



Australian Government



COAG
Energy Council

NATIONAL HYDROGEN STRATEGY

Request for Information – Discussion Paper

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A National Strategy for Hydrogen

Australian, state and territory governments agree that hydrogen presents an opportunity for Australia to lead in the emerging global market for low and zero emissions energy. We believe we could be a major hydrogen producer, creating a thriving export market and opportunities for domestic use.

To support the development of a hydrogen industry in Australia, the Council of Australian Governments Hydrogen Working Group was formed in December 2018. In 2019, this group will be responsible for developing a national strategy for hydrogen. This paper outlines how we will go about this task and seeks your input to inform this process. Your feedback at this early stage will also inform our public consultations and discussion papers to be released in coming months. Further details are provided below on how you can provide input and make submissions to the National Hydrogen Strategy. Also included at the end of this paper is a list of **key policy questions** that would benefit from public feedback.

Why Hydrogen?

Hydrogen is a clean fuel that can be used as an alternative to natural gas, coal, petrol and diesel. When hydrogen is burned, there are no carbon dioxide emissions. The products are heat and water vapour. Similarly, when hydrogen is used in a fuel cell, the products are electricity and water vapour without any carbon dioxide emissions.

While it is the most abundant element in the universe, hydrogen is virtually non-existent in its free form and energy must be used to release it from the materials where it is naturally found. Currently, hydrogen can be produced through a thermochemical reaction using natural gas or coal or by splitting water molecules into hydrogen and oxygen using electricity.

The great benefit of using hydrogen as a fuel is that there are no carbon dioxide emissions. So if this characteristic is valued it is important that there be very few carbon dioxide emissions during production or, if carbon dioxide is produced, that it is captured and stored. Historically, the cost associated with producing this 'clean' hydrogen for use as a fuel has proven prohibitive.

Global demand for hydrogen for use as a fuel is currently only 1 million tonnes. This is about 2% of the global demand for hydrogen, which is used mainly for the production of ammonia and methanol and for petrochemical refining.¹ However, with falling costs of production and utilisation, the hydrogen picture is changing. One recent estimate suggests that global

¹ ['Proposal for a national hydrogen strategy'](#) Chief Scientist, Alan Finkel

demand for hydrogen energy is likely to increase to 8 million tonnes by 2030 and about 35 million tonnes by 2040.²

Australia's Potential

The most immediate economic opportunity for Australia is to establish itself as the hydrogen supplier of choice to Japan and other nations such as South Korea.³ By some estimates, a hydrogen export industry in Australia could be worth up to \$1.7 billion and provide around 2,800 direct and indirect jobs by 2030.⁴

Several other nations are also actively pursuing the global hydrogen supply market but Australia has some key natural advantages. These include its abundant land area, renewable energy resources and extensive coal and natural gas reserves.⁵ Australia also has offshore sites suitable for carbon capture and storage at a large scale, which will be needed to produce clean hydrogen produced from coal or natural gas.

To realise this economic opportunity and become a major exporter, Australia will need to develop capabilities in making, moving, storing and using hydrogen over coming years, and preparations for this need to start now. This work will also open up cost competitive opportunities for hydrogen to contribute to our domestic needs over the longer term.

Developing a National Hydrogen Strategy

On 19 December 2018, the [COAG Energy Council agreed](#) to support the [Chief Scientist's proposal to develop a National Hydrogen Strategy](#) in 2019, with the aim of building a clean, innovative and competitive hydrogen industry that benefits all Australians and is a major global player by 2030.

The Council also agreed to increase Australia's engagement with potential international partners and supply destinations and commence work on two domestic 'kickstart' projects in 2019. These kickstart projects will investigate the use of hydrogen in the gas network and scope the potential for building hydrogen refuelling stations in every state and territory.

To develop the strategy and co-ordinate the approach to projects and programs that support industry development, Council agreed to establish a [COAG Working Group on Hydrogen](#), chaired by the Chief Scientist.

² [Medium hydrogen uptake scenario](#) in: ACIL Allen for ARENA

³ ['Hydrogen for Australia's Future'](#), Hydrogen Strategy Group briefing to COAG Energy Council

⁴ [Medium hydrogen uptake scenario](#) in: ACIL Allen for ARENA

⁵ [Hydrogen for Australia's Future'](#), Hydrogen Strategy Group briefing for COAG Energy Council

The Working Group has six work streams:

1. **hydrogen exports**, which will examine how Australia can become a major player in a global hydrogen industry by 2030 and capture the emerging opportunity to be a supplier to markets in Asia.
2. **hydrogen for transport**, which will examine the role hydrogen can play in light and heavy transportation and the refuelling infrastructure required
3. **hydrogen in the gas network**, which will examine using hydrogen in the domestic gas network, initially at 10%, with the potential to increase to 100%.
4. **hydrogen for industry**, which will examine the use of hydrogen in existing industries and consider the potential for new industries using hydrogen.
5. **hydrogen to support electricity systems**, which will examine the potential of hydrogen to contribute to secure, reliable and affordable electricity.
6. **cross-cutting issue**, which will examine issues that affect all sectors, such as safety, R&D and innovation, and environmental impacts.

Principles Underpinning the National Strategy

The COAG Energy Council set out eight principles to guide the development of the strategy.

The national strategy should:

- **be bold and ambitious** to ensure hydrogen plays a role in maintaining Australia's status as an energy export superpower
- **prioritise safety and benefits to customers**
- **have clear goals and objectives**, which are communicated succinctly and consistently, to help catalyse industry growth
- **use partnerships** to ensure the strategy is owned by industry and government, and build on work that has already begun
- **be technology-neutral** to facilitate healthy competition and acknowledge that each technology will have its own development path
- **have a commercial focus** to facilitate the creation of an economically viable and self-sustaining hydrogen industry
- **benefit all Australians** and ensure costs to domestic consumers are minimised
- **be consistent with sustainable environmental management** to ensure there are no substantial negative impacts on Australia's greenhouse gas emissions, water availability or the environment.

Consultation

To inform the development of the strategy, the COAG Hydrogen Working Group will conduct extensive consultation across Australia during 2019, in person and through electronic submissions. This request for information is the first step.

The department invites interested parties to comment **by 28 March 2019**.

Key policy questions have been provided below that would benefit from public feedback. These questions may be individually answered through an online survey on our Consultation Hub or through a written submission, which can also be lodged via our Consultation Hub.

You can also review a selection of the recent Australian reports on hydrogen at <https://www.industry.gov.au/hydrogen>

Key Policy Questions

- What do you think are the two or three most significant recent developments in hydrogen?
- What are the most important safety issues to consider in producing, handling and using hydrogen in Australia?
- What environmental and community impacts should we examine?
- How can Australia influence and accelerate the development of a global market for hydrogen?
- What are the top two or three factors required for a successful hydrogen export industry?
- What are the top two or three opportunities for the use of clean hydrogen in Australia?
- What are the main barriers to the use of hydrogen in Australia?
- What are some examples where a strategic national approach could lower costs and shorten timelines for developing a clean hydrogen industry?
- What are Australia's key technology, regulatory and business strengths and weaknesses in the development of a clean hydrogen industry?
- What workforce skills will need to be developed to support a growing clean hydrogen industry?
- What areas in hydrogen research, development and deployment need attention in Australia? Where are the gaps in our knowledge?

Indicative Timeline for 2019

The timeline below indicates key milestones in the development of the strategy along with consultation periods. International engagement began in January and will continue all year.

January

- National Hydrogen Strategy Steering Committee established
- National Hydrogen Strategy Taskforce established
- International engagement on hydrogen began

February

- Stakeholder Advisory Panel established

March

- Public Request for Information

April

- Public consultation on Export Issues Paper

May

- Begin refuelling station mapping
- Public consultation continues

June

- Public consultation on Domestic Policy Issues Papers

July

- Report on potential regulatory changes to allow up to 10% hydrogen in the gas network
- Public consultation continues

August

- Draft strategy considered by Energy and Resources Ministers

September

- Public consultation on draft strategy

October

- Public consultation on draft strategy

November

- Public consultation on draft strategy

December

- National Strategy presented to Ministers