MINISTRY OF BUSINESS, INNOVATION AND EMPLOYMENT

Regional Hydrogen Industry Transition
Project Indicative Business Case (IBC)

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PREPARED FOR:	The Treasury
DATE:	06 December, 2022
VERSION:	1.0
STATUS:	FINAL
TEMPLATE VERSION:	Original

Executive Summary

The Regional Hydrogen Industry Transition project gives effect to a key plank of the Government's 'just transition' election commitment while also contributing to two strategic objectives. The Southland just transition process aims to *"help Southland build its economic, environmental and social resilience through and beyond the planned closure of the New Zealand Aluminium Smelter in December 2024"*. This initiative gives effect to this work plan, while also contributing to the Government's objectives of decarbonising hard-to-abate sectors, and delivering economic resilience through diversification.

The Regional Hydrogen Industry Transition (RHIT) project will create high value jobs by supporting early adopters of hydrogen as a fuel and industrial feedstock. Hydrogen is emerging as an important technology in the energy transition. Supporting early adopters will build skills, knowledge and capabilities which can be scaled as hydrogen technology reduces in cost. This staged approach is complimentary to, and can inform the development of, the Government's wider energy strategy.

The proposed initiative will accelerate uptake of green hydrogen as an alternative to fossil fuels in just transition regions. Hydrogen producers have identified the price gap with fossil fuels as largest barrier to scaling the market. This gap is the result of high cost of capital and input costs. Through a consumer rebate for green hydrogen, the project will provide industry with forward price certainty by bridging this commercial gap over the medium-term. In this way, government will support counterparties to transition from fossil fuels to green hydrogen. Establishing this market will decarbonise hard-to-abate sectors, create good jobs, build economic resilience, Free and frank opinions [redacted]

The anticipated output of the Regional Hydrogen Industry Transition project is one or more long-term contracts between the Crown and a counterparty engaged in the productive use of green hydrogen. These contracts will support industry to grow end-use demand and drive the development of a broader hydrogen supply chain, including renewable generation and hydrogen production.

The proposed recipient selection process is an opportunity to support iwi social and economic ambitions. The model also includes the use of third-party benefit sharing provisions, ensuring the Crown's investment delivers on broader regional and national transition outcomes.

The total cost of the Regional Hydrogen Industry Transition project is $212.112m over 12 years.

STRATEGIC CASE

In its 2020 election manifesto, the Government committed to a 'just transition' process for Southland in light of Rio Tinto's announcing it would close NZAS. The community-led process developed a workplan with a goal to *"help Southland build its economic, environmental and social resilience through and beyond the planned closure of the New Zealand Aluminium Smelter in December 2024"*. The community's plan identified clean energy as a regional priority, with the goal of developing new renewable generation and a hydrogen economy, creating high value jobs and economic diversification.

The strategic objective of the Regional Hydrogen Industry Transition (RHIT) project is to support the emergence of a domestic, commercial green hydrogen market. This scaled and targeted initiative will assist early adopters to catalyse this emerging industry through a targeted consumer rebate, reducing consumption costs. This will deliver on the dual objectives of supporting:

- Regional just transitions, by creating good, low-carbon jobs, building regional economic resilience, and delivering concrete economic and social outcomes for Māori.
- Aotearoa/New Zealand's equitable transition, by incentivising investment in renewable generation and establishing a model for decarbonising hard-to-abate industries nationwide.

The RHIT will also deliver on key Government strategies, including the Emissions Reduction Plan, the Government's Economic Plan, the Hydrogen Roadmap, and the Gas Transition Plan.

ECONOMIC CASE

In recent years government has supported the hydrogen sector through ad-hoc grants and structured loan and equity investments. Though this approach has delivered a number of early initiatives, it requires extensive project engagement, while not resolving the fundamental "missing market" problem faced by the sector. Numerous hydrogen sector interests have reported that the cost of hydrogen to consumers currently remains a significant barrier to uptake. A new approach is needed to support the industry's scaling-up.

The RHIT project moves beyond subsidised capital investment to drive development of the broader hydrogen supply chain, from renewable generation and hydrogen production to a diversity of end-uses. This outcome will be achieved through a targeted consumer price rebate, reducing costs of consuming green hydrogen. A consumer rebate also imposes greater discipline in the supply chain.

To this end, the RHIT project will use long-term rebate contracts for to bridge the commercial gap for end-users, bringing forward uptake. This model also supports the use of third-party benefit sharing provisions in contracts, ensuring the Crown's investment delivers broader regional and national transition outcomes. The preferred approach has been tested and refined through ongoing engagement with industry and project partners, including iwi.

COMMERCIAL CASE

Based on our engagements, we believe there is sufficient market interest to run an Expression of Interest (EoI) or competitive selection and appointment process for participation in a sector support mechanism. Kānoa - Regional Economic Development & Investment Unit (RDU), and the Procurement and Commercial Projects team will support the delivery of an EoI/competitive selection process.

The anticipated output of the process is one or more long-term agreements between the Crown and a counterparty engaged in the productive use of green hydrogen. The purpose of the contract is to provide the counterparty with forward input cost certainty to support the uptake of green hydrogen as an alternative fuel or feedstock and on this basis, make appropriate infrastructure investments.

The structure of the procurement process and subsequent contract provides opportunity to foster positive relationships with Māori and drives positive broader outcomes throughout the value chain.

FINANCIAL CASE

Based on current estimates, anticipated cash flows for the initiative are as set out in the table below.

$MILLIONS	*2023/24*	*2024/25*	*2025/26*	*2026/27*	*……..*	TOTAL
CAPITAL	0.01m	0m	0m	0m	0m	0.1m
OPERATING	3.158m	13.109m	21.009m	21.009m	151.791m	210.076m
TOTAL	3.668m	13.609m	21.509m	21.59m	152.013m	212.086m

In addition to $2m met from existing appropriations (Supporting Just Transitions), MBIE intends additional funding required ($210.102m) is sought from the Climate Emergency Response Fund.

MANAGEMENT CASE

The project will be delivered in phases, utilising the various project implementation and delivery capabilities across MBIE, and adopting a cross- organisational governance structure.

An initial inception phase will be led by the Economic Development and Transitions Branch, working closely with MBIE's Procurement and Commercial team, to run a competitive selection and appointment process. Following selection of eligible rebate recipients, the operational aspects of payments administration, monitoring, reporting and verification will transfer to Kānoa - RDU.

The Project will be led by a Project Board with representation from relevant parts of MBIE.

The Strategic Case – Regional Hydrogen Industry Transition

This document informs the development of a hydrogen consumption rebate to support the transition to a low-carbon, high-wage economy: the *Regional Hydrogen Industry Transition* project. The strategic objective of the Regional Hydrogen Industry Transition project is to support the emergence of a domestic, commercial green hydrogen market, including new renewable generation.

Establishing this market will displace fossil fuels in hard-to-abate sectors, create good jobs, build economic resilience, Free and frank opinions [redacted] The project will provide industry with forward price certainty by bridging the commercial gap between fossil fuels and green hydrogen over the medium-term. In this way, government will support counterparties to transition from fossil fuels to green hydrogen.

Sector engagement to date has highlighted the central importance of hydrogen demand in catalysing downstream development. The Regional Hydrogen Industry Transition project aims to move beyond subsidised capital investment to drive the development of the broader hydrogen supply chain, from renewable generation and hydrogen production to a diversity of end uses.

The price gap between green hydrogen and fossil fuels is expected to close in coming years, as electrolyser efficiencies improve, and capital costs decline[1]. The Regional Hydrogen Industry Transition project will bring forward activity we expect to become commercially viable in the next ten-to-15 years.

Accelerating uptake of green hydrogen will address the dual objectives of supporting:

- Regional just transitions by creating good, low-carbon jobs, building regional economic resilience, and delivering concrete economic and social outcomes for Māori.
- Aotearoa/New Zealand's equitable transition by incentivising investment in renewable generation and establishing a model for decarbonising hard-to-abate industries nationwide.

In addition to delivering the government's transition goals, the Regional Hydrogen Industry Transition project aligns closely with the Minister of Finance's Budget23 wellbeing objectives – particularly just transitions, the future of work, and lifting Māori and Pacific outcomes.

The need to deliver the Regional Hydrogen Industry Transition project in the near-term is driven by the actions of NZAS' owners, Rio Tinto. In July 2020, Rio Tinto announced its intention to close NZAS in 2021, throwing the region, and electricity markets, into turmoil. Following negotiations, this closure timeline was pushed out to 2024, and Rio Tinto have subsequently signalled their interest in continuing to operate beyond this date.

In response to the closure announcement, the Government committed to support Southland through a just transition. The goal of the just transition is to respond to the impacts of NZAS' vacillating commitment to the region; both the threat of an abrupt closure, and longer-term economic and community uncertainty. Southlanders identified clean energy and hydrogen as key to diversifying and decarbonising the region. Through the Regional Hydrogen Industry Transition project, government can reassure the community these challenges are being addressed.

The Government has also committed to international emission reduction targets in line with the Paris Agreement, and domestic targets, as set out the Climate Change Response (Zero Carbon) Amendment Act 2019. Meeting these targets will require action to decarbonise hard-to-abate sectors. Delivering this goal requires long lead times, development of industry capabilities, skills, and supply chains. The proposed approach is a targeted and scaled approach focused explicitly on early adopters. This approach is complimentary to, and can aid the development of, wider national energy strategy by:

- Informing the development of the Hydrogen Roadmap, including future government policies.
- Enabling scaling of the hydrogen sector as the technology matures and reduces in cost.

Finally, enabling Māori aspirations is a central component of the Regional Hydrogen Industry Transition project. Through the use of innovative contracting mechanism, government can ensure counterparties work with iwi to deliver concrete social and economic outcomes. This mechanism could serve as a blueprint for similar programmes in future.

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[1] https://www.mbie.govt.nz/dmsdocument/20118-new-zealand-hydrogen-scenarios-pdf

STRATEGIC CONSIDERATIONS

In light of this context, the Regional Hydrogen Industry Transition project has two key requirements:

1. A market-based industry support mechanism.
2. A benefit sharing mechanism.

The goal of delivering the first of these requirements is to support the emergence of a viable hydrogen industry and new renewable generation in just transition regions. The goal of delivering the second requirement is to ensure social, commercial and economic benefits of the Regional Hydrogen Industry Transition project are shared with iwi and the community.

The Regional Hydrogen Industry Transition project will benefit just transition regions through increased employment, earnings and subjective wellbeing. Nationally, Aotearoa/New Zealand will benefit from decarbonisation of hard-to-abate sectors and greater renewable energy generation.

Despite the potential benefits, the Regional Hydrogen Industry Transition project comes with risks. The intervention may lead to a localised rise in housing costs, a temporary decrease in road safety, and a decline in perceived environmental quality. Government will need to proactively monitor these impacts and mitigate where necessary.

There are four key constrains to our work: the availability of funds, the number of market participants, technology and process inputs. If these constrains emerge as decisive, they could limit the impact of the Regional Hydrogen Industry Transition project. Likewise, the project depends on consenting regimes and supply chains supporting timely development. We will work with industry, central and local government, and Ministers to limit any negative impact of these dependencies and constraints.

The development of this business case also highlighted the Regional Hydrogen Industry Transition project's core assumption: *There is a role for green hydrogen in New Zealand's future energy system*. To complete the IBC we made a number of other assumptions covering future demand, commercial sophistication of counterparties, and the availability of viable hydrogen projects. We are aware of the potential impact on project effectiveness should any of these assumptions prove inaccurate, and will incorporate mitigation efforts into the design of the Regional Hydrogen Industry Transition project.

WHY NOW?

Timing for the Regional Hydrogen Industry Transition is critical. MBIE's New Zealand Hydrogen Scenarios report argues *"New Zealand will have to act quickly to capitalise on the potential to be a low cost, early supplier of hydrogen, but could miss out if it lags."*[2]

Bringing forward investment in a green hydrogen sector will contribute to the Government's goal of becoming a high wage, low emission country which honours Te Tiriti. Seizing these long-term opportunities requires short-term action. Private sector investment alone will not deliver industry growth in the timeframes required. Government can set the sector up for long-term success by supporting near-to-medium term development.

Uncertainty over the future of NZAS, and the delivery of the Southland just transition work plan, mean Budget23 is the right time to invest in the Regional Hydrogen Industry Transition.[3] To deliver the project in the timelines set out below, non-policy spending cannot be deferred. Firms require lead time to acquire finance, skills, plant and consents, particularly given global supply-chain disruptions. Without certainty that the Regional Hydrogen Industry Transition will be delivered, counterparties will not engage seriously in a market sounding or tender process. Communicating and committing funds to the Regional Hydrogen Industry Transition project sends a clear signal to industry that government is serious about supporting the sector's long-term success.

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[2] https://www.mbie.govt.nz/dmsdocument/20118-new-zealand-hydrogen-scenarios-pdf

[3] https://southlandjusttransition.nz/wp-content/uploads/2022/01/7406-LSE-Sthland-Just-Transition-Work-Plan-v4-1.pdf

ORGANISATIONAL OVERVIEW

MBIE's Just Transitions Partnerships (JTP) team will be the core party in the delivery of the Regional Hydrogen Industry Transition project. JTP will deliver policy advice, design the project, support implementation, and be the lead engagements with internal and external stakeholders.

To meet service requirements and objectives, JTP will rely on support from within MBIE, including:

- As experts in the field, the **Energy & Resource Markets** branch will provide policy advice to ensure project alignment with the government's wider energy policy.
- MBIE's regional investment arm, **Kānoa-RDU**, will provide investment and due diligence advice, and assist with the tender and procurement process.
- Given experience leading large, complex procurement processes, the **Procurement and Commercial Projects** team will support delivery of the tender process, and ensure alignment with the government's procurement policies.

The process will also be supported by external parties. These groups will facilitate particular parts of the project. MBIE will outsource to these groups where there is no internal capability, and it would not be prudent to hire more FTE. The external groups include:

- A private law firm will design the contracts which operationalise the Regional Hydrogen Industry Transition. We will work with MBIE legal to minimise the need for external legal services, though note the nature of the contracts will likely require specialised expertise.
- Expert financial consultants will prepare models and costings for the project to support decision making. Consultants may also provide deal advisory services to the Crown during the negotiation phase of the project.

INPUTS, ACTIVITIES, OBJECTIVES, OUTCOMES, AND IMPACTS

Inputs

- $210 Million over 10-15 years
- 3 FTE over baseline

Activities

- Iwi are actively involved in the process
- Rebate is developed and funded and delivered successfully
- A competitive procurement and contracting process is undertaken
- Compliment existing government programmes

Objectives

- Commercial consumption of hydrogen
- Increased regional electricity demand

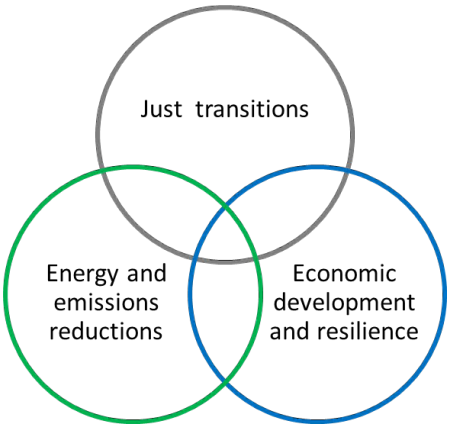
Outcomes

- The subsidy catalyses additional hydrogen offtake and enables new green industry
- Stronger investment environment for renewable electricity generation

Impacts

- Just Transition
  - New clean high wage jobs
  - Resilient regional economies
  - Reduced regional reliance on singular industries
  - Iwi ambitions are realised in the clean energy and hydrogen sectors
- Equitable Transition
  - Decarbonisation of hard to abate sectors
  - New renewable electricity generation in the just transition regions

CONTRIBUTION TO EXISTING STRATEGIES



Just/Equitable transitions

- The Regional Hydrogen Industry Transition project supports the delivery of an **equitable national transition**, as set out in the **Emissions Reduction Plan** by:
    - Supporting economic development and diversification in new clean industries.
    - Addressing one of the key causes of high wholesale electricity prices, reducing the costs of the transition for individuals and firms.
- The Regional Hydrogen Industry Transition project supports the delivery of the **Southland just transition work plan,** which identified clean energy and hydrogen as key opportunities for diversifying the region's economy.

Energy and emission reductions

The emergence of a green hydrogen industry in Aotearoa/New Zealand can contribute significantly to the national transition to 100% renewable energy. Through displacing fossil fuels in hard-to-abate sectors, providing demand response, and underwriting new generation, green hydrogen can complement moves to decarbonise the wider energy system. Despite this promise, government needs to ensure development occurs strategically, at appropriate scale, and in a planned fashion. Unplanned large-scale hydrogen development can pose risks to an orderly transition. These risks include:

Overdevelopment of electrolysis capacity in inappropriate locations – Developing large-scale electrolysis in regions with tight wholesale markets or constrained transmission risks driving up wholesale and consumer prices.

Development of large-scale electrolysis capacity without new generation – Developing electrolysis capacity without corresponding new generation may increase wholesale prices.

The preferred approach set out in the economic case below has been developed specifically to alleviate and respond to these two risks. Eligibility for large-scale projects participating in the scheme will be limited to Southland, which has an isolated grid and extensive renewable energy resources. The preferred approach eliminates the risks of over developing electrolysis capacity in the tighter North Island wholesale market. Similarly, counterparties will be required to contractually source new generation, or grid services, as part of any development. This requirement will ensure the Regional Hydrogen Industry Transition project mitigates the impact of inefficient consumption.

When developed at an appropriate scale in strategic locations, the deployment of electrolysers in the grid also presents an opportunity to study and understand the impact and opportunities of hydrogen production on the grid and wholesale electricity markets.

Detailed design work on these mitigations will be done in close collaboration with MBIE's Energy and Resource Markets branch to ensure alignment between the Regional Hydrogen Industry Transition project with the wider energy policy system.

- The **Emission Reduction Plan** sets out how Aotearoa/New Zealand will meet the targets legislated in the Climate Change Response (Zero Carbon) Amendment Act 2019. Projects supported through the Regional Hydrogen Industry Transition could contribute to meeting the goals set out in the Energy and Industry, and Transport chapters of the Plan.
- The **Gas Transition Plan** will outline steps to decarbonise and reduce reliance on fossil gas, while supporting an equitable transition for those affected. The Regional Hydrogen Industry Transition can contribute to this goal by providing alternative feedstock to firms relying on fossil gas, and alternative jobs for oil and gas workers.
- **MBIE's Hydrogen Roadmap** will inform the development of a national hydrogen economy. The Roadmap is in active development, with a draft due in 2023, and a final document complete by 2024. The development and delivery of the Regional Hydrogen Industry Transition project is an opportunity to better understand the sector, and support the emergence of a right-sized national hydrogen industry.

Economic resilience and development

- The purpose of the **Government's Economic Plan** is to guide the development of a high-wage, low-emisisons economy that provides economic security in good times and bad. The Regional Hydrogen Industry Transition project, by diversifying local economics and supporting the emergence of new, low-carbon industries in emerging sectors, while reducing reliance on imported fossil fuels, will contribute the realising the Economic Plan's goals.
- MBIE's strategy, **Te Ara Amiorangi,** aims to grow New Zealand for all. The Regional Hydrogen Industry Transition project will support Aotearoa/New Zealand's growth and productivity in partnership with affected communities. In particular the investment enables economic diversification and will use a bespoke benefit sharing model to deliver iwi ambitions.

STAKEHOLDERS ANALYSIS

Through discussion with industry and the sector, we have identified the following interested parties.

Stakeholders/partners

- **Ngāi Tahu and Te iwi o Taranaki –** MBIE will work with iwi to design the benefit sharing components of the Regional Hydrogen Industry Transition project. Representatives of Ngāi Tahu have been closely involved in developing the concept set out in this document, including through leadership of the clean energy stream of the Southland just transition work plan.
- **Electricity generators/retailers –** Activities supported through the Regional Hydrogen Industry Transition project will require electricity supply, and may need to contract for new generation. Generators and retailers will play a key role in facilitating these outcomes.
- **Southland just transitions Enduring Oversight Group (EOG) –** The EOG is the governance body of the Southland just transition. The group are responsible for delivering the just transition work plan, including the clean energy stream. The EOG are a key stakeholder as they can support the Regional Hydrogen Industry Transition project to meet wider transition goals.
- Negotiations [redacted]

- Negotiations [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

	LEVEL OF INTEREST	
POWER TO INFLUENCE THE DECISION	**LOW**	**HIGH**
LOW	*MINIMAL EFFORT* Academics	*KEEP INFORMED* The EOG
HIGH	*KEEP SATISFIED* Electricity generators/retailers Major hydrogen technology providers	*KEY PLAYERS* Iwi Māori (Ngāi Tahu and Nga Iwi o Taranaki). Potential counterparties

INVESTMENT OBJECTIVES, EXISTING ARRANGEMENTS & BUSINESS NEEDS

INVESTMENT OBJECTIVES

The fundamental investment objective of the Regional Hydrogen Industry Transition project is to support the development of a hydrogen industry in just transition regions. This high-level objective as two key drivers:

DELIVER REGIONAL JUST TRANSITIONS	CONTRIBUTE TO AOTEAROA/NEW ZEALAND'S EQUITABLE TRANSITION
• Create new low-carbon and high-wage jobs. • Develop new green industry. • Diversify the regional economy. • Build economic resilience. • Support regional innovation. • Free and frank opinions [redacted] • Deliver concrete social and economic outcomes for Māori.	• Decarbonise hard-to-abate sectors such as heavy industry and heavy transport. • Support a strong renewable energy investment environment. • Develop innovative ways to partner with Māori.

EXISTING ARRANGEMENTS & BUSINESS NEEDS

Summary of the existing arrangements and business needs

INVESTMENT OBJECTIVE ONE	DELIVER REGIONAL JUST TRANSITIONS
EXISTING ARRANGEMENTS	As a function of its size, NZAS dominates employment and electricity markets in Southland. Free and frank opinions [redacted]. The desired future state would see innovative, new clean industry in the region, supporting new jobs, regional resilience, and the wider energy transition. Both Southland and Taranaki face ongoing challenges retaining young people in-region and building the skill base of existing workers. New future focused industry, and associated education and training opportunities, will encourage workers and young people to stay in the region, while attracting people from outside Southland. Māori have previously missed out on realising the full benefits of regional economic opportunities in both Southland and Taranaki. The Regional Hydrogen Industry Transition project is an opportunity to deliver on Māori clean energy and economic development aspirations. The Government has proactively supported just transition processes in Taranaki and Southland. Both processes identified clean energy, and hydrogen, as key to regional transitions. The Regional Hydrogen Industry Transition project will give effect to these ambitions, while supporting the emergence of a nationally significant new industry.
BUSINESS NEEDS	Based on sector engagement, we are of the view meeting these ambitions requires Government support. Delivering a market-based intervention which maintains the greatest degree of commercial discipline across the sector will be the most efficient and effective way to achieve the investment objective above. In order to meet its goals, the Regional Hydrogen Industry Transition project will need to encourage sufficient demand to incentive hydrogen production development, while also encouraging new renewable generation.

INVESTMENT OBJECTIVE TWO	CONTRIBUTE TO AOTEAROA/NEW ZEALAND'S EQUITABLE TRANSITION
EXISTING ARRANGEMENTS	Agriculture, industry and heavy transport are high emission, hard-to-abate sectors. Heavy Transport alone makes up 4% of New Zealand's carbon emissions.[4] Our investment provides a means to decarbonise those sectors by incentivising the uptake of green hydrogen, while displacing fossil fuels. NZAS's dominant market position and ongoing public ambiguity over its future creates significant uncertainty in wholesale electricity markets. Negotiations [redacted]

[4] Programme Review - Heavy Vehicle Fuel Efficiency (mbie.govt.nz)

	Furthermore, in recent years NZAS has used its market power to secure below-market prices for electricity. This dynamic has led to cross-subsidisation of NZAS's electricity supply by smaller business and residential consumers. The Electricity Authority estimates the cost to consumers of this cross subsidisation, and parallel market gaming by major generators, at up to $850m per annum over the life of their current contract.[5] The hydrogen industry is an opportunity to address this dynamic by creating wholesale competition on both the supply and demand side of the electricity market. Finally, government frequently uses *consultation* to tailor projects to Māori needs. While consultation is a useful tool, it is not always well suited to supporting active participation in the development of new sectors and economic opportunities. The Regional Hydrogen Industry Transition project will employ a benefit sharing mechanism to directly enable iwi ambitions. Government could use the lessons learned through this process to inform further work on the equitable transition.
BUSINESS NEEDS	Based on sector engagement, we are of the view meeting these ambitions requires Government support. Delivering a market-based intervention which maintains the greatest degree of commercial discipline across the sector will be the most efficient and effective way to achieve the investment objective above.

POTENTIAL BUSINESS SCOPE AND KEY SERVICE REQUIREMENTS

Potential business scope and key service requirements

SCOPE ASSESSMENT	MINIMUM SCOPE	INTERMEDIATE SCOPE	MAXIMUM SCOPE	OUT OF SCOPE
DELIVERY OF A MARKET-BASED INDUSTRY SUPPORT MECHANISM	Small hydrogen industry established in just transition regions with emphasis on heavy transport	Medium scale hydrogen industry and new renewable electricity generation established in just transition regions	Large scale hydrogen industry and new renewable electricity generation established in just transition regions.	Hydrogen industry established nationwide
BENEFIT SHARING MECHANISM	Some minor social benefits shared with iwi	Social and economic benefits shared with iwi and the community	Social, commercial and Economic benefits shared with iwi and the community. Iwi have a commercial interest in the hydrogen value chain	A joint management structure over resources and investment into hydrogen.

[5] https://www.ea.govt.nz/assets/dms-assets/29/Inefficient-Price-Discrimination-in-the-Wholesale-Electricity-Market-Issues-and-Options-Discussion-Paper.pdf

MAIN BENEFITS AND DISBENEFITS

Analysis of primary potential benefits

DOMAINS	BENEFIT
WORK, CARE AND VOLUNTEERING	**Employment rate:** NZAS's market dominance in Southland has created a regional dependence, and a lack of industrial diversification. initiative will address the uncertainty driven by NZAS and build resilience in the region by providing workers and supporting industries an alternative economic base.
	Household net worth: Jobs in the hydrogen industry are relatively trade insulated, as compared with jobs in the wider New Zealand economy. We aim to set the rebate such that Hydrogen is commercially viable following the end of the rebate scheme. Given the length of the rebate, and the industry's insulation, workers in the hydrogen industry will have increased job security.
INCOME AND WEALTH	**Hourly Earnings:** the project will catalyse and crowd-in investment to kickstart industries across the hydrogen value chain. This will create higher wage jobs in the region, increasing regional income and consumption.
JOBS AND EARNINGS	**Consumption:** By creating sustainable, high-value jobs, we will support improved rates of consumption in just transition regions.
SUBJECTIVE WELLBEING	**Subjective wellbeing:** The ongoing uncertainty generated by NZAS has placed the region in jeopardy, resulting in avoided investment decisions and slowing economic development. This has been a major regional pain point for several years. The rebate will address this uncertainty by developing the hydrogen sector as a viable alternative to Tiwai. By reducing uncertainty we can expect subjective wellbeing in the region to increase.
ENVIRONMENT	**Net greenhouse gas emissions:** Hydrogen is a renewable resource which can decarbonise many hard-to-abate sectors, such as agriculture and transport. Hydrogen's uptake will therefore reduce net emissions.
	Renewable energy: By incentivising a hydrogen offtake industry, we will create new demand for electricity, supporting development. We would also require large hydrogen producers to contract for new renewable electricity generation directly.
HE ARA WAIORA	**Kotahitanga:** By working directly with iwi both in developing the policy itself, and the benefit sharing approach to be delivered alongside the intervention, we have established a model for the Crown working directly with mana whenua to resolve shared challenges
	Tikanga: The process to develop this intervention, and the planned outputs, has been developed in recognition of the Crown's responsibilities to work in partnership with iwi, and of the iwi's responsibility as mana whenua to both protect and derive a living from their rohe.
	Tiakitanga: One of the key benefits of this initiative is emission reduction in hard-to-abate sectors. Climate mitigation is essential to preserving and protecting the natural world.
KNOWLEDGE AND SKILLS	**Net intangible assets:** We are endeavouring to link relevant universities and academics into the investment to support New Zealand's hydrogen research.
	Educational attainment of the adult population (upper secondary): The contracting mechanism could enable the Crown to link offtakers with relevant training institutions and workforce groups in the regions. This would support workers to gain new skills to work in the emerging industries.

Analysis of primary potential disbenefits

DOMAINS	DISBENEFIT
ENVIRONMENTAL AMENITY	**Access to the natural environment:** Hydrogen production facilities, industrial hydrogen users, and renewable generation facilities all diminish public access to land. Industrial sites require exclusion zones and may limit access to surrounding landscapes. Similarly, access to land on which wind farms are located may have additional restrictions imposed above and beyond those to which users may be accustomed.
	Drinking water management: Hydrogen production requires access to water. The cleaner this water is to begin with, the easier the production process is (because the desalination/purification stage is less time and energy intensive). Therefore, developers may compete for access to potable water with municipal authorities and regional communities.
	Perceived environmental quality: New industrial development may lead to a perceived reduction in environmental quality, particularly during construction.
HOUSING	**Household crowding:** In the event the intervention leads to a large-scale construction project, temporary workers may price locals out of existing housing stock, potentially leading to an increase in household crowding.
	Housing cost: In the event the intervention leads to a large-scale construction project, temporary workers may compete with locals for existing housing stock, potentially leading to an increase in prices.
SAFETY	**Feeling safe:** Were a large construction project to occur in a small community, locals may feel less safe as a result of temporary workers moving into the community.
	Road toll: Large construction projects lead to an increase in heavy vehicle movements, which may in turn have a deleterious effect on road safety in the vicinity of any projects supported through the intervention for the duration of the development phase.
	Workplace accident rate: Construction is a relatively dangerous sector, as is manufacturing/plant operations. If this intervention leads to a shift in the employment mix towards these sectors and away from relatively less dangerous fields, there may be a marginal impact on the workplace accident rate.

RISKS AND MITIGATIONS

Risk is an uncertain event or circumstance that, if it occurs, has a negative effect on at least one project investment objective. The most significant categories of risks that might prevent, degrade or delay the achievement of the investment objectives are identified and analysed below.

Risk and Issues Registers have been developed and will be regularly and progressively updated as the project proceeds. A Risk Management Strategy will be reviewed and adopted by the Project Board, and will be updated, reported to the Board and monitored regularly.

	MAIN RISKS	COMMENTS & RISK MANAGEMENT STRATEGIES (MITIGATIONS)
1	Procurement Process Risk Risks relating to designing and executing the competitive process for selecting and appointing eligible rebate recipients. - Inadequate market response - Probity and process risk - Inadequate evaluation criteria - Appeals to selection process	• Working with MBIE Procurement to ensure a well-designed and robust selection process • Clear signalling to the market well in advance of an EOI process will ensure potential counterparties have time to develop project proposals. • Running a relatively length EOI process will ensure potential counterparties have sufficient time to respond and participate. • Work with and related central government teams/agencies (MBIE Energy and Resource Markets, New Zealand Trade and Enterprise) will help to identify and approach potential counterparties. • process probity will support best-practice is followed, mitigating the risk of poor procurement design.
2	Hydrogen project delivery risks - supply chain, timeframes, costs, quality of project delivery - delayed hydrogen production delivery date	• Undertake appropriate due diligence on prospective rebate recipients • Contractually limit Crown's exposure to ongoing costs, • Work being progressed through the development of the Hydrogen Roadmap will identify and address hydrogen sector specific barriers (such as regulation).
3	Legal, Contracting and Specialist Advice - Poor contract design exposes Crown to undue costs - Energy market advice results in unexpected costs of rebate - Additional unnecessary administration	• Procuring high-quality commercial and legal advisors • Working closely with MBIE Legal, Procurement, Kānoa and Energy and Resource Markets Teams to ensure quality advice; • Build on experience from other similar industry support programs
4	Counterparty risk – rebate recipients: - Credit worthiness - Insolvency - Reputational	• Rigorous evaluation criteria, selection process and due diligence • Cost containment measures in contracts • Rigorous contract design

5	Programme administration and delivery risk	• Engaging widely across government on programme design will support alignment across policy areas. • Build on experience from other similar industry support programs
6	Benefit Sharing Delivery Risk – Expectations to deliver benefits to iwi and community not realised	• Engaging early with industry and prospective suppliers to communicate expectations • Ensure benefits sharing expectations effectively communicated in selection documents • Ensuring benefit sharing requirements are quantifiable and clear will provide counterparties with certainty on requirements. • Develop monitoring and reporting regime with opportunities for remedial action • Developing bid assessment criteria which allow sufficient flexibility in how counterparties meet benefit sharing requirements will support a range of approaches. • Undertake due diligence through selection process to mitigate against non-delivery of benefits.

A Risk Management Strategy, and Risks and Issues Registers, have been developed and will be regularly and progressively updated as more detailed analysis is undertaken.

OPTIMISM BIAS

Based on the nature of the investment proposal, the expected net benefits should be reduced by 25% to reflect the effects of optimism bias. This loading will be progressively reduced as the accuracy of the estimates for proposal costs and benefits improves.

CONSTRAINTS, DEPENDENCIES, AND ASSUMPTIONS.

Key constraints, dependencies and assumptions

	CONSTRAINTS	NOTES & MANAGEMENT STRATEGIES
C1	Funds	The scale of projects enabled through the scheme will depend on the funds available. There is a minimum scale of development required to achieve the programme's goal of injecting competition into the wholesale electricity market.
C2	Number and complexity of market participants/project developers	There is a limited number of potential market participants, and potential projects. The number of viable projects willing to participate in the scheme could have significant impact on cost government will pay per unit of production, and therefore the scale of the total development supported through the scheme.
C3	Technological readiness	A number of use-cases/projects may rely on technology which is still on a steep learning curve/relative nascence. The range of available use cases will be constrained by the pace of progress in the sector over coming years.
C4	Input availability	The reliable and affordable supply of electricity and water are essential for hydrogen production.

		Though there is ample operating and consented electricity generation capacity and water available, there may be infrastructure constraints which limit the ability for project developers to access key inputs in a timely and affordable manner. This challenge can be managed by providing early signals to industry through budget announcements and the EOI process. These long lead times will allow developers to identify suitable sites and establish relationships and agreements with potential suppliers.
	Labour force and skill availability	
	DEPENDENCIES	NOTES & MANAGEMENT STRATEGIES
D1	Hydrogen projects supported through the mechanism are able gain development consents	Though consenting is a consideration for all developments, there may be particular challenges posed by the scale, complexity and nature of the developments enabled through this intervention. The requirement for counterparties to work closely with mana whenua as part of the iwi benefit sharing aspect of this project may mitigate the consenting risk to an extent.
D2	Existence of consented renewable energy projects to supply electricity to hydrogen production	Delivering on the wider goals of the Regional Hydrogen Industry Transition project relies on the existence of available consented renewable energy projects. There are a number of consented projects on both the North and South Island which could supply large-scale projects participating in the Regional Hydrogen Industry Transition.
D3	Developers are able to import the equipment/capital goods required to deliver projects	Availability of the kit required to establish a hydrogen production facility, or downstream industry is constrained by the following factors: Global supply chains are strained, and significant uncertainty exists around when this challenge will resolve. There is significant demand for relevant equipment, given the scale of investment in the hydrogen sector around the world. There is limited production of this same equipment as the sector is in its early days and production is still scaling up. This challenge can be managed by providing early signals too industry through budget announcements and the EOI process. These long lead times will allow developers to establish relationships and agreements with potential suppliers.
	ASSUMPTIONS	NOTES & MANAGEMENT STRATEGIES
A1	There is a role for green hydrogen in New Zealand's future energy system	This assumption largely underpins the economic case for this proposal (setting aside the competition benefits). Though there is a large body of work setting out the potential role for green hydrogen in a decarbonised energy system, there is uncertainty over the both the breadth of applications and the scale of the subsequent industry. This risk is offset by the likely scale of activity supported through the scheme, which will not be significant in the context of: Existing grey hydrogen use in industrial production Total projected green hydrogen demand

		New Zealand's existing or projected total electricity generation
A2	A customer/demand side intervention will support activity down the production chain.	Though we have conducted relatively extensive sector engagement, which has affirmed the preferred approach, the model is still untested. There are not any existing identical models currently in operation around the world. Our preferred approach builds on similar models around the world, while adjusting for the government's priorities and specific regional context.
A3	Counterparties are able to manage the contracts	The Regional Hydrogen Industry Transition project will rely on the use of indexed contracts between government and external counterparties. Though government has the internal capacity, or is able to procure external support, to manage these contracts, counterparties may not have the capacity or resources to do so. The risk associated with this assumption are particularly acute in relation to a Contract for Difference approach (described below). The risks associated with this assumption can be managed by maintaining flexibility in the type of contracts employed so approaches can be tailored to the needs of counterparties.
A4	Availability of projects	In designing this business case, we have assumed the market will respond with proposals which align with the project's goals. This assumption has been made following extensive sector engagement. Given the nascence of the hydrogen industry, it is possible market participants will not respond as expected. The impacts of this assumption proving to be false can be mitigated by using a two stage market sounding process to gauge sector interest ahead of running a formal tender process.

The Economic Case for the Regional Hydrogen Industry Transition

Hydrogen electrolysis is an emerging technology. Prices for green hydrogen remain high due to a range of factors, including capital costs, unfamiliarity with the technology, and relatively low electrolyser efficiency. Happily, as the global energy transition accelerates, and the scale of electrolysis increases, capital costs are falling and efficiencies are improving. Despite these tailwinds, green hydrogen remains uneconomical when compared with fossil fuels, and will in the medium term. As set out above, this commercial gap is the primary barrier to the uptake of green hydrogen.

Hydrogen will play a critical role in decarbonising New Zealand's hard-to-abate sectors. The Regional Hydrogen Industry Transition project will support early-movers to transition to green hydrogen, and away from fossil fuels, by bridging this commercial gap. The activity supported through the project will contribute to the emergence of a wider hydrogen sector in Aotearoa/New Zealand by supporting the sector to establish supply chains, create familiarity with the technology, and ultimately achieve scale.

Governments in both Aotearoa/New Zealand, and overseas, have previously played a similar role in the emergence of other technologies, such as solar, offshore wind, and even geothermal. Governments overseas are now actively supporting the transition to hydrogen through similar means in recognition of the role hydrogen will play in the energy transition and decarbonisation.

The total cost of the initiative must be viewed in this context. Were green hydrogen commercial now, there would be no need for government intervention.

VALUE FOR MONEY

This project provides strong value for money. The Regional Hydrogen Industry Transition project can build the economic resilience of just transition regions by creating new jobs and industries. The project will also displace fossil-fuels in hard-to-abate sectors and incentivise renewable generation.

These benefits can be unlocked by catalysing the nascent hydrogen industry. The Regional Hydrogen Industry Transition projects aims to drive development across the value chain, while maintaining commercial discipline, by growing end-user demand. Increased demand for hydrogen, and certainty for producers and offtakers, incentivises greater private sector investment. The Crown's investment would act as a catalyst for further investment into a hydrogen ecosystem in just transition regions.

The Regional Hydrogen Industry Transition project's value is further highlighted by the cost of sticking with the status-quo. The cost of abatement in heavy transport and industry is high; a carbon price many times the current level would be required to deliver widespread mitigation in these sectors. The alternative, relying on carbon forestry, does not drive meaningful, long-term emission reductions across the economy. The Regional Hydrogen Industry Transition project leverages private sector investment to achieve meaningful and lasting abatement, while laying the ground-work for similar projects across the wider economy.

IMPLEMENTABILITY

This project also has strong implementability but relies on certainty of Crown funding. Certainty allows project developers to begin preparing bids for participation in the Regional Hydrogen Industry Transition. In this way, the Crown delivers value from the allocation, even when unspent

We have set tight timelines for the project and intend to do early market engagement to shorten private sector lead times. We expect to go to market by September 2023 and have bids returned shortly after. Once bids are negotiated, the private sector has a direct financial incentive to ensure timely acquisition of plant. We will also design contracts to limit delays.

CRITICAL SUCCESS FACTORS (CSFS)

Critical Success Factors

KEY CRITICAL SUCCESS FACTORS	BROAD DESCRIPTION	PROPOSAL-SPECIFIC CRITICAL SUCCESS FACTORS
STRATEGIC FIT AND BUSINESS NEEDS	How well the option: meets the agreed investment objectives, related business needs and requirements, and fits with other strategies, programmes and projects.	• Alignment with regional just transition plans • Alignment with government's wider strategic goals, primarily: • Just/equitable transitions • Emission reductions • Energy system resilience • Economic development and resilience
POTENTIAL VALUE FOR MONEY	How well the option: optimises value for money (ie the optimal mix of potential benefits, costs and risks).	• Consumption volume (and therefore cost per unit of consumption) • Emission reductions • Economic uplift
CAPACITY AND CAPABILITY OF MARKET TO DELIVER	How well the option: matches the ability of potential suppliers to deliver the required services, and is likely to result in a sustainable arrangement that optimises value for money over the term of the contract.	• Responses to EOI/tender process • Long-term viability of supported projects/counterparties
POTENTIAL AFFORDABILITY	How well the option: can be met from likely available funding, and matches other funding constraints.	• Portion of operating expenses met from existing baselines
POTENTIAL ACHIEVABILITY	How well the option: is likely to be delivered given the organisation's ability to respond to the changes required, and matches the level of available skills required for successful delivery.	• Pace of fund deployment • Wider impacts on the wholesale electricity market

LONG-LIST OPTIONS AND INITIAL OPTIONS ASSESSMENT

OPTIONS ASSESSMENT

Possible project options classified by the five dimensions of choice

DIMENSION	DESCRIPTION	OPTIONS WITHIN EACH DIMENSION
SCALE, SCOPE AND LOCATION	In relation to the proposal, what levels of coverage are possible?	• Southland small scale (<5MW) only • Taranaki small scale (<5MW) only • Both regions small scale (<5MW) only • Southland no scale restrictions • Taranaki no scale restrictions • Both regions no scale restrictions • Southland no scale restrictions, Taranaki small scale only (<5MW)
SERVICE SOLUTION	How could services be provided?	• Fixed hydrogen consumption rebate • Indexed hydrogen consumption rebate • Mixed approach model
SERVICE DELIVERY	Who could deliver the services?	• Kānoa-RDU • Private provider • Other third party • Just Transition Partnerships team • New Zealand Green Investment Finance
IMPLEMENTATION	When could services be delivered?	• As soon as achievable • After release of Hydrogen Roadmap
FUNDING	How could it be funded?	• Crown funding • A deferred cost-recovery levy on offtakers • User pays through equity

The potential project options in each of the five dimensions were assessed against the investment objectives and critical success factors using an options assessment framework. Our preferred configurations are summarised below.

	SCALE, SCOPE AND LOCATION	SERVICE SOLUTION	SERVICE DELIVERY	IMPLEMENTATION	FUNDING
INDEXED HYDROGEN CONSUMPTION REBATE	7	1	3	1	1
CONTRACT FOR DIFFERENCE (CFD)	7	2	3	1	1
HYBRID MODEL	7	3	3	1	1

The **summary** assessment of each of the long-list options not rejected is included below. A more detailed analysis is included as **Annex 1**.

SHORT-LIST OPTIONS

On the basis of this analysis, the recommended short-list for further assessment is:

Option 1: Capital grants/Status quo option (scaled for ease of comparison)

Option 2: Indexed Hydrogen Consumption Rebate (IHCR)

Option 3: Contract for Difference (CfD)

Option 4: Hybrid Model:

ANALYSIS OF PRIORITISED OPTIONS

	CAPITAL GRANTS/STATUS QUO OPTION
DESCRIPTION	At present, government has supported the emergence of a hydrogen sector through a mixture of ad-hoc grants and structured loan and equity holdings. **Scope:** The current approach has focused on business cases and scaling up of technology demonstrations. The largest Crown investment, in the Hiringa/Balance joint venture, aims to support 5MW of electrolyser capacity backed by 24MW of new electricity generation. Larger projects would in turn require a larger grant/equity/loan scheme. **Solution:** Government's existing hydrogen programmes are primarily managed using investment approaches developed by the responsible agencies below. The bulk of funding has been delivered on an ad-hoc basis, with a number of investments made through the Infrastructure Reference Group's "shovel ready" projects programme. **Delivery:** Government's hydrogen support to date has primarily been led out of Kānoa-RDU and the Energy Efficiency and Conservation Authority (EECA). **Implementation:** Current programmes are delivered on a largely ad-hoc basis. Government has yet to settle on a strategy/AOG approach to hydrogen, which has led to a lack of long-term/ongoing funding programmes. The scale of investment required has also limited opportunities for government support. **Funding:** Funding to date has taken the form of grants and concessional loans and equity.
ADVANTAGES	The main advantages are: • Government has experience in design and delivery of this approach. • We have existing processes and institutional settings for this approach. • Industry is accustomed to dealing with government in this way. • Total cost to government is well understood. • Easy to communicate to the public and industry stakeholders. • Relatively low barriers to participating in this approach for counterparties.
DISADVANTAGES	The main disadvantages are: • Does not establish demand-side applications (missing market) • Free and frank opinions [redacted] [redacted]

	• Free and frank opinions [redacted] • Does not send long-term investment signals to industry. • Free and frank opinions [redacted]
COSTS	~$210m
BENEFITS (10Y)	Abatement (t/CO2-e) – Between 543,848 and 735,794 t/CO2-e Job years – Between 1,736 and 2,349 Wage uplift – Between $24,262,192 and $32,825,319 GDP increase – Between $285,846,466 and $386,733,454
CONCLUSION	To continue with the status quo would mean continuing to support small scale projects and business cases, with tangible but limited results. This option may achieve some of the just transition goals set out above, but would be unlikely to resolve the larger-scale electricity system challenges. Would require extensive input from government to manage relatively small-scale projects. Unlikely to achieve a scaling up of the industry, as it does not resolve the fundamental "missing market" problem the preferred approach seeks to address. Given this option does not resolve the identified challenges, does not support industry growth, and continues to cost substantial sums – we do not recommend proceeding with this option.

	INDEXED HYDROGEN CONSUMPTION REBATE (IHCR)
DESCRIPTION	This option involves a rebate targeted at end users of green hydrogen. It reduces the cost of the hydrogen product to close the gap with alternative commodities (such as diesel, gas or urea). The approach seeks to deliver efficiency by focusing on the point of use rather than point of production, or by directly assisting with infrastructure and development costs. The rate at which the rebate is paid can be adjusted periodically to more accurately reflect the price gap between green hydrogen products and alternative commodities. This approach will reduce the long-term cost to the Crown and will introduce market discipline to avoid over-subsidisation. **Scope:** A IHCR would be better suited to smaller projects or counterparties lacking the internal legal and financial capabilities to manage the complexities associated with a Contract for Difference (CfD) structure. **Solution:** The solution involves a consumption rebate applied to the consumption of green hydrogen by smaller consumers. The purpose of signing long-term (~10Y) contracts with counterparties is to provide long-term certainty to off-takers, which will in turn underwrite the development of new hydrogen production backed by new renewable generation to supply these facilities. As a CfD presents greater commercial discipline and potential revenue benefit sharing for the Crown, eligibility for the IHCR would be limited to smaller participants. **Delivery:** It is proposed that the IHCR would be administered by Kānoa-RDU recognising existing capabilities in delivering a number of similar existing programmes administered. Rebates would be paid at regular agreed intervals (likely quarterly) based on documentation.

	Implementation: Once IHCR agreements were negotiated and signed, ongoing benefits management and payment would be administered by Kānoa-RDU. Given these agreements would be based on contracts between the parties, we do not anticipate significant additional work being required beyond the negotiation period. Implementation would be supported by a monitoring, reporting, and verification and auditing framework. **Funding:** Payments would take the form of a direct rebate per unit of consumption, indexed to a level that bridges the commercial gap between green hydrogen and the replacement fuel/input (diesel, fossil gas, grey hydrogen).
ADVANTAGES	The main advantages are: • Administrative simplicity for counterparties and the Crown • Contracting model can enable specific requirements relating to new generation or energy system services • Relative ease of delivery for government • Lower establishment costs due to reduced complexity (in particular, with respect to commercial energy market advice, legal establishment costs, and negotiation with counterparties). • Rate of rebate indexed to alternative commodities to main • Enables adoption of green hydrogen consumption in the near term, increasing visibility and normalising the practice among industry • Greater forward budget certainty comparted to a CfD as the rate of the rebate will be indexed and determined prospectively for the payment period.
DISADVANTAGES	The main disadvantages are: • The need to index to a reference commodity introduces a small amount of additional administration • Compared to a Contract for Difference approach, there is no opportunity for the Crown to benefit from revenue sharing in the event that green hydrogen prices become commercially favourable with alternative commodities. • Depending on indexation frequency intervals, there is potential for the Crown to over-subsidise green-hydrogen consumption relative to market. This is in comparison with the CfD option which would pay a rebate at a volume weighted average over the term of the payment period, more accurately reflecting the discrepancy between green hydrogen costs and the cost of alternative fuels.
COSTS	~$210m
BENEFITS	Abatement (t/CO2-e) – Between 544,040 and 736,054 t/CO2-e Job years – Between 2,325 and 3,146 Wage uplift – Between $32,494,184 and $43,962,720 GDP increase – Between $476,250,000 and $644,338,235
CONCLUSION	This option achieves a high degree of commercial discipline and provides long-term price certainty to green hydrogen consumers and revenue certainty to producers. This option is favoured for small consumers of green hydrogen due to the relative ease of smaller market participants to contractually engage with the program.

	CONTRACT FOR DIFFERENCE (CFD)
DESCRIPTION	This option involves the establishment of contracts between the Crown and hydrogen consumers for long-term cost sharing with a view to bridge the gap between the price of green hydrogen and the alternative commodity. Under this arrangement the Crown would rebate any price difference above the alternative commodity to the consumer. Conversely, in the event that the alternative commodity should increase in price above the price of green hydrogen, the consumer would rebate the difference to the Crown. **Scope:** A CfD would be better suited to larger projects or counterparties with the internal legal and financial capabilities to manage the complexities associated with the structure. **Solution:** The solution involves a long-term contract signed between counterparties in which costs and revenues associated with a traded product are shared. A CfD can be used to bridge the gap between a higher market price, and the price of a commodity. For example, a CfD could close the price gap between green hydrogen and diesel – supporting use in heavy transport. As with an IHCR, the purpose of signing long-term (~10Y) contracts with counterparties is to provide long-term certainty to off-takers, which will in turn underwrite the development of new hydrogen production backed by new renewable generation to supply these facilities. As a CfD presents greater commercial discipline and potential revenue benefit sharing, eligibility for the IHCR would be limited to smaller participants. **Delivery:** It is proposed the CfD's delivery would be administered by Kānoa-RDU recognising existing capabilities in delivering a number of similar existing programmes administered. Given the derivative nature of the contract, there may be a role for the New Zealand Debt Management Office in administering any CfDs. Settlement periods and mechanisms would be **Implementation:** Once CfD agreements were negotiated and signed, ongoing benefits management and payment would be administered by Kānoa -REDIU. Given these agreements would be based on contracts between the parties, we do not anticipate significant additional work being required beyond the negotiation period. Implementation would be supported by a monitoring, reporting and auditing framework. **Funding:** Payments would take the form of an indexed payment per unit of consumption pegged to the movements of a reference commodity (diesel, fossil gas, grey hydrogen).
ADVANTAGES	The main advantages are: • Provides consumers with long-term certainty that they will not incur commodity costs above the market as a result of transitioning to green hydrogen use in favour of carbon intensive fuels • Contracting model can enable specific requirements relating to new generation or energy system services • Commercial discipline – mitigates risk of Crown paying disproportionately high rebate relative to market trends. • Potential for Crown to derive revenues in event that alternative commodity prices exceed green hydrogen costs.

DISADVANTAGES	The main disadvantages are:
	• Administrative complexity:
	  o Requires specialist legal advice to deliver
	  o Requires calculation of settlement volumes.
	• Establishment costs present barrier to smaller consumers.
	• Reduced budget certainty concerning the volume of rebates paid as these will vary depending on both use and market price trends.

COSTS	~$210m
BENEFITS	Abatement (t/CO2-e) – Between 725,386 and 981,405 t/CO2-e Job years – Between 3,100 and 4,194 Wage uplift – Between $43,325,579 and $58,616,960 GDP increase – Between $635,000,000 and $859,117,647
CONCLUSION	This option reduces cost to the Crown by ensuring that the scale of the rebate closely follows market movements in the alternative fossil fuel commodity.

	HYBRID MODEL
DESCRIPTION	This option is a mix of the IHCR and CfD option discussed above (assumed to be 50:50, but these proportions may shift depending on the outcome of an EOI process). The purpose of this model is to ensure we can capture the efficiency of the CfD model, while also allowing greater flexibility in the selection of counterparties. Selecting the hybrid model mitigates the risk of proceeding with a single model which does not suit industry needs
ADVANTAGES	The main advantages are: • Captures the advantages of the options above while maintaining flexibility in programme delivery.
DISADVANTAGES	The main disadvantages are: • A mixed model will require additional administrative support. • Making mistakes during guideline development for IHCR/CfD eligibility risks projects falling between the cracks and winding up with a model which does not suit their needs.
COSTS	~$210m
BENEFITS	Abatement (t/CO2-e) – Between 616,578 and 834,194 t/CO2-e Job years – Between 2,635 and 3,565 Wage uplift – Between $36,826,742 and $49,824,416 GDP increase – Between $539,750,000 and $730,250,000
CONCLUSION	This option is the preferred approach because it captures the advantages of both a IHCR and a CfD while maintaining flexibility in final programme delivery. The added benefit of this approach is that in the event market participants call for the sole use of more efficient CfDs, we will have the flexibility to respond.

THE RECOMMENDED PREFERRED WAY FORWARD

On the basis of the above initial assessment, **the preferred way forward is the Hybrid Model.**

INDICATIVE BENEFIT-COST ANALYSIS

Officials ran a cost benefit analysis of the three shortlisted options. We contrasted this with the do-nothing option, having spent $41,000,000 on supporting the hydrogen industry. To demonstrate our preferred model's effectiveness we also contrasted it with the status quo, scaled to a comparable level of funding. Across all domains and on the aggregate our options outperformed the status quo. The Monetized CBA is located in Annex 2.

To identify the best option, we created a non-monetized CBA. Ultimately, it shows that **the Hybrid option is the best fit** over the CFD. The Non monetized CBA is located at Annex 3.

ASSUMPTIONS

This analysis compares the GDP generated by the projects against the total costs. To reach these figures we used the: [6]

- McKinsey report: The New Zealand Hydrogen Opportunity
- Deloitte report: Southland H2 Project
- Insight Economics: Economic Impact Assessment of Proposed Green Hydrogen Development
- MBIE & EECA websites

We scaled our costs based on the total electrolysis analysed in the Deloitte and McKinsey reports to match a maximum 100MW of electrolysis supported through the Regional Hydrogen Industry Transition. We then used the following assumptions to calculate CBR:

- A 25% optimism bias
- Linear scaling of GDP and costs
- The Status Quo will continue at the current rate of investment for 12 years, resulting in a 200% uplift.
- An 8.5 divisor for McKinsey and 6 for Deloitte (given the electrolyser capacity in the report).
- Job and wage ratios outlined in Insight Economics' report can be extrapolated.
- A variable rebate provides sufficient certainty.

Expenditure on options 2-4 remains the same and the amount of electrolysis supported differs as costs incurred rise or fall. Options were scaled as follows:

- Status Quo: 0
- IHCR: 25%
- CFD: 0
- CFD/IHCR: 15%

[6] https://www.datocms-assets.com/49051/1626295071-the-nz-hydrogen-opportunity.pdf

https://www.epa.govt.nz/assets/Uploads/Documents/Fast-track-consenting/Kapuni-Green-Hydrogen/Appendix-T-Economic-Impact-Assessment.pdf

https://www.eeca.govt.nz/assets/EECA-Resources/Co-funding/LETF-Rd-1-2-Project-Summaries-List.pdf

https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-strategies-for-new-zealand/hydrogen-in-new-zealand/

INDICATIVE COSTS AND BENEFITS

The proposed whole of life cost of the project is $213,000,000.00 over 12 years.

Summary Indicative costs and benefits, by short-list option

$MILLIONS (+- 15%)	DO NOTHING	CAPITAL GRANTS SCALED UP	IHCR	CFD	HYBRID
WHOLE OF LIFE CAPITAL COSTS	$8,400	$8,400	$8,400	$8,400	$8,400
WHOLE OF LIFE OPERATING COSTS	$41,047,000	$210,101,887	$210,101,887	$210,101,887	$210,101,887
TOTAL	$41,055,400	$210,110,287	$210,110,287	$210,110,287	$210,110,287
TOTAL BENEFITS	$65,195,000	$392,594,215	$616,618,243	$822,157,657	$698,834,008
NPV OF COSTS	$31,701,892	$162,241,594	$162,235,108	$162,235,108	$162,235,108
NPV OF BENEFITS	$50,341,851	$303,150,846	$476,136,262	$634,848,350	$539,621,097

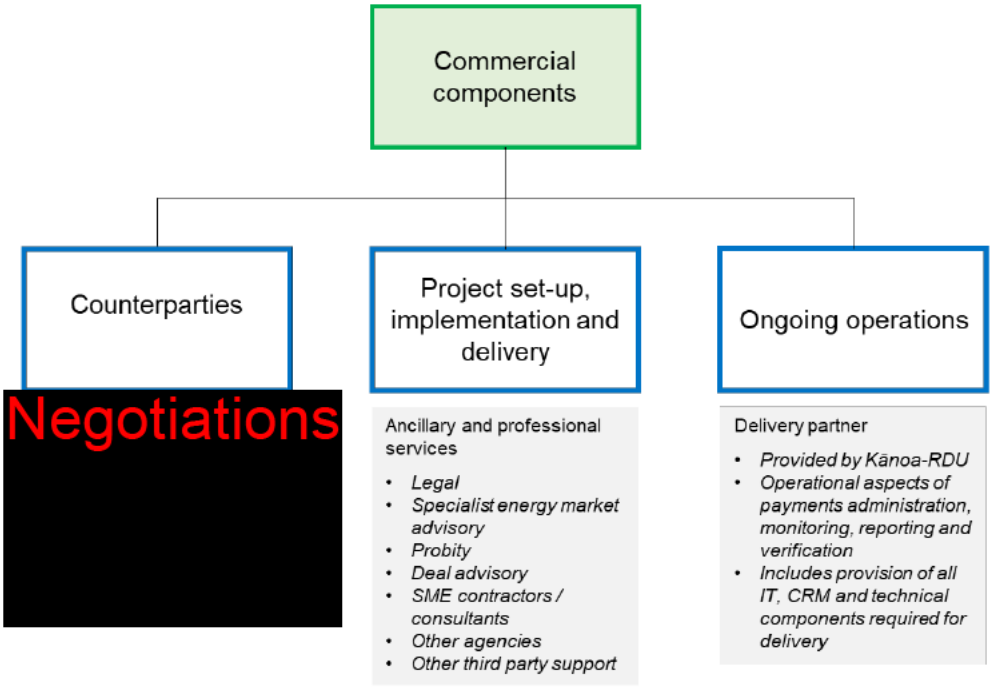
Commercial Case

OUTLINING THE COMMERCIAL CASE

The Commercial Case outlines the proposed **commercial** arrangements for the preferred way forward.

This case outlines the proposed commercial arrangements for delivering Option 4: The Hybrid Model as recommended in the Economic Case.

It contemplates the selection and appointment process, market engagement and procurement of specialist third party services to support set-up, implementation and delivery and the establishment of ongoing a commercial and contractual relationship between the Crown (MBIE) and rebate recipients (Counterparties), as well as arrangements for the operations. the RHIT scheme. It outlines the key procurement and commercial principles and protocols applied in undertaking the Regional Hydrogen Industry Transition project, as laid out below:



COMMERCIAL ARRANGEMENTS

The Regional Hydrogen Industry Transition project consists of three core commercial components being:

1. Primarily, the selection and appointment of one or more end-user(s) (each a counterparty) who will be provided with forward input cost certainty (eligible rebate recipients) to support the uptake of green hydrogen as an alternative fuel or feedstock;
2. The resourcing and any ancillary and professional services associated with project set-up, implementation and delivery.
3. Establishment of service requirements to be provided by Kānoa-RDU as the service delivery partner, including the operational aspects of payments administration, monitoring, reporting and verification.

The commercial approach outlined in this section provides an overarching strategy to deliver the Hybrid Model (preferred way forward) and its set-up.

Procurement and commercial activity will be consistent with obligations to Te Tiriti o Waitangi

The commercial approach recognises the importance of fostering partnership and creating positive outcomes for Māori. We will ensure procurement and commercial activities and processes are aligned to the principles of Te Tiriti early in the procurement process and reflect Iwi and Māori input provided

in the design, evaluation, selection and appointment process in relation to the eligible rebate recipients.

We will support the Government's Broader Outcomes

The achievement of Broader Outcomes will be reflected in MBIE's delivery of the Hybrid Model and throughout all procurement and commercial arrangements of the Regional Hydrogen Industry Transition project.

This means all applicable commitments will be implemented through procurement planning, design, delivery and ongoing management phases.

The commercial arrangements will also consider broader social procurement goals under development

The Government is committed to work to stamp out migrant worker exploitation with a focus on exploring the implementation of modern slavery legislation in New Zealand to eliminate exploitation in supply chains. The Regional Hydrogen Industry Transition project will take into account the goals associated with the legislative and policy response in development to modern slavery and worker exploitation in the engagement of suppliers and appointment of any counterparty.

The principles of Government Procurement will underpin the procurement and commercial approach

Decision making will align with the principles of New Zealand government procurement, as follows

The five principles of Government Procurement underpin the procurement strategy:

- Plan and manage for great results
- Be fair to all suppliers
- Get the right supplier
- Get the best deal for everyone
- Play by the rules.

These principles apply even if the Government Procurement Rules do not. Where reference to 'supplier' is made, this will include any counterparty and end-user and their opportunity to be involved in the Regional Hydrogen Industry Transition project.

MBIE will seek to be attractive to the market and explore opportunities to unlock mutual benefits for all parties, so we can attract and optimise quality of delivery from key supply partners and establish sustained, beneficial arrangements with counterparties. This approach also ensures opportunities for New Zealand businesses and positively contribute to the green hydrogen value chain.

All procurement that relates to any ancillary and professional services to be provided to MBIE will comply with Government Procurement Principles and Rules, and the procurement policies of MBIE

MBIE will utilise established policies and processes, which follow the Government Procurement Rules (the Rules), to ensure that the procurement of ancillary and professional services is tailored to the needs of the service or deliverable required.

The project will require commercial expertise. MBIE's Procurement and Commercial Projects team will lead the sourcing function and procurement management for the project. These resources will flex as per the needs and timing during the stage-gates of the business case approval process, sourcing and market engagement and implementation of the Hybrid Model. The Regional Hydrogen Industry Transition project may require additional expertise where MBIE does not have sufficient capability and capacity itself.

Sourcing will follow a best practice approach, comply with our procurement policy, probity protocols, and partnering models will be observed to with regards to procurement planning, approaching the market, contracting, and management.

The Government Procurement Rules must be followed for procurement of all ancillary and professional services which are sought by MBIE

All procurement must follow the Government Procurement Rules unless specific exemption or opt-out is approved in accordance with approved delegated authority. This is required as part of the procurement planning process.

Sourcing approaches for ancillary and professional services

We will utilise a hierarchy of sourcing approaches to guide our decision making. While we have many existing agreements with suppliers. We will make active decisions on the best approach for each requirement based on the following hierarchy of sourcing approaches:

- MBIE capability – where there is capability and capacity within MBIE that can fulfil the requirements, these resources may be used.
- Existing MBIE Agreement – where existing MBIE agreements that are compliant with the Government Procurement Rules are in place that meet the requirements of the good or services to be procured, these are used.
- All-of-Government (AoG) Contract – where existing MBIE agreements do not fulfil requirements, AoG contracts are used.
- Syndicated Procurement Agreement (other Agency led) – where common capability requirements are not suitable, syndicated procurement agreements are used.
- Approach to open market – where none of the above arrangements are suitable, MBIE will go to the open market. This could occur through single stage procurement, or multistage procurement.

REQUIRED SERVICES

There are a range of capabilities that will be required for The Regional Hydrogen Industry Transition project. Capabilities required include governance, programme management, integration, design, implementation, change management, and specialist technical skills. Where MBIE does not have all the required capability and capacity internally we will engage the market to supplement our own expertise.

Capabilities required for delivery of the Hybrid Model

CAPABILITY	DESCRIPTION
WORKFORCE	Procurement of potential supplementary resources to existing business as usual resources, and the potential to draw on the contractor and consulting market to staff up as required, necessary during phases of the Regional Hydrogen Industry Transition project including establishment and ongoing administration and maintenance by Kānoa-RDU.
ANCILLARY SERVICES AND PROFESSIONAL	Implementation of other arrangements to ensure the necessary third party ancillary and professional services can be delivered in a timely manner. Ancillary services may include: • Legal • Specialist energy market advisory • Probity • Deal advisory • Technology

In sourcing these capabilities, the scope of procurement covers:

- Engagement, negotiation and provisional agreements with identified providers; and
- Undertaking the selection and contracting processes for the services/functions identified.

The precise scope of services, sourcing approach and timing of delivery would be determined through the scoping phase of the procurement process and as detailed requirements are developed.

SELECTION OF (PROGRAMME) COUNTERPARTIES

The anticipated output of the selection and appointment process is the establishment of one or more long-term contract between the Crown and a counterparty engaged in the productive use of green hydrogen. The purpose of the contract is to provide the counterparty with forward input cost certainty (in the form of a rebate) to support the uptake of green hydrogen as an alternative fuel or feedstock. This contract may take a number of forms, including a CfD or IHCR (described above in the Economic Case) depending on policy decisions made as the project develops.

Hydrogen Market engagement to date

To avoid creating expectations of government intervention among sector participants, market sounding to date has consisted primarily of one-on-one discussions with industry players. We have discussed the high-level proposed model with participants in the following priority sectors:

- Heavy land transport
- Marine transport
- Aviation
- Industrial applications, including fertiliser and methanol production
- Fossil gas admixture

These sectors are also identified as priorities in the New Zealand Hydrogen Scenarios Report, commissioned by MBIE's Energy and Resource Markets branch. A number of market participants highlighted the need for a long-term mechanism to support the sector to realise the emergence of a hydrogen industry at scale.

One particularly encouraging feature of our engagement with the sector has been a general agreement across the value chain on the need for an intervention which supports the emergence of an end-user market.

Negotiations [redacted]

EVALUATION PROCESS

for ancillary and professional services

Evaluation of ancillary and professional services providers will be undertaken commensurate with their nature and materiality and undertaken in accordance with established good practice and policy related to procurement. Evaluation criteria will generally be weighted and follow the technical merit of the proposal, the provider's capability and capacity to deliver, Broader Outcomes and value-for-money.

Negotiations [redacted]

PROBITY

Probity will be of paramount importance when conducting the competitive selection process.

A probity plan will be prepared to guide the promotion and application of probity practice and to ensure probity risks are identified and managed.

Procurement activity will be conducted in accordance with the following six key 'probity fundamentals' as stated by the Office of the Auditor-General:

- Accountability
- Openness
- Public value
- Lawfulness
- Fairness
- Integrity.

A probity management plan will be established as part of the Regional Hydrogen Industry Transition project establishment, to cover all aspects of the project, including procurement.

Negotiations [redacted]

Negotiations

Financial Case

OUTLINING THE FINANCIAL CASE

This section sets out the *indicative* financial implications of the preferred way forward.

FUNDING MODEL AND FINANCIAL APPRAISAL

Based on current estimates, the anticipated cash flows for the investment proposal over its intended life span are as set out in the table below.

Anticipated cash flows

$MILLIONS	*2023/24*	*2024/25*	*2025/26*	*2026/27*	*. . .. .*	TOTAL
PREFERRED WAY FORWARD:						
CAPITAL	0.01m	0m	0m	0m	0m	0.1m
OPERATING	3.158m	13.109m	21.009m	21.009m	151.791m	210.076m
TOTAL	3.668m	13.609m	21.509m	21.59m	152.013m	212.086m
FUNDED BY:						
EXISTING REVENUE	0.5m	0.5m	0.5m	0.5m	0m	2m
EXISTING CAPITAL	0m	0m	0m	0m	0m	0m
EXTRA REVENUE	3.158m	13.109m	21.009m	21.009m	151.791m	210.076m
EXTRA CAPITAL	0.01m					0.1m
TOTAL	3.668m	13.609m	21.509m	21.59m	152.013m	212.086m

The following assumptions have been made in determining these initial estimates:

- Counterparties will accept contractual cost containment measures.
- Projects begin production in 2025/26. If this date shifts, more of the total cost of the intervention will fall into outyears.
- Existing Just Transition Partnerships team baseline funding can be used to cover a portion of Ministry staffing costs.
- Staffing costs associated with the programme will decline once contracts are signed.

FUNDING SOURCES

In addition to 2m to be met from existing agency appropriations (Expanding Just Transition Support for Communities Facing Transitions), MBIE intends that the additional funding required $210.076m is sought/provided from the following sources:

1. 210.076m to be met through the Climate Emergency Response Fund

OVERALL AFFORDABILITY

The proposed whole of life cost of the project is $212.086m.

Management Case

PROJECT MANAGEMENT STRATEGY AND FRAMEWORK

The project will be delivered in phases, utilising the various project implementation and delivery capabilities across MBIE, and adopting a cross- organisational governance structure. The project will draw on previous knowledge and experience in implementing similar initiatives.

An initial inception phase will be led by the Economic Development and Transitions Branch, working closely with the Procurement Branch, the implement a procurement process. Following selection of eligible rebate recipients, the operational aspects of payments administration, monitoring, reporting and verification will transfer to Kānoa-RDU.

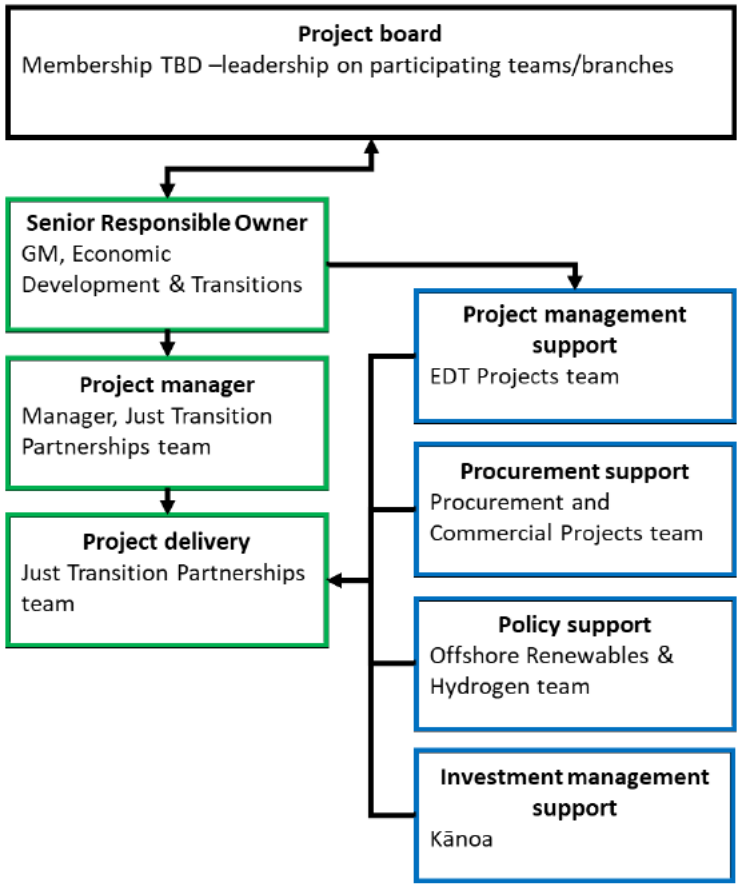
The Project will be led by a Project Board with Senior representation from relevant parts of MBIE – Economic Development & Transitions, Energy and Resource Markets, Kānoa-RDU, and Procurement.

The Project will (utilise) existing Project delivery capabilities within the organisation.

- Policy development has been undertaken by the Economic Development and Transitions Branch, undertaking iwi, stakeholder and market engagement over several months.
- The Procurement Projects Team in Finance Procurement Branch has been engaged to provide specialist procurement capabilities - to design market selection processes which are robust, fair, transparent, defendable and deliver value for money to Government. Finance and Procurement existing capabilities and Government procurement systems will be adapted to meet the needs of the Project.
- Due diligence on shortlisted rebate recipients will be undertaken jointly by Economic Development and Transitions, Kānoa-RDU, and Procurement and Commercial Projects Teams. These units possess existing expert capabilities relevant to due diligence tasks which are regularly employed in procurement and grant programmes.
- Contracting, and negotiation will be led by Procurement with close assistance from EDT and Kānoa-RDU. It is anticipated that External legal advice may be sought given the specialist energy market nature of the contracting involved.
- Contract inception will involve contributions from all three branches. Ongoing programme administration, including payments, monitoring and reporting will transition to Kānoa-RDU.

A phased delivery approach will ensure Project preparedness before commencing each subsequent phase. The Project Board will be able to review the planned approach prior to commencement of each subsequent phase. Each phase will be informed by the outcomes of previous phase and an appropriate approach planned and developed. This approach will require an iterative and cross-organisational Project management methodology.

Key roles and responsibilities



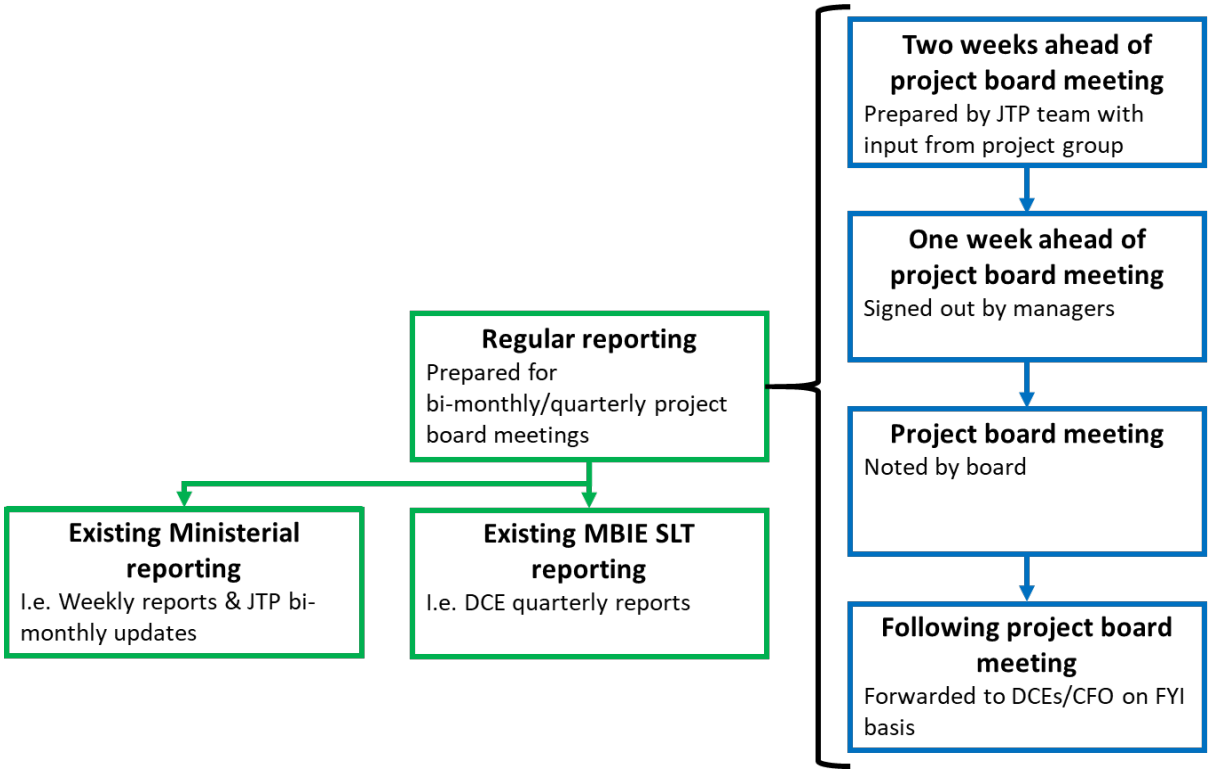
Summary of key project roles and description of responsibilities

ROLES	RESPONSIBILITIES
PROJECT OVERSIGHT – PROJECT BOARD	Membership TBD, but likely to include senior leaders from across business areas contributing to project delivery (ERM, Finance/Procurement, Kānoa-RDU & EDT). The project board will be responsible for providing strategic and organisational oversight of the project to ensure alignment across policy domains. The board will also be responsible for supporting the long-term success of the project though establishing appropriate ongoing organisational management structures. We propose the project board meet bi-monthly to quarterly. In addition to scheduled meetings, the Project Board members can be called upon on an ad-hoc basis as a resource to help resolve high-level strategic challenges as they emerge. Terms of Reference will recognise the different project phases and the roles of the Board at each phase. The membership and Chair of the Project Board will evolve as the project progresses through project phases to reflect operational needs to align with leadership responsibilities.
SENIOR RESPONSIBLE OFFICER – GM	The Senior Responsible Officer will initially be the GM Economic Development and Transitions for the project inception, development, procurement and implementation phases. It is envisaged that responsibility for this role will transition to another relevant GM during the operational phases of the project.

	The Senior Responsible Officer will be responsible for managing the strategic direction of the project, chairing / reporting to the Project Board, maintaining strategic relationships with other parts of Government and with the Ministers.
PROJECT MANAGER	The Project Manager will initially be the Manager, Just Transition Partnerships. The Project manager will work with the project team on daily operational aspects of the project.
PROJECT DEVELOPMENT AND DELIVERY – JUST TRANSITION PARTNERSHIPS TEAM	The JTP team will be responsible for the day-to-day development and delivery of the programme. These responsibilities include: • Project management (with EDT Projects team) • Ministerial engagement • Stakeholder engagement (and, with support from Procurement Team, market engagement) • Policy design (with Offshore Renewables & Hydrogen team) • Programme design • Delivering procurement process (with Procurement Projects team) • Contractor/supplier management (with Procurement Projects team)
PROJECT MANAGEMENT SUPPORT – EDT PROJECTS TEAM	The EDT Projects team will be responsible for supporting effective and efficient project management, while ensuring the JTP team adheres to best practice process. The project will likely require a dedicated project management resource within the EDT Projects team.
PROCUREMENT SUPPORT – MBIE PROCUREMENT AND COMMERCIALPROJECTS TEAM	Development and design of market engagement and procurement process Administration and management of procurement process It is intended that this function will be undertaken by the MBIE Project Procurement Team on a cost recovery basis, with external probity support engaged as appropriate.
POLICY SUPPORT – MBIE ENERGY AND RESOURCE MANAGEMENT - OFFSHORE RENEWABLES AND HYDROGEN TEAM	The ORH team will be responsible for providing policy support and interface with MBIE's wider energy policy ecosystem, primarily within the Energy and Resource Markets (ERM) branch. JTP and ERM will work closely to identify alignment between JTP hydrogen measures and development of the Hydrogen Roadmap. JTP will inform ORH team of the JTP work agenda to enable early identification of issues and opportunities for joint working. Both branches will provide regular updates for branch leadership and where appropriate, raise issues with the Project Board. Responsibility for ensuring alignment between JTP hydrogen market measures and the Hydrogen Roadmap will be shared with the JTP team.

Project reporting arrangements

To minimise the need for additional reporting, the project will use a single regular reporting template to inform project managers, the project board, and agency senior leadership. It will align reporting timelines with existing reporting regimes (such as regular Ministerial and DCE reporting) to avoid duplication and ensure consistent and timely messaging.



Outline project plan

Key Milestone	Start	End	Updates to Ministers
Project management structures and process established	Mar-23	Apr-23	
Procurement of commercial services process	Apr-23	Jul-23	
Public announcement of funding provided through Budget23	May-23	May-23	
Market engagement to inform tender design	Jul-23	Aug-23	✓
Development of tender documentation	Jul-23	Aug-23	✓
Tender process	Sep-23	Dec-23	✓
Determination on next stage of procurement made by Ministers	Aug-23	Jan-24	✓
Subsequent contracting and negotiation process	Jan-24	Mar-24	✓
Successful announced	Apr-24	May-24	✓

ORGANISATIONAL CHANGE MANAGEMENT

Aside from establishing a project board, we do not anticipate there will be large-scale organisational structure/personnel change required to deliver this project. There may be some minor structural changes made withing the Economic Development and Transitions Branch to ensure appropriate project and staff management to deliver the project. Operational and implementation capabilities within Kānoa-RDU will leverage existing staff and delivery frameworks.

If organisational structure/personnel change becomes required through the delivery of the project, the project will work within MBIE's existing change management processes and frameworks. In the event of change management being required, the project manager and senior responsible owner will work with MBIE People & Culture to ensure alignment with organisational processes.

BENEFITS REALISATION MANAGEMENT

The project has developed a range of iwi, community, economic development and environmental benefits that will be realised through the initiative. These benefits will be identified and agreed with counterparties during the procurement process. A benefits realisation plan will be implemented by Kānoa-RDU through the implementation phase of the project, incorporating monitoring, reporting and verification.

In partnership with central government counterparts and Ngāi Tahu, a range of potential benefits have been identified. An initial benefits outline has been developed and is appended at **Annex 4**. Pending discussion with Taranaki iwi, these benefits will be developed as criteria in the procurement process. These benefits include:

- Carbon emissions reduction.
- Opportunities for iwi and rūnanga investment and employment.
- Economic resilience and diversification.
- Whānau; Education and training; Intergenerational benefits; Community development; energy poverty.
- Environmental Stewardship.
- Downstream economic benefits.

RISK MANAGEMENT

A Risk Management Strategy & Framework have been developed consistent with the MBIE Risk Management Framework. A Register has been established and will be maintained throughout the project as more detailed analysis is undertaken and as the project moves through the various project phases. The risk register will regularly be reported on and reviewed by the Project Board. Responsibility for managing each risk will be assigned to a responsible manager with mitigation strategies developed and implemented.

The table below identifies a summary of the main risk categories:

RISK CATEGORY	INITIAL LIKELIHOOD ASSESSMENT
Policy Development	Low
Procurement process	Low
Market / commodity	Medium
Implementation and operation	Low – medium
Project management and execution	Medium
Project resourcing	Low
Reputational and communications	Low

PROJECT AND BUSINESS ASSURANCE ARRANGEMENTS

This investment proposal has been assessed as high risk using the Treasury's Risk Profile Assessment[7] tool and moderation process.

On the basis of this risk assessment, the on-going Treasury engagement as part of the business case process will be agreed.

An Assurance Plan will be developed.

7 https://treasury.govt.nz/information-and-services/state-sector-leadership/investment-management/think-investment-possibilities/risk-profile-assessment

POST-PROJECT REVIEWS

A post implementation review will be included in planning to confirm that the new system/facilities are operating as intended and delivering the services proposed in the business case, and to identify any lessons learned from the management of the project/tranche that can be applied to future projects or projects in other agencies.

As required by Cabinet Office Circular CO(19)68, this project will report back to Cabinet within 12 months of the in-service date on the actual level of benefits achieved compared with those outlined in the Cabinet-approved investment.

This project is high risk, so a Treasury Operations and Benefits Realisation Review will be undertaken at agreed points; the initial review will be timed to inform the Benefits report-back to Cabinet.

Next Steps

This Indicative Business Case seeks approval for MBIE Just Transition Partnerships:

1. To lodge the Regional hydrogen Industry Transition Budget 23 bid.
2. To start development of the Detailed Business Case, based on the preferred way forward; this will include more detailed analysis of the short-listed options identified and the selection of a preferred option.

8 https://dpmc.govt.nz/publications/co-19-6-investment-management-and-asset-performance-state-services

Annexes

Annex 1: Monetized CBA

Annex 2: Non-monetized CBA

Annex 3: Detailed options analysis

Annex 4: Iwi benefits outline

Annex 1: Monetized CBA

The table below shows the benefit-cost analysis for the short-listed options over a 10 year appraisal period.

SCENARIO	NAME	REDUCED C02 TONNAGE	REDUCED C02 VALUE	JOB YEARS	TOTAL WAGE UPLIFT	GDP INCREASE	NPV BENEFITS	NPV COSTS	COST BENEFIT RATIO
PESSIMISTIC	Do nothing	106,250	$9,350,000	399	$4,740,035	$55,845,000	$50,341,851	$31,696,673	1.59
OPTIMISTIC		143,750	$12,650,000	459	$6,412,988	$75,555,000	$68,109,563	$31,696,673	2.15
PESSIMISTIC	Option 1: Status Quo (CAPITAL Grants)	543,848	$47,858,617	1736	$24,262,192	$285,846,466	$257,678,219	$162,241,594	1.59
OPTIMISTIC		735,794	$64,749,893	2349	$32,825,319	$386,733,454	$348,623,473	$162,241,594	2.15
PESSIMISTIC	Option 2: Indexed Hydrogen Consumption Rebate (IHCR)	544,040	$47,875,506	2325	$32,494,184	$476,250,000	$404,715,823	$162,235,108	1.87
OPTIMISTIC		736,054	$64,772,744	3146	$43,962,720	$644,338,235	$547,556,702	$162,235,108	2.53
PESSIMISTIC	Option 4: Hybrid Model (preferred)	616,578	$54,258,907	2635	$36,826,742	$539,750,000	$458,677,933	$162,235,108	2.12
OPTIMISTIC		834,194	$73,409,110	3565	$49,824,416	$730,250,000	$620,564,262	$162,235,108	2.87
PESSIMISTIC	Option 3: Contract for Difference (CfD)	725,386	$63,834,008	3100	$43,325,579	$635,000,000	$539,621,097	$162,235,108	2.49
OPTIMISTIC		981,405	$86,363,658	4194	$58,616,960	$859,117,647	$730,075,602	$162,235,108	3.38

Annex 2: Non-monetized CBA

NON-MONETIZED ROUGH BENEFIT COST ANALYSIS (SUMMARY)		DO NOTHING	OPTION 1: STATUS QUO (CAPITAL GRANTS)	OPTION 2: INDEXED HYDROGEN CONSUMPTION REBATE (IHCR)	OPTION 3: CONTRACT FOR DIFFERENCE (CFD)	OPTION 4: HYBRID MODEL
PREFERRED OPTION		No				Yes
BENEFITS	ECONOMIC DIVERSIFICATION	0	2	3	4	5
	PARTNERSHIP WITH MĀORI	1	1	4	4	5
	ELECTRICITY MARKET DIVERSIFICATION	0	1	4	5	4
	EFFECTIVENESS AT OVERCOMING BARRIERS	0	1	4	4	5
COSTS						
	RISK OF OVER-SUBSIDISATION	0	-1	-4	-1	-2
	PATH DEPENDENCE	0	-5	-3	-1	0
ANALYSIS						
SCORE		1	-1	8	15	17
ASSESSMENT (NON-MONETISED)		Poor fit	Poor fit	Partial fit	Good fit	Good fit
RANK		5	4	3	2	1

Annex 3: Detailed options analysis

Development of hydrogen production plant

Approach: most -> least preferred	Equity	Rebate	Tax	Grant
Definition	Involves the Government providing capital to a plant developer in exchange of ownership stake in the electrolyser plant.	Involves the Government providing a payment or reduction in various forms that electrolyser plant owners will receive from the government, as an incentive for the plant developer to establish an electrolyser plant. The payment is made following the successful delivery of the plant.	Involves the Government offering tax incentives to encourage electrolyser plant developers to establish a plant.	Involves the Government awarding money to a plant developer for a specific purpose, such as establishing an electrolyser plant.
Variations	Structures such as voting and non-voting, convertibles	Forms such as cash or credit	Forms such as deductions, credits, exemptions, deferrals	By asset type By activity By size of firm include: open competition, challenge funds, or direct award Covenants such as: meeting certain performance benchmarks, disclosure of information, allocation of end-products
Strengths	Government can negotiate favourable terms	Provides direct financial support	Targeted incentive can help the plant developer (or to the industry) to support its growth / stabilisation.	Funding for activities which may not be financially viable Support for building a plant which aligns with government priorities

Weakness	Increased compliance and monitoring costs Does not encourage market competition Inefficiencies due to political, social, and economic interference	Complexity in setting rules specific to the electrolyser plant developer. **Carries a risk that the electrolyser is delivered but does not operate, resulting inefficient application of government funds.**	Complexity in setting broad rules which ensures parity across the tax system	Too specific to the recipient electrolyser plant developer. Eligibility criteria needs to be established, met, and monitored to ensure money is expended appropriately.
Opportunities	Increased control over strategic industry Improved economic stability Improved social welfare Profits returned to treasury Limit monopolistic abuse	Incentivise desirable behaviours of industry Stimulate economic activity	Incentivise desirable behaviours of industry Stimulate economic activity	Easy to administer
Threats	Ownership value subject to market volatility Vulnerable to changes such as expiration of technology Control and oversight costs: potential for follow-on investments in order to maintain similar ownership levels or in order to support the plant Marketability risk: government unable to exit from investment.	Vulnerable to changes in political priorities or economic conditions Face competition from other initiatives aimed at achieving similar goals Subject to regulatory risks **Waste and/or inefficiency**	Create unfair competition Create dependency on government support Fiscal risk for the government	Can be subject to changes in future government priorities or budget constraints Subject to complex and changing regulations or criteria Create dependency on government support Mismanagement of funds Waste and/or inefficiency Subject to political influence/bias
Risks Probability that threat will occur		**Carries a risk that the electrolyser is delivered but does not operate, resulting inefficient application of government funds.**		Higher

Operation of plant and production

Approach: most -> least preferred	Per Unit production subsidy	Contract for Difference between electricity and hydrogen price
Definition	Specific sum per unit of hydrogen produced is given to the producer by the government	An arrangement made between government and electrolyser plant so that the differences between the market price and strike price for hydrogen is settled.
Variations	Amount of subsidy (cap, floor, floating, pegged, by volume) Duration	Key elements are: - terms (duration, strike price, settlement method etc)
Strengths	Provides direct financial support Targeted specific to the electrolyser plant (induces higher investments in emission-reducing tech[9]) Used to encourage production to a target volume	One way to manage price uncertainty for both parties Commitment device for governments Incentives to producer to innovate is higher
Weakness	Subject to political influence/bias Unequal treatment among producers Expensive to provide and to administer	High-risk due to potential for significant losses if underlying hydrogen prices move in the opposite direction Complex instruments with many variable terms and conditions
Opportunities	Can encourage more plants to be established Tailored to meet the needs of the plant	Provides opportunity for plant and government to create a market Flexibility through varying terms of contract Stability in price encourages market development
Threats	Unfair competition Creates dependency on government support Fiscal risks for government	Complexity of the contract Costs associated with hedging
Risks	It depends based on prescriptiveness of the contract Lower	It depends based on prescriptiveness of the contract Higher

[9] https://www.sciencedirect.com/science/article/abs/pii/S0377221720304422

Electricity input cost support

Approach: most -> least preferred	Contract for difference	Rebate	Finance support (loans, direct finance)	Grants
Definition	Contract between government and either the operator of the electrolyser plant *OR* the electricity generator. The aim is to provide the electrolyser operator with ongoing price certainty for electricity input costs.	Provides the hydrogen producer with a rebate on the electricity component of the producer's input costs.	Government provides direct finance to developers of electricity generation infrastructure associated with hydrogen production at concessional rates.	Involves the Government awarding money to a developer of renewable electricity plant for the purpose of supplying hydrogen projects with a view to reducing electricity input costs.
Variations	Can be aimed at electrolyser operator, or electricity generator	By asset type By sector By size of firm By type of activity By specifying the level of co-investment (e.g. what proportion of the total project spend is grant-based) Forms such as cash or credit	Loan guarantees, Direct finance	Covenants such as: meeting certain performance benchmarks, disclosure of information, allocation of end-products By volume By price Can involve Government taking an equity stake in the asset.
Strengths	One way to manage price uncertainty for both parties Commitment device for governments	Does not directly interfere in the operation of the electricity wholesale market. Provides direct support	Based on existing models delivered by Kānoa Reduces cost of finance and therefore cost of plant, in turn reducing cost of production.	Not distortionary, compared to tax options
Weakness	Contractually complex	Complexity in setting rules specific to the electrolyser plant developer. No guarantee that reduction in electricity input costs will flow to end	High costs associated with developing electricity generation projects ($'00s million)	High cost to government compared with finance options.

	Exposes government to electricity wholesale price uncertainty Does not guarantee that reduced electricity input costs will flow to hydrogen end user in the form of reduced cost of hydrogen.	user in the form of reduced cost of hydrogen. No opportunity to influence outcomes in wholesale electricity market.	Requires up-front expenditure from government Effect of lower cost of finance for electricity projects on end cost of hydrogen likely to be marginal. No guarantee that reduced electricity costs will flow to consumers No guarantee that hydrogen will be consumed by consumers. Risk that hydrogen plant will be underutilised. Government shared development and operational risks associated with development Extra due diligence is required; greater establishment costs.	Specific to the recipient – aimed at a specific renewable energy project. Eligibility criteria needs to be established, met, and monitored to ensure money is expended appropriately. Need to ensure that electricity is provided to electrolyser operator at concessional rates. Risks on non-delivery – project development risks. No guarantee that reduced cost of electricity will flow through to hydrogen end user as a reduced hydrogen price. No guarantee that hydrogen will be consumed by consumers. Risk that hydrogen plant will be underutilised.
Opportunities	Opportunity to achieve outcomes in electricity generation market – enable development of more new generation	Can encourage re-prioritisation of supply to electrolyser plants	Opportunity to influence electricity wholesale market outcomes – achieve more renewable energy generation. Opportunity to leverage scale – provision of electricity to other industries in addition to hydrogen.	Easy to administer Opportunity to influence electricity wholesale market outcomes – achieve more renewable energy generation. Opportunity to leverage scale – provision of electricity to other industries in addition to hydrogen.

Threats	May distort existing electricity marketplace for electricity	May distort existing market for electricity market	Financial support may not be an appropriate mechanism if electricity supplier especially if the suppler has over-supply	Can be subject to changes in future government priorities or budget constraints Mismanagement of funds Waste and/or inefficiency Subject to political influence/bias
Risks	Long-term electricity wholesale price volatility	Carries a risk that the electrolyser is delivered but does not operate, resulting inefficient application of government funds	Development risks associated with renewable energy projects, consents, supply chain, social licence, technical, etc. Risk of default Risk that plant will be under-utilised Development risks – consents, social licence, supply chains, insolvency, etc.	Development risks associated with renewable energy projects, consents, supply chain, social licence, technical, etc. Risk that plant will be under-utilised Development risks – consents, social licence, supply chains, insolvency, etc.

Purchase distribution and consumption

Capital

Approach	Grant	Rebate	Accelerated depreciation
Definition	Involves the Government awarding money to a plant developer for a specific purpose, such as developing hydrogen distribution & infrastructure (eg. hydrogen refuelling stations).	Involves the Government providing a payment or reduction in various forms to the owners of infrastructure involved in distributing hydrogen – such as refuelling stations, pipelines, storage, etc. This is an incentive for the plant developer to establish an electrolyser plant. The payment is made following the successful delivery of the infrastructure. Range of rebate for direct and indirect costs incurred relating to distribution & infrastructure	Accelerated depreciation is the name for a tax incentive for either providing a higher rate of depreciation for an asset than is currently allowed for tax purposes or providing an immediate tax deduction for part (or all) of the cost of the asset (or a combination of both).
Variations	Approaches include: open competition, challenge funds, or direct award Covenants such as: meeting certain performance benchmarks, disclosure of information, allocation of end-products By asset type By activity By size of firm	By asset type By sector By size of firm By type of activity By specifying the level of co-investment (e.g. what proportion of the total project spend is grant-based) Forms such as cash or credit	By asset type Rate of acceleration Duration
Strengths	Not distortionary, compared to tax options	Provides direct financial support Not distortionary, compared to tax options	Greater commercial rigour and broader systematic impact compared to grantsimpact compared to grants
Weakness	Too specific to the recipient electrolyser plant developer. Eligibility criteria needs to	Complexity in setting rules specific to the electrolyser plant developer. Carries a risk that the electrolyser is delivered but	Targeted setting difficult to administer (potentially impossible)

	be established, met, and monitored to ensure money is expended appropriately.	does not operate, resulting inefficient application of government funds.	
Opportunities	Easy to administer	Incentivise desirable behaviours of industry Stimulate economic activity	Creates more commercial rigour (compared to grants) because enterprises will have skin in the game
Threats	Can be subject to changes in future government priorities or budget constraints Subject to complex and changing regulations or criteria Create dependency on government support Mismanagement of funds Waste and/or inefficiency Subject to political influence/bias	Vulnerable to changes in political priorities or economic conditions Face competition from other initiatives aimed at achieving similar goals Subject to regulatory risks Waste and/or inefficiency	May encourage other industries to seek similar treatment
Risks	Delivery and development risks. Risk of financial benefits not flowing through to consumers. Risk of under production/ inefficient utilisation of plant.	Forms such as cash or credit Carries a risk that the infrastructure is delivered but does not operate, resulting inefficient application of government funds.	Fiscal cost highly variable

Finance

Approach	Loan guarantee	Direct finance
Definition	Involves the Government providing a loan security for developers of hydrogen infrastructure – such as electrolysers. This enables finance to be provided at reduced cost based on Government's credit rating rather than developers credit rating.	Government provides direct finance to developers at concessional rates.

	Reduces cost of finance to project developers and therefore cost of capital. This increases availability of hydrogen in the market, reduces the cost of production and results in lower cost hydrogen to producers.	
Variations	Interest rates Payment terms Covenants	Various conditions can be created tailored for individual needs/circumstances
Strengths	Reduces cost of finance to project developers and therefore cost of capital. This reduces the cost of production and results in lower cost hydrogen to producers. Does not involve upfront outlay by government and only incurs cost in event of default on finance by developer.	Based on existing models delivered by Kānoa Reduces cost of finance and therefore cost of plant, in turn reducing cost of production.
Weakness	No guarantee that reduced costs will flow to consumers No guarantee that hydrogen will be consumed by consumers. Risk that plant will sit idle. Government shared development and operational risks associated with development Extra due diligence required; greater establishment costs.	Requires up-front expenditure from government No guarantee that reduced costs will flow to consumers No guarantee that hydrogen will be consumed by consumers. Risk that plant will sit idle. Government shared development and operational risks associated with development Extra due diligence is required; greater establishment costs.
Opportunities	May encourage the developers to expand its existing business or expand into the hydrogen market Can encourage developers to access credit or re-finance on more attractive terms	Contracts can be tailored for specific circumstances and needs
Threats	Subject to interest rate changes Can compete with other forms or lower cost of capital May	Subject to changing economic environment including interest rates Can compete with other forms of financing
Risks	Risk that plant will be under-utilised / sit idle.	Risk of default

	Risk of default by developer. Development risks – consents, social licence, supply chains, insolvency, etc.	Risk that plant will be under-utilised Development risks – consents, social licence, supply chains, insolvency, etc.

Sales revenue subsidy

Approach	Per Unit sale subsidy	Sales revenue subsidy
Definition	A subsidy is generally some form of payment—provided directly or indirectly—to the receiving individual or business entity for them to meet the cost of supplying the hydrogen energy as a function of units purchased.	A subsidy is generally some form of payment—provided directly or indirectly—to the receiving individual or business entity for them to meet the cost of buying the hydrogen energy as a function of sales/revenue.
Variations	Direct vs indirect Volume Duration Usage / frequency	Direct vs indirect Volume Duration Usage / frequency
Strengths	Controls / lowers prices Encourages greater consumption Avoids development risks associated with support aimed at development stages of supply chain. Rebate is only paid once hydrogen production occurs.	By focusing on consumption quantity than on green technology investments, the consumer subsidy can lead to a greater consumption than the manufacturer subsidy.[10] Yields (compared to production subsidy) higher social welfare Avoids development risks associated with support aimed at development stages of supply chain. Rebate is only paid once hydrogen production occurs.
Weakness	Taxation of those receiving subsidy can be complicated (depending on taxable status) No guarantee that the reduced costs of hydrogen will flow to consumers. – Lack of market visibility. Requires ongoing administration of rebate	Higher financial burden for government as a result of producer's practice of taking advantage Taxation of those receiving subsidy can be complicated (depending on taxable status)

[10] https://www.sciencedirect.com/science/article/abs/pii/S0377221720304422

		No guarantee that the reduced costs of hydrogen will flow to consumers. – Lack of market visibility. Requires ongoing administration of rebate
Opportunities	Suitable for supporting efficient, large-scale production, due to direct producer-Crown relationship (quasi-consortium approach).	Suitable for supporting efficient, large-scale production, due to direct producer-Crown relationship (quasi-consortium approach).
Threats	If dealing with single large-scale producer is the preferred approach (due to cost/volume considerations), success will rely on the decisions of only a few potential counterparties, as opposed to a range of smaller and medium sized actors.	If dealing with single large-scale producer is the preferred approach (due to cost/volume considerations), success will rely on the decisions of only a few potential counterparties, as opposed to a range of smaller and medium sized actors.
Risks	May create a supply monopoly without careful mitigation (see above)	May create a supply monopoly without careful mitigation (see above)

Off-taker support

Approach	Consumer subsidy	CfD between hydrogen and reference price	Tax changes (GST)
Definition	Rebate targeted at end users of green hydrogen. Reduces the cost of the hydrogen product to close the gap with alternative commodities (such as diesel, gas or urea).	Costs and revenues associated with a traded product are shared between parties. Contract sets a "strike price" - When the market price of the commodity is below the strike price, the 'customer' pays the producer the balance to make up the difference When the market price of the commodity is above the strike price, the producer pays the difference to the 'customer'.	Most goods & services are taxed at 15% including grants / subsidies received from government. A number of secondary taxes may also interact with the target sectors (i.e. Road User Charge)
Variations	Indexed consumer subsidy, which is intermittently altered to avoid over or under subsidisation.	N/A	RUC exemptions
Strengths	Administrative simplicity for counterparties and the Crown Relative ease of delivery for government Lower establishment costs due to reduced complexity	Provides contractual certainty Minimises long-run cost to government due to market tracking mechanism	Supports desired activity Sends clear signals Broad based – simple for end-users

	Greater forward budget certainty comparted to a CfD as the rate of the rebate will be indexed and determined prospectively for the payment period.	Contracting model can enable specific requirements relating to new generation or energy system services Commercial discipline – mitigates risk of Crown paying disproportionately high rebate relative to market trends	
Weakness	The need to index to a reference commodity introduces a small amount of additional administration Depending on indexation frequency intervals, there is potential for the Crown to over-subsidise green-hydrogen consumption relative to market.	Unfamiliar mechanism Best suited to supporting large projects – may not work at smaller scale Difficult to quantify "whole-of-life" cost with certainty	Complex and distortionary Ill-suited to supporting narrow sectors Increased administration for government
Opportunities	Development of indexed rebates/subsidies may lead to more efficient/effective ED programmes in future	Establishes CfDs as a public policy intervention in NZ – in widespread use around the world.	Market has asked for this intervention in the past, and would likely respond quickly.
Threats	Extending use of subsidies to drive outcomes can create expectations of support in other sectors. May lead to greater calls for industry assistance.	Misuse of CfD mechanism in other sectors could lead to the NZ Govt being exposed to substantial and ongoing liabilities.	May lead to similar requests from other sectors, leading to a complex and ineffective tax system, which runs counter to NZ's approach to a broad based, low rate tax system.
Risks	Risk of over-subsidisation if indexing mechanism not well designed. Agreements with counterparties may not be "bankable" as a CfD is – untested approach	Risk of costs to Crown blowing out if market moves in the wrong direction	Risk of support being withdrawn in future or alternatively, risks locking in subsidy permanently (and hollowing out road-use tax base)

Confidentiality [redacted]

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