



11 August 2023

Submission: South Australia's green paper on the energy transition

The Australian Pipelines and Gas Association (APGA) represents the owners, operators, designers, constructors and service providers of Australia's pipeline infrastructure, connecting natural and renewable gas production to demand centres in cities and other locations across Australia. Offering a wide range of services to gas users, retailers and producers, APGA members ensure the safe and reliable delivery of 28 per cent of the end-use energy consumed in Australia and are at the forefront of Australia's renewable gas industry, helping achieve net-zero as quickly and affordably as possible.

APGA welcomes the opportunity to contribute to the Department of Energy and Mining's consultation process on *South Australia's green paper on the energy transition*. This is an important document in setting out South Australia's energy transition policy and the critical role that gas – both natural and renewable – has to play in this transition.

APGA supports a net zero emission future for Australia by 2050¹. Renewable gases represent a real, technically viable approach to lowest-cost energy decarbonisation in Australia. As set out in *Gas Vision 2050*², APGA sees renewable gases such as hydrogen and biomethane playing a critical role in decarbonising gas use for both wholesale and retail customers. APGA is the largest industry contributor to the Future Fuels CRC³, which has over 80 research projects dedicated to leveraging the value of Australia's gas infrastructure to deliver decarbonised energy to homes, businesses, and industry throughout Australia.

Pipelines already provide lower cost energy transport and storage in comparison to powerlines and other forms of electricity energy storage.⁴ New pipelines are considerably cheaper build than new powerlines. Existing pipelines can carry biomethane right now, or be repurposed to carry hydrogen or hydrogen blends. This means that renewable gas supply

¹ APGA, *Climate Statement*, available at: <https://www.apga.org.au/apga-climate-statement>

² APGA, 2020, *Gas Vision 2050*, https://www.apga.org.au/sites/default/files/uploaded-content/website-content/gasinnovation_04.pdf

³ Future Fuels CRC: <https://www.futurefuelscrc.com/>

⁴ Australian Pipelines and Gas Association, 2022, *Pipelines vs Powerlines: A Summary*, https://www.apga.org.au/sites/default/files/uploaded-content/field_f_content_file/pipelines_vs_powerlines_-_a_summary.pdf

GPA Engineering, 2022, *Pipelines vs Powerlines: A Technoeconomic Analysis in the Australian Context*, https://www.apga.org.au/sites/default/files/uploaded-content/field_f_content_file/pipelines_vs_powerlines_-_a_technoeconomic_analysis_in_the_australian_context.pdf

chains are often more economically efficient than renewable electricity,^{5,6} and are a significant opportunity which could be explored more comprehensively in the Green Paper.

South Australia has significant comparative advantages that will enable it to become a green hydrogen superpower, namely its considerable renewable energy assets and, importantly, its existing gas infrastructure. This infrastructure can support hydrogen use in residential, commercial and hard-to-abate industrial settings as well as for export, assuming the right policy settings are in place.

The South Australian Government is already working towards a major hydrogen industry with the announcement of the 200 MW hydrogen generation and storage project in Whyalla, providing dispatchable renewable energy. Coupled with the energy transport and storage savings offered by pipelines, this concept can be replicated across the proposed renewable energy zones in South Australia. Green hydrogen produced can be produced on-site and shipped via new or repurposed existing pipelines to population centres where it is needed. This concept is not limited to hydrogen, and could provide scale and certainty in the gas industry to bolster the development of biomethane in South Australia.

There are two areas where the opportunities of renewable gases can further strengthen the plan outlined in the Green Paper: energy storage, and the role of renewable gases. APGA also recommends that the South Australian Government investigate a Renewable Gas Target.

Energy storage in pipelines

The Green Paper has gone into considerable detail in identifying energy storage solutions for South Australia, including electrochemical, mechanical, chemical and thermal systems. These can be summarised as battery energy storage systems (BESS) and pumped hydro energy storage (PHES).

BESS can meet some of the needs of short-term storage to smooth generation variability and to provide grid stabilisation (such as Hornsdale Power Reserve). PHES, meanwhile, can meet some of the need for long term storage to cover extended periods of low output from variable renewable generation. But these options are costly and, in the case of PHES, limited by geography. APGA offers an existing alternative: energy storage through pipelines.

Pipeline energy storage can provide more capacity

Australia's existing gas transmission and distribution pipeline networks already contain significantly more energy storage capacity than all existing electricity storage in Australia, storing 2,300 GWh of energy. A further 64,300 GWh can be stored in underground gas storage.

⁵ CSIRO, 2022, *GenCost 2021-22 Final Report*

<https://publications.csiro.au/publications/publication/Plcsiro:EP2022-2576>

⁶ The Grattan Institute, 2021, *Go for Net Zero* <https://grattan.edu.au/wp-content/uploads/2021/04/Go-for-net-zero-Grattan-Report.pdf>

By comparison, approximately 2.04 GWh of large-scale BESS systems were under construction at the end of 2022.⁷ Australia's current pumped hydro capacity is about 1.6 GW, with approximately 9 GW planned or under construction.

AEMO's current calculations⁸ estimate that 61 GW of storage capacity is needed by 2050 under the Step Change scenario. This can be provided cheaper and easier in new and existing pipelines.

Pipeline energy storage is cheaper

APGA commissioned GPA Engineering to undertake *Pipelines vs Powerlines study* in 2021 to understand whether pipeline infrastructure could continue to deliver lower cost energy storage than BESS and PHES into the future with both natural gas and hydrogen.

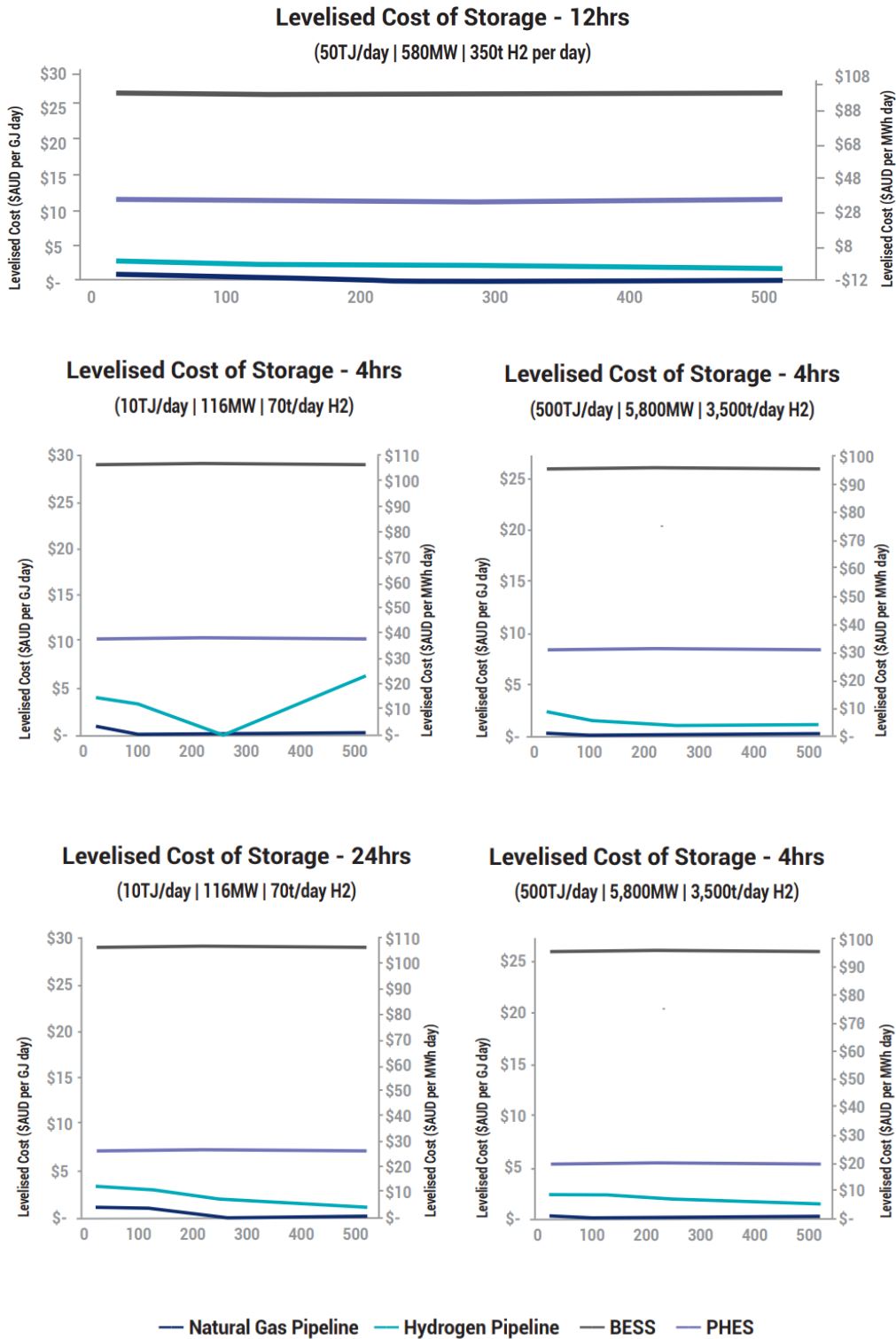
When considering all factors including construction cost, the study found that energy storage in natural gas pipelines can be hundreds of times cheaper than energy storage in BESS or PHES across a range of scenarios over 500km (Figure 1). Energy storage in hydrogen pipelines can be 2 to 36 times cheaper, excluding the instances in which it is essentially free.⁹

⁷ Clean Energy Council, 2023, *Clean Energy Australia Report 2023*, <https://assets.cleanenergycouncil.org.au/documents/Clean-Energy-Australia-Report-2023.pdf>

⁸ AEMO, 2022, *2022 Integrated System Plan*, p. 10, <https://aemo.com.au/-/media/files/major-publications/isp/2022/2022-documents/2022-integrated-system-plan-isp.pdf?la=en>

⁹ GPA Engineering, 2022, *Pipelines vs Powerlines: A Technoeconomic Analysis in the Australian Context* available at https://www.apga.org.au/sites/default/files/uploaded-content/field_f_content_file/pipelines_vs_powerlines_-_a_technoeconomic_analysis_in_the_australian_context.pdf; APGA, 2022, *Pipelines vs Powerlines: A Summary*: https://www.apga.org.au/sites/default/files/uploaded-content/field_f_content_file/pipelines_vs_powerlines_-_a_summary.pdf

Figure 1: Levelised cost of energy storage via pipeline linepack, BESS and PHES



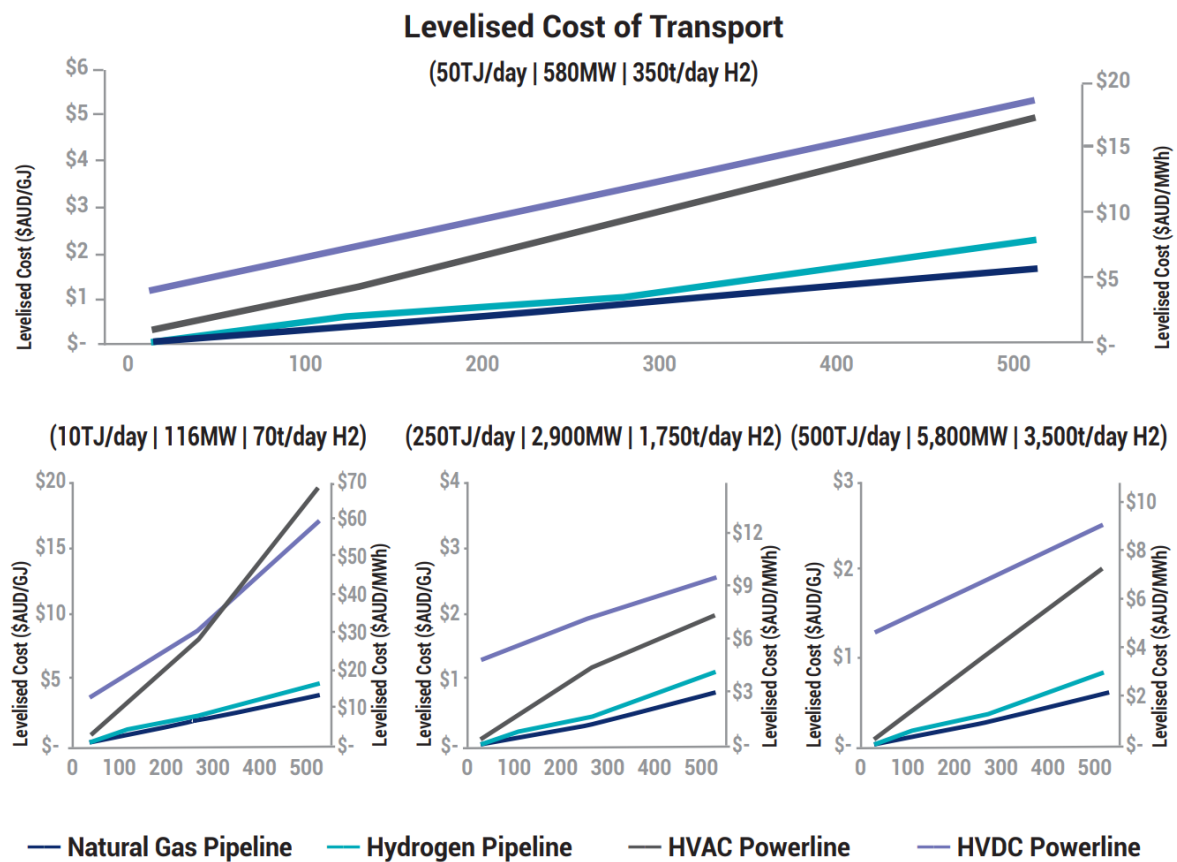
Source: GPA Engineering, 2022, *Pipelines vs Powerlines: A Technoeconomic Analysis in the Australian Context*

Pipeline energy transmission is cheaper

Pipelines provide benefits beyond offering cheap storage. Gas and hydrogen transmission pipelines consistently cost less to deliver the same quantity of energy across the same distance in comparison to electricity transmission powerlines. This is important in the context of moving energy large distances from renewable energy zones to population centres.

GPA Engineering also considered this in the *Pipelines vs Powerlines* study. An example of this relationship can be seen in Figure 2, outlining the cost of energy transport for a range of energy capacity scenarios over 500km.

Figure 2: Levelised cost of energy transport via pipelines and powerlines



Source: GPA Engineering, 2022, *Pipelines vs Powerlines: A Technoeconomic Analysis in the Australian Context*

A Renewable Gas Target to bolster industry development

It is appropriate that the Green Paper acknowledges the necessity of natural gas in enabling the transition to net zero, and the role of green hydrogen in this transition. While the Green Paper identifies its role as 'soaking' excess variable renewable energy production, providing grid stabilisation, and providing an export market, its potential role is much greater. Supportive policies are required to achieve this, such as a Renewable Gas Target.

A Renewable Gas Target designed in much the same way as the Renewable Energy Target would provide significant market incentives. APGA suggests a South Australia investigate a similar target to that currently being designed for the South Western Interconnected System. This could be applied more broadly to all renewable gases and to all applications of that gas. Nationally, APGA is also pursuing a national Renewable Gas Target.

To discuss any of the above feedback further, please contact me on +61 422 057 856 or jmccollum@apga.org.au.

Yours Sincerely,

A handwritten signature in black ink, appearing to read 'JM', is positioned below the text 'Yours Sincerely,'.

JORDAN MCCOLLUM
National Policy Manager
Australian Pipelines and Gas Association