



SUBMISSION: TE HAU MĀROHI KI ANAMATA

Engineering New Zealand (formerly IPENZ) is New Zealand's professional home for engineers. A non-profit membership organisation with over 21,000 members, we help our members to be the best so that they can engineer better lives for New Zealanders. We are committed to climate action and to supporting engineers, industry, and government respond to climate change. We need to be bold in mitigating, transitioning, and adapting to climate change, for a re-imagined and resilient future.

INTRODUCTION

Thank you for the opportunity to provide comment on the Ministry for the Environment's *Te hau mārohi ki anamata Transitioning to a low-emissions and climate-resilient future* consultation document. We understand responses to the consultation document will inform Aotearoa New Zealand's first emissions reduction plan (due for publication in May 2022).

Engineering New Zealand is committed to [climate action](#), and we support the Government's work to reduce emissions, transition society and support adaptation.

Established in 1912, Engineering New Zealand maintains professional engineering standards, and supports and honours the range of expertise our members make to society. Together, with 27 technical groups and societies as well as 18 branches throughout New Zealand and the United Kingdom, we are proud to be credible, connected, influential and recognised. We to support engineers to thrive.

Over the past few years we have partnered with other engineering and professional bodies to design and execute several flagship programmes to address challenges Aotearoa faces. These include [Engineering Climate Action](#), the [Wonder Project](#), the [Diversity Agenda](#) and [Sector Programmes](#). Our members explore possibilities, innovate new technologies and are dedicated to advancing the profession and industry.

The Government's work to develop the emissions reduction plan is of utmost importance. This work sets out the blueprint for New Zealand to reach our commitments under the Climate Change Response (Zero Carbon) Act 2019. We need a clear and definitive emissions reduction plan in order to take collective actions. This plan must include tangible targets, roles, and responsibilities, including timeframes and accountabilities. Without these, we have little hope of meeting our goals.

Engineers are pivotal to transitioning to a carbon neutral society. Engineers work across all key transition sectors listed by the Ministry for the Environment in its consultation document. As such, we are watching the Government's work closely and look forward to working with the relevant government departments.

SUMMARY OF FEEDBACK

Further work is needed to clearly set out our pathway to carbon neutrality. We cannot see the intervention logic used by the Ministry for the Environment when pulling together the cross government emission reduction work. There is little clarity in the consultation document on roles, responsibilities, and especially timeframes for delivery. There is little operational practicality. To engineer climate action, we require certainty on what we must do, as well as a plan for addressing shortcomings. Otherwise, we cannot deliver necessary, rapid, and lasting change. We need further direction, initiation, innovation and leadership.

We ask that the emissions reduction plan delivered in May 2022 focus on:

- Clarification on transition targets and accountability frameworks for these targets
- Clarification on the roles and responsibilities across government and industry
- Further analysis on emissions target gaps and options to address these gaps
- Clear timeframes for all targets

THE ROLE OF ENGINEERING

The consultation document makes little mention of engineering and engineers despite singling out other professions (for example, planners). For New Zealand to meet the challenges ahead, we must utilise and develop the expertise of the engineering profession. Engineers must be involved in the Government's future planning, and we must work to further develop our engineering workforce to address the cross-disciplinary challenges we face.

Future capability and capacity requirements

The need for capacity and capability building is mentioned several times throughout the consultation document, in particular:

- potential new resource recovery and energy-focused jobs (page 49)
- "we expect a need to upgrade skills and capacity in high-end engineering" (page 75, transport)
- workforce transformation coordination and support (page 95, energy)

We agree with the focus on capability and capacity. Te Ao Rangahau Engineering New Zealand is focused on developing engineering capacity and capability for climate action.

We need more engineers

Many engineering disciplines have long been on New Zealand's skills shortage list. PwC's research estimates we need about 1,500 new engineers every year (under normal circumstances).¹ We also need to retain existing engineers and replace the large number of engineers due to retire in the next 5-10 years. Much of the work engineers do is highly specialised and requires years of training and experience.

¹ https://www.engineeringnz.org/documents/587/Economic_contribution_of_engineering_PwC_February_2020.pdf

More certainty on work pipelines through the emissions reduction plan, as well as other government initiatives (such as three waters), would provide employers with the confidence needed to recruit, train, and retain employees, especially new graduates. It can also help us develop training courses to support the need for specialist skills.

We are ready to support

We will support engineers as New Zealand transitions to a low emissions economy. We look forward to working with various government departments as the work ahead accelerates.

We will also support the development of New Zealand talent. Since 2018, Engineering New Zealand has developed a programme to inspire more young New Zealanders (Year 1 – Year 13) to pursue careers in engineering and other science, technology, engineering, and maths (STEM fields). The [Wonder Project](#) is primarily funded by Callaghan Innovation and takes young Kiwis on a creative, dynamic, and fun STEM journey via hands-on, student-led programmes designed to fit seamlessly into the New Zealand school curriculum.

In the past two years, we've touched almost 30,000 Kiwi school kids with our Rocket Challenge and STEM Careers programme – and doubled the number of Kiwi kids wanting to be engineers.

Making the most of vocational training reform

In its last term, the Government introduced sweeping reform of vocational training, which is now being operationalised. This reform presents a strategic opportunity to address engineering skills shortages, support future engineering and technology workforce demand, and better align engineering vocational training with other relevant technology training programmes. New Zealand could develop more advanced post-graduate training and qualifications to support specialised industries – for example, the rail industry – as long as there is sustainable, long-term demand for these services. Likewise, there are opportunities to upskill engineers to enter emerging industries. This would decrease New Zealand's reliance on the overseas specialist market.

QUESTION RESPONSES

In this submission we will answer several of the Ministry for the Environment's consultation questions. Through these questions we will highlight several gaps identified and suggest opportunities for this work to be strengthened.

SECTION 1: MEETING THE NET-ZERO CHALLENGE

Question 1: Principles

We support the use of principles in the emissions reduction plan. We emphasise our support for the following subcomponents or elements of the principles listed:

- Working with Tiriti partners
- Government accountability and coordination
- Focus on skills and knowledge
- Research, science and innovation
- Equitable transition

- Planning – integration into the planning system
- Circular economy

Regarding the five principles listed in Table 5 (page 20), while each of these are important, we cannot see the logic used to prioritise these actions across the key sectors identified. For example, the principle ‘Upholding Te Tiriti o Waitangi’ is not visible across every sector. Forestry is the only sector that includes “Working with Māori to develop and implement [forestry] policies” in table 4 which outlines the principles that inform each part of the strategy (page 16).

Will the principles support decisions on the challenges ahead?

Climate change will require us to make difficult decisions which need to be accessed and made in line with key principles. As they are drafted, it is not clear how these principles will be used to prioritise and balance potentially competing initiatives and their impacts.

Systems analysis

Under the fifth principle listed in Table 5 on page 20, the consultation document states “design effective policies that recognise the connections and flow-on effects within systems”. Engineers regularly undertake system analysis. This a core a component of engineering. Currently Engineering New Zealand alongside the New Zealand Institute of Civil Engineers is looking at how to identify and support systems-level reduction in in-use carbon. We would appreciate engaging with you on any systems level analysis work undertaken, as this work processes.

Additional resources required (question 18)

To design appropriate low-emissions solutions, including infrastructure, we must have frameworks for developing these solutions for our changing climate. For this reason, we need better publicly available local risk assessment tools and data. We welcome the opportunity to discuss this further with the Ministry for the Environment.

Nature-based solutions (question 4)

The consultation document focuses largely on built environment solutions. Nature-based solutions are mentioned in passing. As the document outlines, nature-based solutions, including the renewal of marine and wetland environments, have considerable carbon sequestration potential (and other co-benefits for biodiversity etc) and therefore should be considered more widely within the emissions reduction plan. Nature-based solutions must be profiled and supported alongside hard engineering solutions for these alternatives to be adopted by industry.

Nature based solutions could be, or perhaps should be, incentivised as part of the current RMA reforms.

SECTION 2: ALIGNING SYSTEMS AND TOOLS

The consultation document states that the government will “provide clear information” and signpost policies early (page 29) to reduce risks for firms and households. However, the language used throughout the document is non-committal. Clear dates and timeframes are also frequently omitted. As noted in our introduction, it is also not always clear who (which government department) is leading and ultimately responsible for various initiatives. Given the variety, complexity and overlap across initiatives, having clear timeframes and responsibilities is important for enabling the private sector to step up to the challenge.

There are also significant gaps within sectors, as noted in the document itself, and the policies that are included often do not meet the required reduction targets. Furthermore, the pace at which these policies and further planning is set is slow. This decade is crucial in ensuring the 1.5C Paris Agreement target is viable. Given how long the policies outlined in the consultation document will take to implement, especially those that are infrastructure heavy, we cannot afford to delay action.

Many of the suggested proposals lack feasibility analysis, costing and estimates of their emissions reduction. Likewise, the funding and financing section lists what the government intends to do but not how. We recommend strengthening analysis in these areas to support a productive transition.

Government accountability and coordination (question 23)

As previously noted, industry needs the Government to provide clear roles, responsibilities and accountabilities. The intent outlined in the consultation document is good, however we cannot see how this will be implemented.

Planning (page 40)

Urban intensification, low-emissions land uses, public transport, and walkable neighbourhoods (question 34)

In order to promote urban intensification, support low emissions land uses and intensify public transport and walkable neighbourhoods, we need to use different metrics to change the conversation (i.e. from congestion to vehicle kms travelled [VKT]) – as already noted in the Transport section.

Circular economy (page 48)

Transitioning Aotearoa to a circular economy presents many challenges, which engineers can help address. We look forward to working with the Ministry for the Environment and relevant ministries on transitioning to a circular economy.

Circular economy of the future (question 45)

To establish a circular economy, we need a plan to develop the necessary infrastructure to achieve this.

The pages on circular economy lack consideration of infrastructure, as something to be ‘rethought’ alongside consumption, production, and goods and services. Current lack of infrastructure in this area is a constraint to our achieving a circular economy (for example lacking adequate onshore infrastructure to recycle and recover).

Barriers (question 49)

We currently lack adequate investment in onshore resource recovery, in particular the infrastructure and workforce required.

It is notable that resource recovery proposals were rejected by the provincial growth fund as ‘not being shovel ready’. These proposals need to be investigated if New Zealand wants to be able to recycle all grades of plastic.

Investments needed (question 50)

Government seed funding, loans and grants should be prioritised to support infrastructure development to enable a circular economy.

SECTION 3: TRANSITIONING KEY SECTORS

Transport (Page 54)

VKT (question 52)

As above, we are very supportive of the use of VKT as a metric for intervention rather than mitigating congestion. Research shows that focusing on congestion often has the perverse outcome of creating more traffic and congestion through the expanding capacity for cars and thereby encouraging that mode of transport.²

Other views (question 57)

We are encouraged by and supportive of the level of detail that has gone into the transport section of this consultation document. In particular, we support the emphasis on:

- Increasing the affordability, reach, frequency, and quality of public transport – in particular for disabled people and low-income communities that do not currently have adequate access to public transport.
- Having national direction and supporting local governments to implement place-based appropriate solutions
- Developing a Sustainable Biofuels Mandate

Several areas, including increasing the affordability of public transport, require further clarity on how these will be financed and operationalised. We look forward to working with Waka Kotahi and the Ministry of Transport on transitioning the transport system to net-zero.

Energy and Industry (page 81)

There is a lack of clear policies for energy in the discussion document. No target is provided for primary energy consumption from renewable resources, nor is there a timeframe for developing the energy strategy. The latter needs to consider the additional infrastructure – with associated global (material and energy) value chains – that will be needed for the energy transition, as well as the financing/business models that will facilitate the infrastructure development. The strategy also needs to incorporate the circular economy objectives, to consider the end-of-life of assets and how Aotearoa-New Zealand may be better integrated in global (circular) value chains.

Key priorities, challenges, and opportunities for an energy strategy (question 58)

We strongly support the development of an energy strategy and look forward to working with the Ministry for Business, Innovation and Employment on this important and urgent piece of work. Key points for consideration:

- Key energy vectors that need to be supported with appropriate financing/business models;
- Hard to abate industry sectors, and the mechanisms to support the transition in those sectors;
- Additional assets/infrastructure that will be needed for the energy transition, with appropriate private-public, and global, partnerships to enable the development;

² Thorwaldson, L. (2020, March 11). LoS-LESS PLANNING: VKT for EQUITABLE OUTCOMES [Paper]. Transportation Conference: Equity in Transportation, Christchurch Town Hall. <https://az659834.vo.msecnd.net/eventsairaeuprod/production-hardening-public/1ac44a82e0404be58a1c2c4eb9e78c9b>

- Circular economy interventions to address the end-of-life of assets and products, with the necessary integration with global value chains; and
- Overall efficiency of the energy transition, including the necessary engineering (and other) skillsets that are required.
- Roles and responsibilities for delivery

Building and Construction (Page 90)

Although it is noted that emissions budgets take a production-based approach, when discussing the necessary reductions required in the building and construction sector the consumption-based or embodied emissions are equally important. The discussion document states that the consumption-based emissions of the sector are 15%. However, as stated in the Ministry of Business, Innovation and Employment’s Building for Climate Change *Whole-of-life Embodied Carbon Emissions Reduction Framework* and *Transforming Operational Efficiency* (pages 2 and 3 respectively):

The Building and Construction Sector needs to play its part in meeting this goal as the Sector currently accounts for around 20% of New Zealand’s carbon emissions through the energy and materials used in buildings.

The 20% figure is frequently used by the sector, including the Construction Sector Accord (*Environmental challenges, opportunities, and transitions for construction in Aotearoa New Zealand*, page 7).

Proposed behaviour change activity (question 76)

In addition to the regulatory, clients of engineering services (building owners and developers) hold the ultimate power over decision making. Work to change behaviour must focus on building owners and developers to impact long term change.

Use of contestable funds (question 77)

Engineers require a consistent and reliable carbon calculator for embodied carbon in projects (as opposed to organisations) in New Zealand. We can support or lead the development of this work and welcome a discussion with the Ministry of Business, Innovation & Employment, as well as local Councils, on this.

Agriculture (Page 97)

The lack of agricultural policies to enable New Zealand to meet the biogenic methane reduction targets of 10% by 2030 (let alone reduce by 30% by 2030 as agreed to at COP26) sets us up for failure as non-agricultural sources only account for 9%. As methane has a higher short-term impact in our atmosphere this brings into question the approach noted on page 12 “there are likely to be more emissions reductions in the transport, energy and industry sectors in the first budget period. This is where the most efficient and cost-effective reductions can be made in a short period of time.” The modelling behind this rationale needs to be more transparent.

We need to engineer better interventions across the sector. Engineering New Zealand looks forward to working closely with the Ministry of Primary Industries to support the development and deployment of cost-effective technologies to reduce agriculture on-farm and off-farm related emissions.

The sector also needs clear incentives to adopt carbon reduction technologies already developed.

CONCLUSION

Thank you for the opportunity to provide comment on the consultation document. While we have not answered each of the questions individually, we have sought to raise key points on the draft emissions plan and look forward to the final emissions reduction plan.

Te Ao Rangahau Engineering New Zealand recognises that human-induced climate change is already affecting Aotearoa New Zealand. The time for action is now, this decade. We must treat climate change like the crisis that it is and act with urgency to limit warming to 1.5C above pre-industrial levels and avoid worse case scenarios.

We have launched Engineering Climate Action to support engineers, industry, and the Government to take positive action to address climate change mitigation, transition, and adaptation. This includes a focus on capability development, we look forward to working with relevant departments on this important work.

We support the intent of the work set out in the consultation document. However, the current proposals lack clarity on timeframes, targets, roles, responsibilities, and accountabilities. A strong, detailed, and clear emissions reduction plan is needed to lead and support industry to meet the challenges and opportunities of transitioning to a net-zero economy.

The scale of work ahead is immense, and engineers are at the heart of this work. For New Zealand to succeed in reaching our Paris Agreement goals, engineers must be at the table and deeply involved in shaping the path ahead. Engineering New Zealand, together with its affiliated technical groups, supports this important work and welcomes the opportunity to be involved as we work collectively to reduce emissions across New Zealand.

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