Consultation: Advancing New Zealand's energy transition
Energy and Resources Markets
Ministry of Business, Innovation and Employment
PO Box 1473
Wellington 6140

2 November 2023

Re: New Zealand Steel submission on the interim hydrogen roadmap

This is a submission from New Zealand Steel on the Ministry of Business, Innovation and Employment's (MBIE) consultation package – Advancing New Zealand's energy transition. Separate submissions have been provided for each paper; this submission acts as the overarching key messages summary including the separate submission on the interim hydrogen roadmap.

New Zealand Steel - contributing to the productivity and resilience of New Zealand

1. Formed in 1965, New Zealand Steel has been an integral part of New Zealand's history. Steel production began in 1968 and major expansions completed in 1987 created an integrated steel mill. The company is in Glenbrook, Southwest of Auckland on 560 hectares in industrial land, on the southern shores of the Manukau Harbour. As a significant employer with more than 1,500 people employed directly in high-skilled, well-paid jobs, and indirect employment of a further 2,500 people, NZ Steel makes a substantial contribution to the people in its community.

2. NZ Steel is a critical part of New Zealand's supply chain and provides a reliable supply of high-quality steel products to New Zealand's building, construction, industrial, energy, infrastructure manufacturing and agricultural sectors. Around 650,000 tonnes of steel is made a year and almost all our production is consumed in New Zealand or supports the Pacific Islands' needs. We contribute around $900m to the New Zealand economy each year.

BlueScope Climate Action Strategy

3. NZ Steel's parent company, BlueScope, is committed to exploring and collaborating to pursue emerging and breakthrough technologies to work towards its 2050 net zero goal across all global operations, including New Zealand.

4. Achieving the 2050 net zero goal is highly dependent on a range of key enablers, requiring collaboration and action across multiple sectors and stakeholders.

Energy and Decarbonisation at New Zealand Steel

5. Energy policy and decarbonisation are inseparable. In line with the BlueScope climate strategy, in September 2023 New Zealand Steel is committed to the construction of an Electric Arc Furnace (EAF) at Glenbrook. Work

is underway to install an EAF to shrink its carbon footprint and secure the future of domestic steel making. The environmental, societal and economic benefits to the country are far reaching:

- **Significant gross emission reductions** of 800,000 tonnes of $C0_2e$ per annum, seeing NZ Steel almost halve its emissions from day one, (over 45% of New Zealand Steel's gross carbon emissions reduced). This is the country's largest industrial decarbonisation project to date.
- **Retain critical domestic steel industry** and its related jobs, contribution to economic resilience and domestic supply chains, without emissions leakage.
- **Recycle domestic scrap steel** in volumes up to 300,000 tonnes. Steel is infinitely recyclable, and this project will make New Zealand as close to self-sufficient as possible using renewable energy via an innovative partnership with an electricity generator to recycle domestic steel scrap rather than shipping it offshore.
- The benefits are made possible through partnerships across public and private sectors.
- Decarbonisation at scale has occurred without deindustrialisation.
- A power supply deal that gives flexibility to lower demand on the grid during peak time loads, strengthening the grid's demand management flexibility.
- Provides optionality for further reductions in steel making related emissions.

6. Energy policy, security and affordability are intrinsically linked to our national carbon net-zero 2050 goal, but also the continued viability of manufacturing in New Zealand. We know, through recent experience, that collaboration and joined up thinking is critical. New Zealand Steel's EAF project only came about through careful collaboration between industry, steel suppliers, commercial and environmental regulators, central government alignment and buy in from electricity generators.

7. Our main message is that New Zealand needs a coherent and joined-up energy eco-system that leverages the country's competitive advantages, recognises all of the interdependencies and avoids unintended consequences. New Zealand Steel has made submissions on all MBIE energy consultation papers, however our top ten submission points that span all energy areas are as follows.

Advancing New Zealand's Energy Strategy – Key Points

8. MBIE guide completion of the NZ Energy Strategy using a 'one eco-system' nationwide approach. This should be visionary guiding a holistic pathway as NZ transition to a low emissions society.

9. Reliable, firmed and affordable energy together with demand response efficiencies is essential for heavy manufacturing, NZ Steel is no exception. The integration between energy and heavy manufacturing will only grow deeper over time as NZ Steel continues to decarbonize and leverage its Glenbrook site to more energy related opportunities. In this sense, NZ Steel is as a major energy user as a heavy manufacturer and energy policy is critical for our success and the continuation of steel making here.

10. Electrification is key to reducing emissions (both from the grid but also for opportunities like hydrogen). For this to be achieved NZ will require an abundant supply of reliable, affordable electricity generated from renewable sources.

11. The challenges posed to the stability of the electricity grid by increased intermittent generation, namely wind and solar, must be recognised. As for the challenges of dry-year risks to hydro generation. Firming of the power supply is essential – firming solutions are multifaceted and must be understood in totality.

12. Demand flexibility is recognised as an essential tool in managing increased intermittent generation and peak-time loads. NZS encourages the development of an auxiliary market with appropriate demand response products enabling industrial users to provide demand flexibility. Demand response products that reflect true economic value reduce the required generation overbuild and reduce the cost of the marginal MWh, supporting both security of supply, increased competition in the wholesale market and overall system cost.

13. NZ Steel is exploring the next stage of decarbonisation following installation of the EAF. To fully remove coal from the ironmaking process an alternative reductant source is required to produce direct reduced iron (DRI). One option being investigated is using hydrogen as the reductant. While viability is yet to be proven there are promising signs. However, we are concerned at the expectations being built for green hydrogen in NZ. Hydrogen as a process input and/or energy source has many challenges through the complete end to end supply chain and will be dependent on availability of large amounts of electricity at costs several times lower than the current wholesale and futures market prices.

14. Further to point 6 above, a hydrogen steelmaking opportunity will only come about if a 'hydrogen hub' type concept is seriously considered at the Glenbrook site. This will require careful engagement with end-to-end supply chain partners and regulators – practical workshops are essential.

15. Whilst green hydrogen is a likely end state for ironmaking, NZ Steel believes there is a credible transition pathway using natural gas as the reductant. Converting the ironmaking process to using natural gas can facilitate a further step change in decarbonisation, transitioning to green hydrogen when the infrastructure exists.

16. While electrification can be and is a substitute for many applications, gas will remain essential for some industrial applications until new technologies are available and implementable. Until alternatives can be found, natural gas remains an important fuel source for peaking and dry-year electricity generation.

17. NZ Steel supports the further investigation of offshore wind in New Zealand mainly because of the scale of the green electricity it provides and the downstream opportunities that scale unlocks. Appropriate engagement with iwi and communities is essential.

Submission on the *Interim Hydrogen Roadmap*

Name	
Organisation (if applicable)	New Zealand Steel
Contact details	

Release of information

Please let us know if you would like any part of your submission to be kept confidential.

☐ I would like to be contacted before the release or use of my submission in the summary of submissions that will be published by MBIE after the consultation.

☐ I would like my submission (or identified parts of my submission) to be kept confidential, and **have stated below** my reasons and grounds under the Official Information Act that I believe apply, for consideration by MBIE.

I would like my submission (or identified parts of my submission) to be kept confidential because [Insert text]

[To check the boxes above: Double click on box, then select 'checked']

Responses to questions

Section 1: Hydrogen is emerging as an important part of the future global energy system	
	Are there other issues we should be considering in our assessment of the strategic landscape for hydrogen in New Zealand?
1	We note this roadmap is solely focused on green hydrogen and does not consider alternative sources for hydrogen production. Whilst green hydrogen should be the long term aim of every hydrogen roadmap this has the potential to be short sighted by not factoring hydrogen from other sources. Consideration into alternative hydrogen sources could provide a transition pathway from some sectors to achieve their long-term green hydrogen goals. For hydrogen from electrification to be a sustainable option this will require electricity pricing to be significantly lower to ensure early investment into new infrastructure is attractive. Whilst this is noted in the paper, there needs to be substantive analysis on this. The paper notes, it is expected that electricity costs will lower, a strategy has not been identified to support this. Investment in infrastructure to support green hydrogen will require a higher level of certainty of lower electricity cost. Blue, turquoise and gold hydrogen should be factored into a hydrogen roadmap. These options all have the capability of decarbonising New Zealand. Grey hydrogen has a part to play in the overall roadmap transition and should be considered from its current use through to achieving a move to clean hydrogen options (green, blue, turquoise and gold). Presenting the only option for the roadmap as being green hydrogen will stifle industries' ability to innovate and invest in decarbonising, through building the expectation this can be achieved in one "green hydrogen" step.
Section 2: The role for hydrogen in New Zealand's energy transition	
	Do you agree with our assessment of the most viable use cases of hydrogen in New Zealand's energy transition?
2	It is positive to note steel and other metals are included within the roadmap. We believe hydrogen could play a pivotal part in completing NZ Steel's carbon intensity reduction to net zero. With the new electric arc furnace in operation, NZ Steel will look to further reduce its emissions by an additional 800kt-900kt CO_2. We are investigating how and if hydrogen has the capability to achieve this decarbonisation step. We believe hydrogen reduction of ironsands will have a technical solution; the cost of green hydrogen will challenge the viability of such a transition. We welcome the approach taken as a first step in this interim roadmap, however additional assessment of alternative clean hydrogen options should be included.
	Do you support some of these uses more than others?
3	Obviously, we are supportive of the steel case. However, we strongly believe that supporting all opportunities will strengthen the capability of the hydrogen sector. Multi stakeholder

	collaboration and investment will be fundamental to developing and growing the sector. Specific focus on hydrogen hubs will allow for scale and investment considerations. Multi use case hubs will allow growth for cases that could struggle independently.
4	What other factors should we be considering when assessing the right roles for hydrogen in New Zealand's energy transition?
	Consideration of additional hydrogen sources, such as blue and turquoise hydrogen. These have the potential to support New Zealand's decarbonisation pathway in addition to electrification. Legislation and safety regulation needs to be extended to take these technology options into account. Until certainty about electrification capability through supply and cost exists, limiting alternative options will limit NZ's capability. There is room and opportunity for multiple hydrogen options to co-exist to support the overall transition of New Zealand.
5	Do you agree with this assessment of the potential for hydrogen supply and demand in New Zealand?
	In terms of the supply side factors, a real focus is required on where hydrogen should be manufactured in NZ at scale. There will be a range of factors to consider – a just transition being one such consideration. However, our view is that consideration of things like proximity hydrogen demand and use-centres should be key. For example, proximity to scaled green electricity, adjacency to hydrogen manufacturing use and/or SAF consumption, proximity to a reticulated hydrogen network etc.
6	Do you agree with the key factors we have set out that are likely to determine how hydrogen deployment could play out?
	The paper is solely focussed on green hydrogen. New Zealand will be missing an opportunity by not factoring in alternative hydrogen options, i.e. blue, turquoise. There are interesting technologies being developed in this space that could gain decarbonisation quicker and bring investment into hard to abate carbon sectors. Ultimately the goal is to decarbonise, if NZ solely focuses on green hydrogen opportunities could be missed to take advantage of other decarbonisation options.
7	What do you think needs to happen to address these factors?
	Ensure consideration of alternative hydrogen options are included in the roadmap. Whilst not the end solution, acknowledgement of the current and potential use of natural gas must not be excluded. This has the ability to provide a pathway to ultimately green hydrogen whilst moving down the decarbonisation pathway.
8	Do you have any evidence to help us build a clearer picture?
	Looking globally, questions are being raised on how certain green hydrogen will be for the only solution. NZ should acknowledge this risk and factor into the roadmap.

9	Do you agree with our findings on the potential for hydrogen to contribute to New Zealand's emissions reduction, energy security and resilience and economic outcomes?
	Absolutely, it is positive to see specific focus being applied to a future hydrogen sector.
10	Do you have any insights we should consider on what is needed to make hydrogen commercially viable?
	Some of the key components will be: • Economically viable price. For domestic use this will determine when the transition to hydrogen occurs. For export, it will determine whether export happens at all. • Involving off takers early on in the process to provide the investment with certainty and security. We would have thought that a mix of private and public future use needs to be considered at a collective level. • Ensuring that scaled green electricity generation is possible at the right price (this is probably the most important sub-set of whether green Hydrogen can be commercially viable). As per above, the commercials need to be considered holistically through the supply chain (offshore wind is a good example of where end-to-end collaboration is required; offshore wind developers --> electrolyser pricing --> optimal location(s) to manufacture and create a hub in NZ --> right mix of policy incentives --> early engagement with off takers thereby providing the investment certainty right up the supply chain. • De-risking investment through Government governance and brokerage across multiple stakeholders
11	Is there any further evidence you think we should be considering?

Section 3: Government position and actions

	Do you agree with our policy objectives?
12	We largely support the policy objectives with respect to green hydrogen, however, would recommend the objectives capture alternative options. Scale up of hydrogen production and continued scaling ahead of current expectations, expect more and more opportunities will be identified. Government support of infrastructure and legislations will be one of the most significant requirements to ensure the potential for hydrogen contributes to the future of NZ. Confidence in availability, cost and safety measures are significantly important for investments in this sector.

	We believe where possible, bringing forward opportunities to demonstrate both hydrogen production and use, very important to demonstrate capability for both. Supporting this demand is key for the roadmap to have impetus.
	Do you agree with our positioning on hydrogen's renewable electricity impacts and export sector?
13	It is good to acknowledge the potential for hydrogen exports. At the moment it may too early to say whether exporting hydrogen would frustrate or enhance our domestic hydrogen and electricity markets. It may be that exporting hydrogen may provide the scale and cost required to serve our domestic market but it's too early to tell. We appreciate that MBIE are not advocating for direct financially support for any hydrogen export opportunities at this current point in time. However, we would recommend that MBIE and other government agencies stay involved in export opportunities, even if that participation is just via thought leadership and maintaining relationships with Japanese and Korean off takers. Prioritising domestic infrastructure to meet domestic demand and cost should be the focus. Building the hydrogen sector will be a long-term process, stabilising the domestic should be the priority. There are uncertainties about hydrogen transportation, viability is unknown. Production of hydrogen at the utilisation point provides more certainty. Whilst this point relates to export, consideration should be given to transport within NZ, minimising cross country transportation.
	Do you agree with the proposed actions and considerations we have made under each focus area?
14	It is very positive to see a dedicated government body set up to focus on hydrogen. Collaboration across various areas of expertise and stakeholders is fundamental to success of this body. We cannot underestimate the importance of regulation setting and legislation control. Good to see acknowledgment of raising public awareness of the value and use of hydrogen.
	Is there any evidence we should be considering to better target actions in the final Hydrogen Roadmap?
15	Working more closely with stakeholders through workshops, public and private collaboration to determine these actions.
General comments	