



Hydrogen Guarantee of Origin scheme

Consultation summary and next steps

Part 1: Overview

The Australian Government is working to develop a hydrogen Guarantee of Origin (GO) scheme to ensure the right frameworks are in place to allow Australia become a world leader in the clean hydrogen industry. The government is seeking to design an Australian scheme that will inform and enable customers who buy clean hydrogen in the future to choose the product best suited to their needs.

A Guarantee of Origin (GO) or certification scheme for hydrogen will provide a consistent and accurate approach to track the key attributes associated with hydrogen production, in particular its carbon footprint. The scheme will initially support the tracking of emissions from hydrogen production, but will need to be extended quickly to support the tracking of hydrogen and any hydrogen-derived products used in storing and transporting hydrogen (for example, ammonia) through to end buyers (at least to receiving port after shipping for exports). A GO scheme would provide transparency to consumers around the emissions intensity of the hydrogen being purchased and used and will help facilitate trade in clean hydrogen.

The government, led by the Department for Industry, Science, Energy and Resources, released a discussion paper on 21 June 2021 outlining a proposed approach to the development of a hydrogen GO scheme for Australia.

The approach presented in the discussion paper aligns closely with work underway through the International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE). The aim of the IPHE is to develop a mutually agreed methodology for determining the emissions associated with hydrogen production. The IPHE released the [Working Paper Methodology for Determining the Greenhouse Gas Emissions Associated with the Production of Hydrogen](#) on 4 October 2021. Australia played a leading role in the development of this working paper, which may help to form the basis of an international standard.

It is important that Australia's GO scheme is:

- nationally consistent
- reflective of domestic industry
- developed at pace with international methods.

This will allow Australia to:

- leverage our comparative advantages
- provide certainty to consumers through consistency
- maximise international trade opportunities by having a GO scheme that is adaptive and accepted by different consumer countries.

The government's discussion paper sought feedback on the following key issues:

- the coverage and boundaries of the scheme, including priorities for extending the scheme to cover additional components of the supply chain, downstream products and additional hydrogen production pathways
- the inclusion of offsets to reduce emissions from hydrogen production after carbon capture and storage (CCS) has been applied
- leveraging International Standardisation Organisation (ISO) standards and the Greenhouse Gas Protocol as the overarching frameworks of the scheme, and the Australian National Greenhouse and Energy Reporting scheme (NGERS) for specific guidance on accounting methodologies
- scheme governance (whether the scheme should be government-led or industry-led)
- the appropriate regulatory framework for the schemes
- the use of a market-based approach to calculating emissions from grid-sourced electricity (scope 2 emissions)
- the development of a renewable Guarantee of Origin scheme to initially verify 'below-baseline' generation that is not eligible for large-scale generation certificates (LGCs) under the Renewable Energy Target (RET) and verifying all renewable generation once the RET ceases in 2030
- the approach to allocating emissions between hydrogen and co-products that may be created through the hydrogen production process
- the approach to accounting for carbon emissions permanently captured and stored
- the application of a materiality threshold
- the inclusion and format of a trial phase as the next step in scheme development.

We received 80 submissions in response to the discussion paper. Feedback showed broad support for the approach in the paper, recognising there are areas of the scheme that need to be developed in more detail through a trial phase and/or further stakeholder consultation.

A summary of submissions is included in part 2 of this paper. The main findings from the consultation include:

- a unanimous view that the scheme needs to be aligned with and adaptable to international developments
- the importance of transparency to consumers regarding all attributes of hydrogen production
- support for an initial focus on hydrogen production, but the need for the scheme to quickly expand to cover hydrogen energy carriers and the transport and storage components of the value chain
- suggestions that methodologies should also be developed to include the production of hydrogen from biomethane and biomass
- support for a government-led scheme, but with a strong emphasis on industry consultation.
- divergence on the inclusion of offsets, with those supporting inclusion noting this would help the industry in the early stages of development and give greater choice in the range of products that can be offered to consumers. Those not supportive noted a lack of international consensus about the application of offsets
- a need for further consultation on the market-based approach to accounting for grid electricity emissions and the proposed renewable Guarantee of Origin scheme.

The government will next work through the implementation of trial projects, being led through the Clean Energy Regulator, to gather more information to help better understand and resolve the outstanding issues highlighted during the consultations. The intended outcome of this trial period is to settle the parameters for a fully operational, legislated GO scheme for hydrogen that is both internationally aligned and suitable for Australian industry.

Part 2: Feedback from submissions

Scheme coverage and boundary

Discussion paper proposal: The scheme will initially focus on hydrogen production from the 3 production pathways most relevant to Australia:

- electrolysis
- coal gasification with CCS
- SMR with CCS over a 'well-to-gate' boundary.

Feedback on priorities for extending this scheme was also requested.

There was strong support for the scheme coverage and boundary proposed through the discussion paper.

74% of respondents agreed that an initial focus on hydrogen production was appropriate to enable timely establishment of the scheme. Many respondents stated a need to expand the scheme quickly:

- 39 respondents stated a need to expand to scheme to cover hydrogen energy carriers.
- 7 respondents considered the scheme should cover other renewable gases such as biomethane.
- 8 respondents considered methods should be developed for hydrogen production from biomethane, biomass or waste products.
- 4 respondents considered the scheme should be extended to support hydrogen blending in gas networks.

In terms of the boundary of the scheme, 64% of respondents agreed that well-to-gate was a good starting point. However, 21% respondents mentioned the scheme should be expanded to cover the conversion, storage and transport steps (or a well-to-receiving port boundary) as a priority.

There was mixed reaction to the proposed boundary conditions of pressure of 3 MPa and 99% purity, with some support for application of these conditions as the threshold to measure emissions. However, 13% of respondents believed that there should be a different set of conditions or no conditions at all. The reasons cited for this were the low pressure of hydrogen required for various applications and the fact that electrolyzers produce hydrogen at a relatively low pressure.

Accounting frameworks

Discussion paper proposal: The scheme will leverage existing emissions accounting frameworks such as the ISO standards, Greenhouse Gas (GHG) Protocol, Intergovernmental Panel on Climate Change, NGERs and ClimateActive.

65% of respondents support leveraging ISO standards and the GHG Protocol to inform carbon accounting methodologies as it ensures a domestic scheme will align with international standards. A small number believe the NGERs alone should be leveraged.

Offsets

Discussion paper proposal: No singular approach proposed with options for inclusion and exclusion of offsets presented.

Responses to the question on offsets were fairly evenly split:

- 36% considered offsets should not be included in the GO scheme (option 1)
- 30% of respondents thought that offsets should be included (option 2)
- 34% did not answer.

It is clear from these mixed responses that further work is needed through the trial process to better understand the potential benefits and implications of offsets.

Advocates for the inclusion of offsets noted this would help the industry in the early stages of development and give greater choice in the range of products that can be offered to consumers.

For those against offsets, a potential lack of international acceptance was cited as the main reason for not wanting offsets to be included in the scheme. Some other concerns included that:

- offsets could reduce investment in CCS and renewable energy if producers are able to source offsets to reduce emissions, as opposed to lowering emissions of hydrogen production themselves
- specific ISO standards explicitly forbid the use of offsets when determining emissions arising from a product.

Of the 63% supporting option 2 (that offsets should be included) or not specifying, 19% believed that consumer choice should dictate inclusion of offsets within the scheme, while a small number believed that the offsets provide a transitional period while clean hydrogen production costs remain high. Respondents supporting option 2 generally stated that flexibility in use of offsets should be allowed, as long as GO certificates were fully transparent and enabled the clear identification of emissions associated with production with and without offsets.

Many respondents specifically noted that offsets should only be used to offset residual emissions to ensure integrity of the scheme.

Scheme governance and administration

Discussion paper proposal: The scheme will be developed and implemented by the government and administered by the Clean Energy Regulator.

74% of the respondents supported the Australian Government leading the development of a GO scheme. These respondents considered a government-led scheme would be credible and effective, and the government's participation in the IPHE was seen to ensure an internationally aligned approach.

Similarly respondents showed strong support for the Clean Energy Regulator (CER) administering the scheme, with 69% agreeing they were best placed to administer the scheme. There was a clear indication that the scheme would need to continue to evolve with international standards.

Respondents also noted that industry should play a strong role in development of the scheme and should be consulted thoroughly throughout the process.

Scheme design and regulatory framework

Discussion paper proposal: The scheme will be implemented as a certificate scheme. Options were put forward for the underpinning legislation to be either new or amending existing legislation.

76% of respondents supported implementation of the hydrogen GO scheme as a certificate scheme. Respondents reflected on:

- industry's expertise and familiarity with certificate schemes
- the ability for a certificate scheme to be readily expanded where hydrogen was used as an input to other products, such as ammonia.

Only a few respondents responded to questions about whether to develop new legislation compared to amending existing legislation to underpin the scheme. Of those who responded:

- 50% specified that new legislation should be developed.
- A further 25% suggested amending of existing legislation such as the National Energy and Greenhouse Reporting scheme (NGERs) or the REE Act should be used.
- 7% were open to either the development of new legislation or the amendment of existing legislation.
- The remaining 18% had varied views such as adopting a decentralised system featuring blockchain, an independent auditing body, or unspecified views on the best regulatory framework.

There was no clear view on how often certificates should be created and how often data should be reported for the GO scheme, with answers ranging from an annual basis to real-time reporting.

Approach to calculating scope 1 and upstream emissions

Discussion paper proposal: The scheme will leverage NGER determinations for the calculation of scope 1 and upstream emissions.

There was broad agreement on the approach set out for calculating scope 1 and upstream emissions, with many citing that the international aligned approach was ideal for the basis of an Australian scheme.

Approach to calculating scope 2 emissions (market-based approach)

Discussion paper proposal: The scheme will implement a market-based approach for the calculation of scope 2 emissions.

The majority of respondents (53%) supported a market-based approach to calculating scope 2 emissions (12% did not support and 35% did not answer). In some cases support was conditional on the approach being internationally acceptable, noting that some regions could look to impose strict conditions on the renewable electricity that can be used to claim clean hydrogen production.

Ten respondents suggested exploring a more granular methodology more closely linked with the generation mix at the time of electrolyser use to ensure increased demand from hydrogen production was not met with non-renewable electricity generation.

Three submissions mentioned that the scheme should distinguish new build renewables to be consistent with the Renewable Energy Directive (RED) II, as European certification schemes may require green hydrogen to be manufactured from newly built renewable energy sources. It is noted that such an approach may have a significant impact on projects costs and lead times.

Some suggested further consultation is needed on the approach, particularly the calculation of the residual mix factor.

Renewable Guarantee of Origin scheme

Discussion paper proposal: The scheme will include a new renewable electricity GO (RE GO) certificate that would verify all renewable electricity from 2030. This includes a transitional arrangement until 2030 where LGCs would continue to be used and RE GOs would only apply to below baseline generation.

47% of respondents were in favour of establishing a guarantee of origin certificate for renewable electricity, initially applying to below baseline renewable generation (6% were not in favour, and 47% did not answer).

Those supportive cited consistency with international approaches and ensuring that Australian producers are not put at competitive disadvantage to their global peers. Some considered more consultation is required.

Concerns include that the approach would not support additional renewable generation and may be inconsistent with the approach under consideration in Europe. Some submitters were concerned about implications for the LGC market.

It is clear from these responses that further consultations are needed and this matter should be tested through the trial process to better understand the potential benefits and implications in its implementation.

Allocation to co-products

Discussion paper proposal: Where co-products are on-sold, a portion of the total emissions should be allocated to those products. System expansion and energy allocation approaches were proposed as options.

50% of submissions supported the approach to allocation to co-products in recognition that it was internationally aligned (12% did not support and 43% did not answer). Some noted the importance of proof of the sale of the co-product before allowing emissions to be attributed to it. Testing the approach through trials was supported.

Concerns with allocating emissions to co-products include:

- The approach allow emissions to be deducted where co-products are sold for an uneconomic return, and the co-product would not have been created if it were not for the hydrogen production.
- The approach may add unnecessary complexity and it is unclear whether this will be needed for renewable electrolysis.

Approach to CCS and carbon capture, use and storage (CCUS)

Discussion paper proposal: The scheme will limit emissions removals to CCUS to emissions permanently stored in geological storage formations until robust international accounting provisions are developed for other forms of CCUS. The scheme will initially leverage NGER determinations to calculate CCUS removals.

43% of respondents supported initially limiting provisions for CCS and CCUS in an initial Guarantee of Origin scheme to those included under the NGER determination (CCS). 12% did not support the approach and 45% did not answer.

Nine submitters supported this initial focus, but considered it would need to evolve quickly to incorporate new CCUS technologies. Many of these considered ERF methods could be used in the absence of NGER methods.

Four submitters considered it is important internationally agreed methods for CCUS methods are available before they are included.

Materiality threshold

Discussion paper proposal: The scheme will include a 2.5% to 5% materiality threshold where emissions can be excluded.

34% of submitters agreed with setting a materiality threshold allowing entities to exclude a small amount (for example, 2.5% to 5%) of total emissions from analysis. 17% did not agree while 47% did not answer.

Submissions supportive of a materiality threshold cited reducing complexity and cost. Those not supportive considered the proposed threshold (2.5% to 5%) represented a significant proportion of emissions and may discredit the scheme. Two submissions considered this should be based on consumer requirements. Submissions were supportive of testing and adjusting through the trial phase.

Trial phase

Discussion paper proposal: Consultation through the discussion paper will be followed by a trial period.

The majority of respondents (64%) considered a trial phase an appropriate next step for testing and refining the proposed methodologies (4% did not agree and 33% did not answer). 32 respondents indicated they would like to be involved in a trial.

Part 3: Next Steps

Trials

Feedback from the consultation process supports progress to a trial phase, which will be jointly run by the Department of Industry, Science, Energy and Resources and the Clean Energy Regulator.

The government has provided funding to support the Clean Energy Regulator to work with the department across a 21-month period to design and implement voluntary certification trials.

The trials will focus on testing and refining methodologies presented in the discussion paper to determine the accuracy, practicality and administrative burden of the proposed scheme. Trials will provide the necessary data and information needed to inform on final scheme design including an opportunity to gather more detailed information on scheme components without clear industry preference. Components tested through the trials are for information purposes and not all components may be included in the final scheme design.

Through the discussion paper consultations, the government received strong interest in participation in trials from a number of consultation respondents. These participants represent a range of different projects at different stages of development including operational projects and projects in early development, as well as universities and educational centres, local and state governments and other private industry representatives.

Trials will include participants that are able to test methodologies with actual data from their operational projects. Trials will also include desktop analysis and co-design processes where qualitative data will be gathered to inform scheme design.

The government will now work with interested parties on participating in the trials on a voluntary basis, with more information on the final trial projects to be announced soon. For more information on this process, please email the department at hydrogen@industry.gov.au.

The intended outcome of the trial period is to settle the parameters for a fully operational, legislated GO scheme for hydrogen that is internationally aligned and allows for the Australian clean hydrogen industry to grow.

Scheme extension

We will continue to work with IPHE to develop internationally agreed approaches that can be used to extend the scheme. This will include:

- coverage of conversion of hydrogen to hydrogen energy carriers
- the conversion, transportation and storage components of the hydrogen value chain
- methods for the production of hydrogen from biomethane and biomass.

The IPHE has established sub-groups to develop carbon accounting methodologies for hydrogen carriers and the production of hydrogen from biomethane and biomass. Australia is participating in these groups. IPHE also intends to commence work later this year on the transport and storage components of the value chain and Australia will also participate in this process.

The government will consider the development and impacts of a potential GO certificate for biomethane that would enable the tracking of its emissions as a feedstock to the steam methane reformation pathways.

It is important that the government develops methods for hydrogen energy carriers and the conversion, transport and storage components of the value chain in line with international progress. The government will prioritise this work and it will be released for industry consultation once an agreed methodology within IPHE has been reached.

The department will continue to work with industry on the development of a market-based approach to accounting for scope 2 emissions and with international partners to ensure the approach is internationally aligned. If necessary, variations of the methodologies will be tested in trials as they progress.

In line with industry views, the government will explore further extensions to the GO scheme to cover further elements of the hydrogen value chain and to consider GOs for other low emissions commodities beyond hydrogen and its derivatives. The department will continue work through the IPHE and seek out other relevant international forums to ensure any such extensions are internationally aligned and meet the needs of product consumers.