Australian Government

Department of Climate Change, Energy, the Environment and Water

Implementing a Guarantee of Origin Scheme

Impact Analysis

Department of Climate Change, Energy, the Environment and Water

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Table of Contents

Key terms

Term	Definition
ACCUs	**Australian Carbon Credit Units** – a unit representing one tonne of carbon dioxide equivalent (tCO2-e) stored or avoided by eligible activities undertaken as part of the Australian Government's Emissions Reduction Fund.
ARC	**Annual Reconciliation Check** is an electronic report submitted through the CER GO system to confirm or correct all reported information from the previous year.
Carbon Offsets	Units representing carbon dioxide equivalent net abatement generated by projects that reduce, remove or capture emissions from the atmosphere such as reforestation, renewable energy, or energy efficiency.
CCS	**Carbon Capture and Storage -** the process of capturing and permanently storing carbon emissions
CER	**Clean Energy Regulator** is an independent statutory authority established by the *Clean Energy Regulator Act 2011* that administers clean energy related regulatory schemes for the Australian Government.
CERT	The **Corporate Emissions Reduction Transparency** report is a voluntary initiative for eligible companies to present a snapshot of their climate-related commitments, progress, and net emissions position, published by the CER.
Chain of custody	Refers to how a GO certificate is allowed to be transferred relative to the transfer of the associated product or renewable electricity throughout the supply chain. There are two main certificate chain of custody approaches facilitated under the GO scheme: mass-balance and book-and-claim. Mass-balance certification tracks products through the physical supply chain, including when the product is blended, to ensure emissions and other attributes are allocated appropriately. Book-and-claim allows certification of certain attributes disconnected from the physical flow of the goods themselves (e.g. electricity in a network).
Climate Active	**Climate Active** is an Australian Government program that supports national climate policy by driving voluntary climate action by Australian businesses. **Climate Active** certifies businesses that have credibly reached a state of carbon neutrality by measuring, reducing, and offsetting their carbon emissions. Certification is available for organisations (business operations), products and services, buildings, events, and precincts.
CO_2-e	Carbon dioxide equivalent
Electrolysis	The process of using electricity to split water into hydrogen and oxygen. This reaction takes place in a unit called an electrolyser
GreenPower	**GreenPower** is a government accredited renewable energy product offered by most electricity retailers to households and businesses in Australia. The NSW Department of Climate Change, Energy, the Environment and Water acts as the Program Manager on behalf of the National GreenPower Steering Group.
IPHE	**International Partnership for Hydrogen and Fuel Cells in the Economy** - an international government-to-government partnership whose goal is to promote the advancement of technical hydrogen industry standards and protocols that are expected to underpin future trade and investment in hydrogen.
ISO	**International Organization for Standardization**
LGCs	**Large-scale Generation Certificates**

LSTR	**Limited scope technical reviews** are a third-party assurance process over the life cycle emissions and associated metering of each GO-certified product.
MWh	A measure of electricity equal to one million watt hours.
NGA factors	National Greenhouse Accounts (NGA) factors provide methods that help companies and individuals estimate greenhouse gas emissions. These are published by the Department of Climate Change, Energy, the Environment and Water each year.
NGERs	**National Greenhouse and Energy Reporting scheme** - A single national framework for reporting company information about greenhouse gas emissions, energy production and energy consumption. The NGER scheme is administered by the Clean Energy Regulator.
Product GOs	Guarantee of Origin (GO) certificates which provide details on the emissions from producing a specific product such as hydrogen or ammonia.
REC	**Renewable Electricity Certificate**, e.g. an LGC or REGO
REGOs	GO certificates which represent renewable electricity generation.
RFS	**Renewable Fuel Scheme** is a scheme under development by the NSW Government to create a financial incentive for the production and consumption of green hydrogen within NSW.
RET	**Renewable Energy Target** scheme is a legislated Australian Government scheme that aims to reduce greenhouse gas emissions in the electricity sector and increase renewable electricity generation.
RMF	A **Residual Mix Factor** is an emissions factor where the zero emissions renewable generation from grid connected electricity (and associated consumption) that can be purchased and claimed through the use of corresponding contractual instruments is removed.
Scope 1 emissions	Emissions released into the atmosphere as a direct result of an activity or series of activities.
Scope 2 emissions	Indirect emissions from consumption of purchased electricity, heat, or steam. Most scope 2 emissions represent electricity consumption from a grid and can include other forms of energy transferred across facility boundaries.
Scope 3 emissions	Indirect greenhouse emissions other than scope 2 emissions that are generated in the wider economy. They occur because of a facility's activities from sources not owned or controlled by that facility's business. Extraction and production of purchased materials is an example. Transportation of purchased fuels, use of sold products and services, and flying on a commercial airline by a person from another business are also examples.
Standards Australia	The representative for Australia within the ISO, ensuring alignment between domestic and international standards.
STCs	**Small-scale Technology Certificates**
SMR	**Steam Methane Reforming** is a method to extract hydrogen using natural gas.
System boundary	A system boundary is the scope within which emissions sources are accounted for a product across its supply chain.

Executive Summary

Global emissions reduction ambitions are increasing, as are raising demand for renewable energy and clean products worldwide. Internationally, countries are setting criteria over the goods they will import to ensure products align with emissions goals. Domestically, governments are developing incentive programs to accelerate the production of low-emissions products which include eligibility criteria on energy sources and emissions intensity. Many of these clean products, such as renewable electricity, hydrogen, metals, and other fuels are physically indistinguishable from more emissions-intensive versions.

There is a need for transparent, consistent, and trusted emissions information on products and renewable electricity to provide assurance to domestic and international consumers over low emissions claims and to act as a verification mechanism for Government incentive programs. There is presently a market failure in the availability of this information. As it stands, product-level information regarding emissions or other attributes is inconsistent or non-existent. This restricts the capacity for consumers to ascertain the difference between carbon-intensive and low-emission goods. Without this information, buyers and sellers of these kind of products are unable to efficiently transact and co-ordinate their activities, inhibiting the development of markets for low-emission goods.

To help achieve Australia's ambition of becoming a renewable energy superpower, industry, consumers and Government require a system to certify renewable electricity and emissions embedded in a product. This system needs to be transparent, trusted and consistent with international best-practice, to provide assurance to domestic and international markets and act as a verification mechanism to support access to related government incentive programs.

The purpose of this Impact Analysis (IA) is to inform the development and assessment of policy options to implement a framework supporting transparent, verified information on the origin and attributes of renewable energy and clean products, including embedded emissions. The Australian Government has conducted broad-scale domestic and international consultation and considered a range of possibilities based on industry feedback to develop the policy options below. This extensive consultation has informed and supports the recommendation of this report.

When assessing the preferred option, DCCEEW's analysis considered regulatory costs of the options (should the entities choose to engage with the voluntary options) against possible economic, reputational, and decarbonisation impacts. Qualitative assessments of benefits have been made against these impacts. Quantitative regulatory burden estimates form the basis of DCCEEW's recommendation and are included for options 2 and 3.

The following three options for voluntary certification of emissions associated with specific products and renewable electricity have been examined in this Impact Assessment:

- **Option 1: Status-quo (non-regulatory)** – Australian industry would develop emissions accounting and certification frameworks as required without Australian Government involvement.
- **Option 2: Publish framework with no government administration (quasi-regulatory) –** The Australian Government would develop an emissions accounting framework that industry could voluntarily choose to adopt and apply to their certification schemes for clean products for both domestic and export. This option would involve certification of products being administered by industry based on guidelines developed by the Australian Government. No legislation would be made, and the framework would operate like a model code, without government issuance of certificates.
- **Option 3: Australian Government administered Guarantee of Origin Scheme (regulatory)** – The Australian Government would implement and administer a voluntary scheme, the Guarantee of Origin or "GO" scheme, that would measure, track and verify emissions information related to products. This would include an enduring renewable electricity certification mechanism. This includes establishing supporting IT and compliance systems and enable ongoing domestic and international engagement to expand and evolve the scheme to support Australian renewables and clean energy export industries into the future.

Maintaining the status quo (option 1) would mean that producers and consumers would continue to be impacted by the current market failure. Industry-led schemes may emerge, but these are likely to be overlapping and inconsistent. This would undermine trust and introduce uncertainty to the market rather than reducing barriers. The status quo option

represents a reduced initial impact and compliance cost on industry, but a longer-term burden to realise opportunities and achieve growth.

Option 2 is also likely to result in duplicative and overlapping industry schemes, although there would be greater alignment than under option 1. These industry schemes would be perceived as having reduced integrity compared to a government-led scheme as there would be no single source of truth, i.e. a certificate register or a government administrator.

No enduring certification for renewable electricity would be introduced under options 1 and 2.

The preferred option is the regulatory option (option 3). This option would provide the necessary investment certainty, achieve greater integrity and unlock greater economic opportunities over the medium-to-long term. A government led scheme would be perceived to have increased credibility and could achieve increased alignment with international standards and other Australian Government carbon reporting frameworks. This leads to opportunities to streamline reporting across domestic and international schemes, and decreased compliance costs due to the ability for the regulator to undertake data matching within the scheme and across other schemes it administers. Initial regulatory costs under option 3 are higher than option 2, however this is offset by decreased burden over the long-term due to reduced audit requirements in later years.

Implementation risks and mitigation strategies are also considered in this Impact Assessment, including:

- The scheme does not provide the necessary integrity and transparency
- The value of participating in the scheme does not outweigh the costs
- The scheme is misaligned with international approaches or not accepted by export markets
- Risk of fraudulent activity.

Evaluating the success of the GO scheme will occur through a review commencing within three years of scheme operation and at regular intervals thereafter. The initial review would focus on the integrity and effectiveness of the scheme design and any potential amendments to improve functionality. Ongoing reviews would continue to assess the ongoing integrity, effectiveness and efficiency of the GO scheme and identify any potential amendments.

1. What is the problem you are trying to solve?

Within the Australian economy, there is presently a lack of trusted, consistent, information about low-emission and clean Australian-made products, and no enduring mechanism to certify renewable electricity.

The deficiency of product information restricts the capacity for consumers to ascertain the difference between carbon-intensive and low-emission goods and make claims regarding renewable electricity use. Without this information, buyers and sellers of these kind of products are unable to efficiently transact and co-ordinate their activities. Prospective buyers may not be willing to pay a premium for a good described as 'low emission', 'green', or 'renewable' without independent verification. And government policies are limited in their ability to discriminate and target support towards low emissions or renewable products.

A mechanism for certifying renewable electricity exists through the Renewable Energy Target scheme, however, this is legislated to end in 2030 and only applies to a subset of total electricity generation in Australia.

Proliferation of renewable electricity, hydrogen and other low-emissions products are critical to the decarbonisation of Australia. Electrification using renewable electricity will be a key decarbonisation option for many sectors and renewable electricity is an essential input into the production of hydrogen, which will be important for decarbonising hard-to-abate sectors, and other low emissions products. Use cases for hydrogen include transportation (forklift trucks, fuel cell range extenders in EVs, heavy road transport, rail and marine transport), grid firming, the manufacture of chemicals such as ammonia and methanol, industrial heating, energy storage and in and for use in metals production.

This wide-ranging potential suggests that the demand for clean hydrogen, could grow to substantial levels. Australia has the potential to be a major clean hydrogen producer due to an abundance of renewable energy resources, skilled workforce, and a reputation as a trusted exporter of energy products. The CSIRO estimates that an Australian clean hydrogen industry could create more than 8,000 jobs, generate $11 billion a year in GDP, and result in an emissions reduction equivalent of up to a third of Australia's current fossil fuel emissions by 2050.[1]

Many low-emissions products, such as renewable electricity and hydrogen, are physically indistinguishable from more emissions-intensive versions. They can also be more expensive to produce. Consumers pay a "green premium" when they purchase a product that was made with clean energy sources and caused lower greenhouse gasses to be released in its production. Consumers may not be willing to pay this premium without robust evidence that the low emissions attributes of the product are correct. Where these products are indistinguishable, this creates an uneven playing field within markets where low-emissions products cannot incorporate this green premium into their price.

Australian made clean products will also play an important role in decarbonising the economies of our export markets. These markets are placing requirements on the products they are importing which are marketed as "low emissions". The European Commission's *Renewable Energy Directive II*, United States' *Inflation Reduction Act*, and the EU's *Carbon Border Adjustment Mechanism* (CBAM) are examples of the emerging range of policies that look to define emissions thresholds and accounting approaches for hydrogen and other products. Other nations such as the UK has committed to the introduction of CBAMs. Some of the larger players in Indo-Pacific markets have indicated that certification will be required to ensure imported products are aligned with their domestic decarbonisation pathways and accounted for appropriately in international emissions reporting obligations. For example, Japan and Republic of Korea, are looking at emissions certification schemes for hydrogen and ammonia imports and production.

The success of these industries to access domestic and international markets will rely on a company's ability to effectively prove the level of emissions embedded in their products.[2] Embedded carbon emissions refer to the greenhouse gas emissions generated during the production and transportation of such products – which includes everything from the extraction of raw materials to the manufacturing process and final delivery to the end customer. These embedded emissions

[1] CSIRO Hydrogen – Fuels – Estimated Emission Reduction, n.d., accessed 29 November 2023

[2] World Economic Forum (WEF) Emissions accounting key to unleashing power of circularity | World Economic Forum (weforum.org), September 11 2023, accessed 17 June 2024

need to be calculated in a way that is transparent, credible and consistent both domestically and with international approaches.

Without consistent, trusted product information and certification of renewables, governments (federal, state, and territory) are limited in their capacity to develop proportionate, targeted policies to decarbonise Australia. Programs including Hydrogen Headstart and the new Hydrogen Production Tax Incentive must be able to reliably support hydrogen production that meets certain emissions criteria. Similarly, State and territory programs such as NSW's Renewable Fuel Scheme need to identify and incentivise low emissions hydrogen.

Access to certificates to verify claims to renewable electricity allows industries to demonstrate the production of low emissions products and progress against commitments to emissions reduction or renewable energy goals. Renewable electricity certification currently exists in Australia under the Renewable Energy Target (RET) scheme which provides a framework for the creation of large-scale generation certificates (LGCs) which represent one megawatt hour (MWh) of electricity generated from renewable sources. Corporations acquire and voluntarily cancel LGCs under the RET scheme to demonstrate progress towards renewable energy and emissions reduction goals. However, the RET scheme, including the ability to certify renewable electricity, is legislated to end in 2030 and only applies to a subset of electricity generation in Australia. Businesses are increasingly voluntarily surrendering LGCs to demonstrate use of renewable electricity in producing low emissions products or for corporate reporting purposes, which will not exist once the RET scheme ends.

2. Why is government action needed?

To best assess whether government action is needed, we must first identify the types of outcomes that need to be achieved and the level to which these can be considered measures of success. The objectives of the policy option employed to solve this problem will need to achieve the following:

- Provide a framework for certification that can:
    - accelerate commerciality of low emissions products by supporting the development of emerging markets for renewable electricity and low emissions products to decarbonise Australia in line with Australia's ambition to become a renewable energy superpower.
    - promote private investment in Australian renewables industry and progression of pipeline hydrogen projects toward final investment decision.
    - provide continuity for producers of renewable electricity so that the industry is not adversely impacted once the existing certification scheme sunsets in 2030.
- Provide emissions information that is transparent, trusted and accurate to:
    - be recognised by each country with which Australia may wish to trade low-emissions products.
    - be used to help verify eligibility for relevant Australian Government incentives and policies made available to Australian industry, for example in relation to renewable electricity and the production of hydrogen.
    - integrate with existing and emerging government schemes, programs and accounting frameworks related to emissions.
    - enable and encourage Australian producers and consumers to make claims about the products they make and use that are recognised both domestically and internationally.

These objectives have been developed based on feedback from stakeholder consultation which sought feedback on industry and market needs from a certification scheme. They are also consistent with objectives of international schemes and multilateral work aiming to achieve consistency and interoperability between national certification schemes.

Government-backed frameworks are trusted

Integrity is paramount when establishing and maintaining information and certification frameworks. Integrity controls need to strike a balance between ensuring trust and minimising costs for participants.

Government-backed certification improves integrity by enabling customers to trust the veracity of reported emissions and renewable electricity generation. In turn, this increases the potential acceptance and application of certificates. There is evidence that industry-led certification has limited acceptance. For example, renewable energy certificates issued under the IREC standard are not accepted in some emissions reporting schemes given the lack of independent verification.

The Clean Energy Regulator (CER) is the Australian Government's primary administrator of climate and energy schemes. It has extensive experience in administering climate change legislation including the Australian Carbon Credit Unit Scheme, National Energy and Greenhouse Reporting Scheme (NGER) and the Renewable Energy Target (RET). The CER is a well-recognised and trusted regulator and would be best placed to provide oversight.

Government backing provides stability

Australian Government leadership can prevent duplicative and overlapping approaches—either industry-led schemes or schemes created by other government bodies. Over recent years, several hydrogen certification schemes led by various industry bodies have emerged, creating confusion amongst producers and consumers alike. Government involvement would remove confusion in the marketplace by having the Australian Government, as a trusted intermediary, develop these frameworks.

Industry preference for government-led scheme

The Australian hydrogen and renewable electricity industries have consistently advocated for an Australian Government led certification scheme to provide credibility, integrity and consistency across international and domestic frameworks.

The role and track record of the Australian Government in providing consistency and trust in renewable energy certificates, underpinned by legislation, has been repeatedly highlighted by stakeholders. Many stakeholders have expressed urgent need

for an Australian Government administered certificate scheme for renewable electricity that will continue after the RET ends in 2030.

Industry has also recognised that governments globally have a role in ensuring hydrogen and clean product certification and emissions accounting frameworks around the world are aligned and interoperable. Industry cannot play this role internationally as effectively as government.

Existing schemes and initiatives do not address the problem

There are a range of existing domestic emissions accounting schemes, incentives for production of clean products, and industry initiatives at the state and federal level. While these are effective for the purpose they were designed, they could not address the need for a consistent, transparent product-based emissions accounting framework without significant reform. Some examples of these are set out below.

The National Greenhouse and Energy Reporting (NGER) scheme is a national reporting framework for registered controlling corporations to report emissions and energy production and consumption. The NGER scheme however is not suitable for tracking product based embedded emissions. The scheme only covers Scope 1 and Scope 2 emissions produced by a facility. It does not support the calculation of emissions embedded in a product (which includes Scope 3 emissions). It does not allow for certification of clean products and does not provide domestic consumers and our trading partners assurance over the emissions intensity associated with a product.

The RET scheme is designed to encourage the additional generation of electricity from sustainable and renewable sources. This is done through the issuing of certificates for the generation of electricity using eligible renewable energy sources, and requiring electricity retailers and certain wholesale purchasers to surrender a specified number of certificates for the electricity that they acquire during a year.

The RET scheme issues LGCs for each megawatt hour of eligible renewable generation. However, LGCs can't be created for generation that existed prior to scheme commencement (known as below baseline generation) and electricity generated for export. Additionally, the RET scheme is scheduled to end in 2030 which limits its ongoing efficacy. The RET scheme is therefore not suitable for ongoing tracking of all renewable generation in Australia.

Consistency and integration across government and industry schemes and frameworks

A high integrity, product-based emissions accounting framework can be accessed and built upon by other schemes and initiatives to add value or incentivise different products and industries. Consistency at the federal level reduces risk of fragmentation or friction between different frameworks at a domestic and international level. By centralising supply chain product-based emissions accounting into a single Australian Government-led framework, other industry and government schemes could leverage information to deliver their own objectives. This would also reduce costs by avoiding duplication and minimising regulatory burden on producers.

Standardising product emissions accounting and certification approaches at a national level can ensure more consistent and effective application of connected policies and programs. Product incentive programs such as Hydrogen Headstart, carbon accounting frameworks such as Climate Active or the Corporate Emissions Reduction Transparency Report, and future mandatory climate-related financial disclosures, would all be able to recognise the same foundational information. This can streamline reporting and administrative processes for industry and government.

The alternative is that industry sectors will have to choose individual or disparate accounting or certification approaches that may not integrate domestically or internationally, ultimately hindering Australia's decarbonisation efforts.

Barriers and constraints to government action

Product-based emissions accounting schemes are complex and therefore costly to develop and must strike a careful balance between accuracy of information and participant burden. Formally implementing schemes through legislation also presents risks as these processes can be resource intensive and a risk that enshrining a scheme in legislation will make it less flexible and hard to adjust to reflect developments in industry and the international landscape.

The Australian Government would need to negotiate bilaterally and multilaterally to ensure international consistency and acceptance of the scheme. Many different schemes and initiatives are already underway, and negotiating a consistent international approach will be complex and time consuming.

However, many of these barriers apply equally to industry-led initiatives. Government is well placed to tackle these challenges due to its experience in developing and administering similar schemes and its ability to work with foreign governments and multilateral bodies.

3. What policy options are you considering?

DCCEEW has conducted broad-scale domestic and international consultation and considered a range of possibilities based on stakeholder feedback to develop each of the below options considered to address the policy problem. This work includes:

- research and reviews of existing and emerging international certification schemes with a view to identifying any interface/linkage opportunities for a future Australian scheme.
- surveys and discussion papers outlining a range of nominal models for a certification system.
- industry trials to test proposed certification system design and emissions accounting methodologies.
- stakeholder workshops to understand key issues and address feedback in further developing these models.

Stakeholder engagement sought feedback on key scheme design elements such as system boundary and accounting methodology as well as options for scheme governance, including whether Australia's approach should be industry or government led. The three options outlined in this section of the IA are a characterisation of the key differences in a range of approaches that have been considered.

Each of the policy options included in this IA have been contemplated and assessed on how they best resolve the policy problem, i.e. how do these options address the market failure in the availability of information provision for low-emission and clean Australian made products and enable market participants to ascertain the difference between carbon-intensive and low-emission goods.

Option 1 – Non-regulatory approach

Maintaining the status quo

OIA guidance states that options considered must include a status quo or "take no further action" option. The specifics of what maintaining the status quo would entail have been considered in line with this guidance and developed to provide the baseline against which the impacts of the alternative options discussed below are evaluated.

Under this option, the Australian Government would not undertake any work to develop a product-based emissions accounting framework or develop a scheme to succeed the certification mechanism that exists in the RET. Industry may determine its own methods to verify emissions associated with the production of low emissions products and renewable electricity. This may involve one or several independent voluntary certification schemes or other approaches to guarantee the origin of products and to verify renewable electricity generation to support claims.

Option 2 – Quasi-regulatory approach

Publish framework with no government administration

A quasi-regulatory approach would involve the Australian Government developing an emissions accounting framework as a guide to industry which would be published, but it would not involve government administering a centralised scheme (i.e. backed by legislation, IT systems, or compliance processes). As emissions accounting frameworks are already in place for renewable electricity generation, there is no consideration to introduce a quasi-regulatory policy approach to this sector. While it is likely that under option 1, an industry led scheme for renewable electricity would be introduced (I-RECs for example), for the purposes of this IA, Option 2 would only apply to certifying the production of hydrogen and hydrogen related products.

A quasi-regulatory approach would involve the government drafting rules or guidelines, but not administering a scheme. The framework would operate like a model code and the government could recognise schemes that comply with it.

Industry-led or private schemes would implement and regulate their own assurance frameworks, and entities would have to select frameworks and source independent assurances both for the data they provide, and to verify that the framework remains compliant with various domestic and international requirements.

This approach is taken in some jurisdictions such as the European Union, whereby a standard is published. Industry-led schemes then apply to the European Commission to be formally recognised as a scheme that is consistent with the requirements of the standard.

Option 3 –Regulatory approach to voluntary certification

Australian Government administered Guarantee of Origin Scheme

A centralised regulatory approach would involve the Australian Government developing, legislating and administering a Guarantee of Origin (GO) scheme to measure, track and verify emissions across the supply chain of products and provide an enduring renewable electricity certification mechanism. It would initially apply to renewable electricity and hydrogen and expand to other products over time, such as green metals, biomethane and low-carbon liquid fuels in line with government and industry needs. Participation in the GO scheme would be voluntary. The scheme would encompass establishing supporting IT and compliance systems and ongoing domestic and international engagement to expand and evolve the scheme to support Australian renewables and a clean energy export industry.

This option would provide a government-led scheme to track the carbon emissions associated with production, storage, and transportation of clean products, along with other characteristics such as the type of technology and energy source used in its manufacture. It would create a pathway to certify all renewable electricity generated in Australia and enable greater granularity of information to be captured to ensure compatibility with international standards.

This option was arrived at through stakeholder consultation that included seeking feedback on governance approaches for a certification scheme. In response to a discussion paper released in June 2021, *A Hydrogen Guarantee of Origin Scheme for Australia,* 74% of respondents indicated support for a government-led scheme aligned with international approaches, citing the opportunity for increased integrity, international alignment and alignment with other domestic reporting frameworks.

4. What is the likely net benefit of each option?

Consideration of the net benefit must balance the regulatory burden of participation with the opportunities unlocked by each option. We have provided quantitative estimates where possible of the regulatory burden on businesses, as well as a qualitative analysis of the impact on businesses, consumers, the broader economy, the environment and Government, to a level of detail commensurate with its impact.

It is important to keep in mind when considering the regulatory burden that the options presented are voluntary. Any participation burden will only apply to entities who wish to access the advantages and opportunities of any certification framework.

Why a cost-benefit analysis was not possible to undertake

The Australian Government acknowledges the utility of using cost-benefit analysis (CBA) to assess policy proposals. CBAs can allow decision-makers to consider all the positive and negative effects of proposed policy options to address an identified problem area.

In this instance however, it was not possible to conduct a CBA to evaluate the three policy options under consideration to address the nature of market impacts described in Chapter 1 due to:

1. **the nascent state of Australia's domestic hydrogen industry:** although Australia has the potential to grow a substantial hydrogen industry, the current lack of scale makes estimating the potential monetary impact of the three policy options impossible. There is considerable uncertainty regarding how far, or distributed, the hydrogen market will be, and any growth of the market will be based on a range of interdependent factors and enabling measures – of which the policy options proposed would be only one.
2. **limited data on how assurance schemes work:** Hydrogen certification schemes are also at a nascent stage of development globally, and limited data is available on how they work in practice, restricting the ability to estimate the costs and benefits of these options based on international schemes. Non-government schemes that are being developed overseas in a manner somewhat analogous to policy option 2, such as CertifHy in Europe, are either still at a pilot phase or are in early stages of operation. This provides a limited source of data to draw from for the purposes of evaluation. Similarly, data that is available to help evaluate policy option 3 is also quite limited and was generated during trials held by CER between 2022 to 2023. It includes hypothetical data from some industrial participants because their respective hydrogen projects had not yet commenced at the time of the trials. As the hydrogen industry begins to scale over time, only then will the impact of assurance schemes, such as the types under consideration in option 2 and 3, be quantifiable.
3. **there is not yet a set, internationally recognised approach to assurance schemes for hydrogen:** whilst international standards are presently under development, there is not yet a universal approach to how assurance for hydrogen products and its derivatives will work. This adds to the difficulty of using international data to assess the costs and benefits of option 2 or 3.
4. **indirect benefits of participation**: many benefits of certification to industries and entities will be indirectly realised and cannot be counted as part of a CBA. For example, the GO scheme, as outlined in option 3, will be an 'enabler' of additional policy opportunities. This means many of the benefits of the GO scheme will be indirect benefits, rather than measurable benefits directly attributable to implementation of the GO scheme. An example of this are hydrogen production incentives such as the Hydrogen Headstart program and the Hydrogen Production Tax Incentive. These initiatives will utilise the GO scheme as a verification framework but are separate polices and are aimed at achieving differing outcomes than addressing the market failure previously described. These costs and benefits of these initiatives would be best considered in distinct analyses.

Renewable electricity certification

The voluntary market for renewable energy certificates is more advanced and some existing data is available to provide a relative estimate of costs and benefits. However, the scale of these benefits depends largely on the extent of demand for renewable energy certificates.

Currently, there is a market for LGCs that are acquired by businesses and voluntarily surrendered to the Clean Energy Regulator. Businesses that create LGCs are typically large-scale renewable energy developers that build wind and solar farms. Some agents operate as intermediaries in the certificate market. Purchasers of LGCs for voluntary purposes are typically large corporate entities with Environment, Social and Governance (ESG) goals or government agencies with renewable energy targets.

The Clean Energy Regulator estimates that around 10 million LGCs will be voluntarily surrendered or cancelled to match business renewable energy claims in 2024. While the price of certificates that are traded directly under contracts or openly on the spot market can vary, based on an average spot market price of $40, the value of voluntarily surrendered certificates would be in the order of $400 million. This represents the value to businesses in making claims of renewable energy to demonstrate their environmental credentials. This also represents additional revenue for renewable electricity generators in addition to the underlying electricity which supports investment in renewable energy power stations.

There is a cost to create LGCs in the form of an administration fee paid to the Clean Energy Regulator. The fee is currently $0.08 per LGC which represents a cost of $800,000 for 10 million LGCs which slightly reduces the overall value of LGCs.

Voluntary demand for LGCs is expected to continue to grow but the extent of that growth is difficult to quantify. As the supply of certificates increases, it is likely that the value of each certificate would be lower than the current spot price for LGCs so the net benefit to the industry would likely be lower than that outlined above.

However, the value of government-backed certificates is likely to be greater compared with industry-based verification given the greater integrity associated with a centrally administered mechanism.

Analytical approach taken

Regulatory burden estimate (RBE)

Businesses will be the primary entities impacted by policy options 2 and 3. With respect to the Regulatory Burden Measurement framework, our estimates focus on regulatory costs imposed on these businesses through administration and compliance *should they choose to align with a model code or participate in a certification scheme*. Our estimates include comparisons of annual average participant resource requirements for options 2 and 3.

The costs involved with each policy option have been calculated by:

- Identifying the key steps for business to comply with the regulatory options.
- Estimating the burden and costs of each step.
- Estimating annual costs for a single business, for initial and ongoing years
- Compiling the annual costs scaled over a 10-year period.

Detailed RBEs that calculate the costs involved with each implementation option are included at Appendix (ii) of this Impact Assessment. Sector wide annual costs are included in the RBE table under option 3 in Appendix (ii) as well as comparisons of average per participant burden for both government and industry-led options. The per participant burden is a useful metric because it does not rely on participant forecasts and enables comparison between option 2 and option 3. It is also valuable as the scheme proposed as part of option 3 would expand to other products, where the model code proposed for option 2 would be for hydrogen and derivatives only.

Conditional on achieving the same benefits, a certification scheme with lower regulatory burden is preferable. If a scheme has a high regulatory burden, then smaller producers may be disproportionately affected by the costs involved with participation and may be inadvertently excluded from the scheme. If a scheme unintentionally excludes producers due to regulatory burden rather than on the basis of low-emissions credentials, then industry may not be able to develop efficiently.

Net benefit analysis

We have compared the potential benefits for each option with specific attention on:

- economic impact,
- trade and export opportunities,
- product related claims and reputations,
- potential for decarbonisation

Benefits to hydrogen and renewables industries, as products that would be the initial subjects of a certification scheme, are considered in greater detail. However, as a GO scheme would be designed to expand to include other products over time, the benefit of a certification approach itself and what it can enable in the future must be kept in mind. A summary of benefits with respect to regulatory burden for each option is included below.

Net Benefit for Option 1 – Non-regulatory approach

Maintaining the status quo

There are no costs to comply with a government framework under this option. While industry-led schemes may develop for hydrogen and other products, the likelihood of this occurring, and the scope and design of the schemes if they do occur are too uncertain to quantify. For renewable electricity, the Renewable Energy Target scheme will continue to operate until 2030, however this is an existing policy, so those costs are included in the baseline. There will be no regulatory costs associated with renewable certification after 2030, as no new certification mechanism would be introduced.

Maintaining the status quo would mean that producers and consumers would continue to be impacted by the current uncertainty in the hydrogen and renewable electricity industry. Industry-led schemes may emerge, but these are likely to be overlapping and inconsistent. This would undermine trust and introduce uncertainty to the market rather than reducing barriers.

This uncertainty has the potential to negatively impact Australia's international reputation as a committed actor against climate change and reliable partner in the world's rapid energy transition. The status quo option represents a reduced initial impact and compliance cost on industry when contrasted with burden of the other policy options, but a longer-term loss of opportunities and growth.

Potential consequences of this option include:

- Failure of emerging green industries to capture significant trade/economic opportunities associated with clean energy export, due to Australian products failing to prove they satisfy consumer needs.
- Possible restrictions to the trade of Australian products if they are unable to demonstrate compliance with country and regional requirements (e.g. CBAM, country of origin)
- Reputational damage arising from perceptions that Australia is failing to act on important climate/emissions reduction initiatives.
- Lack of trust in inconsistent, industry-led schemes that may reduce investment, industry-scale-up and export opportunities and lead to increased difficulty for hydrogen and renewable energy projects to secure project finance.
- Over the long term, inconsistent industry-led schemes could result in additional layers of assurance burden and associated costs:
    - Producers would have to procure independent assurance of the emissions credentials of their products to ensure compatibility with export requirements on an ongoing basis. This would include a process to identify what international and domestic standards are applicable, which can be extremely difficult to do for products such as hydrogen, as they could potentially be supplied to multiple markets.
    - Developers of third-party frameworks will need to seek assurance that their approach is consistent and compliant with domestic and international criteria. They may need to apply for recognition from governments such as the European Commission.
    - Third-party auditors are generally private companies. Multiple industry-led schemes are likely to lead to increased demand for third-party audit and verification services of this kind. As the industry grows, it is likely that the cost of this kind of third-party verification will also increase in a manner that could lead to negative commercial outcomes for Australian producers. Conversely, a legislated scheme would offer long-term term regulatory certainty for industry in terms of cost of compliance.

Net Benefit for Option 2 – Quasi-regulatory approach

Publish emission accounting framework with no government administration

Option 2 would likely result in emergence of duplicative and overlapping industry schemes, although there would be greater alignment than under option 1. These industry schemes would be perceived as having reduced integrity compared to a government-led scheme as there would be no single source of truth, i.e. a certificate register or a government administrator. As a result, these schemes would be less transparent and less consistent. Consumers, investors, and markets more broadly would be less equipped to identify and access the products with the attributes that meet their needs. Other domestic schemes (such as government incentives schemes) would not be able to readily input data from these frameworks as they would with a federally operated scheme and would likely have to overlay additional compliance processes of their own.

Decentralised schemes reduce opportunities for compliance efficiencies that would be accessible to a centralised regulator such as the CER. Under this approach, there would be no single administrator who would be able to undertake cross scheme verification and data matching to aid identification of non-compliance, as well as fit and proper person assessments using information on participation in other schemes.

This option meets limited industry needs. It would provide direction on best-practice approaches and internationally aligned embedded emissions accounting frameworks. It would also encourage greater consistency in emissions accounting approaches. The integrity issues outlined in Option 1 above remain however as there would be no Australian Government administration and related compliance, enforcement, and oversight.

Costs to government

Costs to government under a quasi-regulatory approach would include the consultation on and drafting of rules or guidelines that would be published and operate like a model code for the Australian hydrogen industry. Under this option, government would bear the operational and staffing costs involved with developing an emissions accounting framework covering the production of hydrogen, but no costs for implementing or administering any resulting certification scheme. As emissions accounting frameworks are already in place for renewable electricity generation, there is no consideration to introduce a quasi-regulatory policy approach to this sector.

The 2021-22 budget provided $9.7 million for operation of industry trials to test the applicability of IPHE methodologies in an Australian context, as well as the test design elements of a possible certification scheme. $700k was spent by DCCEEW on technical consultancy services to review international arrangements and standards. In the 2022-23 Budget, DCCEEW was provided with $2.2 million to develop and consult on design for the hydrogen emissions accounting scheme.

These allocations are representative of the types of costs listed above that would be incurred under option 2 in the development and publishing of a model code without the costs to develop or implement.

Costs of regulation and regulatory compliance burden

The regulatory burden of this option (including the financial burden of obtaining additional third-party assurances) is difficult to quantify precisely. But assuming that industry-led schemes would be based on the model code released by the government allows for a generalised estimation of burden per-producer. Further details of the estimation approach are included at Appendix (ii).

Many of the other burdens and qualitative costs identified for Option 1 remain applicable for Option 2:

- Without a government framework, producers (assumed hydrogen producers for this options and analysis) would have to procure regular independent assurance of the emissions credentials of their products to ensure compatibility with export requirements on an ongoing basis.
- Developers of third-party schemes will need to seek assurance that their certifications are consistent and compliant with domestic and international criteria.

Table 1: Average annual regulatory costs (from business as usual), Quasi-regulatory option

Change in costs ($ million)	Business	Community organisations	Individuals	Total change in costs
Total, hydrogen sector	$2.05	N/A	N/A	$2.05
Total, hydrogen sector (per producer)	$0.03	N/A	N/A	$0.03

It is estimated that the annual average regulatory burden for a single hydrogen producer to comply with a model code under the quasi-regulatory approach would be **$28,722 per year.** This cost is mainly comprised of the anticipated requirement for annual third-party assurance over production, transport and storage supply chain emissions**.** This estimation assumes that hydrogen producers will spend less time on monthly record keeping and reporting due to being self-regulated (when contrasted with option 3), with a likely increased burden on auditors to complete annual assurance processes.

Applying the per-participant costs to forecasts of producers of hydrogen products yields the estimated annual average regulatory costs of **$2.05 million** over a 10-year period for the sector. Details of this forecasting are at Appendix ii.

Estimates for record keeping and assurance burden and costs are based on data provided by the CER from similar schemes that they administer. This approach was taken as there was no reliable data available from industry-led schemes to model these costs on at the time this analysis was undertaken.

Some functions that would otherwise be performed by government under option 3 (for example, assessing the eligibility of the facility and its metering and measurement arrangements to comply) would instead be required from third-party audits under this option. These include production related record-keeping and procurement of third-party assurance, of which the substantive costs would be borne by producers.

Producers would need to procure more frequent independent assurance of the emissions credentials of their products to ensure compatibility with domestic criteria and export requirements. For these estimates, we assume audits that provide this assurance will be done annually. Assurance costs are likely to continually increase over time as the industry scales-up and demand for third-party verification increases.

As producers would be seeking certification with the model code from private entities rather than the Australian Government, the regulatory burden is likely to be similar – at least initially. Much of the same data would need to be collected and reported. However, the credibility of any certification received is likely to be lower. In addition, private schemes do not offer the opportunity to integrate with other government reporting frameworks, so the benefits in streamlining reporting across schemes could not be achieved.

Benefits

Compliance with a model code would be voluntary for hydrogen producers, so regulatory burden to comply with the code would only apply to those who wish for or require consistency with international standards.

Producers who choose to comply with a model code would achieve greater consistency of product information and, as a result, a firmer basis for establishing claims regarding low emissions products to capture green premiums from consumers. When compared with the status quo, consumers would have greater assurance that claims based on product information featuring the model code are reliable. Internationally too, the quasi-regulatory approach could provide necessary information regarding exported products to jurisdictions with CBAMs, energy product import regulations, or other trade barriers.

This approach would result in an increase burden to comply compared to the status quo, likely achieved through a third-party assurance scheme and/or procurance of regular assurance audits as outlined above. However, likely a reduced initial compliance burden when compared with Option 3.

Net Benefit for Option 3 – Regulatory approach

Australian Government administered Guarantee of Origin Scheme

The regulatory approach provides clear benefits for Australia's clean energy sector. It establishes a single, government-run certification scheme that ensures domestic consistency of standards, boosts investor confidence to facilitate financing of clean energy and renewable projects and provides a robust verification mechanism for relevant government incentive programs. It will also support trade by aligning with global standards, thereby reducing barriers and enhancing the competitiveness of Australian exports.

The scheme would be voluntary and capture sufficient information to enable market participants to identify products that meet their needs. It would be designed to underpin and integrate with existing and emerging domestic frameworks and align with trading partner schemes. This includes industry-led and state and territory schemes that could use information from the GO scheme to provide certifications or incentives for low carbon or carbon neutral products.

The centralised framework will help to grow Australia's emerging hydrogen industry, contributing to Australia's goals of domestic decarbonisation and increased international export of our low carbon products. The framework would create national consistency and integrity by utilising internationally aligned accounting methods and ensuring no double counting of offsets (e.g. ACCUs within the system boundary) or renewable electricity certificates (such as LGCs).

This option would position Australia to capture early opportunities to facilitate the development of Australia's hydrogen industry and support proactive domestic and international engagement to attract global investors and shape emerging markets for Australian low-emissions goods. The consistency, integrity, and trust that comes from a government-run scheme will minimise regulatory burden for industry while enabling significant scale-up and investment.

Government intervention would likely provide the best chance of success in achieving each of the objectives identified in section 2. A government-led approach increases the opportunity for transparency and integrity in information that is provided to the market on environmental attributes of products compared to non-government led alternatives. A government-backed approach would assist with independent verification of renewable energy and low emissions claims which would help to avoid greenwashing.

Costs to government

The costs to consider for Government under option 3 include costs for policy development and consultation, the drafting of and passing of legislation, implementation costs including IT build and resourcing and the ongoing costs of administration of the scheme.

In the 2022-23 Budget, the government provided $2.2 million to the DCCEEW to develop and consult on the design of the GO scheme and to draft legislation and $19.7 million was provided over 2021-22 and 2022-23 to the Clean Energy Regulator to undertake industry trials ($9.7 million) and the initial ICT system build for a possible certification scheme ($10 million).

In the 2023-24 Budget, the government provided $38.2 million over four years from 2023-24 (and $6.8 million per year ongoing) for the implementation and operation of a GO scheme. $8.7 million is expected to be cost recovered by 2026-27 with full cost recovery achieved by 2031-32.

It should be noted that the equivalent costs of building an IT system and administering a scheme have not been included under option 2. These costs would be incurred but would be borne by an industry association or other private entity. The scope of option 3 is also broader than option 2, as it includes some funding for expanding the scheme beyond hydrogen to other products over time.

Costs of regulation and regulatory compliance burden

Importantly, this option proposes establishment of a voluntary scheme. Entities who wish to access certain domestic incentives or international opportunities are more likely to benefit from participating in the scheme. Producers that do not require or desire certification are able to continue unaffected. Innovators or emerging producers can participate to acquire a competitive edge. Companies will only participate if the benefits of the scheme outweigh the costs.

Table 2: Average annual regulatory costs (from business as usual), Regulatory Option

Change in costs ($ million)	Business	Community organisations	Individuals	Total change in costs
Total, renewable electricity sector	$16.9	N/A	N/A	$16.9
Total, hydrogen sector	$1.3	N/A	N/A	$1.3
Total, other product sectors	$2.0	N/A	N/A	$2.0

For entities that choose to participate, based on a pipeline of existing and anticipated projects in the product and renewable electricity sectors, the regulatory option then represents a total increase in annual regulatory costs (from business as usual) of **$20.2 million.** Comprised of **$1.3 million** for the hydrogen sector, **$2.0 million** for other products that are incorporated in the GO scheme, and **$16.9 million** for the renewable electricity sector (that would create REGO certificates).

$9.0 million of the total **$20.2 million** annualised regulatory costs compared to business as usual are incurred by existing renewable electricity generators migrating from the existing RET scheme to the GO scheme to receive REGOs as the RET scheme concludes in 2030.

Participant numbers included in this analysis are based on a GO scheme commencing with hydrogen and renewable electricity. The timeframes for the addition of specific products would only be determined once the scheme is operational, as such a single hydrogen "sector" figure is provided separately to all other possible products for clarity and simplicity. These participant number forecasts have been based on a range of sources including:

- CSIRO's HyResource web page, which includes information on a range of pilot, pipeline and fully operational Hydrogen projects in Australia.
- Rystad Energy's production facility data that covers energy production facilities currently operating across sectors that will likely be included in the GO Scheme in the future.
- CER's own data from administering similar programs that covers production of some of the products that will likely be covered under the GO scheme in the future.

Estimating the regulatory compliance burden imposed by a proposed regulatory scheme considered:

- business resources to join the scheme, and undertake upfront reporting processes,
- upfront and regular compliance costs including initial technical reviews and assurances,
- ongoing administrative burden to manage GO certificates through their lifecycle (create certificates, add information, finalise certificates)
- modelled scheme participation over time based on new products included in the scheme and added over time from 2025-26 to 2033-35.

Cost of regulatory option per participant vs cost of quasi-regulatory option (Option 2)

To participate in a scheme, per-participant, would mean an estimated average annual regulatory cost of **$16,363** per year, per producer in the hydrogen sector (and **$6,128** per year per producer in the renewable electricity sector). This compares with an estimate of **$28,722** per year per producer for the quasi-regulatory option.

Participants of a GO scheme based on option 3 would be able to register and report most of their information upfront, with fewer audits required on an ongoing basis. This information will be used throughout the certificate creation and verification process and enable high volume certificate creation with reduced ongoing resource demands.

A comparison of the annual and cumulative costs for each approach based on a single producer's compliance is shown in Figure 1 below. Forecasts for number of participants under each option has been incorporated as part of our RBE analysis, but to provide further detail and context, per-producer estimates have also been provided to differentiate regulatory costs between options.

Figure 1: Comparison of regulatory costs (Option 2 and Option 3)

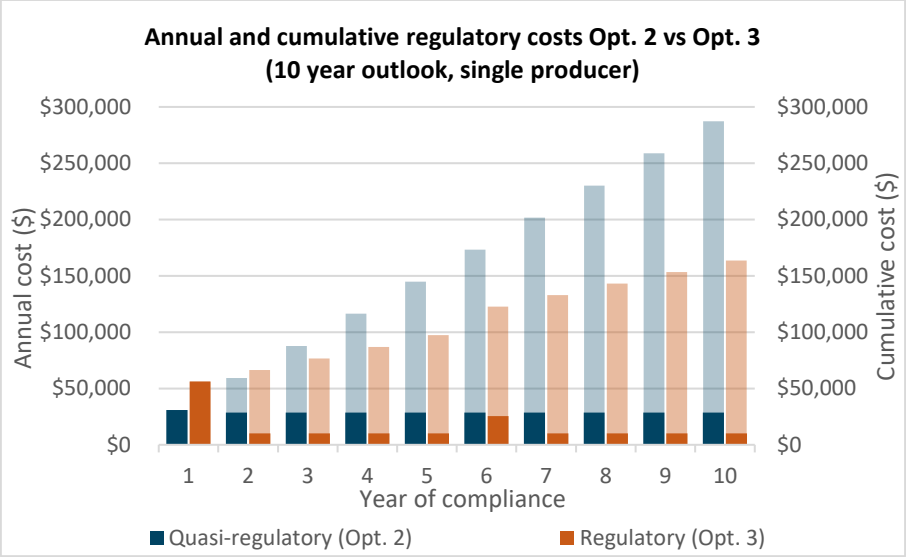

Figure 1 compares the cumulative costs **per producer** (i.e. a producer complying with a model code or participant in a government-led scheme) under the regulatory and quasi-regulatory approaches over a 10-year period.

In the option without explicit regulation (option 2), the **per-producer** burden is estimated to initially be lower but so too are the opportunities for growth and subsequent policy incentives. Barriers for market participation would remain. It is estimated that option 2 represents increased burden for participants (complying with a model code and/or third-party scheme) in the long-term due to the costs involved with procuring regular third-party assurance.

This estimate aligns with several studies and reports into the potential long-term financial burdens associated with industry-led hydrogen certification. For example, IRENA's analysis on hydrogen certification and standards notes substantial costs to participate in certification schemes that include initial setup expenses and ongoing costs for third-party verification and compliance[3]. Without the administration of a full-time government regulator, such as the CER, businesses would be required to oversee these arrangements independently, and these ongoing costs would impact participants more over the long-term.

Benefits of option 3

Benefits to businesses in the renewable electricity and hydrogen industries

As it is intended that Australia's GO scheme would be aligned and accepted internationally, it would offer a single certification for renewable electricity and hydrogen projects that could be used to access a variety of markets. It will help provide certainty about market requirements prior to investing and provide assurance that project proponents will meet desired standards. This in turn would help to build an enabling business environment, in which it is more likely to occur that investment into hydrogen production will occur. This would cement Australia's status as a world leader in low-emissions technologies.

Assurance about the emissions intensity of products is the key metric to access policies and funding targeting decarbonisation of products such as hydrogen. As a foundational layer of accounting and certification, the proposed option 3 will serve as the verification mechanism for current and future targeted incentives. The proposed Hydrogen Production Tax Incentive, at an estimated cost to the budget of $6.7 billion over ten years from 2024–25 (and an average of $1.1 billion per year from 2034–35 to 2040–41), and the $4 billion Hydrogen Headstart program will rely heavily on the Guarantee of Origin scheme demonstrate compliance with eligibility criteria for hydrogen producers accessing the programs. These incentives represent significant support for industry, and the Guarantee of Origin scheme will be key to providing a high degree of integrity in the administration of these programs. The proposed option 3 will also streamline compliance requirements for other programs and initiatives delivered at the state, territory or even industry level.

[3] International Renewable Energy Agency (IRENA) Hydrogen (irena.org) (2022) accessed 4 July 2024

Robust and accurate certification of clean hydrogen and renewable electricity technologies provides a metric that will help track our efforts to decarbonise domestic industry. Facilities may wish to purchase low emission products so they can 'write down' their respective emissions profile through voluntary schemes, such as the Corporate Emissions Reduction Transparency report[4]. Business would also be able to use scheme information to support reporting requirements, including Scope 3 emissions metrics and targets for Climate Related Financial Disclosures. More broadly, overall production of low-carbon products will be able to be compared to emissions intensive equivalents over time to measure against reductions targets.

Benefits to consumers

Option 3 will provide assurance to consumers of low emissions products so that they can make credible environmental claims about the products they buy and use. Government regulated and nationally consistent certification would result in more trustworthy, transparent, consistent, and comparable claims from producers and consumers of clean energy products. This would help to reduce the prospects of greenwashing regarding products, and renewable electricity covered by the scheme.

Consumers who purchase and use products or renewable electricity would not be subject to participation burden in a guarantee of origin scheme. While information on consumption would be required on certificates, this can be completed by participating businesses as a part of their reporting requirements. Individuals would be able to refer to a trusted, centralised data set of information regarding products and renewable electricity without any burden of participation.

Trade, export, and economic benefits of growing the hydrogen and renewable electricity industry for Australia

Australia's abundance of wind and solar resources make it an ideal location for large-scale renewable electricity. Our natural advantage also positions our developing hydrogen industry to similarly attract significant investment in current and future projects. The hydrogen industry has consistently stated that reliable and robust certification scheme, equivalent to option 3, will be critical in supporting industry to reach its potential.

Two of the world's leading energy forums see Australia's potential as a potential major hydrogen producer and supplier. The World Energy Council's *International Aspects of a Power-to-X roadmap* report identified Australia as a 'giant with potential to become a world key player[5]. The International Energy Agency's *World Energy Outlook* report projects that Australia could easily produce 100 million tonnes of oil equivalent of hydrogen, equating potentially to 3% of global gas consumption today[6].

An Australian Government operated and legislated scheme removes key risks for investors looking to finance projects in Australia including certainty over certification consistency, and surety over international acceptance. It can facilitate alignment with international standards (e.g. ISSB standards) and unlock capital flow towards green projects to help achieve Australia's sustainable finance objectives.

International trade is key to helping unlock the full potential of the clean hydrogen market. Regions that will be able to produce cost-competitive hydrogen in quantities that exceed domestic needs are already positioning themselves as future hydrogen exporters—to supply other less-competitive regions and helping to smoothly facilitate the energy transition. Notably, global hydrogen trade is projected to generate more than US$280 billion in annual export revenues by 2050.[7]

Government would continue working to ensure that a GO scheme's certification approach is compatible and acceptable and aligned with international approaches. The regulatory approach then provides a high degree of trust both domestically and internationally of the quality of Australian products. Credible, government-backed certification would give Australian industry an edge over its competitors who may use less transparent, industry-led schemes. A consistent and overarching certification framework would minimise the impact of CBAMs and trade barriers on Australian products.

Reports on the creation of a global renewable hydrogen market list the development of a robust, and internationally aligned certification process for clean hydrogen, as a key component to help facilitate market development and international trade and promote a level playing field.[8] With an effective scheme in place, Australian producers will be able to confidently spruik

[4] Clean Energy Regulator (CER) Corporate Emissions Reduction Transparency report, n.d., accessed 5 July 2024

[5] Frontier Economics Power-to-X Study, World Energy Council, 18 October 2018, accessed 24 November 2023

[6] International Energy Agency World Energy Outlook 2023, October 2023, accessed 24 November 2023

[7] Deloitte Green hydrogen: Energizing the path to net zero, 19 June 2023, accessed 29 November 2023

[8] Deloitte Emerging green hydrogen market set to help reshape global energy map by end of decade, creating US$1.4 trillion market by 2050, 13 June 2023, accessed 30 April 2024

the clean attributes of their certified products in order to capitalise on the opportunity of extracting a 'green premium' for them.

Australia's renewable hydrogen exports could create tens of thousands of direct and indirect jobs by 2040, and provide opportunities for existing workers in declining fossil fuel industries to transition to new resource and manufacturing businesses that use hydrogen. [9] Most of the jobs created by this new industry are likely to be in regional areas. Australia already has a globally significant project pipeline of more than 100 hydrogen projects announced since 2019. The IEA reports that 20% of all announced projects globally are in Australia.[10] It represents approximately half of all export-oriented projects announced globally, with the pipeline growing year upon year and valued at $225 billion or more.[11]

[9] Accenture 2021, Sunshot: Australia's opportunity to create 395,000 clean jobs, October 2021, accessed 21 August 2024.

[10] International Energy Agency, Global Hydrogen Review, September 2023, accessed 21 August 2024.

[11] Department of Industry, Science and Resources, Resources and energy major projects 2023, 18 December 2023, accessed 21 August 2024.

5. Who did you consult and how did you incorporate their feedback?

DCCEEW has been working domestically and internationally with industry, government, and the public over the past four years to help evaluate our chosen policy options. Stakeholder consultation has included the following:

Hydrogen Certification Survey [12]: Preliminary domestic industry consultation in May 2020 on high level considerations for the design of a hydrogen certification scheme. Feedback from this survey was used to develop options for the development of an Australian hydrogen certification scheme. This consultation included workshops to understand key issues with respect to timing and design elements, and development of options for a scheme in Australia.

Recommendations that came out of this consultation were to undertake further industry consultation to assist in selecting a preferred scheme, and to test the key parameters, methods and processes of the scheme through pilot project(s).[13]

International engagement as part of IPHE

The IPHE is the most advanced multilateral government-to-government forum for international collaboration on the challenges facing the global hydrogen industry. The IPHE has over 23 member countries, including almost all of Australia's priority trading partners. IPHE established a taskforce where emissions accounting methodologies for different hydrogen production pathways and supply chain components is discussed and agreed to. It is the main forum for developing internationally aligned emissions accounting methodologies. [14]

Australia has played a leadership role in many of the methodologies developed by the IPHE. The IPHE's agreed methodologies have been formally adopted at the International Organisation for Standardisation (ISO) as an international standard.

DCCEEW's participation and leadership in the IPHE has helped to ensure Australia's proposed GO scheme will keep pace with developments in international markets. The specific benefits for the Australian industry include:

- Ensuring consistency across emissions accounting globally to level the playing field for trade in hydrogen.
- Providing a forum to understand other countries' perspectives to hydrogen supply chains' associated emissions.
- Enabling a forum to voice and influence outcomes in a manner that is beneficial for Australian industry.
- Accelerating emissions accounting methodologies development for GO scheme use.

International stakeholders support the proposed GO scheme's alignment with IPHE methodologies, and the flexible approach that will allow Australian hydrogen producers to demonstrate adherence to different requirements internationally.

A Hydrogen Guarantee of Origin Scheme for Australia[15]: In this discussion paper, released in June 2021, DCCEEW outlined a proposed approach to emissions accounting for hydrogen production across three production pathways. This approach aligned with the methodologies developed in partnership with the IPHE mentioned above.

The paper also sought feedback on whether a scheme should be government or industry led, with 74% of respondents indicating support for a government-led scheme aligned with international approaches.

Respondents were broadly supportive for the approach in the paper, recognising there are areas of the scheme that needed to be developed in more detail through a trial phase and/or further stakeholder consultation. Feedback from this consultation was also used to inform the development of the second version of the IPHE methodologies.

GO scheme trials[16]: Facilitated by the CER, these trials were run over 2022 and 2023 to test the practical application of emissions accounting methodologies from the IPHE and the Australian Government's 2021 discussion paper. The trials

[12] DCCEEW, Hydrogen Certification Survey, n.d., accessed 9 April 2024

[13] Energetics Hydrogen Guarantee of Origins for Australia, Department of Industry, Science, Energy and Resources (DISER), 24 February 2021, accessed 27 June 2024

[14] International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE) IPHE WP Methodology Doc Oct 2021 accessed 27 June 2024.

[15] Energetics Hydrogen Guarantee of Origins for Australia, DISER, 24 February 2021, accessed 27 June 2024

[16] Clean Energy Regulator (CER) Designing the Guarantee of Origin, n.d., accessed 9 April 2024

involved 19 industry participants representing the three hydrogen production pathways of interest (electrolysis, steam methane reforming and coal gasification)**.** Phase one focused on scheme settings and design, while phase two focused on the production of ammonia as a downstream product of hydrogen and emissions involved with activities beyond the well-to-production-gate system boundary, such as transport and storage.

These trials tested and refined policy settings for an effective government-led scheme. Trial participants confirmed previous views that commercialisation would be aided by a high integrity government-backed scheme that can demonstrate emissions credentials to hydrogen buyers, providing market certainty and underpinning commercial arrangements.

Trial workshops focused on the GO scheme concepts presented in DCCEEW's June 2021 GO discussion paper and the IPHE published working paper. The trials also functioned to collect qualitative, and where possible, quantitative data to inform scheme and emissions accounting methodology design.

Australia's Guarantee of Origin Scheme consultation papers[17]: These two detailed policy position papers, published in December 2022 and complemented with a webinar, detailed the proposed approach to implementing an Australian GO scheme and Renewable Electricity Certification. DCCEEW received 81 submissions on the Guarantee of Origin paper.

This consultation re-iterated the urgency of the scheme to support investment.

Overall feedback indicated the proposed policy positions were broadly supported, with support ratios (the ratio of support to disagreement where respondents directly responded to a proposed policy position) ranging from 81 per cent to 100 per cent. DCCEEW received 77 submissions on the paper covering renewable electricity certification. These were also positive with some divergence of views.

Australia's Guarantee of Origin Scheme: consultation on scheme design, emissions accounting and renewable electricity certification[18]: This suite of consultation papers, published in September 2023, proposed a detailed scheme design, emissions accounting methodologies for production of hydrogen across three production pathways (along with the product emissions calculator used in the GO scheme trials) and the proposed design for an enduring mechanism to track renewable electricity generation. These papers were complemented by a series of webinars on each topic.

The feedback received was broadly positive and many stakeholders indicated that the scheme should be legislated as soon as possible. This consultation sought feedback from prospective participants on the regulatory burden and cost of compliance with the scheme. Thirty-five out of the 40 respondents considered these to be appropriate and balanced given the need for overall scheme integrity. The five respondents that expressed concerns are eager to engage further with DCCEEW on the scope of compliance assessments and potential alignment with other existing emissions reduction and reporting schemes, such as the NGER scheme. The approach to scheme design detailed in this consultation forms the basis of the Option 3 contemplated in this IA.

Product GO consultation outcomes

Three policy positions generated the most contention – the well-to-delivery gate boundary, the mass-balance chain of custody model for Product GO certificates and the use of offsets in the scheme. A summary of the feedback received on each of these positions is included below:

System boundary

There was majority support for the proposed *well-to-delivery gate* system boundary that covers:

- upstream emissions associated with the extraction, processing and transport of feedstocks,
- direct emissions associated with the production of outputs from the product facility,
- post-production emissions associated with transport and storage of the registered product to its delivery gate.

Stakeholders were satisfied that this system boundary would enable transparency of emissions over the full supply chain, support enhanced credibility of the scheme and was consistent with international trends.

[17] DCCEEW Australia's Guarantee of Origin Scheme: consultation papers, n.d., accessed 27 June 2024

[18] DCCEEW Australia's Guarantee of Origin Scheme: consultation on scheme design, emissions accounting and renewable electricity certification, n.d. accessed 27 June 2024

Some respondents called for a narrower system boundary with concerns about the increased complexity of the well-to-delivery gate boundary. Some also suggested that the scheme could initially use a well-to-production-gate boundary and then transition to well-to-delivery gate boundary.

Some indicated that a wider system boundary was more appropriate citing that the GO product does not stop or cease to exist after the transport and storage stage. Some respondents sought clarity over how the boundary would apply to exports and integrate with international certification schemes.

Given there was still majority support for this proposed measure, the system boundary was retained in the detailed design of the scheme but was clarified and renamed a well-to-delivery gate boundary.

Chain of custody

The majority of respondents supported a provenance/mass-balance approach to the chain of custody for Product GO certificates. Stakeholders noted that having the certificates follow the product would support greater transparency and scheme credibility and be aligned with international approaches.

Some pointed out that allowing Product GOs to be traded in the same way as REGOs would not preclude a producer from meeting a preference for the certificate and product to be traded together. Some supported the provenance approach initially, but considered a tradeable approach would be needed in the future.

Given encouraging the tradability of certificates would be a departure from international approaches, and there was still majority support for this proposed measure, this proposed chain of custody model for Product GO certificates was retained in the detailed design of the scheme.

Treatment of offsets and double counting

This proposal relates to the requirement for offsets generated within the system boundary, such as through CCS, to be surrendered to claim an emissions reduction. The vast majority of stakeholders supported this approach and considered it would help prevent double counting between the proposed GO scheme, and the existing Australian Carbon Credit Unit Scheme.

It was also proposed that offsets generated outside of the system boundary, such as for afforestation, would not be able to be used in the scheme. Again, the majority of respondents agreed with this approach, and many considered that the use of offsets generated outside of the boundary would risk the credibility of the scheme and its acceptance internationally.

Some stakeholders called for the GO scheme to allow for offsets outside of the system boundary to be surrendered to claim further emissions reductions. This group broadly considered that the use of offsets outside the system boundary would increase the flexibility of business models and support greater investment. Some submitters suggested the scheme should be adaptable to the inclusion of offsets in the future where emissions reductions are permanent.

Consideration and action taken

All feedback received was considered in finalising our policy design. Each of the above proposed policy position that garnered divergent views was considered in depth, was weighed up against consultation undertaken previously and work being undertaken internationally. DCCEEW considered that while these were the most contentious issues, the proposed positions were still strongly supported by stakeholders. Based on this positive overall response, the proposed policy positions have broadly been retained while incorporating the feedback provided into the detailed scheme design as appropriate.

REGO consultation outcomes

Renewable energy stakeholders emphasised the need for an enduring mechanism to certify renewable electricity to be implemented in 2024 or shortly after to provide certainty to support long-term investment and prevent other schemes from emerging.

DCCEEW received feedback from 77 stakeholders on the REGO policy paper. Respondents were generally supportive of the policy positions with some divergence of views on below baseline eligibility, REGO created for stored renewable, eligibility of small-scale generation and the requirement to include a time stamp on a REGO certificate. A summary of the feedback received on each of these positions is included below:

Below-baseline generation

The majority of stakeholders supported the premise of this policy position – to enable broad eligibility for all forms of renewable electricity to be certified. They noted that broad eligibility would provide flexibility in the certificate market and help lower costs of making renewable claims. Some also noted that broad eligibility is consistent with the intent of the policy to promote transparency in renewable electricity claims.

Over half of the respondents either explicitly noted their support for the proposal or provided views that were consistent with support for allowing below baseline generation to create REGO certificates. Some supported the proposal on the basis that GO represents a modern scheme that serves the needs of all participants and would provide flexibility to respond to customer needs.

Several stakeholders provided conditional support for the proposal if it is accompanied by measures to drive investment in renewable energy. Those submissions largely noted concerns with the potential impact that certificates for below baseline legacy generation could have on LGC prices and investment signals. Other respondents noted concerns about the potential effect on integrity of the certificates, or that they could be enabling greenwashing.

Storage

This position was supported by stakeholders. Some noted that the proposal to surrender REGOs from renewable generation before creating REGOs for storage adds to the traceability and integrity of the scheme. Some submissions noted however issues with losses through the storage system and queried whether the price differential would incentivise storage.

Some respondents raised the potential for storage REGOs to result in double counting of the same volume of generation. Some noted that a REGO price signal could add complexity for some storage facilities and there may be potential metering issues for hybrid generator-storage arrangements.

Time stamping

Specific to REGOs, time stamping refers to the date and time information associated with an amount of renewable electricity generation. A time interval that is provided as an additional qualitative characteristic for REGOs where 1 MW is generated in an hour.

The majority of respondents agreed with the time stamping proposal specifically indicating it should be a mandatory requirement. Some who were supportive of time stamping thought it should only be optional.

Some stakeholders noted issues with the approach to time stamping for smaller generators and suggested that the proposal to carry over generation would not be desirable. It was suggested that REGOs could capture output at a more granular level (1 watt hour) instead to address this. Some suggested that time stamping would provide hydrogen producers with the option to demonstrate compliance with temporal standards internationally. Others considered that mandatory timestamping should be implemented at a more granular level, consistent with five-minute settlement.

The respondents who either disagreed or were neutral on this policy proposal outlined potential issues with implementation and didn't consider there was a strong demand for time matched renewable electricity purchases yet. Some stakeholders considered that the costs could exceed benefits. Some did not support time stamping due to the potential to create inefficiency by fragmenting the certificate market.

Table 3: Impact of feedback on policy design and process

Domestic industry feedback	Impact on policy design and process
A unanimous preference for the scheme to be aligned with and responsive to international developments.	Deepening work through the IPHE and with bilateral energy trading partners.
High importance placed on transparency to consumers about all attributes of hydrogen production.	Exploring the practicality and limitations of providing all information across the supply chain.
Support for an Australian Government-led scheme, but with a strong emphasis on industry consultation.	The Australian Government will continue to develop the GO scheme with strong industry engagement, including as it develops subordinate legislative instruments and expands to new products.

Domestic industry feedback	Impact on policy design and process
Support for the inclusion of additional products in the GO scheme, including biomethane, green metals and sustainable aviation fuels.	The Government has committed to expanding the scheme to low-carbon liquid fuels, green metals and biomethane,

In addition to published discussion and design papers, ongoing engagement and consultation has been undertaken. In particular, in relation to ongoing international partnerships and on an as needs basis in response to requests from stakeholders. This targeted consultation includes:

- DCCEEW and CER's ongoing direct and indirect engagement through webinars, in person and virtual meetings, presentations, conference appearances and attendance, and communications and media engagement.
- Bilateral and multilateral work with energy trading partners to align, accept and recognise a potential GO scheme for the trade of Australian hydrogen globally.
- Ongoing and active participation through the IPHE to develop internationally agreed accounting methodologies.
- Targeted consultation with renewable electricity stakeholders during August and September 2022. Stakeholders explored the need for renewable electricity certification and possible scheme design features.

6. What is the best option from those you have considered?

The identified objectives of this policy are to accelerate the commerciality of low emissions products, promote private investment in the renewables industry, and ensure continuity for renewable electricity producers post-2030. It must also provide transparent, trusted, and accurate emissions information that integrates with government schemes, verifies eligibility for domestic product incentives, and support recognised claims by producers and consumers both domestically and internationally.

Based on delivery of these objectives, and assessment of the relative costs and benefits, the best option from those considered is the regulatory approach outlined in Option 3 - Australian Government administration of a GO Scheme. We have also considered the following in assessing this as the best option:

- RBEs of each option that compare the impact and costs of participation for businesses over the short and long-term.
- Net benefit analysis to compare the potential of each option to realise certain benefits for the broader Australian community and economy.
- Feedback received from stakeholders thorough public consultations since 2020 to the present.

This model has guided our decision making by providing an objective framework for comparing the different impacts and benefits we can expect under each option. This objectivity is supported by converting impacts, where possible, into present value dollar terms. The quantification of these impacts and benefits are estimates only, as certain parameters (sector use, extent of usage etc.) are still being determined or are otherwise qualitative.

Our quantitative analysis is compared with feedback received through consultation to verify it aligns with the stakeholders' preferences, whom in large part will be future scheme participants. Our detailed assessment including analysis and caveats on quantification are included below.

RBE analysis and caveats

Initial costs under quasi-regulated option 2 are lower than option 3, however the RBEs indicate that participants would likely experience decreased burden over the long-term under option 3. Please see Figure 1 above and the corresponding chart in Appendix (ii) for more detail.

The key consideration remains that Option 3 represents development of a voluntary scheme, and any associated regulatory burden would be elective by entities and industries that wish to access the benefits.

There are some limitations around availability of data on the estimates. Our RBEs include significant assumptions regarding scheme participant numbers and the time and cost impacts of the steps involved in scheme participation or compliance with a modelled code. We have maximised estimates of the impact of each step required to participate in the scheme at Option 3 to mitigate the risk of misrepresenting the regulatory burden through underestimation.

The domestic hydrogen industry may grow to similar levels under a quasi-regulated approach; however, without a government backed scheme, export opportunities will be reduced or not realised. This is because overlapping industry led alternatives will struggle to gain international recognition with the various government backed schemes implemented by our export partners and would likely be subject to CBAMs and CBAM variants implemented by our trading partners.

Net benefit analysis

The Net benefit analysis, as discussed in Chapter 4, considers and compares each approach outlined across a range of categories of potential benefits that the scheme is intended to have. Benefits outlined are qualitative only. Figures used in this analysis reference reports and modelling done by Australian and international renewable energy organisations, government agencies, public policy think tanks, economic institutes, industry associations and business groups.

Option one meets some of the objectives identified above. As industry-led or private schemed develop, this will aid the commerciality of low-emissions products and promote private investment. However as multiple schemes are likely to emerge, with different frameworks, methodologies and assurance processes, the transparency and accuracy of those schemes will be difficult to assess. These schemes will not have the ability to integrate with other Government schemes.

Producers would have to assess which schemes are compatible and accepted in markets they wish to export to and may need to participate in multiple schemes to access different markets.

Option 2 also meets the objectives of aiding the commerciality of low-emissions products and promote private investment. AS they will be based on a common framework, transparency and accuracy will be enhanced over option 1, but there may still be some divergence in approached between schemes. Other domestic schemes (such as government incentives schemes) would not be able to readily input data from these frameworks and would likely have to overlay additional compliance processes of their own. Decentralised schemes reduce opportunities for compliance efficiencies that would be accessible to a centralised regulator.

Option three meets all the objectives identified above. It provides the best foundation to help realise the greatest net benefit for Australian industry and consumers. Being government-led, both domestic and international consumers would have greater certainty and trust about the underlying data used to certify products they make and use. This leads to more credible environmental claims for consumers in the domestic market, unlocks additional policy opportunities and funding support for industry (e.g. production incentives such as Hydrogen Headstart), reduces trading barriers and ensures compatibility of Australian products sold internationally. The certainty provided by the framework encourages a faster scaling up of new Australian low-emission energy industry production and export to meet the world's energy needs while realising its domestic decarbonisation goals as soon as possible.

Feedback from consultation

Ongoing consultation and engagement domestically and internationally (detailed in section 5) have re-iterated the urgent need for an Australian Government-led scheme to attract investment, support economic growth, unlock trading opportunities and partnerships, and meet industry expectation. Renewable energy stakeholders continue to emphasise the need for an enduring mechanism to certify renewable electricity to be implemented in 2024 or shortly after to provide certainty to support long-term investment and prevent other schemes from emerging.

Stakeholders emphasise the benefits from a government-led scheme including increased credibility and increased alignment with international standards and other Australian Government carbon reporting frameworks. While consultation on certain elements of the scheme has garnered diverging views from stakeholders, feedback has been consistent that a government led approach is preferred by industry. This has been the message from industry since the earliest consultation on potential options for a GO scheme in 2020.

Conclusion

The consistent feedback from our stakeholders on their preference for a government-led scheme aligns with the results of our analysis. There are significant net benefits to participation under option 3 when the economic, industry growth, and integrity benefits are factored in.

This is particularly evident when contrasted with options 1 and 2, where the reduced initial burden is significantly outweighed longer term by the lost opportunities for a streamlined and centralised framework that enables high-volume, high-integrity certification creation that is compatible with domestic and international requirements.

7. How will you implement and evaluate your chosen option?

The implementation objectives are similar to the policy objectives set out in Chapter 2. These include

- Provide emissions information that is transparent, trusted and accurate to:
    - be recognised by each country with which Australia may wish to trade low-emissions products.
    - be used to help verify eligibility for relevant government incentives made available to Australian industry, for example in relation to renewable electricity and the production of hydrogen.
    - enable and encourage domestic markets for renewable electricity and low-emissions products by enabling Australian producers and consumers to make robust claims about the products they make and use.

Implementation of a GO scheme will be a cooperative inter-agency effort between DCCEEW and the CER. GO Scheme implementation can be broken down into three broad streams:

1. **Legislation and methodologies (DCCEEW lead)**

New legislation (primary and subordinate) would be required to implement the scheme and to provide administration and enforcement powers to the CER. New methodologies will need to be developed as the scheme expands to incorporate new products.

2. **IT systems (CER lead)**

New IT systems will need to be built and developed for the CER to be able to properly administer the scheme. This will include application portals, registries and transfer systems, assessment risk engine tools and other related systems. These systems will undergo pre-implementation testing to determine if the requirements are met, to capture end-user feedback and iterate on the system's design. Testing will be conducted with external end-users (industry stakeholders) by staff from both CER and DCCEEW.

3. **Stakeholder engagement (shared)**

Additional to the stakeholder engagement that has already occurred, further consultation will be undertaken on the development of detailed carbon accounting methodologies and IT system design. The GO scheme has numerous and diverse stakeholder groups. As such, CER and DCCEEW will approach this task through an engagement plan which outlines all key stakeholders, which agency is responsible for engaging with each stakeholder, and what specific strategy will be employed to target/inform that stakeholder group.

Implementation risks

There are a range of implementation risks to the success of the scheme involved with each work stream that need to be managed. These have been detailed in the table below. This table helps identify the source of these risks and helps to establish the extent to which that source plays a contributory role, either in terms of the likelihood of the risk occurring and/or its impact.

Table 4: Implementation risk table

Risk	Likelihood	Impact	Mitigation
The GO scheme does not provide the integrity, and transparency needed by low emissions and renewable energy product consumers	Unlikely	1. GO scheme will not meet the needs of stakeholders and may not be used. 2. Australia's reputation as a supplier of renewable and low emissions products may be negatively affected. 3. Markets will be negatively impacted by a lack of reliable, transparent information.	1. High levels of data transparency are a feature of the scheme (while managing confidential data). 2. Easy to access and understand registers and public information, reinforced by extensive outreach and education 3. Effective compliance and risk management using data matching, compliance tools, communication of compliance outcomes and verification/monitoring. 4. Emissions accounting that aligns with international and domestic carbon accounting regimes. 5. Outreach and education program for participants.
Value derived from the scheme does not outweigh the costs of participation (i.e. the scheme does not deliver net benefits).	Unlikely	1. GO scheme will not meet the needs of all stakeholders and the scheme may not be used. 2. Markets will be negatively impacted by a lack of reliable, transparent information.	1. DCCEEW has undertaken extensive external consultation via three public consultations as well as an ongoing trial process run by the CER. 2. The consultation documents released in September 2023 explicitly asked for feedback on whether the regulatory burden of the scheme is appropriate. 3. Continued stakeholder engagement on the development of subordinate instruments. 4. Outreach and education program for participants.
Scheme is misaligned with international approaches or not accepted by export markets	Unlikely	1. The scheme will not meet the needs of stakeholders seeking to trade products internationally. 2. May impact potential trade opportunities in low-emissions products	1. DCCEEW has been engaging both multilaterally and bilaterally on the design of the scheme to ensure acceptance by international markets: 2. DCCEEW has taken a lead role in the development of internationally aligned emissions accounting methodologies trough IPHE and the GO scheme is closely aligned with this work. 3. DCCEEW is co-leading the IPHE Certifications Mechanism Taskforce looking at harmonisation and interoperability of certification schemes. 4. DCCEEW will continue to be engaged in other multi-lateral forums looking at the harmonisation of hydrogen regulations, codes and standards.

Risk	Likelihood	Impact	Mitigation
			5. DCCEEW has been and will continue to engage bilaterally to ensure acceptance of our approach with key trading partners. 6. DCCEEW will seek to develop bilateral studies with trading partners to analyse the interoperability of certification schemes.
Risk of fraudulent activity, leading to fraudulent claiming of incentives	Unlikely	1. Negatively impacts the reputation of the Australian Government and the GO scheme	1. High integrity controls and checking, such as submission of additional documentation, compliance action and other deterrence measures and regular audits.

Evaluating implementation success

Evaluating the success of the GO scheme will occur through internal engagement between DCCEEW and the CER, and in addition, will be undertaken through a formalised initial review proposed to commence within three years of scheme operation. Further evaluations will be conducted on an ongoing basis thereafter.

The initial review would focus on the integrity and effectiveness of the scheme design and any potential amendments to improve functionality. It would also consider whether the scheme continues to remain aligned with international developments.

The ongoing reviews would continue to assess the ongoing integrity, effectiveness and efficiency of the GO scheme and identify any potential amendments. This program of ongoing review would also provide a mechanism to track unintended consequences of the GO scheme. Any such unwanted impacts could then be addressed, whether through legislative or administrative amendments.

Metrics for these reviews would include:

- *GO scheme participation and production compared to total eligible domestic entities and production figures*. The proportion of overall hydrogen and renewable electricity business operating in Australia and associated production that has been certified under a GO Scheme. This could help to evaluate the perceived attractiveness and value of the scheme across different sectors.
- *GO scheme data interoperability and level of usage with other domestic schemes and government incentives.* Data from the GO Scheme is used as an evidence base and metric for a range of other existing schemes and incentives such as Hydrogen Production Tax Credits. The effectiveness of this interaction could be measured by the number of functions GO data is being used for and the number of transactions this amounts to. This could also be measured quantitively through stakeholder feedback.
- *International acceptance and reputation of GO scheme and certificates*. This could be measured by export trade figures by jurisdiction for products covered under the GO Scheme. It would be quantified through the number of formalised multi/bi-lateral trade agreements in place that leverage GO scheme data and certificates. This could also be measured subjectively based on reports, media articles or other indicators that refer to the reputation of products covered under the GO Scheme on the export market.
- *Comparison of certified product trade flows against products from countries with no certification scheme, or industry-led schemes only*. Comparing export figures, or equivalent product prices, between countries with government-led certification and those without could also provide a foundation for measuring the success of an Australian GO scheme compared to other government-led schemes.

Appendix (i) - Comparison and interactions between Australian Government GO Scheme and other schemes

Table 5: National Emissions Accounting schemes summary

	National Greenhouse and Energy Reporting scheme	Safeguard Mechanism
Scheme purpose	The NGER scheme supports and informs Australia's greenhouse gas inventory and international reporting obligations under the UNFCCC. It is also used to track progress towards emissions reduction commitments and help to inform on emissions reduction policy, programs and activities.	The Safeguard Mechanism requires Australia's largest greenhouse gas emitters to keep their net emissions below an emissions limit.
Scheme coverage	The NGER scheme is a national emissions accounting framework which covers emissions produced at a facility-level.	Applies to facilities with scope 1 emissions of over 100,000 tonnes annually
Similarities to GO scheme	An emissions accounting function	Leverages NGER scheme data
Differences to GO scheme	• NGER scheme is facility level emissions accounting whereas GO scheme is product-level emissions accounting. • Thresholds are in place for NGER facilities, exceeding this threshold means you are legally obligated to provide information to NGERs.	• Mandatory scheme which sets a baseline for scope 1 facility emissions. • Covers scope 1 emissions at the facility level whereas GO incorporates measurement and reporting across scope 1, scope 2 and partial scope 3 at the product level.
Interactions with GO scheme	• Where there is an overlap between the GO scheme and NGER for a facility reporting under both schemes, the aim is to align the GO measurement and emissions approach with the NGER prescribed approach.	• GO scheme allows low emissions producers, some of whom will be covered by the Safeguard Mechanism to verify the emissions intensity of their production on a product basis.

Table 6: Incentive schemes summary

	Hydrogen HeadStart	Hydrogen Production Tax Incentive (HPTI) (proposed)	NSW Renewable Fuel Scheme	WA Renewable Hydrogen	GreenPower Renewable Gas Certification Pilot
Scheme purpose	The program is intended to accelerate the technical and commercial viability of renewable hydrogen production in Australia.	To incentivise renewable hydrogen production for eligible Australian resident corporations with a time-limited and demand driven refundable tax offset.	To create a financial incentive for the production and consumption of green hydrogen within NSW	To require a percentage of electricity generated in the South West Interconnected System (SWIS) to be fuelled by renewable hydrogen.	To establish a voluntary market for renewable gases starting with biogas, biomethane and renewable hydrogen.
Scheme coverage	The program focuses on high value, high-quality and large-scale renewable hydrogen production projects. Aims to catalyse Australia's hydrogen industry to take advantage of Australia's unparalleled opportunity to be a global hydrogen leader. Projects can apply for a production credit delivered over ten years to bridge the gap between the cost of producing renewable hydrogen and the market price. The GO Scheme will be used to verify the production volume and renewable electricity requirements.	The incentive is proposed to provide $2 per kilogram of hydrogen produced for up to ten years, between 1 July 2027 and 30 June 2040, to eligible renewable hydrogen producers. The GO Scheme will be used to verify production volume and emissions intensity requirements in order to claim the incentive.	Sets a target for hydrogen production in each compliance period. Creates a tradeable certificate. Gas retailers and end users that are not retail customers will be required to purchase and surrender RFS certificates to demonstrate compliance with a mandatory target.	Currently at the detailed design phase, proposed to include a Renewable Hydrogen Electricity Generation Certificate for the SWIS which would be created for every MWh of electricity generated via the combustion of renewable hydrogen	Enables network-connected commercial and industrial gas customers to offset their gas use with Renewable Gas Certificates (RGCs).
Differences to GO scheme	With the exception of the Greenpower scheme, these schemes are not emissions accounting schemes; They are intended to incentivise a specific low emissions activity.				
Interactions with GO Scheme	The GO certificates may be an input into these schemes, providing a mechanism to identify hydrogen that is eligible for participation and create unbundled certificates based on the GO certificate information. Noting the GO scheme will expand to products beyond hydrogen.				

Table 7: Voluntary carbon neutral schemes summary

	Climate Active	Corporate Emissions Reduction Transparency Report	Mandatory climate-related financial disclosures
Scheme purpose	Climate Active is an Australian Government program that encourages business decarbonisation through certifying voluntary climate Action. Under current settings, to achieve certification, participating businesses must meet the requirements of the Climate Active Carbon Neutral Standard, which requires them to measure emissions, develop and maintain an emissions reduction strategy, offset remaining emissions using eligible offset units, and verify and publicly report their emissions. Certification is currently available for organisations, products, services, buildings, events and precincts.	The Corporate Emissions Reduction Transparency (CERT) report is a voluntary initiative for eligible companies to present a snapshot of their climate-related commitments, progress and net emissions position.	To improve the quality of climate-related financial disclosures, providing Australians and investors with greater transparency and more comparable information about an entity's exposure to climate-related financial risks and opportunities and climate-related plans and strategies.
Scheme coverage	Voluntary certification available for businesses.	Voluntary participation for NGER participants above the reporting threshold (50kt combined scope 1 and scope 2 emissions)	Large entities that are required to prepare and lodge annual reports under Chapter 2M of the Corporations Act will be required to disclose information about climate-related risks and opportunities. Coverage will be phased subject to entity size (revenue/gross assets/employee numbers) over a four-year period.
Similarities to GO scheme	Climate Active and GO scheme both require emissions accounting.	Enables market-based scope 2 emissions and renewable electricity use reporting to support companies who are looking to demonstrate performance against their emissions reduction and renewable electricity targets. Covers NGER controlling corporations	Both schemes seek to provide transparency and help support Australia's reputation as an attractive destination for international capital, and help draw the investment required for the transition to net zero.

Differences to GO scheme	Climate Active currently only certifies carbon neutral claims that meet the requirements of the Climate Active Carbon Neutral Standard. Climate Active is currently open to a range of organisations, products, services, buildings, events and precincts. Following certification, businesses can use a trade mark (subject to approval) to communicate their claim to consumers.	GO certificates may be recognised in future to the same extent that they would be under NGER. However, under current arrangements NGER covers scope 1 and 2 emissions only, while a GO certificate captures emissions generated outside of the facility emissions boundary, i.e. scope 3 emissions from the perspective of the consuming NGER facility, the two would not intersect in a carbon accounting sense. There may be appetite in future to accept GO certificates towards evidencing against scope 3 targets in CERT.	Climate related financial disclosures are more focused on organisational governance and risk While both schemes cover scope 1, 2 and 3 emissions, climate-related financial disclosures record emissions information against targets (among other things) where product GO certificates are focussed on the emissions associated with products.
Interactions with GO scheme	Subject to future decisions and implementation, emissions information produced under the GO scheme may be able to be used as part of a business' reporting under Climate Active.	GO certificates may be recognised in the future as they would under NGER. However, under current arrangements NGER covers scope 1 and 2 emissions only, while a GO certificate captures emissions generated outside of the facility emissions boundary, i.e. scope 3 emissions from the perspective of the consuming NGER facility, the two would not intersect in a carbon accounting sense.	Reported GO scheme data may be used as an evidence base for an entity's climate-related financial disclosures regarding renewable electricity use or environmental attributes of products they use.

Appendix (ii) – Regulatory burden estimate

Regulatory costs of each implementation option

This appendix includes estimates of the costs for options 2 and 3 and outlines the key assumptions underpinning estimates and modelling. These estimates have been used to compare net benefit of the two options against the status-quo (Option 1).

There is no regulatory obligation for entities to comply with the quasi-regulatory (option 2) or regulatory (option 3) approaches proposed. This analysis seeks to capture the impact on businesses who choose to comply because they have some other motivation, including to facilitate international trade or to extract a "green premium" for low emissions products, as discussed in **Chapter 2**.

Methodology

These estimates have been prepared consistent with the Australian Government Regulatory Burden Measurement Framework (RBMF). Administrative costs for each business activity are calculated hourly, based on an individual worker completing each step and the level of information required. Substantive compliance costs are expressed as an overall financial cost borne by participant businesses.

The costs involved with each policy option are calculated by:

1. Identifying the key steps for business to comply with the regulatory options.
2. Estimating the burden and costs of each step.
3. Estimating annual costs for a single business, for initial and ongoing years
4. Compiling the annual costs scaled over a 10-year period.

Overarching assumptions

- For policy options 2 and 3, it is assumed that each participating business reports on a complete supply chain of a product (within a well-to-delivery gate scope). Labour estimates are conservative, assuming participants report information manually – as opposed to using automated reporting (e.g. via Application Programming Interfaces), even though it is likely that these efficiencies would be introduced for option 3.
- We have included labour as an administrative cost in line the RBMF and have calculated this as an hourly figure. These estimates use the default work-related labour costs ($79.63 per hour) listed by the OIA in their RBMF Guidance Note of May 2022. We have used the default due to uncertainty around labour rates in these emerging industries. Further speculation on this would likely add undue complexity to the costing process. The default rate cost will likely be an overestimate of costs to the average scheme participant. Businesses will likely realise lower administrative costs in practice.
- Participant numbers are approximate based on forecasts of industry growth. These forecasts consider current renewable electricity generators that participate in the RET, pipeline projects for hydrogen, renewable generators, and (for Option 3) the incorporation of other production pathways of hydrogen and products likely to be covered by the scheme over a 10-year period.

- The impacts on the specific sectors that the GO Scheme will expand will be added as addenda to this analysis. Sector wide cost estimates are calculated by applying activity modelling estimates to the single business regulatory costs over a 10-year period.

Exclusions

The following costs were excluded from these estimates:

- **Costs of delay:** Application and approval delays are excluded. Producers are not forced to await certificate approvals to trade their products meaning assessment times do not impact trade opportunities.
- **Direct financial costs:** Government charges to participate in the scheme have been excluded. The cost to administer the GO scheme would be completely cost recovered, including fees for direct services and levies to cover scheme-wide operational costs. Cost recovery would be phased to support nascent industries such as hydrogen.

Option 2: Quasi-regulatory approach

Calculations and assumptions

Quasi-regulatory approach only applies to hydrogen production.

As emissions accounting frameworks are already in place for renewable electricity generation, there is no consideration to introduce a quasi-regulatory policy approach to this sector. As such, the estimates in **tables 9 and 10** only cover projected costs to businesses producing the hydrogen and hydrogen derivatives that would be published in the model code. No additional low-emissions products are considered in these estimations.

Independent assurance

Some functions that would be performed by government under option 3 (for example, assessing the suitability of the facility and its metering and measurement arrangements to comply) and would instead be required from third-party audits under option 2. These substantive compliance costs would be borne by producers.

Producers would need to procure more frequent independent assurance of the emissions credentials of their products to ensure compatibility with domestic criteria and export requirements. For these estimates, we assume audits that provide this assurance will be done annually.

Assurance costs are likely to continually increase over time as the industry scales-up and demand for third-party verification increases. The time-scaled estimates in Table 8 however are calculated in present day terms in line with the requirements of the RBMF.

Individuals

Burden on individuals is not included in option 2 estimates as they are not envisaged to participate in the quasi-regulated production of hydrogen or hydrogen-related products.

Quasi-regulatory cost estimates (Option 2)

Estimates in the tables below examine the costs for a single hydrogen producer to operate without a government administered scheme but adhering to a model code.

Table 8 outlines implementation and ongoing annual costs to a hydrogen producer to operate under an emissions accounting framework aligned with a published model code. Estimates for record keeping and assurance burden and costs were provided by the CER based on participant data from similar schemes that they administer.

Ongoing annual costs include production related record-keeping and procurement of third-party assurance. This estimate assumes that hydrogen producers will likely spend less time on monthly record keeping under a quasi-regulated model due to being self-regulated. This would likely result in comparatively increased burden for producers and auditors when conducting annual reviews.

Table 8: Regulatory costs of a single producer under option 2

GO scheme activity	Number of hours involved per hydrogen producer	Cost per hydrogen producer
Establishing data collection processes	8	$637
Assurance reporting framework against model code	22	$1,752
Establishment cost total		**$2,389**
Production	N/A - During this period, not considered an administrative cost	
Production record keeping	48	$3,822
Annual Assurance in line with model code		
Production assurance	N/A	$18,480
Transport and storage assurance	N/A	$5,544
Review facilitation (including site visits and providing information to auditors)	8	$637
Ongoing annual total		**$28,483**

Table 9 compares the total costs per producer under the regulatory and quasi-regulatory approaches over a 10-year period in line with the RBMF. While initial costs under option 2 are initially lower, our estimates indicate that participants would likely experience decreased burden over the long-term under option 3.

Table 9: Comparison of regulatory costs of a single producer under option 2 and option 3

Year of participation	Cost per producer (option 2)	Cost per GO producer (option 3)
Initial year	$30,872	$56,260
Year 2	$28,483	$10,252
Year 3	$28,483	$10,252
Year 4	$28,483	$10,252
Year 5	$28,483	$10,252
Year 6	$28,483	$25,354
Year 7	$28,483	$10,252
Year 8	$28,483	$10,252
Year 9	$28,483	$10,252
Year 10	$28,483	$10,252
Annual average	**$28,722**	**$16,363**

Table 10 applies the per-participant costs to forecasts of producers of hydrogen and hydrogen derivative products under the quasi-regulatory approach to estimate total regulatory costs of obtaining certification over a 10-year period in line with the RBMF.

Table 10: Regulatory costs by sector (Hydrogen and derivatives) over 10 years, Quasi-regulatory Option

Year of participation	New producers	Total producers	Total Annual costs
Initial year	33	33	$1,018,776
Year 2	12	45	$1,310,403
Year 3	9	54	$1,559,583
Year 4	9	63	$1,815,930
Year 5	15	78	$2,257,509
Year 6	3	81	$2,314,290
Year 7	3	84	$2,399,739
Year 8	2	86	$2,449,538
Year 9	5	91	$2,603,898
Year 10	4	95	$2,715,441

Option 3: Regulatory approach

Calculations and assumptions

Audit costs

Audits are a required process under Option 3 to provide third-party assurance over the life cycle emissions and associated metering of each GO-certified product. Initial audits would ensure the information provided throughout the registration process is accurate. Latter audits would ensure ongoing measurement and reporting remains accurate and reflects any production changes. Audits are excluded from REGO Producer calculations under the assumption they will not be required by default.

Audits will be conducted by NGER qualified auditors to provide third-party assurance of the information reported under option 3. The costs of are borne by participant businesses and as such are captured as substantive compliance costs under the RMBF. Cost estimates are based on NGER Audit Cost Analysis in November 2022 provided by the CER. In their analysis, the CER identify that s74 NGER audits on average cost $56,014 each. They also identify average hours to be 212 hours (approx. 6 working weeks) with average hourly cost to be $264/hr. GO audits are anticipated to impose significantly less burden than NGER audits but are used as a guide in calculating these estimates due to their similarities.

The impact of audits varies between both GO and REGO producers. This reflects the level of information required for each, REGO producer familiarity with similar reviews, and considers that REGO audits only cover production information.

Individuals

As scheme participation does not mandate individuals to interact with government, there is no real regulatory burden to estimate. The steps involved for individuals who choose to participate with the scheme will be fundamentally the same as those for businesses though far less intensive. The costs to these individuals would be very low and have no material impact in the context of these estimates. For these reasons, the estimates for costs to businesses should be considered to include costs to individuals.

Regulatory cost estimates

The tables below detail the administrative costs for each step involved in participation with a legislated GO Scheme for a single GO and REGO producer.

Table 11 outlines the estimated administrative and compliance costs for producers to register with the GO scheme. These costs would be incurred as a one-off upon scheme participation. Initial registration with the scheme presents significant up-front burden to participants. Increased burden is attributed to GO producers due to the additional requirement to register post-production profiles and provide corresponding audits.

Values are included for REGO participation including and excluding audits. It is assumed that audits will not be required as this will better align with existing policy approach under the RET scheme, however these values are provided for reference.

Table 11: Enrolment, profile registration and initial LSTR costs (initial year of participation)

GO scheme activity	Number of hours involved per GO producer	Cost per GO producer	Number of hours involved per REGO producer	Cost per new REGO producer (inc. audits)	Cost per new REGO producer (no audits - aligned with RET)
Participant enrolment					
Completing online forms	2	$159	2	$159	$159
Fit and proper person information provision (e.g. ID)	2	$159	2	$159	$159
Preparatory data collection					
Gather profile data	8	$637	8	$637	$637
Profile registration					
Product profile	8	$637	8	$637	$637
Delivery profile	10	$796	N/A	N/A	N/A
Consumption profile	2	$159	2	$159	$159
Preliminary assessment of application and profiles	N/A - During this period, the only work is conducted by the CER				
Audits					
Production profile review (audit costs)	N/A	$18,480	N/A	$9,240	N/A
Delivery profile review (audit costs)	N/A	$9,240	N/A	N/A	N/A
Review facilitation (including site visits and providing information to auditors)	8	$637	8	$637	N/A
Final assessment of application, profiles and audits	N/A - During this period, the only work is conducted by the CER				
Total		**$30,905**		$11,629	**$1,752**

Table 12 outlines the estimated ongoing annual administrative cost for producers to participate in the scheme. This includes entering batch data to create GO certificates and an Annual Reconciliation Check (ARC). The range of frequency for GO certificate creation ranges between hourly and annually. For these estimates, we have assumed the producer is completing this activity monthly. Profile variations are required if a producer varies their production or post-production processes. The CER estimate that 15 per cent of participants will vary their profiles annually based on RET operational experience.

Table 12: Batch information, ARC, and profile variation costs (ongoing annual costs)

GO scheme activity	Number of hours per GO producer	Cost per GO producer	Number of hours per REGO producer	Cost per REGO producer
Production	N/A - During this period, the activity is not mandated by regulation			
Batch information				
Product batch	4	$319	4	$319
Delivery batch	4	$318	N/A	N/A
Consumption batch	1	$80	1	$80
CER assessment of certificates and batch data	N/A - During this period, the only work is conducted by the CER			
Total (monthly)		**$717**		**$398**
Total (annually)		**$8,600**		**$4,778**
CER produce Annual Reconciliation Check (ARC) report	N/A - During this period, the only work is conducted by the CER			
Producer conducts ARC				
Profile information	4	$319	2	$159
Batch information	8	$637	8	$637
Input certificate use	4	$319	N/A	N/A
Production changes since last LSTR	2	$159	2	$159
ARC Declaration				
Formal declaration	1	$80	1	$80
Submit declaration and evidence to CER	1	$80	1	$80
Total		**$1,593**		**$1,115**
Profile variations				
15% of participants to vary annually (5hr task)	0.75	$60	0.75	$60
CER assessment of ARC	N/A - During this period, the only work is conducted by the CER			
Ongoing annual total		**$10,252**		**$5,952**

Table 13 outlines the estimated annual administrative cost to producers to undertake audits required to maintain registration with the scheme. Audits would be done as part of the ARC within the first year of participation and every five years thereafter.

Table 13: Audit costs

GO scheme period	Number of hours involved per GO producer	Cost per GO producer	Number of hours involved per REGO producer	Cost per REGO producer*
Audit				
GO production + post-production review	N/A	$14,784	N/A	N/A
REGO production review	N/A	N/A	N/A	$9,240
Review facilitation (including site visits and providing information to auditors)	4	$319	4	$319
CER assessment of audit	N/A - During this period, the only work is conducted by the CER			
Total		**$15,103**		**$9,559**

*** Note: Limited scope technical review audits are not anticipated to be required for REGO participants**

Table 14 incorporates the total cost estimates per GO and REGO producer for each year of participation with the scheme over a 10-year duration in line with the RBMF. While initial burden is estimated to be quite high, option 3 becomes less burdensome over time and yields long-term efficiencies to participants. This reduction in burden in the long-term is explored in further detail in Table 10 where these costs are compared to those estimated under option 2.

Table 14: 10-year costs PGO and REGO

Year of participation	Cost per GO producer	Cost per REGO producer
Initial year	$56,260	$7,704
Year 2	$10,252	$5,952
Year 3	$10,252	$5,952
Year 4	$10,252	$5,952
Year 5	$10,252	$5,952
Year 6	$25,355	$5,952
Year 7	$10,252	$5,952
Year 8	$10,252	$5,952
Year 9	$10,252	$5,952
Year 10	$10,252	$5,952
Total	$163,634	$61,275
Annual average	**$16,363**	**$6,128**

Table 15 estimates future participant numbers and total regulatory cost to the hydrogen sector to comply with the scheme over a 10-year period. This includes participants producing hydrogen derivatives (such as ammonia) as well as hydrogen production methods that will not be initially covered in the scheme but may be added over time.

Table 15: Regulatory costs by sector (hydrogen and hydrogen derivatives) over 10 years, Regulatory Option

Year of participation	New GO participants (Hydrogen and derivatives)	Total GO participants (Hydrogen and derivatives)	Total annual costs
Initial year	33	33	$1,856,580
Year 2	12	45	$1,013,436
Year 3	9	54	$967,680
Year 4	9	63	$1,059,948
Year 5	15	78	$1,489,776
Year 6	3	81	$1,466,835
Year 7	3	84	$1,180,428
Year 8	2	86	$1,109,615
Year 9	5	91	$1,298,899
Year 10	4	95	$1,384,517

Table 16 outlines the total regulatory costs to other sectors to comply with the scheme. Participant number forecasts are based on current production data collated by the CER. The spike in REGO producers in Year 5 reflects the scheduled sunset of the RET where most RET participants are expected to transition into the GO scheme during this corresponding year. RET participants are not expected to participate in the scheme until 2024-25 due to proposed start dates and the existing RET.

Table 16: Regulatory costs by sector (other products, renewable electricity) over 10 years, Regulatory Option

Year of participation	New GO participants (Other products)	Total GO participants (Other products)	Total annual costs	New REGO participants	Total REGO participants	Total Annual REGO costs
Initial year	0	0	-	383	383	$2,950,710
Year 2	7	7	$393,820	202	585	$3,835,996
Year 3	8	15	$521,844	219	804	$5,169,341
Year 4	22	37	$1,391,500	166	970	$6,064,581
Year 5	34	71	$2,292,164	306	1276	$8,131,258
Year 6	28	99	$2,303,172	2869	4145	$29,698,546
Year 7	31	130	$2,864,729	223	4368	$26,390,497
Year 8	34	164	$3,366,424	218	4586	$27,679,348
Year 9	23	187	$3,307,574	201	4787	$28,845,987
Year 10	26	213	$3,893,386	210	4997	$30,111,746