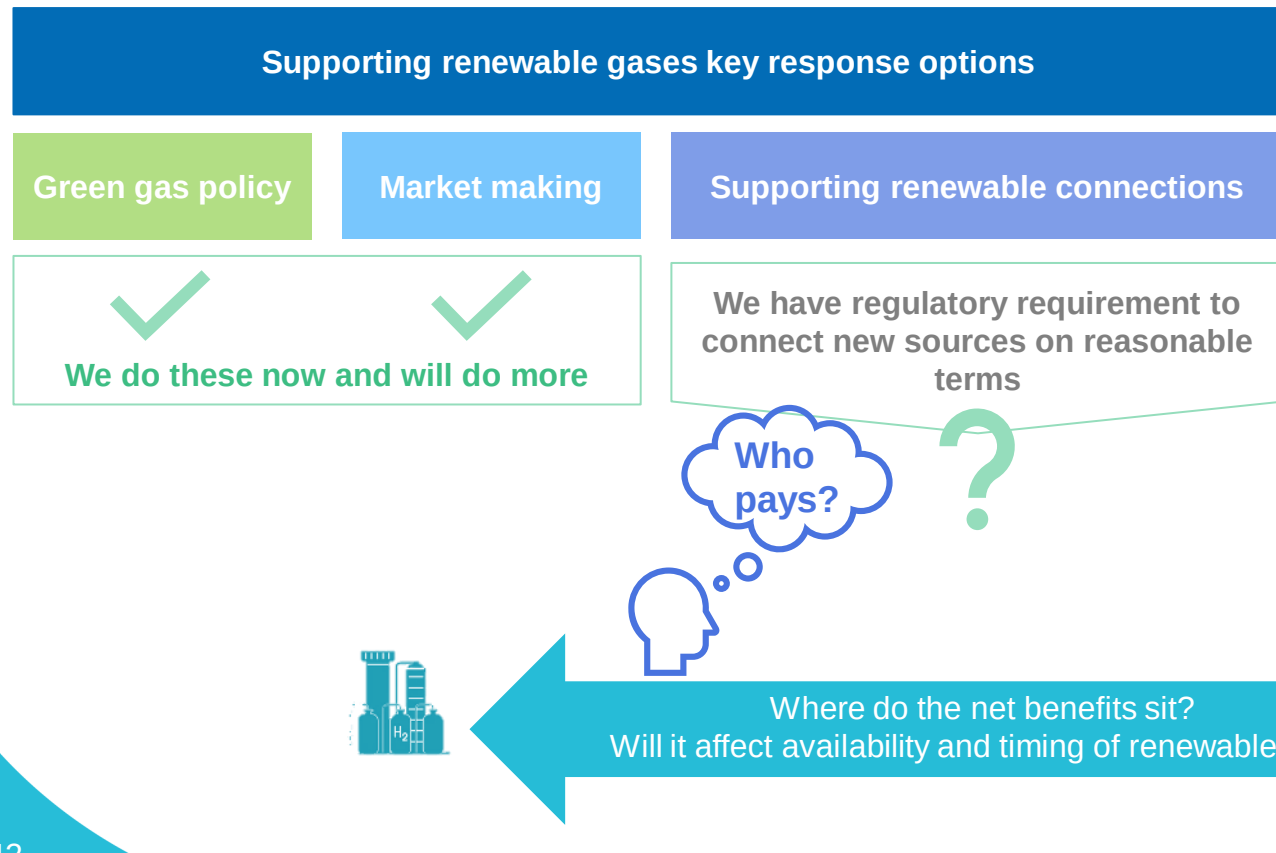
Market making

*We have started
Could ramp up 2025+*

Supporting renewable connections

*Trials so far
Could ramp up 2025+*

Supporting NSW renewable gas market - Jemena view





Session wrap-up and close

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Rosemary's playback



Thank you!

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Thank you

Please contact us if something comes up, you didn't get a chance to raise an issue, or you just don't feel heard.

E: GasNetworks2050@jemena.com.au