



Low-emissions economy

Summary of submissions

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October 2018

The New Zealand Productivity Commission

Te Kōmihana Whai Hua o Aotearoa¹

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Inquiry contacts

Administration	Robyn Sadlier T: (04) 903 5167 E: info@productivity.govt.nz	Website	www.productivity.govt.nz
		Twitter	@nzprocom
Other matters	Steven Bailey Inquiry Director T: (04) 903 5156 E: steven.bailey@productivity.govt.nz	Linkedin	NZ Productivity Commission

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Background and introduction

The Government asked the Productivity Commission to identify options for how New Zealand can reduce its domestic greenhouse gas (GHG) emissions through transitioning to a low-emissions economy, while at the same time continuing to grow income and wellbeing.

In response, the Commission released an issues paper to the public on 9 August 2017 inviting responses to 40 questions. The Commission engaged with a large and diverse group interested in climate change and mitigation policy. We completed over 120 engagement meetings (including overseas), 15 conferences/seminars and received 132 submissions on the issues paper.

A draft report was subsequently prepared and released to the public on 27 April 2018. The draft report made 140 findings, 50 recommendations and asked 11 questions. Submissions were called for, and 269 were received. The interest across communities has been unprecedented for Commission inquiries.

The Commission's approach to submissions, consistent with good consultation processes, is to maintain a high level of openness and transparency of the views of submitters. Where practicable, the exact wording of submissions has been quoted in this report.

Document purpose

Due to the unprecedented level of interest in the *Low-emissions economy* inquiry, it was decided that a single summary document bringing together many of the different views of submitters would be a useful adjunct to our final report.

The key intended audience of this report are the submitters and other parties interested in anthropogenic climate change. Submissions have come from all sectors of the community, representing many different interests and different views. The submitters are united in their passion for the challenges posed by anthropogenic climate change.

It is hoped this document will help people identify information and information sources that will make their future views, representations and submissions to this and future governments even more valuable and effective.

Due to the large and diverse interest in this inquiry not all comments were able to be used. Also, due to the need to keep the size of this document manageable, the material used is frequently only a pointer to more substantive analysis in the original submissions. So as well as this document, readers are strongly encouraged to access and read the full submissions provided by others here <https://www.productivity.govt.nz/inquiry-content/3254>. It is hoped this summary document will make it easier to identify those submissions of most interest.

Finally, please note the views set out in a submission identified in this summary document are those of the submitter, and publication of those views does not associate the Commission with those views.

1 Beyond the inquiry terms of reference

It was widely accepted by submitters that the inquiry was bound by its terms of reference. A number, however, felt future work by government should not face the same limits. A number of these themes and a selection of submitter views are provided below.

Moving beyond GHG emissions

A number of submitters felt that although GHG emissions was at the core of the review, it was important government decisions ultimately be guided by the totality of co-impacts. This was provided for in the inquiry, but some sought to go further. *The Responsible Investments Association Australasia* (sub. 168, pg. 2) for example, recommended that:

New Zealand not limit this opportunity to greenhouse gas emissions alone, and rather establish a Sustainable Finance Roadmap for New Zealand, including elements of the low-emissions investment strategy, to align finance with Paris Agreement objectives, but going further to align with other national environmental and social objectives such as the Sustainable Development Goals.

Similarly, in a substantive and wide ranging submission, the *Wise Response Society* (sub. 354) sought a much wider discussion, one covering; the challenge faced by finite resources (including diminishing returns energy), the sustainability of economic growth, the need to contemporaneously focus on mitigation and adaptation, and the need for a profound shift in community values and culture. Failure, they argued, would result in tremendous cost.

International emissions are important

A number of submitters felt, in the face of a global problem, it was important to focus on global emissions, not just domestic emissions. In contrast, others supported focussing first and foremost on New Zealand's own emissions. See in particular comments in the ETS, transport, and EITE sections below.

Adaptation

While reducing GHG emissions was almost universally supported, a strong minority felt the review needed to also consider adaptation to climate change, and if not in the review, then subsequently, for example by the proposed Climate Commission. *Local Government New Zealand* (sub. 248, pg. 8) made the point as follows:

Mitigation and adaptation must not be viewed in isolation from one another. The emissions trajectory that we get locked into will determine the scale of our adaptation challenge, while equally we cannot invest significant amounts of money into preparing for climate change without doing anything to reduce the problem. Linked strategy for both climate change mitigation and adaptation is therefore critical.

Also, *Professor Michael Kelly (sub. 172, pg. 1)* offered another angle, “Because New Zealand investments in mitigation will have no direct return, scarce New Zealand resources should be husbanded to adapt to the changing climate as, when and if the need arises in the future.”

The *Insurance Council of New Zealand (sub. 315)* and the *Auckland Council (sub. 273, pg. 5)* also supported a greater, contemporaneous focus on adaptation strategies.

Looking beyond 2050

A small number of submitters felt it important to explicitly consider life after 2050 (and not just leave it to the Climate Commission). This was, in particular, because of New Zealand’s changing net emissions profile post 2050 consequential on forestry having less of an impact on net emissions. *Chris Boxall (sub. 190, pg. 1-2)* for example, suggested a post 2050 focus would likely lead to a greater focus on technology (to the extent it becomes the fourth pillar in the report), eventually replacing forestry as forestry ceases to contribute net sequestration and acting as insurance for agriculture.

2 Mitigation pathways (modelling)

A minority of submissions engaged on the mitigation pathways. Some of these submissions were significant and detailed (see *Scion*, sub. 366, and *BusinessNZ* (sub. 347, pg. 7-11)) for examples. Some of the higher level comments are provided below. Readers are encouraged to refer to the full submissions as necessary.

It was clear a number of groups were engaging in their own modelling. *Vector* (sub. 287, pg. 4), for example, commissioned a report in 2017 on the economic impacts of a transition to a two degree world with a particular focus on the sectors of most relevance to Vector. Among other things, the modelling suggested “a tipping point of around \$110 per tonne for carbon where new renewable generation will replace non-renewable sources including coal and gas.”

Some submitters felt the modelling was too *heroic* (see for example *BusinessNZ*, sub 347). *Dr Wayne Cartwright* (sub. 392, pg. 1) suggested a flaw in the modelling resulting in a substantial underestimate of the effort required to achieve a low-emissions economy by 2050:

The flaw in Part 2 arises because the modelling fails to recognise that all scenarios for transition to a low-emissions economy must play out in the context of the inevitably accelerating effects of warming and climate change that have already begun. Any sensible scenario out to 2050 must include the effects of at least 1.5 degrees of global warming that is already ‘locked in’ by the emissions of the past. Plausibly, warming by 2050 will be closer to 2 degrees, irrespective of future reduction of emissions.

Others felt the modelling was too conservative. Giving examples, *Ralph Sims* (sub. 199, pg. 2) concluded, “Overall, it appears the modellers may have been somewhat conservative in their future vision, even under the disruptive decarbonisation (DD) scenario.” And (pg. 3):

The transition of the sector to a circular economy, reducing food losses and wastes, reducing demand for animal proteins, increasing urban agriculture and synthetic protein production methods (as acknowledged in Box 10.11) are inevitable. These global trends, already underway, do not appear to be included in the pathways.

While complimentary of the modelling work done, the *Parliamentary Commissioner for the Environment* (sub. 387, pg. 2) felt too much emphasis had been placed on emission pricing:

Innovation and technological change are what matter most for long term emissions reductions. Yet assumptions about innovation are inputs into the modelling and prices are the headline result. There is no explicit feedback loop, in the modelling, between emissions prices, or expectations about emissions prices, and investment in new technologies or new knowledge.

Spindletop Law (sub. 385, pg. 26) suggested a different approach:

It is recommended that the Commission identify a 'basket' of peer nations against which decarbonisation efforts may be benchmarked and that pathways be identified and modelled that will deliver a top-quartile performance in both emissions reduction and the growth of incomes and well-being.

Advocating a change with respect to modelling forestry, *Scion* (sub. 366, pg. 14) stated:

The potential contribution of forestry is reduced to sequestration only in the report because: (1) cellulose-to-fuel has been dismissed as an option (even though wood waste is already used to generate heat and electricity), and (2) the narrow focus on New Zealand's accounting liability does nothing to incentivise the use of sustainable, low-emissions wood products over imported alternatives e.g. steel or plastic.

On page 16, *Scion* continue "we believe that biofuels would be a key component in the transition to a low-carbon economy."

Focusing on the same sector, but for a different reason, *New Zealand Carbon Farming* (sub. 293, pg. 3) commented:

Carbon Forestry is the optimal solution to maximise the objective of achieving carbon removals, and meeting and sustaining a net-zero emissions profile. Carbon Forestry will sequester around four times more carbon than a native forest and two and half times more carbon than rotational forests. In addition, unlike harvested forests, Carbon Forestry delivers environmental benefits and will regenerate to native state over time.

They go on to recommend the Productivity Commission "revise their modelling to clearly show the respective contribution to emissions reductions if land was planted in native, rotational forest or permanent Carbon Forestry."

The *Parliamentary Commissioner for the Environment* (sub. 387, pg. 4), however, offered a warning about relying too heavily on forestry:

A tonne of emissions avoided and a tonne of emissions offset may be arithmetically equivalent but they can also reflect fundamentally different long term risks and fundamentally different long term value. The long term pay-off from investing in avoidance may exceed the pay-off from investing in offsets – even though the short term pay-off looks the same.

Molly Melhuish (264, pg. 1-2) felt a greater focus should have been placed on energy efficiency over increasing energy supply. She commented:

The Sapere report on transitioning to a low-carbon electricity sector therefore needs to be augmented by a thorough analysis of one or more energy-efficiency-first scenarios. This should compare the dollar cost and emissions impact of:

- building power stations and electricity networks to meet forecasted demand
- reducing peak demands by insulating the 600,000 under-insulated houses and installing clean heaters - heat pumps or ultra-clean wood burners
- local energy supply from solar, wind power, and wood-fired residential, institutional (especially rest homes) and industrial heat, including dual-fuel to utilise surplus electricity

- improving building standards for near-zero heating demand, and to sequester carbon.

Fonterra (sub. 355, pg.7) suggested that it would be useful if:

The Commission modelled the sequencing of transport decarbonisation and other sectors, and the associated marginal carbon abatement costs. This modelling would be useful to identify if it was a lower cost option to New Zealand inc to focus on a rapid conversion of the light vehicle fleet and increased utilisation of rail transport for freight, than decarbonisation of other sectors in the short term.

Gas New Zealand (sub. 360, pg. 1), in the context of recent announcements from the government indicating a no fossil fuel future, commented “We believe the implications of gas switching, and the issues that arise from this, should be considered.” They also provided a report into New Zealand switching from gas to electricity.

A small number of submitters challenged the view modelled that “to achieve net-zero emissions by 2050, production of iron and steel also ceases” (see *Methanex*, sub. 399, *New Zealand Steel* sub. 309 and *Pacific Aluminium* sub. 268). It was suggested this would only happen if the mechanism intended to protect EITE entities failed to function as intended.

Carbon Neutral Waiheke (sub. 381, pg. 15) favoured the explicit use of the precautionary principle in the modelling.

Adrian Macey (Sub. 160, pg 1) suggested there should have been “further modelling of analysis of macroeconomic implications - for the major sectors of the economy, for households and for GDP.”

The majority of submitters who addressed the scenarios section called for more effort on modelling (see *Motor Industry Association*, sub. 342, and *New Zealand Steel* (sub. 309, pg. 8), for examples), arguing this was a necessary prerequisite to evidence based policy and investment decisions.

Others, however, felt the significant uncertainty around the output of these models would result in marginal gain from further effort. The *National Energy Research Institute* (sub. 337, pg. 6) favoured an “adaptive approach”:

Starting with our current situation and selecting what look like the best options for action towards the 2050 goal in light of the current state of knowledge and the uncertainty. As more information flows in the process is adapted in light of this.

3 Emissions pricing

Emissions Trading Scheme (ETS) versus a tax

A clear majority of submitters on this issue felt the NZ ETS should be retained and modified, rather than replaced by a GHG emissions tax.

Commentary from the *New Zealand Farm Forestry Association* (sub. 338, pg. 7) was typical:

We agree that it would be foolish to change course now and replace the ETS with a carbon tax. We prefer the devil we know, even if it is being constantly tweaked to remove perversities and encourage 'suitable' behaviour from different industries. As the economy and public expectations evolve, so the ETS must evolve to remain both positive and effective.

Kevin Rolfe (sub. 187, pg. 2), while accepting retaining the ETS as a pragmatic solution, commented that: "a carbon tax is more easily understood mechanism. Singapore recently joined 67 other countries, including China, the European Union, and Japan, by introducing a carbon tax, to take effect from 2020. It is initially set at a low rate, but it will rise over time."

Others supported a carbon tax. For example, *Jacqueline Barnes* (sub. 343, pg. 1) commented:

I would understand a carbon tax made directly on me or, more effectively, on products which use oil in production or ongoing use, which I then have a choice whether to purchase or not. This would also directly affect companies' spending choices. Maybe use a higher GST rate on specific products, including cement, petrol, diesel, oil-based products.

Carbon Neutral Waiheke (sub. 381, pg. 18) favoured a carbon tax plus a sequestration subsidy as "they are not subject to the whims of the marketplace and should be easier to operate."

Rethinking how the ETS might operate

The vast majority of submitters felt the ETS had not worked as intended and needed to be reformed. Some suggested a significant refocus was necessary. *Sustainable Business Network* (sub. 254, pg. 2) felt:

The carbon 'conversation' needs to widen to include consumption-based emissions. Consumption-based emissions (also known as embodied, embedded or Scope 3 emissions) are the carbon emissions associated with producing the goods and services which we buy (including from overseas). We need to be more aware of the emissions associated with imported goods (and increasingly services) we use, so that action programmes are enhanced to look at reducing these consumption-based emissions.

SAFE for Animals (sub. 216, pg. 2) commented:

Instead of relying on a single, politically uncertain, high-priced measure (emissions price), we consider that a more robust approach would be to combine a lower emissions price with a suite of other moderately-priced fees, charges and taxes covering the full range of

pastoral farming's environmental externalities. The separate charges would attract less resistance while their combined weight would create an incentive on farmers to reduce livestock numbers.

Les Jones (sub. 180, pg. 10) advocated for a more static, simpler and certain mechanism, being: "A fixed linear reduction path (my RERP), coupled with a carbon price permanently fixed at \$100 is the best, most transparent way of providing the certainty that businesses and households need if they are to adjust to the challenges of carbon reduction."

Some submitters, on the other hand, felt the ETS had performed reasonably well. *BusinessNZ (sub. 347, pg. 4)* argued New Zealand to be one of the "few economies in the world that has successfully implemented an economy-wide ETS while achieving modest change commensurate with action by other jurisdictions."

And in a more limited endorsement, *Genesis Energy (sub. 301, pg. 10)* commented that the ETS has been effective in the electricity sector, "We would argue carbon prices have had an influence on retirement of thermal generation and investment in new renewables." Genesis noted, however, that the ETS has been ineffective in sectors not currently covered, such as agriculture.

Others favoured the continued use of the ETS mechanism, but amended in a number of important respects. See in particular sections below under "land use", "EITE entities" and "waste".

Pricing emissions as the centre-piece of a GHG reduction strategy

There were many who supported the ETS being at the centre of efforts to reduce emissions.

First Gas (sub. 316, pg. 3) supported the view that a credible emissions price and ETS would be vital to drive the change required to achieve a low-emissions economy:

A credible emission price and ETS will provide parties with certainty (particularly with investment decisions), promote the right consumer behavioural changes, and encourage research and investment in options with lower emissions. As we highlighted in our submissions on the issues paper, the ETS has not played this role to date.

Similarly, *Trustpower (sub. 249, pg. 9)* "is of the view that the ETS should remain the centrepiece, rather than attempting a range of disparate intervention practices."

In support of the ETS as the main mechanism for impacting the shape of economic production and consumption, *Te Rau Aroha Trust (sub. 207, pg. 16)* commented:

Major regulatory intervention is not needed and instead adjustment of key settings towards a more-real cost to polluters, alignment and integration of existing and new instruments and critically, overseen by a new and Independent body. [...]As a Maori Trust, through our efforts in recent years to work collectively as whanau and Maori landowners we are poised to begin practically creating the numerous new green jobs for our whanau, working on otherwise under-utilized Maori lands, in very high value and growth horticulture sectors linked to high value markets of the world. While transitioning to a low-emissions economy.

But there were also many who felt the ETS couldn't do it alone.

Local Government New Zealand (sub. 248, pg. 10) commented, "It is critical that the Productivity Commission's final report strongly emphasises other policy mechanisms for achieving emissions reductions, which complement the ETS, as opposed to corrections to the existing ETS being viewed as a blanket solution."

The *New Zealand Green Building Council (sub. 263, pg. 3)* commented:

There is ample evidence from around the world that additional measures are required to overcome this low-price elasticity that are not being implemented in New Zealand such as mandatory energy labelling of buildings, tougher new-build standards and Government promotion of higher performance in buildings that it owns, builds or leases.

Jonathan Boston (sub. 368) felt there was a risk of over reliance on the ETS, not because it is not the correct option, but because ongoing "government failure" risked it failing to be used as it needs to be to support a transition to a low-emissions economy. As a consequence, he supported a new chapter outlining a plan b or suite of measures to turn to in the event the ETS could not be made effective.

Similarly, *SAFE (sub. 216, pg. 7)* commented:

According to Canadian energy economist and climate policy analyst, Mark Jaccard, it is difficult in political democracies to achieve price settings that are high enough to deter carbon emissions. As a result, regulations have been the more powerful change agent in all jurisdictions that have significantly reduced their emissions.

On a related but wider point, *Toyota New Zealand (sub. 177, pg. 3)* encouraged more work on how the importance of political consensus can be highlighted. They suggested addressing this imperative as a separate chapter at the start of the final report.

Low Carbon Kapiti (sub. 299, pg. 9):

Generally, small differences in operating costs are not a material consideration in a decision to purchase an asset such as a building, vehicle or piece of equipment, assuming that the purchaser even had such information available when they made a decision. The Commission seems to understand this with respect to electric vehicles, as they have recommended a wide suite of complementary measures such as a feebate and minimum standards. We recommend that the Commission extend this logic to other sectors.

Trade in carbon credits

This was a topic that reasonably evenly split submitters. Many referenced a distrust in markets and evidenced the failure of carbon credit trade under the NZ ETS previously. Also some favoured a focus on New Zealand emissions only.

Linda Hill (sub. 193, pg. 2):

Under no circumstances should New Zealand's ETS be linked to global trading – the outcome of that will be speculation and scams, as we have already experienced. The point of policy is to reduce New Zealand's emissions, not to allow our industry/agriculture to

emit if they can afford to buy credits from less polluting countries, or to sell the benefits of our forests to environment-damaging corporations offshore.

Barry Coates (*sub. 374, pg. 2*) commented on the importance of adherence to strict criteria if international trade were again permitted. He suggested:

- An independent and objective assessment to ensure that carbon trading has sufficiently robust and transparent research, quantification, certification, tracing and verification mechanisms to ensure the integrity of carbon credits
- A pre-condition that carbon credits may only be used if the current domestic emissions price is higher than the best estimate of the cost of externalities from greenhouse gas emissions
- Traded credits should be managed by Government (rather than relying a private sector scheme)
- The quantity of credits should be capped at less than 10% of total emission units.

But there was also strong support for trade.

New Zealand Steel (sub. 309, pg. 10) noted:

Prohibiting the use of credible overseas emission reductions (as New Zealand has done and as the CMV model assumes will continue), is economically inefficient and imposes unnecessarily high costs on New Zealand businesses. Provided the eligible international emissions units are credible, the global climate change impact will be the same as domestic abatement, simply at lower cost.

A number of submitters saw an opportunity not just to trade in carbon credits, but to actually earn them through activity overseas.

Fonterra (sub. 355, pg. 6) favoured the development of a "shared value scheme" for international units:

An example of a shared value scheme could be where a New Zealand agricultural company works with farmers in a developing country to mitigate their emissions, and is able to access any units created as a result of this activity, then have them recognised against New Zealand's target. The United Nation's Food and Agricultural Organisation have a framework for creating projects in the agriculture sector to reduce emissions and issue equivalent units, which could be utilised in this way.

Similarly, the *Petroleum Exploration and Production Association of New Zealand (sub. 328, pg. 3)* felt:

Exports of New Zealand gas in a manner that secures international carbon mitigation credits, in the spirit of Article 6 of the Paris Agreement, could offer NZ the opportunity to secure emission credits from South Asia. That could lead to abatement in a more affordable manner than the high cost, \$250/t of CO₂e option available in NZ's largely renewable economy.

More specifically, *Spindletop Law (sub. 385, pg. 24)* commented:

Indeed, the proponents of the Belt and Road Initiative envisage the construction of some 700 coal-fired power stations throughout South East Asia and across through to Africa in order to support the initiative and bring some 2 billion people into the middle class. That project alone is likely to double, some say triple, China's current CO₂ emissions which, in themselves, represent 26% of global emissions. Hydrogen technology coupled with New Zealand coal or gas as a feedstock, could make significant reductions in emissions that are currently projected, thereby earning New Zealand international emissions units that could be applied to meeting any target set by the Government.

Emissions Intensive Trade Exposed (EITE) entities

A substantial group of submitters supported providing free credits to EITE firms (and agriculture – refer also “land use” section below for discussion) as a way to reduce the risk of activity being transferred to other countries and possibly increasing global emissions. Many also agreed some mechanism needed to be in place to withdraw free credits over time as abatements technology and practices came available, and as overseas competitors too faced the cost of their carbon emissions.

Some submitters feared the mechanism for subsequently withdrawing those credits wouldn't operate as intended, i.e., the risk that withdrawal would force the closure of business and sectors, the loss of jobs and incomes, and an increase in world carbon emissions through leakage. *Horticulture New Zealand (sub. 394, pg. 4)* provided a downstream example:

An increase in carbon price to the potential \$200/tC will put South-Island covered crop growers out of business. The produce they grow will instead be trucked from the North Island, and there is likely to be an increase in imports to fill the gap in production. Neither of these outcomes are likely to improve global emissions, and will also result in poorer quality product for consumers.

While supportive of the ETS covering all sectors and free units being phased out over time, *New Zealand Steel (sub. 309, pg. 4)* had reservations that it would be done correctly, “Where there are climate change policies, the implementation details are crucial in that the actual effect on a sector or facility can be considerably different to the implied broad descriptions of the policy.”

New Zealand Steel (sub. 309, pg. 2) saw steel as “part of the solution, not the problem. For example, steel is a critical input into the construction of renewable related infrastructure – infrastructure that directly supports a low-emissions economy.”

Wiremu Thomson (sub. 376, pg. 6) opposed grandparenting (pg. 86 of the report):

To base the free allocation on a business level of emissions in recent years is bad in two ways:

- It makes it harder for disruptive low-emissions businesses to enter the market as they are paying full price for any of their emissions whereas the existing business is paying zero, and if the existing business loses its share of the market to the other business, then it is free to increase its emissions or sell the NZUs to compete with the new business better.
- It rewards businesses that have been slow to take action on their emissions, as the early adopters of low-emissions were never paid for it and receive a lower allocation of free NZUs.” Wiremu proposed a different ETS model (appendix 1 to his submission).

The *Auckland Council* (sub. 273, pg. 12) recommended that industries who receive free ETS credit should:

- a. demonstrate by benchmarking that they are the lowest carbon emitter per unit of production; or,
- b. show that they are investing in research (with tax breaks) that would lower their carbon footprint.

Treasury guidance and shadow prices

A number of submitters sought revision to Treasury guidance, in particular with respect to shadow prices.

Liz Springford (sub. 379, pg. 8, 9) commented:

I strongly recommend using shadow pricing for emissions in all cost-benefit analysis across NZ state sector and influencing local government to do likewise – from 2018/19 onwards. There is limited experience already with shadow pricing, with congestion reduction valued at NZ\$40 per tonne CO₂-equivalent emissions, at the detailed design stage of roading project. I recommend that Treasury update the required shadow pricing within the next few months to an accurate level – based on international social cost of carbon literature. [...] Furthermore, discount rates should not privilege current generations above future generations.

In support, the *Whakatane District Council* (sub. 317, pg. 4) observed that “The adoption of ‘shadow pricing’ (p92) could provide an effective method for local governments to embed emissions-reduction into their decision-making regarding transport, energy, and water infrastructure.”

4 Innovation

A need to do more

There was strong support for increased funding and other measures to promote development and uptake of GHG reducing technologies and practices.

O-I New Zealand (sub. 250, pg. 7) wanted to see a hypothecated fund set up for the purpose of investment in carbon-reducing technologies, drawn from revenues from auctioning of NZUs:

O-I considers that (in potential contrast to hypothecation for households) the case for hypothecating NZU revenue for businesses engaged in research and development to reduce emissions is stronger. There is a more direct connection between revenue raised from auctioned emissions units, and Government funding towards projects and research and development that lead to emissions reductions.

Linking global emissions abatement and New Zealand research and practices, *DairyNZ (sub. 365, pg. 4)* commented that:

There is an opportunity for the Government to negotiate for a mechanism to be established via the Paris Agreement formally recognising the transfer of New Zealand's evolving farm systems knowledge and practices to less efficient producers against the global efforts to reduce greenhouse gas emissions. [...] This contribution should count towards New Zealand's efforts to meet its 2030 NDC and transition to a low-emissions economy.

Dr Geoff Scott (sub. 154, pg. 1) felt it important to identify concrete steps tertiary providers could take to promote an innovation environment be identified, including introducing an undergraduate subject focused on 'inventing sustainable solutions for a low emission New Zealand' and commissioning students to evaluate the viability of EVs.

SRD Consulting (sub. 173, pg. 1,2) favoured the establishment of a New Zealand equivalent to the ARENA in Australia which was to:

Make renewable energy solutions more affordable and increase the supply of renewable energy especially electricity. ARENA facilitates and funds the route from Development to Demonstration and to Deployment for projects before the innovation fund with the Clean Energy Finance Corporation [our equivalent will be the new Green Investment Fund] takes over.

As well as supporting an ARENA equivalent for New Zealand, the Engineering Leadership Forum (sub. 280, pg. 2) emphasised the importance of having strong engineering and technology capability in government, "New and improved Government backed institutions with leaders with proven engineering and technology capability will be required to design and implement the transition to a low carbon economy."

The Energy Management Association of New Zealand (sub. 242, pg. 5, 12) suggested elevating the role of education in the transition to a low-emissions economy. "The role of education in

transitioning to a low-emissions economy is understated throughout the report and should be included as a key pillar of the transition.” They went on to expand on the type of education (pg. 12), “Critical to breaking down such barriers is education around technology alternatives, the true life-cycle costs of investment options, understanding the emissions implications of investment options and adopting a long term investment analysis horizon.”

On recognising the value of New Zealand specific capacity, the Electricity Engineers Association (sub. 250, pg. 2) commented:

As New Zealand has a unique electricity supply profile, relying on an isolated (island) infrastructure heavily dependent on hydro generation (58% in 2017/18), we cannot rely on international research to give us an idea of how emerging technologies will play out in the New Zealand context. A key to continuing and growing our local companies and engineering skills lies in strong local research centres to better understand new technology use and its wider impact, whether the technology is imported or not such as the University of Canterbury’s Electric Power Engineering Centre.

On energy research, the National Energy Research Institute (sub. 337, pg. 9) commented on what they saw as a system bias that needed to be corrected:

Unfortunately if anything NZ’s current interventions in the energy sector target quite low pay-off subsectors and, as we note in our general comments, are preoccupied with low pay-off energy efficiency interventions. Much more limited attention is being paid to the higher return search for alternative fuels (EVs aside) and demand side initiatives.

Soil carbon as a mitigation option

Some submitters felt sequestering carbon in soils offered significant opportunities. See for example Derek Parkes (sub. 138) and the *Department of Conservation*, (sub. 370, pg. 2). The latter commented “There is significant long-term carbon sequestration potential not only from native forests, but also the soils under native ecosystems, mangroves, saltmarsh and seagrass. We should recognize and explore these opportunities.”

Scion (sub. 366, pg. 67) recommended more substantial research to quantify soil carbon turnover and potential ways to sequester soil carbon for long term storage. They identified a number of reasons quantification is currently difficult.

Phasing out fossil fuel exploration and use subsidies

A clear majority of those who commented supported phasing out subsidies for fossil fuel production and use. For example, *Carbon Neutral Waiheke* (sub. 381, pg. 20) commented:

We agree that “Fossil fuel subsidies act in direct opposition to New Zealand’s transition to a low-emissions economy” and “the government should phase out all subsidies that support the ongoing production and use of fossil fuels”. The savings of approximately \$78 - 88 million per year should be invested in a new green clean energy investment fund.

However, there was disagreement over what was a subsidy. The *Petroleum Exploration and Production Association of New Zealand* (sub. 328, pg. 5) claimed there were few if any subsidies:

Of the “approximately \$78-88 million per year worth of government support to fossil fuel production and consumption” contemplated by the Commission, the vast majority is a simple rebate for fuel-excise taxes, which address what would otherwise be an inequity. Simply put, excises taxes are a user-pays fee on transport fuels to fund public roading. Because not all transport fuel is actually consumed on public roads, certain off-road users qualify for a rebate of the tax.

Further, *Northland Regional Council* (sub. 226, pg. 5) offered a caution, “Any reduction in subsidies should match the pace that alternatives become available, recognising that this will vary across regions, or be offset by direct income transfers to poorer households that are disadvantaged.”

5 Investment

The investment topic didn't draw out a lot of analysis from most submitters. One exception was the sub-topic of climate related financial disclosures.

Climate-related financial disclosures

The majority of submitters who commented supported mandatory climate-related disclosures. The main reasons included to encourage better behaviours by entities, and to provide better information to guide investor choice.

New Zealand Super Fund (sub. 334, pg. 2) supported government regulations for mandatory disclosures, within reason and as applicable to individual industries and companies. They suggested, "It may be that this is better structured as a new bespoke reporting obligation, rather than bolting it on to existing regulatory mechanisms (e.g. annual reports, which in many cases are not required as a matter of law and if prepared are not necessarily publicly available)."

The *External Reporting Board (sub. 164, pg. 4)* cautioned:

If the TCFD recommendations are to be officially endorsed by the government, it should note that this is just one of the frameworks that can be utilised for the disclosure of EER information. We are concerned that piecemeal requirements to reporting EER will potentially result in voluminous information on discrete matters (such as climate change) that may not be useful or relevant to users. We prefer a principles-based approach to enable all entities to continue to innovate and evolve their reporting, and to ensure that the most relevant EER matters are reported in a consistent and meaningful way.

Esperance Capital Ltd (sub. 184, pg. 1-3) also urged caution. This was for a number of reasons, including that the investment market is voluntarily moving in this direction already; for some firms the costs will be excessive relative to benefits; there would be a risk good performers would be punished; and because the International Integrated Reporting framework provided a better foundation for reporting requirements.

Chartered Accountants Australia and New Zealand (sub. 208, pg. 4) noted the TCFD standards were intended to be voluntary, there is as yet insufficient understanding across entities to make the disclosures effective and the existing reporting regime already enabled appropriate reporting by organisations. To the last point, they referenced the NZX Code and the related ESG guidance note.

Low-emissions investment strategy

The majority of submitters who commented favoured work to develop a low-emissions investment strategy. One of the most comprehensive submissions on the topic came from the *Responsible Investment Association Australasia*. Among other things, they suggested (*sub. 168, pg. 7*) the strategy include:

- a cost curve of opportunities for investment projects across the key sectors of energy, forestry, agriculture and transport and the means by which these could be delivered (e.g. via the GIB).
- the role of governments at all levels to enable the strategy to be delivered, including the setting of hard laws to require climate risk disclosures consistent with the TCFD, revised government procurement requirements etc., in the various stages of the transition.

They further recommended (pg. 5) it be implemented by undertaking the following:

- a. interpreting existing requirements as requiring climate risk reporting;
- b. encouraging TFCF-aligned voluntary reporting via industry; and
- c. integrating the recommendations into existing or new government-mandated reporting requirements.”

The Association continued (pg. 6) by saying:

These approaches would together underpin the effectiveness of the investor community to (a) hold investee companies to account for the scope and quality of their disclosures, (b) better undertake evidence-based investment decision making and (c) deliver superior risk managed investment portfolios. Ultimately these factors help lead to superior long-term risk adjusted returns for investing New Zealanders and the New Zealand economy as a whole.

Barry Coates (sub. 374, pg. 5) recommended a number of additional topics be included in the strategy, in particular relating to financial sector regulation.

6 Laws and institutions

Climate Change Commission and legislation modelled on the United Kingdom Climate Change Act

Few felt the existing legislative frameworks and institutional arrangements were appropriate for dealing in a co-ordinated and effective manner with GHG emissions. For example, *NZ Wind Energy Association* (sub. 40, pg. 1) commented:

The absence of an integrated approach to developing a strategy and set of actions to address how New Zealand should meet its 2030 climate change emissions reduction target or to agreeing a target date and actions to achieve a net zero position has been a concern for the Association. While a number of separate initiatives have been announced by Government there is currently no defined transition pathway to a low carbon economy.

Further, the *Sustainable Business Council* (sub. 95, pg. 3) noted “Businesses need long term certainty, beyond the election cycle, to make the right investments and changes to their business models.”

Others who identified similar problems included *Dairy NZ* (sub. 18, pg. 2), Robert McLachlan (sub. 9, pg. 2) and *NZ Carbon Farming* (sub. 95, pg. 19).

There was very strong support for the establishment of a Climate Change Commission and legislation based on the United Kingdom Climate Change Act, see for example, *ADLS* (sub. 7, pg. 4), *Auckland Regional Public Health Service* (sub. 105, pg. 14-15) and the *NZ Wind Energy Association* (sub. 40, pg. 7). *Contact Energy* (sub. 29, pg. 1) commented:

We support the PCE’s recommendation that New Zealand develops a Climate Change Transition Bill which sets emissions targets in legislation, sets carbon budgets, requires policy to be developed that meets those budgets and that we have a Climate Change Commission – an expert body to provide objective analysis and advice. This would provide predictability, reduce New Zealand’s risk of an abrupt transition and ensure co-ordination between corporates and government agencies to achieve those targets.

However, some identified where improvements might be made and urged realism.

While supportive of the UK Climate Change Act, *New Zealand Steel* (sub. 309, pg. 13) felt it important to remain realistic. They pointed out that GHG emissions reduction had commenced before the Act was implemented, and was driven by a number of factors independent of the Act, factors that do not feature in New Zealand.

Professor Michael Kelly (sub. 172, pg. 3) commented:

One should be careful in emulating the UK Climate Change Committee (CCC) without a deep and critical analysis. [...] The UK used to make its own aluminium with coal, gas and nuclear-based electricity: it now imports its aluminium from China where it is predominately made with coal-based electricity. As a consequence, UK CO₂ emissions are down but the world emissions are up: this seems not to be the source of any

embarrassment in the public debate. [...] With the New Zealand export economy based mainly on primary production, the UK is not a good example to follow. The draft report draws attention to the trade-offs between cost, environment and security of supply, and any New Zealand Climate Authority should act under the aegis of all three, not just the environment as in the UK context, to provide a more balanced picture.

In identifying a problem with the UK legislation, *ClientEarth* (sub. 238, pg. 1) commented that a new law needs to identify the point(s) in time by which strategies must meet clear standards of preparedness, "There comes a point at which strategies must in fact be certain (though still, of course, open to revision), well-defined, and capable of the most searching scrutiny." This, they observed, was a failure of the UK Act, a failure that impacted its credibility and effectiveness.

Some submitters identified additional functions for the Climate Commission. *Liz Springford* (sub. 379, pg. 12) believed that the Climate Commission must set the emissions budgets, with the other parts of government deciding how those budgets are met.

Trustpower Ltd (sub. 249, pg. 1) recognised that prioritising joined-up thinking was necessary to ensure a clear, coherent and consistent overall strategy through the transition. To this end, they advocated the Climate Commission have a broad policy oversight role, including exploring how the Government could tidy up existing and avoid future policy misalignment.

Pacific Aluminium (sub. 268, pg. 4) was one that broadly supported existing regulatory and institutional arrangements, "In Pacific Aluminium's view the existing Climate Change Response Act framework, with the NZ ETS pricing the greenhouse gas externality as a centrepiece, and governed directly by the democratically elected Parliament has the necessary capability to deliver what is required."

Maori participation and the Treaty of Waitangi

A moderate number of submitters commented on Maori participation and the Treaty of Waitangi. All urged a substantive role for the Treaty.

Liz Springfield (sub. 379, pg. 12) commented:

NZ's fast fair net zero transition needs to be Tiriti-based at every stage. Real partnership is essential to avoid recolonization. This includes the governance of the Commission, setting up a highly influential and well-resourced Māori unit within the Commission for Tiriti-based direction, and resourcing Tiriti-based climate action research and consultation amongst iwi and non-iwi affiliated Māori.

Te Rūnanga o Ngāi Tahu (sub. 362, pg. 6), in noting the draft report appropriately incorporated the Treaty relationship and examples of law supporting the Treaty partnership, urged that messages relating to Treaty of Waitangi roles, responsibilities and partnership opportunities, be reinforced.

Kate McNab (sub. 219) felt more support was needed, "I seek relief to change the recommendation, to go beyond "providing a mechanism" to actually encouraging their [Maori] participation, including providing the resources required to make it happen."

Dr David Geraghty (sub. 313, pg. 4) recommended that, "The legislative framework for a low-emissions economy provide mechanisms for Māori to partner with the Government on policy,

process, and decisions relating to emissions budgets and the Government's strategy to achieve them."

In pointing to legal risks, *Te Rau Aroha Trust* (sub. 207, pg. 8) noted:

The Mataatua District Māori Council Statement of Claim to the Waitangi Tribunal asserts that the Crown is acting in breach of Treaty of Waitangi obligations towards Maori as a result of the New Zealand Government failing to implement adequate policies to address the threats posed by global climate change.

Representation explicitly provided for in governance arrangements

The New Zealand Society of *Local Government Managers* (sub. 198, pg. 2) suggested that provision should be made for a joint central/local Climate Change Leadership forum that had the day to day oversight of a joint programme of policy and other work.

Similarly, *Greater Wellington Regional Council* (sub. 195, pg. 1) encouraged the Commission to, "explicitly recognise the role that local government can play in contributing to emissions reductions, particularly by showing leadership within their individual communities by reducing their own emissions."

National Council of Women of New Zealand (sub. 277, pg. 3) commented:

Women are powerful agents of change and their leadership is crucial. All stakeholders should ensure that climate change and disaster risk reduction measures are gender responsive, sensitive to indigenous knowledge systems and respect human rights. Women's rights to participate at all levels of decision-making must be granted in climate change policies, legislative frameworks and programmes.

7 Short-lived and long-lived gases

Compared to many submissions elsewhere (see in particular the “Land use” section below), submissions on this topic tended to be more conservative with respect to how agricultural emissions (methane) should be treated.

For example, *Pastoral Farming Climate Research* (sub. 256) were critical of recent treatment of methane in the climate change debate and commented there remained considerable uncertainty with respect to its impact on global warming. With respect to New Zealand, they concluded, “With methane emissions having increased only 4.4% since 1990 and with no recent increases at all and no evidence that these emissions will increase significantly, priorities lie elsewhere.” If, however, it is accepted that methane contributes to global warming, they argued that the solution should be a system where emitters who reduce emissions should be paid, people who increase methane emissions charged (once CO₂ emissions have reached net zero) and farmers who maintain emissions should neither pay nor be paid.

Federated Farmers New Zealand (sub. 310, pg. 4) commented that:

The objective should be to stabilise emissions rather than aim to aggressively cut them, especially when cost effective methane reduction technologies are not yet available and trade competitors are not yet including their equivalent emissions in their domestic policies, such as emissions trading schemes.

They go on to suggest (pg. 5) methane be treated differently, through free allocation or a multiple-for-1 type policy. For example, they suggested, a permanent free allocation level could be set that is linked to a methane target or emissions budgets.

Steven Cranston (sub. 170, pg. 1) suggested promoting the green credentials of New Zealand agriculture:

The dramatic drop in sheep numbers largely offset an increase in dairy cow numbers and result in a minor 5.1% increase in enteric methane emissions since 1990. It is only this small increase of Methane that is contributing to warming since 1990. [...] If NZ agriculture can get Methane emissions to ‘net zero’ they can legitimately claim to have stopped any global warming from Methane (subject to Andy Reisinger’s adjustment). [...] New Zealand should be selling our agricultural products as ‘warming neutral’ via an internationally peer reviewed internal GHG modelling scheme.

In support, Jim and Audrey Walker (sub. 204, pg. 3) commented, “The basis of calculation of ruminant methane emissions needs to be changed to a net basis. Sheep and beef farming may then again be seen as a reasonable and sustainable land use in these areas.”

Andy Reisinger (sub. 233, pg. 3) suggested “Stabilization within a temperature limit” provided too little guidance on what level of methane emissions the Commission considered appropriate,

or the criteria by which the Commission considers such a level ought to be determined. He went on to comment that the Commission should:

Develop a clear set of criteria and demonstrate how it would expect those criteria to be applied to determine a target, and under what conditions the target should be revised (e.g. should the target for short-lived gases be subject to more frequent revision than the target for long-lived gases, and under what conditions should such a revision occur?).

Sam Lang & Pubudu Senanayake (sub. 382, pg. 2) provided a full discussion of a 'two baskets' approach based on "biological" and "fossil" emissions, for both budget and target setting, and accounting. With this approach, different gases that contribute to each budget would also be distinguished.

Todd Corporation (sub. 373, pg. 4) worried about the precedent of treating short-lived emissions differently, "The two-baskets approach based on type of GHG will circumvent all sectors being treated the same. This will provide a justification for the Government to develop regulations favouring some sectors over others in an unbalanced way potentially for promoting a political agenda."

8 Policies for an inclusive transition

All who commented on this chapter agreed on the importance of an inclusive transition. None identified the costs of that transition being a reason not to promote a strategy to mitigate GHG emissions. A number of submitters felt more needed to be done to ease the transition for vulnerable entities and individuals.

Local Government New Zealand (sub. 248, pg. 5) commented that:

The report currently lacks but should provide some thinking on the mechanisms that could be put in place to ensure a just transition, including whether the transition will require changes to the way that we currently look at and provide welfare, and whether provision of additional support to different sectors will be necessary.

Taking this point further, *Wiremu Thomson (sub. 376)* favoured the bulk of income from an ETS being used to fund a universal basic income (UBI). This approach, he argued, would make the ETS more politically acceptable, increase the price at which carbon emissions could otherwise be priced, and reduce the poverty trap risk inherent in the Commission's proposed approach (among other reasons). In his submission he contrasted a UBI approach with: reducing GST; and reducing income tax. The *Auckland Council (sub. 273, pg. 4)* felt it would be useful to, "identify trigger points (carbon prices) justifying action, identifying impacts and a recommendation relating to mitigating the regressive impact of ETS prices. The Council also favours identifying what "level of harm" from carbon emissions is likely."

Scion (sub. 366, pg. 56) suggested principles to guide the transition in line with those used overseas:

A review of empirical evidence from 92 cases of adaptive governance shows key principles to lay the foundations for an inclusive transition: meaningful collaboration across actors and scales; effective coordination between stakeholders and levels; building social capital; community empowerment and engagement; capacity development; linking knowledge and decision-making through data collection and monitoring; promoting leadership capacity; exploiting or creating governance opportunities (Sharma-Wallace et al., 2018).

OraTaiao (sub. 375, pg. 2) recommended that:

Some of the highly regressive impacts of an increase in the value of an emissions unit be mitigated by measures including changes in the built environment, income relief, improved affordable safe systems of transport that are not reliant upon private vehicle ownership, better insulated housing stock, and improved nutrition. We recognise that both climate change, and the regressive impacts of reducing emissions, will impact most severely upon children, the less advantaged, Māori and Pacific peoples. We recommend collaboration with the organisations working in the fields of equity and social justice as the way forward.

The Rangitikei District Council (sub. 200, pg. 1) felt communities (not just individuals) should also be offered transitional assistance:

The closure of a large business in a regional economy, such as the Rangitikei District, can have significant negative consequences for the well-being of the entire community (not just individuals). The solution is not to move those individuals to a different location in New Zealand, as this would only create more significant adverse effects on local communities. Instead, assistance should be provided directly to those communities to support the establishment of alternative low-emissions industries.

Vector (sub. 287, pg. 7) supported efforts to promote an inclusive transition, but suggested one area that may have been exaggerated:

There is a persistent message that the less fortunate will end up paying more for electricity as a result of new technology, with wealthy customers leaving the network, and those remaining paying a greater proportion of lines charges. Vector doesn't foresee complete departure from the network, due to the desire for security of supply and to transact energy e.g. peer to peer electricity trading.

9 Land use

Including agriculture in the ETS with free units, those units withdrawn over time

This section should be read with the section on long-lived and short-lived gasses above and EITE entities.

The majority of submitters, even a number within the sector, felt that agriculture should be included in the ETS. Beef + Lamb New Zealand and Deer Industry New Zealand (sub. 389, pg. 3-4):

B+LNZ agrees that the sheep and beef sector must play their part in the changes needed to limit climate warming and take responsibility for its GHG emissions, and that there is a need for its farmers as owners of a significant land resource to look for ways they can contribute to the rapid carbon sequestration needed through afforestation that will allow the country as a whole time to transition to a low carbon emissions economy.

DairNZ (sub. 365, pg. 3) commented:

In regard to whether agricultural emissions should face a price in the ETS, DairNZ is supportive of the process being led by the Interim Climate Change Committee determining the short and long-term objectives and the type of mechanism that could be introduced to address biological methane and nitrous oxide emissions.

There were some qualifications, however.

Agri Nutrients (sub. 285, pg. 6) supported inclusion and suggested that to encourage acceptance, details needed to be provided on transition times, development of capability, complementary government policies, etc.

DairyNZ (sub. 365, pg. 7) commented they were "... supportive of a policy framework which enables innovation and flexibility and is comprised of an array of complimentary measures and is not based solely on a market-based instrument."

Federated Farmers New Zealand (sub. 310, pg. 3) opposed agricultural gases being included in the NZETS "until such time as cost effective mitigation technologies are available and trade competitors are similarly included in emissions pricing schemes."

Taranaki Regional Council (sub. 188, pg. 4) felt agriculture was already a good performing sector:

The Council's concern with these recommendations is that when considered across all the emitting sectors in New Zealand, agriculture is leading international best practice in its carbon footprint. Other sectors, such as transport, with our aging vehicle fleet and lack of emission standards cannot be said to be leading international best practice in greenhouse gas mitigation.

Don J Cleland (sub. 395, pg. 4) took this point further, linking it to changing land use and emissions leakage:

While horticulture is less emissions intensive than animal based agriculture, the NZ emissions for export horticulture products are not significantly lower (and in some cases are higher) than the same horticultural products produced outside NZ (mainly due to the transport emissions). In contrast, the emissions for NZ animal-based products is generally significantly lower than for the same products produced outside NZ. Thus from a NZ perspective, a shift from pastoral agricultural to horticulture is justified from a global perspective the benefits are lower and potential negative if world-wide consumption mix of products does not also change! Put another way - from a global perspective, it is not worth converting land from pastoral to arable or horticultural if the pastoral emissions are lower than the global average and the arable/horticultural emissions are similar or higher than the global average.

Others supported agriculture's inclusion in the ETS but opposed the allocation of free carbon credits. The concerns expressed by *Linda Hill (sub. 193, pg. 3)* were common:

This proposal for free carbon credit allocations to 'support' for farmers facing carbon costs – i.e. beginning to cover the true environmental cost - when their international competitors do not (yet) contradicts the overall emissions reduction policy and economic 'signals'. The cost of carbon is supposed to direct farmers to change their agricultural practices and/or land use in order not to incur costs.

Similarly, *Peter Olorenshaw (sub. 324, pg. 1)* commented:

The costs of greenhouse gas pollution must be brought back to the polluters, in this case the ruminant farmers. Farmers need to move away from animal agriculture to tree crops, other horticulture, arable farming and forestry - this is beyond dispute, but with NZ taxpayers subsidising them to pollute with animal agriculture they have no or minimal price signal to change their ways.

Anne Spicer (sub. 345, pg. 1, 2) noted financial and non-financial factors impact land use decisions. She recommended that a survey of farmer intentions be undertaken to assess the likely responses of farmers to agriculture being included in the ETS, and the effects of different carbon prices.

Point of obligation for agricultural emissions

Most submitters favoured farm level obligations, on the grounds of effectiveness. *Beef + Lamb New Zealand and Deer Industry New Zealand (sub. 389, pg. 5)* commented:

It is the farmers who must work out how changes can most effectively be made to their farm and farming system to meet not just emissions reduction and sequestration goals, but the wider balancing of environmental, social and economic sustainability requirements for their particular circumstances.

Similarly, the Environment Institute of Australia and New Zealand (sub. 260, pg. 2), suggesting how it might evolve, "the larger agricultural enterprises with the greater emissions could come in first and the minimum threshold could be lowered as is practicable. The point of obligation at

the processor level could be used for farms beneath the threshold and for all horticulture and cropping farms.”

With regard to the hybrid option, Federated Farmers (sub. 310, pg. 7) commented that they did not believe it would be suitable for sheep and beef:

Many sheep and beef farmers regularly change meat processors or in some instances do not engage with them directly at all. This would make it extremely difficult for meat processors to ‘reward’ sheep and beef farmers for their on-farm emissions reduction efforts. Turned around the option might be more feasible for dairy but even then not universally so.

AgResearch (sub. 191, pg. 2) suggested full processor point of obligation, but with farm-level rebates for use of GHG reduction practices. This option, they argued, would encourage farmers to reduce GHG emissions, and keep implementation and compliance costs down.

Fonterra (sub. 355, pg. 5) noted one benefit of a processor point of obligation would be opportunities for industry groups to undertake mitigation and offsetting opportunities using economies of scale, which individual farmers would not be able to achieve.

Most who commented supported the use of OVERSEER for modelling farm-level emissions, but amended through an appropriate process to ensure it was fit for purpose. However, *Horticulture New Zealand* (sub. 394, pg. 5) recommended against using it for regulatory purposes (rather than simply as an advisory tool), “as it does not provide sufficient detail, accuracy nor confidence for the horticultural sector to be considered for such purpose.”

Refining the ETS for forestry

Some submitters were highly critical of the ETS forestry rules. *GP International Ltd* (sub. 288, pg. 3):

As an example, if an owner of pre-1990 radiata pine forest harvests it and replaces it [...] with indigenous forest that is capable of absorbing sufficient carbon dioxide to only make perhaps 3 tonnes of dry matter per hectare per year, there is no penalty. However, if they replace that harvested forest with Miscanthus stands that are capable of absorbing sufficient carbon dioxide to make 20 – 30 tonnes or more of dry matter per hectare per year, they are penalised! This is simply because the Kyoto rules, which were written into the NZ ETS legislation, have virtually nothing to do with carbon dioxide in the atmosphere. So in terms of reduction of GHG emissions, the ETS is in our opinion a complete failure.

A number of submitters offered suggestions for how the ETS might better encourage forestry, with some suggesting major change. *Wood Search Marketing Ltd* (sub. 306, pg. 1) recommended:

A simplified variation to work in parallel with the current ETS...[to enable] investors to keep the majority of NZUs earned in the first 10 years to help meet investment costs, and then be able to deregister from the ETS provided they commit to the replanting of the forest post-harvest. This would be an effective non-cash mechanism for the Government to employ to encourage new planting of post-89 forests.

Alec Milne (sub. 146, pg. 1) identified the greatest disincentive to creating permanent forest sinks for some land owners as the risk of losing the forest to fire, wind or disease and therefore having to repay carbon credits on a rising market. He suggested that if the government took on this risk the uptake of forestry would be greatly increased.

New Zealand Carbon Farming (sub. 293, pg. 12) commented on the point at which eligibility is determined:

One enhancement that would give greater investment confidence to all foresters is to ensure greater and earlier certainty around whether land to be planted is eligible for carbon credits. It is important to have eligibility confidence prior to any planting decision. At present, eligibility is only confirmed post planting.

New Zealand Carbon Farming (sub. 293, pg. 10) recommended that if "averaging" is adopted, it only be applied to rotational (harvest) forest and not carbon forestry. This is because carbon forestry is not viable if only 21 years' sequestration is accounted for (as is the case under averaging).

There was strong support for expanding the ETS to small areas of plantings. *DairyNZ (sub. 365, pg. 5)* described the problem and proposed a solution:

Dairy farmers are undertaking a whole range of planting on-farm for other purposes which are sequestering carbon. [...] At present most of this on-farm planting does not meet the international carbon forest rules and therefore cannot be entered [in] the Emissions Trading Scheme or count towards New Zealand's 2030 NDC. DairyNZ proposes as part of New Zealand's negotiation priorities the definition of a carbon forest is examined and consideration is given as to whether it can be expanded beyond the current 5 meters in height, 30 metres wide, 30 percent crown cover, and over one-hectare definition.

The *New Zealand Farm Forestry Association (sub. 338, pg. 7)* suggested the only barrier (to including small lots) was the development of the necessary software as mapping capability already existed.

The *Taranaki Regional Council (sub. 188, pg. 6)* considered that "with developing technology and aggregation of smaller lots for accounting purposes, it should be technically feasible and cost-effective to include small areas of planting (such as riparian planting) within the NZ ETS."

There was strong support for MPI, LINZ and Landcare undertaking an audit of government land suitable for afforestation. *Federated Farmers (sub. 310, pg. 6)* suggested the work be, "broadened to require research and assessment of planting systems, and the potential areas available, for the wide range of non-commercial sites requiring the establishment of woody vegetation for water quality improvement along with carbon removals."

While many submitters supported a greater focus on forest plantings (see *Denis Hocking, sub. 224* for example) and emphasised the co-benefits, support was not universal or always unqualified. The importance of having the right tree in the right place was often raised. *Dame Anne Salmond (sub 185, pg. 3)*:

It would be an extremely poor outcome of a transition to a low-emissions economy if highly erodible lands were to be covered with harvested exotic plantations in New

Zealand, causing extensive damage to waterways, marine environments and biodiversity that will require expensive remediation, or which may not be able to be reversed.

Others questioned the impact greater forest plantings would have on local communities with less employment opportunities than other forms of farming, for example, *Dave Read (sub. 223, pg. 1-2)* and damage to native ecosystems (*Department of Conservation, sub. 370*).

Research

There was almost universal support for increased agricultural research (see too the “innovation” section above). *Genesis Energy (sub. 301, pg. 11)*, however, felt, “this funding should be shared across multiple sectors i.e. not limited to agriculture. Investment should be made into low-emissions vehicle opportunities, renewable energy generation technologies, waste reduction opportunities et cetera.”

Venture Southland (sub. 336) felt there was too great a focus on research, and not enough on implementation, “Money could be spent to assist farmers to adopt bioenergy systems, proven and ready technology worldwide, that will cut emission on farms now.”

10 Transport

Phase out date for importing fossil-fuel vehicles

Many submitters expressed support for setting a date by which the import of fossil fuelled vehicles should cease, thereby reducing GHG emissions from the transport sector. *Genesis (sub. 301, pg. 8)* commented that if New Zealand wants a domestic light vehicle fleet that is predominately EVs by 2050, New Zealand needed to phase out importing fossil fuelled vehicles no later than 2030. *Christchurch City Council (sub. 284, pg. 4)* felt there would be sufficient EVs available by 2030 to make this a realistic date.

However, a number opposed an explicit phase out date.

Inge Bremer (sub. 171, pg. 2) felt a phase out date was unnecessary as long as the full emission effect is being priced in and paid for in the ETS.

Others (see *Bioenergy Association (sub. 352, pg 16, 17)*) felt it would discourage the development and use of biofuels, an energy source they argued was compatible with low GHG emissions.

Government could signal a commitment to move away from fossil fuel vehicles by having a proper low-emissions transport programme and not just an EV programme which only signals use of EV. Fossil fuelled cars will be required for many years and they are also suitable for use with biofuels.

One group not on board with the majority view of increasing EV uptake was the *Special Interest Vehicle Association of New Zealand (sub. 400, pg. 3)*:

We note from the report that the manufacture of an EV (specifically ion batteries) produces much higher levels of CO₂ when compared to the manufacture of a fossil fuelled vehicle. To say that those pollutants are not an issue for NZ because they are produced overseas at best makes a mockery of the globe protection discussion and at worst gives the EV industry an unfair emissions advantage over every other vehicle type.

Price feebate scheme for imported vehicles

Under a feebate scheme, high-emission vehicles would incur a fee, while low-emission vehicles would receive a rebate (hence the name feebate). There was strong overall support from submitters for a feebate scheme to discourage the import of high emission vehicles, although there were some reservations with respect to unintended consequences and suggestions with respect to design.

Sigurd Magnusson (sub. 363, pg. 8) commented, "Used vehicles must be specifically noted in your recommendation as being covered by the feebate. More than 50% of vehicles imported to New Zealand are used. The feebate must apply to the majority of vehicles imported into NZ to be effective."

Genesis Energy Ltd (sub. 301, pg. 9) commented that:

There is a risk that a fixed per vehicle fee – e.g. one that is the same for a zero-emission second hand import and a more expensive New Zealand-new vehicle - would bid up the price of Japanese second-hand vehicles and do little to build a domestic market. Instead, a percentage feebate at the point of import with a cap is preferable. This would target the local market more effectively, while not overly subsidising the most expensive low-emission options.

On the possible impact a feebate scheme might have on biofuels, Scion (sub. 366, pg. 84) commented:

The design of any feebate scheme, particularly if applied to the heavy vehicle fleet, should not dis-incentivise biofuels as a way of lowering carbon emissions. One of the big pluses for biofuels, particularly drop-in biofuels, is that they can be used in engines designed for fossil fuels and distributed via existing fossil fuel distribution infrastructure. The feebate should incentivise lower-emitting vehicles in a technology-neutral way.

GP International Ltd (sub. 288, pg. 6) similarly commented:

The actual GHG emissions that come from a vehicle, while depending to some extent on the type of motor that it has, are much more dependent on the fuel that is to be used. It would be a terrible shame if a “feebate” scheme were to be put in place and result in vehicles that are capable of using fuel that is better than carbon neutral – RDF - were penalised, simply because emphasis was being put on the wrong thing - the type of motor.

The Bioenergy Association (sub. 352, pg 14) felt any standard should be based on the Carbon Intensity of the respective fuels.

BusinessNZ (sub. 347, pg. 14) did not support a feebate nor an end date for fossil fuel vehicles at this time, citing uncertainty around the impact of the ETS and the nature and pace of technology change, and the risk of perverse outcomes.

On a feebate for heavy vehicles, Sigurd Magnusson (sub. 363, pg. 8) commented:

The report states there are less heavy vehicle options today, which is true, however buyers should still be rewarded or answerable for their emissions behaviour; heavy vehicles are significantly more damaging in terms of emissions than light vehicles. A feebate therefore is a reasonable price placed on the environmental impact of a given vehicle.

He also noted that a heavy vehicle standard could be used to promote better adoption of newer ‘Euro’ emissions standards today, and anticipate broad availability of hybrid and zero-emission vehicles in coming years.

Energy Efficiency and Conservation Authority (sub. 326, pg. 6) identified a number of practical considerations with respect to introducing a feebate scheme for heavy vehicles:

For a feebate scheme to cover vehicles within the heavy vehicle fleet, there needs to be reliable and comparable emissions data. As heavy vehicles (e.g. trucks) can vary significantly in terms of their performance, capability to carry loads, and componentry to suit individual business operations (as compared to light vehicles where a degree of

standardisation can be observed), reliably comparing these for a feebates scheme will be difficult.

Similarly, Fonterra (sub. 355, pg. 7) commented that:

The use of a feebate scheme is only fair if the range (i.e. usability) of vehicles are effectively similar. For example, it would not be reasonable to place a fee on a fossil fuel heavy vehicle with a 700km range and place a rebate on an EV heavy vehicle with a 100km range as they do not have a comparable end use or purpose.

While Don J Cleland (sub. 395, pg. 3) supported a feebate scheme, he felt Carbon-based increases in the fuel price and a review of the RUC regime should be sufficient to incentivise change for the heavy vehicle fleet, "so a feebate scheme should not be needed."

CO2 emissions standards

Again there was broad support for emissions standards. This, many argued, would encourage the import of low-emissions vehicles, and manage the risk that New Zealand might become a dumping ground for high emissions second hand vehicles. See for example, Sigurd Magnusson (sub 383. pg. 2) who commented that it needed to include both new and used imports, as cheap used fuel vehicles could pose a high risk with respect to the 'dumping' issue.

Energy Efficiency and Conservation Authority noted (sub. 326, pg. 8) that, "A vehicle emissions standard would help address the supply-side barrier by encouraging manufacturers to offer more models of low-emission vehicles, with marketing and pricing to ensure they meet the standard."

Toyota New Zealand (sub. 177, pg. 5) believed emissions standards were unnecessary if a feebate scheme was to be adopted. A feebate scheme, they observed "is designed to reflect the unique nature of the New Zealand market and to achieve the same objectives as an emissions standard."

The Energy Management Association of New Zealand (sub. 242, pg. 6), while supporting the recommendation in principle, felt there was a risk of unintended consequences, for example, if a moderately emitting vehicle which would have displaced a high emitting vehicle is prohibited from entry. Restrictions on new entries, they argued, may result in increasing the average age of the fleet and limiting the effectiveness of vehicles emissions testing. The New Zealand Automobile Association (sub. 307, pg. 13) also identified this mechanism as a risk to the age and safety of New Zealand's vehicle fleet.

The New Zealand Automobile Association (sub. 307, pg. 13), while supportive of reviewing the appropriateness of emissions standards, felt "global compliance with international standards a more pressing priority given New Zealand's lack of manufacturing and small market."

The Motor Trade Association (sub. 333, pg. 5) sought appropriate due process prior to making a decision, "MTA would not presuppose at this time to call for an introduction of a CO₂ emissions standard for vehicles. We support the appropriate review of options and consultation that should accompany any such legislative move."

Responsiveness to fuel prices

A small number of submitters questioned the elasticity of demand for transport in response to price changes. EROAD (sub. 182, pg. 3-4) suggest the idea of an inelastic demand for fossil fuels, while commonly held, is premised on a significant misconception. They comment that, "In 2012/13 consumers demonstrated significant responsiveness to high pump prices at a time when real household incomes still had not changed to reflect the economic upturn. The New Zealand Household Travel Survey showed significant reductions in discretionary travel."

Toyota New Zealand (sub. 177, pg. 7) commented:

Sixty five percent of new vehicles entering the fleet are purchased by companies that will hold the vehicles for around three years before reselling them. Companies will be interested in the full cost of ownership. These newer vehicles tend to travel more kilometres per year, so fuel costs will typically be an important factor in the decision for a company. Many larger fleet buyers are now also more likely to be concerned about environmental sustainability, so appropriate fuel pricing will help incentivise their decision to acquire lower-emission vehicles.

Barriers to EV uptake

A number of submitters felt there were significant network gaps. *Alan Barraclough* (sub. 149, pg. 3) identified a lack of charging facilities at work places, rental accommodation and apartment accommodation. He proposed a legislative solution to these gaps. Work charging, he noted, would reduce peak loading.

However, some submitters challenged whether the gaps in charging infrastructure were significant. *Vector* (sub. 287, pg. 8) commented:

International evidence has demonstrated that the majority of charging will occur at home (>95%), which means that a vast charging infrastructure is in fact in place. Messaging around the lack of public charging is echoing a misconception of concerned customers that may not yet perceive their home as a convenient 're-fuelling' station. Public charging infrastructure is merely used for emergencies or less commonly undertaken long trips."

Sigurd Magnusson (sub. 363, pg. 8), stated "Going forward, the nature of gaps is not geographical coverage, per se, but rather of density, redundancy, and capacity, and, addressing isolated cases where obstacles make it hard for some people to routinely recharge vehicles."

A minority of submitters opposed government funding of EV charging infrastructure. *Energy Management Association of New Zealand* (sub. 242, pg. 7), for example, felt it would be a subsidy to certain market participants and not an appropriate use of taxpayer resources.

A number of submitters identified other barriers to EV uptake they felt needed to be addressed. *Branislav Petrick* (sub. 145, pg 1) was concerned about the difficulty EV owners have in replacing vehicle batteries. He recommended government work with automakers so that they open their intellectual property to allow selected organization such as VTNZ or NZTA to perform the full battery replacement.

Drive Electric Incorporated (sub. 257, pg. 1) felt more needed to be done to educate potential EV users. In particular they identified the persistence of 'range anxiety', and 'total cost of

ownership' myths, despite the hugely improved performance of recent EV models and the significant increases in the available charging infrastructure. Notably Drive Electric have produced whitepapers on total cost of ownership using Meridian Energy data.

The *Motor Trade Association* (sub. 333, pg. 5) identified supply as a major barrier to EV take up in New Zealand:

There are simply not enough EVs in the global supply chain at present to meet even the modest targets set for EV registration. MTA's analysis of the Japanese domestic market is that there are not enough vehicles registered in Japan that will come available for import to New Zealand before the existing 2021 target date. Even with recent announcements by major corporates regarding EV fleet purchases, MTA does not believe that the new car market can make up the difference.

On the customer side, the *New Zealand Automobile Association* (sub. 307, pg. 20) revealed that a survey of their members had shown that of those who had responded, 63% thought their next car would be an EV, purchased in the next 10 years.

Meridian Energy (sub. 253, pg. 16) referenced research undertaken by Concept Consulting in 2016 as indicating:

The current flat structure of most retail electricity tariffs, along with low carbon costs, constrains the uptake of electric vehicles because of:

- the electricity cost from charging EVs at off peak times (like overnight) generally being too high;
- the payments which future EVs could earn from injecting power back into the electricity grid at times of peak demand being too low; and
- the carbon price that internal combustion engine owners pay from tailpipe emissions being too low.

Carbon Neutral Waiheke (sub. 381, pg. 23) didn't believe electricity supply constraints would limit EV uptake. Quoting Russell Watson, Network Engineering Manager, Northpower:

To power one million EV you would need around 2,600 GWh per annum which equates to 6% of New Zealand's present electricity generation (based on a 40 km daily commute or around 15,000 kms of driving per year and efficiency of 6km/kWh) and If all the consented wind generation was constructed it could potentially charge 3.5 million EVs.

Government procurement of low-emission vehicles

There was strong support for the government purchasing more EVs. *Sigurd Magnusson* (sub. 363, pg. 14) argued for a strong policy linked to a phase out date for fossil fuel vehicles:

A specific timeframe for all Government vehicles being electric should be stated, e.g. 2030 assuming that year is targeted as a zero emissions import goal, as it then highlights the goal is realistic. In order to achieve that, all government agency vehicles purchased from 2019 should be electric where fit for purpose (which, as of 2018, is the majority of passenger vehicles, but leaves trucks and utes for a future year).

Other submitters, also supportive of a government purchase EV policy with, “where practicable”, recognising for example some government roles might be in locations that made EV use difficult.

Road pricing (including internalising externalities)

Of those who commented on road pricing, most were supportive. *Toyota New Zealand* (sub. 177, pg. 10) for example recommended the government look at a nation-wide scheme. And *EROAD Ltd* (sub. 182, pg. 14) commented, among other things, on the need for government to work with local authorities to determine the range of pricing circumstances and purposes a comprehensive national road tax reform should provide for.

Older vehicles in the fleet

A number of submitters identified the old age of New Zealand’s vehicle fleet as a problem for GHG emissions. *Toyota New Zealand* (sub. 177, pg. 12) suggested the Commission consider:

- A scheme to help fund the scrapping of vehicles, often referred to as ‘cash for clunkers’. When linked to the suggested feebate scheme, this could help incentivise the removal of older vehicles from the fleet as new low-emissions vehicles enter.
- A change in policy settings that increase the costs of annual licensing and maintaining a warrant of fitness as vehicles get older.

The *Energy Management Association of New Zealand* (sub. 242, pg. 6) suggested emissions testing as part of the Warrant of Fitness check, with a gradual tightening of standards.

One group concerned about threats to the existing fleet of fossil fuelled vehicles was the *Special Interest Vehicle (SIV) Association of New Zealand* (sub. 400, pg. 2):

What is alarming is that the report does not consider the social and economic impact of the 75,000 SIV owners or the SIV industry; \$10 billion of value and economic contribution is being ignored. These businesses and SIV owners contribute to the social and economic success of a large number of New Zealanders.

International shipping and aviation

A number of submitters sought the inclusion of international shipping and aviation into the review. For example, *Paul Elwell-Sutton* (sub. 241, pg. 1) expressed the view that:

It is particularly misleading not to include emissions from international shipping and aviation in our emissions budgets. Failure to include them amounts to a subsidy to our economy from the international community, and gives us an unfair trading advantage.

The *National Energy Research Institute* (sub. 337, pg. 19) felt:

The fuels developed for international transport would also supply domestic shipping and aviation, and the availability of alternative low-emissions fuels could also impact on other domestic uses e.g. perhaps bio aviation fuels for peaking electricity generation, renewable ammonia for trucking or as an industrial chemical. Therefore fuels for international transport should be in scope, even if the emissions aren’t.

Another idea was to require tourists to and from New Zealand to contribute to accredited reforestation schemes to offset their emissions (350 Christchurch, sub. 162, p. 4).

A role for biofuels in reducing transport emissions?

Many submitters felt biofuels could play a big role in reducing transport emissions.

Fonterra (sub. 355, pg. 7) commented that they are:

Interested in the future development in New Zealand of a drop-in biofuel as an option for reducing emissions from its heavy vehicle fleet and supply chain. The Commission could widen its report to look at what hurdles there are for this product and what could be done to address this as this could be a quicker and lower cost abatement option than development of a lower emission heavy vehicle.

Similarly, *Te Rūnanga o Ngāi Tahu* (sub. 362, pg. 12) noted, "It makes sense to take a regional approach to heavy transport, working with biofuel sources close to local need, which is already starting to happen within the Ngāi Tahu takiwā in association with changing regional economies and land use."

Z Energy (sub. 377, pg. 2) in noting proposed support for EV uptake, felt this should be balanced with biofuel mandates or subsidies to encourage a short term scale up of operations and emissions reductions.

The *Bioenergy Association* (sub. 352, pg. 11) felt opportunities for reducing emissions for heavy vehicles, shipping and aviation were being overlooked. Biofuels, they argued, could significantly reduce GHG emissions across these activities. *Pioneer Energy* (sub. 221) and *Special Interest Vehicle Association of New Zealand* (sub. 400) also provided a number of arguments in favour of biofuels.

Not everyone was so positive towards the use of biofuels. *Sigurd Magnusson* (sub. 363, pg. 16) commented:

NZ will be better off focussing on awareness building and economics of purchasing and running zero emissions vehicles that are mass produced internationally, so that trucks, buses, and trains are electric, and boats and airplanes are either fully electric, or electric/hydrogen hybrids. Focussing too much on an interim step (biofuel) could delay the 'end game' (zero emissions).

New Zealand Centre for Sustainable Cities (sub. 311, pg. 3) commented, "the production and use of biofuels have a range of issues associated with them, including the use of land that could otherwise be used for food production and air pollution (particulates) produced when burning these fuels."

Public transport

Many submitters commented in favour of a greater role for public transport. *New Zealand Super Fund* (sub. 334, pg. 7) argued that:

The first priority of a credible climate change strategy in any country is improved public transport and a modern rail network for passengers and freight. Given the significant

productivity gains from an efficient, low-emission, mass-transport system, a more detailed discussion of the role of New Zealand's public transport network and how these objectives can be achieved, is needed.

Against the views of most submitters who commented, *Transition Town Pt Chevalier* (sub. 235, pg. 6) didn't believe EVs or autonomous vehicles would provide significant reductions in GHG emissions, and instead favoured options that would promote mode shift away from private vehicles. They provided analysis and references to support their conclusions. Further, they pointed out, "Duranton and Turner have established that vehicle kilometres travelled (vkt) rises proportionally with road capacity. Adding road capacity and failing to invest in other modes is where NZ has failed."

11 Electricity

Neutral policy settings

There was strong support for overarching and neutral policy settings for the electricity sector, and relative to other sectors. The *Electricity Authority* (sub. 384, pg. 1) favoured:

A 'general equilibrium' approach to emissions reductions because it promotes emissions reduction at least overall cost to the economy. Interventions which specifically target the electricity sector to lower emissions could increase emissions elsewhere in the economy and at the same time, reduce reliability of supply and raise costs.

Similarly, *Genesis Energy* (sub. 301, pg. 3): commented:

Generally, our view is that rather than attempting to predict the future or import 'other country thinking', it is better to have the right levers in place for all technologies to compete on an equal footing to best suit the needs of New Zealand's changing electricity sector. This includes providing equal access to connect to electricity networks for all generation technologies, and enabling national directives on the benefits of renewable energy generation.

Genesis, however, also offered the following important caveat, "As New Zealand works towards a collective ambition for a lower emissions economy, there may be some circumstances where targeted policy intervention can be supported if there is a sufficient case for collective benefit that outweighs the risk of technology lock-in."

A minority of submitters favoured direct government intervention, and offered a range of suggestions about what might be done. *Ivan Johnstone* (sub. 166, pg. 2), for example, suggested revenue from the ETS to invest in renewable energy projects to maintain stable electricity prices.

Carbon Neutral Waiheke (sub. 381, pg. 23, 31) supported introducing a:

Domestic PVC solar loan scheme modelled on either the current Healthy Home insulation scheme or preferably its predecessor in the 1970s which provided home owners with a zero interest loan. [...] passing legislation to make solar panels compulsory in all new homes, as has happened in California, could stimulate the marketplace and drive prices down which would make solar panels more affordable to both home owners and landlords.

EECA suggested (sub. 326, pg. 11) contracting might overcome a bias against new renewables investment:

Emissions prices alone may not be sufficient to drive investment in new renewables, since new generation plant is a high capital cost investment which, in many cases, is competing against existing depreciated generation assets. Further, the current emissions pricing design provides only a short-term signal, whereas renewable generation investments are a long-term decision. One solution to this would be to facilitate long-term contracting arrangements for both emissions and electricity, so that potential investors could have greater certainty and lower risks.

The Resource Management Act 1991 and renewable electricity generation

Nearly all submitters who commented felt the Resource Management Act was a barrier to new renewable electricity generation. *Meridian Energy* (sub. 253, pg. 7-11) provided a comprehensive outline of the barriers posed by the Resource Management Act 1991 and National Policy Statement on Renewable Electricity Generation 2011. They also provided an amended NPS REG in their appendix 1 which they believed would reduce these barriers.

Similarly, *Tilt Renewables* (sub. 218, pg. 3) identified a number of options for improving decision making under the Resource Management Act, including, "Redrafting the policies of the NPSREG so that they require decision-makers to recognise and provide for the development of renewable electricity generation infrastructure in the same manner as the NPSET (National Policy Statement on Electricity Transmission)."

The *Blueskin Resilient Communities Trust* (sub. 236, pgs. 8 and 9) identified an operational problem with the NPS:

Territorial authorities are exceedingly slow in giving effect to national policy statements. In Dunedin for example, no changes have become legally effective in its Operative District Plan. That means that almost 8 years have elapsed since the NPS become operative, and we are still waiting for the local authority to give effect to it.

The *Blueskin Resilient Communities Trust* proposed a National Environment Standard to enable small-scale wind development as a permitted (or controlled) activity subject to compliance with certain standards.

Similarly, *Carbon Neutral Waiheke* (sub. 381, pg. 26) recommended "The current Resource Management Act needs urgent modification to not only strengthen its environmental provisions but incorporate specific climate change criteria which recognises the impact of carbon emissions and places importance on carbon sequestration."

Genesis Energy Ltd (sub. 301, pg. 6) also argued change is needed:

It is our view that the Government should strengthen the weight local and regional councils give to the NPS-REG by providing specific directives in the wording of the NPS-REG itself e.g. how to balance consideration of other planning documents such as the National Policy Statement on Fresh Water Management (NPS-FM).

In a counter view, the *Waimakariri District Council* (sub. 192, pg. 4) commented:

It is not so much the Resource Management Act 1991 that constrains investment in renewable electricity generation, particularly wind and hydro generation, but the electricity utilities that disadvantage households for supplementing their electricity generation with household-level solar panels and household wind turbines. While other OECD jurisdictions pay comparable rates for household renewable generation to contribute to the grid, this is not the case in New Zealand.

Greater Wellington Regional Council (sub. 195, pg. 2) pointed to a legislative impediment:

Councils could play a greater role in this respect through planning and consenting processes were this not expressly prohibited by law. The Resource Management (Energy and Climate Change) Amendment Act 2004 says in clause 3(b)(i) 'The purpose of this Act is... to require local authorities... not to consider the effects on climate change of discharges into air of greenhouse gases' and does exactly that.

Electricity Authority review of distributed energy resources (DER) and demand response (DR)

Submitters overwhelmingly supported the Electricity Authority undertaking a review centred on distributed energy resources and demand response. There was, however, a range of views on the problems that needed fixing.

On where they felt the market was operating well, the *Electricity Authority* (sub. 384, pg. 3), for example, commented:

For over 20 years the spot market has operated effectively in providing signals for efficient generation investment, including to manage dry years. This has been supported in more recent years by well-functioning hedge and futures markets that provide parties with the means to enter into forward contracts, such as the contract between Meridian and Genesis for dry-year cover, without the prescription of a formal capacity mechanism that can be readily gamed.

The Authority went on to say (pg. 2)

We do not think revising our objective is necessary, in fact, we think requiring the Authority to consider emissions would reduce overall consumer welfare due to the significant risk of Authority decisions forgoing either efficiency or emissions reduction benefits elsewhere in the economy and by creating policy uncertainty.

Vector (sub. 287, pg. 9), in suggesting that open access was already the status quo, commented, "The technology agnostic incentive principles behind Part 4 of the Commerce Act encourages network suppliers to use the most efficient combination of inputs, either insourced or from third-parties, for delivering the network service."

On the capacity of lines companies, Counties Power (sub. 331) and Counties Power Consumable Trust (sub. 262, pg. 2) both questioned the need for complex local System Operator (SO) functions to be established across the range of EDBs, claiming small EDBs were performing well and it would be an unnecessary cost to consumers.

In the context of calling into question the quality of the IEA's 2017 review of the distribution industry, the Energy Trusts of New Zealand (sub. 258, pg. 7), recommended consideration be given to "Professor Yarrow's report on The International Energy Authority's 2017 Review of New Zealand."

Other submitters pointed to significant problems in the electricity market. Independent Electricity Generators (sub. 222, pg 6) commented:

The market is not "fit-for-purpose" for the rapid growth in distributed energy resources nor for the changes that are envisaged in this report to meet the net zero climate objectives. For smaller players such as the IEGA membership investing in generation (and

new competitors in the electricity retail market) the electricity market is essentially inaccessible in many areas due to Code complexity, wholesale trading illiquidity and the costs of meeting the requirements of a vast array of rules.

Given the rate of technology uptake, Meridian Energy (sub. 253, pg. 11) considered distribution pricing reform to be increasingly urgent:

In the absence of timely pricing reform uptake of beneficial technologies may be stymied or investments made in less beneficial technology. As succinctly put by Transpower “[m]ost end users today have pricing structures that over-stimulate self-production, under-stimulate efforts to moderate peak usage, and overly deter electrification”.

Meridian Energy (sub. 253, pg. 11-12) also commented:

The Authority has been working on distribution pricing reform since 2009 and in recent years has been encouraging industry-led pricing reform with publication of roadmaps and next steps every six months. Some distributors have published detailed roadmaps and appear up to the task of reforming their pricing structures. Others have not released a roadmap for pricing reform or updated their roadmaps and appear to be making little or no progress, despite support from the Electricity Networks Association and Authority.

On what needed to be done, Transpower (sub 305, pg. 5, 9) sought, “a specific recommendation that regulators promote, coordinate and prioritise market design changes that will complement the current energy-only market, and support investment decisions that drive the transition to a low-emissions economy.” They also commented that it was important to, “recognise the importance of coordinating new distributed energy technologies with national transmission system operations in order to most effectively enable a low-emission economy.”

Genesis Energy (sub. 301) supported the concerns that EDBs may not have the capability to fully support customers and reduce emissions and agreed it was time for a ‘fresh look at EDB capabilities’. They supported the Authority considering how it could work with ComCom and MBIE to progress this as a priority.

Meridian Energy (sub. 253, pg. 11) commented:

Reform should be completed to align with the next Commerce Commission reset of the default price quality path and the beginning of the next regulatory period in 2020. If distributors are not visibly committed to this timing then regulatory intervention may be required.

Energy Trusts of New Zealand (sub. 258, pg.4):

The costs of solar technologies are falling very fast, to the point where it seems inevitable that they will displace some conventional generation in New Zealand and put downward pricing pressure on our large sunk cost hydro generation base, meaning additional gains for consumers. ETNZ believes that it is in the long-term interests of the economy and of consumers to accept that clean, renewable generation options that by-pass the grid should not be forced to carry a cost loading to support the technologies they are displacing.

Similarly, *Vector (sub. 287, pg. 4)* commented:

The Productivity Commission's acknowledgement that a commitment to current technologies is a barrier to innovation certainly rings true in electricity due to the long-term regulatory investment framework and long-life traditional assets. To embrace new lower-emissions technology, regulators may need to consider accelerated depreciation for current assets.

On the efficient integration of EVs into the electricity distribution network, *Vector (sub. 287, pg. 8)* recommended:

- Mandatory EV registration data to support network planning;
- Charging management using a dynamic/staggering charge (and tariff);
- Vehicle-to-grid and vehicle-to-home technology to enable EVs to earn additional benefits from market and network support, and facilitate the integration of local renewable generation and provide resiliency.

Options outside the Electricity Authority's Review

A number of submitters felt there were issues that would fall outside the Electricity Authority's review that also needed to be addressed. The *Electricity Networks' Association and Electricity Retailers' Association of New Zealand (sub. 211, pg. 1-5)*, for example, recommended the government revoke the Electricity (Low Fixed Charge Tariff Option for Domestic Consumers) Regulations 2004. This, it was argued, would promote cost reflective pricing which in turn would have benefits for consumers and other users of the grid, and in particular promote the electrification of road transport and other technologies supportive of a low-emissions economy.

Energy Trust of New Zealand (sub. 258, pg. 2) recommended that the Electricity Authority's statutory objective be reviewed to ensure that environmental and demand-side efficiencies were given reasonable prioritisation, and to promote socially beneficial outcomes for all classes of consumers.

As an example of poor policy co-ordination across government, *Orion New Zealand (sub. 210, pg. 3)* noted:

In May 2018, the Commerce Commission advised that public electric vehicle chargers are no longer to be included within the regulated assets of EDBs, unless under very restricted circumstances. As a result of this advice Orion has decided to pause its EV charging infrastructure rollout, and other network companies may too."

Mercury (sub. 320, pg. 2), noted that other policy reforms would not necessarily be sympathetic to renewable electricity generation:

The Government's Tax Working Group for example is considering environmental taxes on water users which if applied to hydro generation would raise electricity prices and the costs of carbon abatement across the economy. The Resource Management Act is also in the process of being reviewed along with freshwater quality policy and these initiatives could impact on renewable electricity generation investment and costs.

Energy Trust of New Zealand (sub. 258, pg. 2) recommended that:

The Productivity Commission's report acknowledges the role that s54Q of the Commerce Act could play in advancing progress towards a low-emissions economy, notes that little effective use of this clause has been made to date, and suggests that the Commission revisit its approach to EDBs accounting for involvements in appropriate new technologies in the light of s54Q.

SRD Consulting (sub. 173, pg. 3):

The work of the New Zealand Smart Grid Forum should be acknowledged along with a recommendation to re-introduce it with appropriate funding to enable it to become sustainable and provide consumers with the information they need to get more value from their solar, their hot water cylinders and charging of their Electric Vehicles.

Bioenergy

A number of submitters felt bioenergy was a useful option for electricity generation. *Scion (sub. 366, pg. 87)* commented:

Forest biomass could be used to produce electricity in dry years, keeping the use of fossil fuels low. [] Torrefaction of biomass has been extensively researched globally, is nearing commercial viability, and looks to provide an attractive low-carbon feedstock for use in existing coal-fired power generation plant.

Molly Melhuish (sub. 264) felt home wood burners would provide a good complement to other low GHG emission technologies, in particular solar, provided regulatory barriers were appropriately managed, for example, standards for home wood burners.

12 Heat and industrial processes

Importance of Biofuels

A number of submitters considered there to be considerable scope to reduce GHG emissions in heat and industrial processes. Technological advances, it was argued, together with New Zealand's comparative advantages would enable New Zealand to pursue low carbon emission metals refining.

Venture Southland (sub. 336, pg. 3), for example, commented:

Wood Energy is the most cost-effective technology over the lifecycle of the boiler in comparison to other fuels, with the exception of lignite coal. As mentioned above the quality of lignite has significantly declined over the past few years to the point of causing coal boilers to pre-mature fail. In addition various consumers of coal have recently noted the increase in coal price, particularly in Southland. Biomass boilers have significantly lower maintenance cost and on-going servicing requirements.

Some suggested a modest increase in the price of carbon would see industries with heat demand being met by fossil fuels (especially coal) move to wood (*Scion*, sub. 366, pg. 89).

Others suggested specific measure to promote bioenergy. *Nature's Flame Ltd* (sub. 245, pg. 2) suggested, among other things:

- Life Cycle costing – not just capital or fuel costs.
- Review the current five year payback period on energy systems for Crown loans.
- Allow an accelerated depreciation to promote faster replacement and upgrade of plant to renewable energy generation.

Azwood Energy (sub. 168, pg. 6) recommended government work with large industrial heat users to improve co-firing understanding, and prohibiting the construction of new single-source fossil fuel boilers. They also favoured government financial, regulatory and other assistance to encourage the uptake of biofuels.

Other submitters, however, did not favour biofuels, for example, *Straterra* (sub. 383, pg. 6) and the *Wise Response Society* (sub. 354, pg. 18-19). The latter listed a number of weaknesses with biofuels, including; poor quality, environmental impact and higher lifecycle GHG emissions.

The Energy Efficiency and Conservation Authority (EECA)

On the issue of changing EECA's mandate to focus more on reducing GHG emissions, *EECA* (sub. 326, pg. 16) commented that it already has a clear mandate to deliver carbon emission reduction programmes.

The *Energy Management Association of New Zealand* (sub. 242, pg. 7) commented that:

Emissions reduction should become part of EECA's remit – as is the practice already under the NZEECS – but should not be its primary focus. Stating a primary focus for EECA as emissions reduction introduces a high risk of singular metrics with associated unintended consequences for energy efficiency and energy productivity.

While acknowledging the importance of a GHG reduction objective, the *American Council for an Energy Efficient Economy* (sub. 163, pg. 1) pointed out that energy efficiency is usually the most efficient way to meet energy demand and reduce GHG emissions.

On the issue of EECA services to large versus small entities, *EECA* (sub. 326, pg. 17,18) commented that they:

Must continue to focus on the largest energy users/emitters, as they offer the greatest potential for emissions reductions at the least cost. [...] Where recovery for services is feasible, EECA believes this work would be best done by the private sector.

Fonterra (sub. 355, pg. 9) did not support EECA refocussing on smaller firms at the expense of larger firms:

There is benefit across New Zealand from EECA's engagement with large firms, due to the increase in knowledge and experience that can be shared from the larger to the smaller firms, who may have greater resources available to undertake new initiatives and bear a higher risk than smaller firms. If the focus does change, then so too should EECA's funding model to ensure that large firms are not subsidising reductions in smaller firms – e.g. large firms that are not subject to EECA, should be exempt from contributing to EECA and could then be free to utilise this funding on its own emission reduction activities, rather than subsidising others.

Giving Fonterra discretion to refuse milk supply

The majority of submitters on this issue favoured giving Fonterra discretion to refuse milk supply. The *New Zealand Farm Forestry Association* (sub. 338, pg. 4) noted that:

Compared with dairy farmers, where "Fonterra generally collects milk at no cost regardless of location" (Commission report page 273), foresters pay their own freight. Were both to be charged on an equal basis, we expect that in some areas close to ports and mills but remote from dairy factories, commercial forestry would be more profitable than dairying, leaving aside externalities.

Don J Cleland (sub. 395, pg. 1) noted, "Removal of the obligation to take milk would both help Fonterra move to greater added value processing and to justify investment in lower emission technology for the plants which would have greater utilisation over the year rather than just peak processing capacity."

Federated Farmers (sub. 310, pg. 9) was opposed to providing Fonterra with the ability to refuse milk supply on the basis of climate change (or other environmental) considerations. They pointed to "farm level point of obligation" negating the need, the precedent it would set and noted the issue of allowing Fonterra to refuse milk supply was being considered by government elsewhere.

Cement

On the uptake of lower-carbon cements, *Concrete New Zealand Incorporated* (sub. 303, pg. 6) identified the following factors as likely to limit uptake:

- Relatively low industrial base that produces a limited amount of cement replacement materials such as fly ash and slag.
- Relatively small concrete construction market with small amount of research and development into cementitious materials with most technological change coming from overseas.
- High seismicity in most parts of the country with resultantly high structural demand on reinforced concrete structures.

Golden Bay Cement (sub. 197) identified similar issues.

Fletcher Building (sub. 349, pg. 3-4) suggested it was not the standards themselves that were the main limit on lower carbon components, but the economics of securing those components. They went on to explain a secondary impediment as being:

The perception that the low carbon components are merely fillers and add little to the cement (and consequently concrete) properties. In reality the components can give one or a number of added benefits, whether that be strength, durability, sulphate resistance or heat of hydration properties when used in concrete mix formulations.

Fletcher Building (sub. 349, pg. 4) commented that, "In many instances lower-carbon cements contribute positively to products designed for New Zealand's unique environment." They go on to say "The issue regarding the use of lower-carbon cements relates more to the fact they are largely uneconomic in this market."

Carbon capture and storage activities (CCS)

Innovation and Business Development Solutions (sub. 167, pg. 2) provided extensive comment in support of CCS. They commented:

"New technologies developed (and to be developed) for capturing Carbon and for storing or utilizing after capture provide the potential for great opportunities for New Zealand. This is predicated by the assumption that viable financial models and initiatives can be established and then put in place to facilitate investment, effort and innovation in this potentially hugely valuable space."

The MacDiarmid Institute (sub. 312, pg. 3) was also positive:

It is generally recognised that negative emissions will be required to meet current CO₂ reduction targets. Materials science and engineering can play a significant role in new technologies for capture-at-source (e.g. smokestacks of coal-fired power plants) or direct air capture (pulling air through a material) of CO₂.

Fossil Fuels Aotearoa Research Network (sub. 187, pg 7) and a number of others, however, suggested caution:

In conclusion, negative emissions technologies (NETs) such as bioenergy linked with CCS are unproven, are not economically viable, have environmental issues, and are not scalable in time to reach the government's emissions targets by 2035 and 2050. A viable transition pathway to a low-emissions economy for New Zealand should not place reliance on such technology.

Similarly, New Zealand Steel (sub. 309, pg. 15) warned:

While CCS has conceptual appeal, NZS is cautious about placing considerable reliance on CCS as a removal mechanism for a number of reasons. Firstly, New Zealand's geological context raises considerable risk regarding the permanence and reliability of CCS. Secondly, the costs of early CCS projects have been extremely high and have resulted in very low uptake of CCS projects.

Natural gas

During the inquiry the Government announced a ban on offshore oil and gas exploration. A number of submitters felt it appropriate to address the consequences of the ban in the inquiry. Fonterra (sub. 355, pg. 10) commented:

This section of the Report [heat and industrial processes] should be updated to reflect the impact of the recent ban on offshore oil and gas exploration – such as the risk this has introduced to utilise natural gas as a transition fuel, and if New Zealand will become an importer of LNG supply for the existing gas network as domestic supplies diminish. This could further expand to assess the impacts on domestic electricity prices and how this impacts transitioning to this energy source.

Major Gas Users Group (sub. 341, pg. 4):

Unfortunately investment in gas supply is facing headwinds. MGUG is concerned the announcement by the Prime Minister on 12th April 2018 that "There will be no further offshore oil and gas exploration permits granted" will (and has) impacted confidence in the investment needed to ensure development of reserves and gas supply.

Mercury (sub. 320, pg. 2) comment that:

Large-scale renewable generation will increasingly be built from intermittent sources, like wind, which will need other significant sources of flexible generation that can quickly respond when the wind falls away. This flexibility role will increasingly be filled by hydro-generation. This is because the government's recent ban of offshore oil and gas exploration means gas fired generation will become uneconomic. Gas fired generation is currently the only other major provider of substantial flexibility in the electricity system which is why it is included in all the Commission's electricity supply scenarios out to 2050.

13 Waste

Overarching regulatory framework for wastes

There was general support for an overarching regulatory framework for waste. *Queenstown Lakes District Council (sub. 240, pg. 2)* commented, "National guidelines/templates for effective bylaws &/or consenting requirements (for currently unmanaged disposal sites) would facilitate the change required to bring sites into the data framework and levy scheme."

Waikato Regional Council (sub. 227, pg. 4) commented:

As a region we have had issues with tips, dumps and landfills, including agricultural waste. Soils may be contaminated if hazardous substances are present in the waste and leachate or run-off from farm dumps may reach surface or ground waters if sites are poorly chosen. In these instances groundwater may be contaminated or surface water quality reduced. A more rigorous regulatory framework could address these issues and greenhouse gas emissions at the same time.

In support of a more joined up approach, *Auckland Council (sub. 273, pg 6)* felt waste needed to be considered in a more encompassing way, referencing the "circular economy" and the importance of managing waste as part of "product stewardship" across all waste streams (not just organics).

The waste disposal levy

There was overall support for increasing the waste disposal levy. There were many suggestions on how that might best be done and fit with the ETS, and what the resulting revenue might be used for.

Hitachi Zosen Inova Australia (sub. 308, pg. 2-3) supported "a nationwide landfill levy starting at \$50/t and being ramped up yearly by \$20/t to \$150/t (plus CPI)." This, they argued, would lead to strong financial incentives to implement a number of waste solutions; and hypothecation of all landfill levy would provide capital. Possible solutions included:

- Compulsory source separation of organic waste from residual waste, and capture and use of resulting biogas.
- Separate recycling of batteries, electronics, and other hazardous wastes.
- Waste to Energy (WtE) to be introduced for the remaining residual waste.

Hitachi Zosen Inova Australia (pg. 2-3) further suggested that, "earth-like substances should be levied at a lower rate of around 10% of the base rate. This means that slightly contaminated earth like material or materials such as asbestos will be incentivised to be properly disposed of in a final sink."

WasteMINZ TAO Forum Steering Committee (sub. 261, pg. 2-4) commented that:

rather than applying the waste levy to unmanaged sites, it may be better to apply the levy at differential rates for active versus inert materials (as per many EU countries) irrespective of the landfill these materials are disposed at. This would encourage active materials being taken to facilities with gas capture capacity.

Local Government New Zealand (sub. 248, pg. 8) felt it important to:

Recognise the potential for unintended outcomes due to significant obligations on councils to pay for greenhouse gas emissions from landfills, particularly smaller, and hence less well resourced, local authorities such as increased illegal dumping, early closure of landfills and decreased support for waste minimisation initiatives.

On the relationship between the waste levy and the ETS, the *Greater Wellington Regional Council (sub. 195, pg. 7)* commented that: “as the waste levy and the ETS serve two distinct purposes, there is no overlap. If the organic content and therefore GHG emissions of waste is reduced, there is facility within the ETS to reflect that in the emissions factor used and thereby the cost of the associated ETS obligation.”

However, *Waste Management New Zealand (sub. 332, pg. 9)* commented, “The ETS is aimed at reducing emissions by way of incentivising landfill operators to improve gas management practices. It would not be appropriate to double tax emissions by increasing the waste levy to target organics to landfill for the specific purpose of reducing emissions.”

WasteMINZ TAO Forum Steering Committee (sub. 261, pg. 2) commented that, “currently, there is a perverse consequence whereby the more organic materials sent to a landfill the more gas is generated and so the better the landfill gas capture rate appears against the default emissions factor.” As a solution, they suggested a unique emissions factor based on actual waste composition above a base level (say 50%).

Including wastewater treatment plants in the ETS

Most submitters supported waste water treatment plants being included in the ETS. *Greater Wellington Regional Council (sub. 195, pg. 7)* commented, “This is consistent with the ‘polluter pays’ principle. Although some consideration should be given to administration costs relative to the scale of emissions, there is no reason to exclude waste water treatment plants from the Emissions Trading Scheme.”

However, according to some, performance standards for small plants needed to be accommodated in the design. *Te Rūnanga o Ngāi Tahu (sub. 362, pg. 13)* commented (see also the *Environment Institute of Australia and New Zealand (sub. 260,))*:

Plants that are capable of off-setting emissions through technology (ie larger facilities where operators have greater resources) should be able to opt-in to the ETS to receive benefit from their low-emissions investment. However, we would be concerned if small plants faced costs when we know there is urgent need to address basic performance in some areas. This is especially true in small rural or remote communities.

Fonterra (sub. 355, pg. 10) did not support the inclusion of wastewater treatment plants in the ETS at this point:

This is because the emission profile of wastewater treatment plants in New Zealand is currently not well understood, there are no measurement or reporting standards relevant for New Zealand wastewater treatment plants, nor does there appear to be any co-ordinated response on how such emissions could be minimised.

Watercare Services Ltd (sub. 275) favoured the government leading the development of a nationally agreed accounting methodology for waste water treatment plant GHG emissions.

In the interim, *Water New Zealand (sub. 186)* supported a number of measures, for example energy efficiency labelling of sites and working with EECA on mitigation approaches in preference to extending the ETS.

14 The built environment

Does the New Zealand Building Code need to change, or is a high carbon price enough?

Submitters were divided over the need to amend the Building Code to better accommodate low GHG emissions practices and products, and to manage peak electricity demand. New Zealand Steel (sub. 309, pg. 16) commented:

Any move to assess the embodied emissions of building materials as part of the Building Code would undermine its purpose and potentially raise concerns with safety, stability and durability. NZS agrees that the Building Code should not present a barrier to other technologies and materials but agrees with the Draft Report's findings that it should not favour one material over another based on its embodied emissions.

On a related point, the Property Council of New Zealand (sub. 283, pg. 2) commented in support of price being the key mechanism for driving GHG emissions reduction in the sector:

Emissions through the life-cycle of a building are complex to calculate and relatively low considering the longevity of a buildings life cycle when compared to other emissions. [] "The 'performance-based' philosophy that is the foundation of New Zealand's current Building Code provides sufficient flexibility for designers and developers to make choices about how to meet the required performance standards. We do not support changes to the Building Code that would prescribe particular building material or practices.

On the value of price changes versus building standards, the New Zealand Building Federation (sub. 371, pg. 2) commented:

We contend that that the potential existence of an emissions levy to encourage the design and construction of both residential and commercial builds that encourages an uptake of technologies that will improve building efficiency and reduce electricity use during period of high demand is likely to be more effective than amendments to the Building Code.

Fletcher Building (sub. 349, pg. 7) considered that:

The New Zealand Building Code should not be a barrier to adopting building materials and techniques with low embodied emissions. We do, however, note that not all structures and buildings will be able to be constructed with low carbon substitutions, and so this should not become a mandatory requirement but rather a voluntary choice if feasible.

However, as a way forward, Fletcher Building (sub. 349, pg. 6) suggested:

The New Zealand Building Code could be used to reference green rating tools as a means of compliance and working towards zero carbon buildings. Likewise, Government could change procurement standards for infrastructure or KiwiBuild projects, to encourage further uptake of rating tools such as Green Star, Home Star, the Infrastructure Sustainability rating or Greenroads.

In contrast, Low Carbon Kapiti (sub. 299, pg. 5) felt the ETS alone would not provide sufficient incentives to promote efficient energy use, low GHG practices and products.

The solution is therefore to revise the Building Code to require buildings meet a determined emissions standard. The way this is most effectively implemented (as evidenced in other countries) is to set performance standards for allowable energy consumption for heating and cooling tied to a healthy indoor temperature and other health-related measures such as adequate reliable ventilation.

A number of submitters supported greater use of wood in construction, with some favouring amending the Building Code to achieve this. Ojo Fibre Solutions (sub. 71, pg. 8), for example, commented:

The Building Code should be reviewed to ensure the correct balance between climate change issues and other requirements. In particular, consideration of the benefits of wood and wood related products in any review of the Building Code is encouraged, both in construction and insulation. Timber and other carbon neutral building products should be preferred over carbon-intensive products.

BRANZ (sub. 398, pg. 4) suggested another approach, being to prescribe a building carbon footprint threshold within the New Zealand Building Code, such as has been done in the Netherlands. They commented that "Without regulation it is unlikely the industry would adopt low carbon practices."

Waimakariri District Council (sub. 192, pg. 4) supported reviewing the Building Code:

Particularly relating to more stringent energy efficient standards, but these recommendations could go further. As Building Consent Authorities, Local Government innovation to improve energy efficiency or conserve water are often frustrated by the need for compliance with minimum standards of the Building Code. To achieve zero emissions by 2050, large scale and sweeping reform of the Building Code will be necessary.

On a possible path forward, New Zealand Green Building Council (sub. 263, pg. 9) felt:

New Zealand should set a trajectory for all new buildings to be near zero carbon by 2030. The energy provisions (H1) of the building code should be tightened every 3 to 4 years towards the goal. Having a firm trajectory will help the sector (designers, product suppliers, developers) "tool" up for the change and will considerably reduce the costs of building better.

Some submitters had suggestions beyond the Building Code. The Christchurch City Council (sub. 284, pg. 7) recommended that the NABERSNZ rating scheme be expanded for use for other facilities in New Zealand not just office buildings, e.g. for use for hotels, shopping centres, hospitals, swimming pool complexes etc. Similarly, Low Carbon Kapiti (sub. 299, pg. 8) recommended government require the NABERSNZ rating scheme be applied to its own buildings.

New Zealand Green Building Council (sub. 263, pg. 10) also argued the Government should:

In the procurement of its own buildings, require sustainability standards that force the sector to take a complete supply chain approach to reducing emissions. This will have the

effect of gearing up the industry in the direction it needs to go. Green Star Design & As-Built includes life cycle analysis of the environmental impacts of the construction phase.

Mohio (sub. 330, pg. 10) comment on the “split-incentive problem”:

This is where the costs and benefits of energy efficiency are split between the owner and tenant of a building, because of the separation of responsibilities for capital improvements and paying energy bills. So, while the owner would carry the cost of energy efficiency upgrades, the tenant would accrue the benefits; thus, the owner has no incentive to upgrade and the tenant is left to bear the costs of prolonged inefficiency.

Mohio suggest a better way to overcome this problem than minimum standards might be to encourage transition to ‘green leases’ where the tenant is contractually obliged to transfer some proportion of the energy efficiency gains to the owner, under the condition that the upgrades create the promised efficiencies. Types and examples of clauses were provided.

Compact urban design

The majority of submitters who commented supported greater efforts to promote compact urban design. The *Greater Wellington Regional Council* (sub. 195, pg. 2) commented, “It is critical that all policies align and are consistent with the overall ambition of transitioning to a low-emissions economy. Urban sprawl is inconsistent with that ambition – it results in costs, increased private car travel, infrastructure duplication and associated GHG emissions.”

Similarly, *Auckland Council* (sub. 273, pg. 9) recommended that “legislative provision be made for regional spatial planning as a mechanism for contributing to delivering emissions reductions (as well as delivering other co-benefits).”

Local Government New Zealand (sub. 248, pg. 7) suggested the Commission:

Could add value to its final report by emphasising the impact of policies of quality compact cities and the need to move away from urban sprawl. It should think about ways in which local government could be incentivised to adopt quality compact urban form as a core tenet of land use planning and urban growth and development. [...] The Productivity Commission’s report should recommend that legislative provision be made for regional spatial planning as a mechanism for contributing to delivering emissions reductions (as well as delivering other co-benefits).

A counter view was offered by *Professor Hugh Byrd and Associate Professor Steve Mathewman* (sub. 202, pg. 13). They provided an academic paper supporting the proposition that compact residential buildings use more energy than individual or low-rise buildings. Further, they felt the conclusion that compact urban design favours lower emissions is difficult to sustain in the face of disruptive energy technologies.

As car manufacturers shift production to EVs combined with incentives to assist purchase, these vehicles are likely to dominate the market in years to come. It is a relatively simple thing to then charge these vehicles from electricity generated on rooftops. The result is that suburbia becomes a net energy generator and that travel distance within an urban area has little impact on resource depletion or carbon production.

Similarly, the *Property Council of New Zealand* (sub. 283, pg. 3), commented:

We support Finding 15.2 – that overall there is not an overwhelmingly strong case to use urban planning policies to increase intensification to reduce emissions. This is because planning changes take many years to achieve. By then, reductions in vehicle emissions may have already been achieved through technological advances.

15 Presenting the call for action on climate change

Most submitters commented on the importance of a wide range of stakeholders engaging with and responding to the challenge of climate change. A number of submitters had advice on how best to present the call to action.

Nu Capital Works (sub. 350) wanted a more positive framing of what was needed, for example, in terms of “opportunities” rather than “challenges” and “costs”; and emphasising the many comparative advantages New Zealand has to achieve the necessary transformation.

Similarly, *Local Government New Zealand* (sub. 248, pg. 5):

While the costs of the transition cannot be underestimated, the report needs to more strongly emphasise the opportunities and potential benefits that the transition presents, such as opportunities for skills development, innovation, creation of employment opportunities and economic development. The narrative of the report needs to change to characterise the transition as an investment opportunity, as opposed to a cost. A recent report commissioned by Westpac Bank, for example, has found that the economy would benefit by \$30 billion by 2050 if government and business take early action on climate change.

Others, however, felt the report lacked a sense of urgency. *Resilienz*, (sub. 206, pg. 2) commented, “There is little sense of a huge, looming and prolonged crisis, or of us needing to ready ourselves with urgency for upheaval and responses on virtually all fronts.”

Similarly, *Trip Convergence Ltd* (sub. 305, pg. 2) commented “I implore you to be brave and call us all out on the need to take personal action.”

Others suggested calm was needed. *Spindletop Law* (sub. 385, pg. 25):

Catastrophic claims of alarm must be treated with caution, as the IPCC suggest, and be replaced with rational decision making that balances the needs of the present with those of the future, considering how uncertain that future is both as a consequence of the emerging science, innovations, Paris and other geopolitical developments.

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