Parliamentary Commissioner for the Environment
Te Kaitiaki Taiao a Te Whare Pāremata

Submission on the second emissions reduction plan discussion document

To: Ministry for the Environment

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Submitter details

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The Parliamentary Commissioner for the Environment

The Parliamentary Commissioner for the Environment (PCE) was established under the Environment Act 1986. As an independent Officer of Parliament, the Commissioner has broad powers to investigate environmental concerns and is wholly independent of the government of the day. The current Parliamentary Commissioner for the Environment is Simon Upton.

Some general observations

The second emissions reduction plan (ERP2) discussion document describes a net-based approach to achieving New Zealand's emissions budgets, with an explicit focus on technological solutions to enable the achievement of emissions reductions at the least cost. This is a break from the first emissions reduction plan (ERP1), which included multiple proposals specifically targeted at gross emissions reductions.

ERP2 is predicated on the concept of taking a "least-cost approach".[1] At one level, no one can seriously object to achieving the economic transition implied by the need to eliminate greenhouse gas emissions from fossil fuel combustion. The scale of the challenge is such that we cannot afford an expensive transition. But beyond that, what least cost means becomes more problematic.

To illustrate that point, here are a number of policies each of which could claim to be least cost depending on your definition:

- Requiring information about the lifetime operating costs of different vehicles (including the cost of carbon) to be provided so that purchasers are making 'like for like' assessments of

[1] Ministry for the Environment (MfE), 2024. *New Zealand's second emissions reduction plan Tā Aotearoa mahere whakaheke tukunga tuarua (2026–30): Discussion document*. https://environment.govt.nz/publications/new-zealands-second-emissions-reduction-plan-discussion-document. p.24.

price. This would impose a small cost on retailers but would help consumers make true least cost purchase decisions (rather than buying the cheaper option that ends up costing them more later).

- Subsidising the electric vehicle charging network. Assuming this is publicly funded, this is least cost for those who can afford to purchase an electric vehicle but pushes up costs for taxpayers.
- Doing deals with recipients of industrial allocation (similar to that done with NZ Steel) to 'buy back' their right to emit. In practical terms this would mean the Government invests in helping companies to reduce their emissions in exchange for reducing their allocation of free units. This would cost the taxpayer now but would be least cost for future taxpayers who face the cost of subsidising a continued right to emit via free industrial allocation units. (For example, in the case of NZ Steel the cost to buy back their right to emit was $16.20 per tonne of carbon reduction over the lifetime of the project, which is below the prevailing New Zealand Emissions Trading Scheme (NZ ETS) price).
- Providing households access to symmetrical export tariffs to accelerate take up of roof-top solar and batteries. This would come at a cost to generators and lines companies but would be least cost for households and all electricity users by reducing peak demand on the grid.
- Removing regulations to speed up construction of facilities to support the importation of liquefied natural gas. This may be least cost from the perspective of gas users but may prolong the use of the gas network long term. If upstream emissions (liquefaction energy, transport boil-off, whole of supply chain leakage) were included, imported liquefied natural gas may no longer be the least-cost solution.

A least-cost approach, of course, depends on the answers to these questions:

1. What costs are included or excluded in a least-cost policy?
2. Who bears those costs – for whom is the policy least cost?
3. Over what timeframe is the policy judged to be least cost?

In answer to the first question, ERP2 seems to be narrowly focused on the cost of achieving our national and international carbon *accounting* obligations (or, more accurately, the lowest NZ ETS price required for this goal). The ERP2 discussion document currently gives little or no serious thought to the wider environmental costs at stake or the economic impact of those costs. For example, no thought is given to the significant health and productivity benefits from cleaner air as a result of reduced fossil fuel emissions. Similarly, the draft plan gives no thought to the long-term environmental and economic impact of the massive expansion of exotic forestry that this plan implies.

On the second and third questions, the plan seems to focus on the least cost for current generations. My understanding of the assumptions embedded in the modelling in ERP2 are as follows:

- Access to unlimited forestry offsets will keep the NZ ETS price constrained around $50 per tonne (barring short-term fluctuations). This price is too low to effectively drive reductions in many sources of emissions. According to government modelling, the NZ ETS will reduce

gross emissions by around 10%.[2] At this level, the NZ ETS becomes a tool for offsetting rather than incentivising gross reductions.

- Gross emissions will reduce naturally as new technologies emerge and become cheaper. The falling cost of solar, wind, batteries and electric vehicles are good examples here. While their take up will be slower with a low NZ ETS price, the transition will probably happen eventually even if the NZ ETS price was zero (or there was no NZ ETS). The modelling also assumes that emissions reductions will happen in agriculture, presumably as a result of new technology that is taken up by farmers (but the assumptions around uptake look optimistic).
- Emissions from harder to abate sectors will – apart from some efficiency improvements – remain in 2050. This is likely to include heavy transport, construction and process heat. Some sectors, such as long-distance air travel or steel manufacturing, have no viable alternatives to fossil fuels at present. Others, such as low and medium process heat, could transition but it would require a higher carbon price.

The Government should be congratulated for sticking closely to the Climate Change Commission's advice on NZ ETS settings. Keeping with the minimum price paths and drastically reducing the number of New Zealand Units (NZUs) available for auction out to 2029 will help restore some confidence to the market. The carbon price is likely to stabilise, and possibly see a slight rise. However, this is unlikely to be sustained beyond the short term (maybe as little as 10 years). ERP2 could have been an opportunity to bring medium- and long-term stability, but falls well short of doing so.

The proposed plan contains a number of risks that are likely to see costs being passed to future generations. These risks can be traced to a willingness to make unlimited use of forestry credits, a belief that emissions reduction technologies will inevitably be significantly cheaper tomorrow and an unwillingness to take action now where alternatives are available. The proposed plan will be almost certainly insufficient to meet the third emissions budget, but it is possible that it will miss the second budget and even the first budget, depending on the impact of the current dry year and forestry harvest. In falling short, the plan will pass the bill for additional action to meet the 2050 target and ongoing maintenance to future generations.

Unlimited forestry offsets come with a number of hidden costs that are not being made explicit. Future generations will inherit a vastly expanded forestry estate that will have to be maintained in the face of a changing climate and the risks of extreme weather events, disease and fire. Because carbon stays in the atmosphere effectively forever these forests will also need to remain on the land in perpetuity. The decision to plant forests as an offset effectively removes any option value the land may have for future generations.

Reliance on offsetting was never intended to be a long-term solution to climate mitigation when climate policy was first developed in the late 1990s. Rather, it was envisaged that cheap forestry offsets would be used to buy us the time we needed to see new low emissions technologies developed, commercialised and brought to market. That was an entire generation ago. Rather than prepare proactively for a future transition, New Zealand climate policy went into hibernation. The time has been wasted. This plan risks wasting even more time.

[2] According to MfE's NZ ETS model, under the base case (zero price) emissions will be 14.5 MT per year by 2050. With an NZ ETS price of around $50 this will reduce to 13.2 MT per year – a drop of around 1.3 MT per year.

The assumption that emissions reductions technology will inevitably be much cheaper in the future should be questioned. While this trend has eventuated for some technologies, it is not always the case – hydrogen is a good example where it has not occurred. Estimates of the shadow cost of carbon – the figure used by governments to calculate the costs of benefits of emissions reductions – are rising around the world, indicating a global expectation that the cost of carbon must remain high to drive technological advancements. For example, researchers have calculated that carbon prices consistent with meeting the 2050 net-zero target need to reach US$98 per metric tonne in 2030 (specified in 2018 dollars), with a higher figure of US$115 required if less aggressive complementary measures are pursued.[3] This would require a carbon price in New Zealand in 2030 of around NZ$200 (specified in 2024 dollars), assuming complementary policies exist that address market failures.

Another closely related risk is that as existing technologies become more efficient this can lead to increases in demand but little or no reduction in overall emissions. We have already seen this with internal combustion vehicles, where improved fuel efficiency has led to more people driving further in larger cars. This is Jevon's paradox in action, and as a result I question whether – in the absence of a rising real price on carbon – emissions will fall as far as the model predicts they will by 2050. A rising carbon price over time would help ensure that technological improvements actually deliver lower emissions.

There is no guarantee that the cavalry of cheap technology will come charging over the hill as is implicitly assumed by this plan. In all, this means that as a result of this plan, future generations may need to invest in emissions reductions at costs far higher than current generations face with the NZ ETS price today. Decisions taken today expose future generations to the economic shocks of higher carbon prices.

Given this risk, the current generation should take emissions reduction actions that can be taken at a reasonable cost, rather than delay and pass the bill to a future generation. There is no guarantee that the costs will be radically cheaper in the future, at a time when the heavy costs of climate adaptation will be increasingly felt. Technologies that are benefiting from economies of scale as they are deployed – such as solar, batteries and electric vehicles – are seeing continued falling prices and are increasingly cost effective.

But even in these sectors, uptake is likely to be slower than it could be because of market failures which are not dealt with in this plan. As these technologies become lower cost overall, ERP2 should be focused on removing the barriers and speeding their uptake. Instead, it does virtually nothing to address their uptake and instead doubles down on tree planting. Similarly, process heat can transition to renewable energy now, but it will not happen at a price of $50 per tonne.

Different considerations apply where the technologies to reach our emissions reduction goals do not exist or are unaffordable. This is the case with some technically challenging sectors and with agriculture. Here, access to limited use of forestry offsets makes sense. But for the rest of the economy, it makes sense to have a predictably rising carbon price over time. This gives the economy time to adjust and reduces the risk of future shocks that only become more likely if forest offsets swamp the market. There is growing evidence that a steadily rising carbon price

[3] https://www.nature.com/articles/s41558-020-0880-3. Supplementary material on all modelled scenarios can be found at https://static-content.springer.com/esm/art%3A10.1038%2Fs41558-020-0880-3/MediaObjects/41558_2020_880_MOESM1_ESM.pdf.

drives improved efficiency and prevents the overall energy costs faced by households from rising.[4]

In short, the "low-cost approach" advocated in this ERP runs the high risk of passing costs to future generations. At the same time future generations will inherit a vastly expanded forestry estate that will have to be maintained in perpetuity, effectively removing any option value the land may have.

Overall, the ERP2 discussion document states that the Government is on track to meet the first and second emissions budgets, but not the third emissions budget or the 2050 target. I am concerned that even these projections are too optimistic. It is a concern shared by the Climate Change Commission.[5] The proposed polices for the second budget only just add up and contain insufficient margins for error. The risk of missing targets is therefore higher than indicated, especially given the lags between any emissions increases and the ability to generate new forestry offsets.

In the rest of this submission, I elaborate on the points above. I do not address all of the questions asked in the discussion document. As a consequence, my submission only loosely follows the headings and questions proposed.

The plan as a whole (general consultation questions and chapters 1 and 2)

The plan lacks coherence and margin for error

Firstly, a comment on process. In 2023, I published a review of the process for developing the first emissions reduction plan.[6] The purpose of my review was to identify ways to help future governments – no matter their political colour – develop robust emissions reduction plans.

Many of the problems I identified in the way the first ERP was assembled appear to have been repeated. Principally, there does not seem to be a coherent policy framework underpinning the plan. I have already discussed above how the least-cost approach needs far greater elaboration to be a clear objective.

In my review of the process for ERP1, I recommended that the Government consider, iteratively, a number of key questions. These included the extent to which the Government intends to rely on the NZ ETS versus other policy mixes. The Government states in the ERP2 discussion document that the NZ ETS is its *main* tool for reducing emissions and that its goal is a "strong [and] stable" NZ ETS.[7] However, as I discuss below, the unlimited use of forestry offsets creates

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[4] https://www.sciencedirect.com/science/article/pii/S0954349X24000948.

[5] He Pou a Rangi Climate Change Commission, 2024. *Monitoring report: Emissions reduction*. *https://haveyoursay.climatecommission.govt.nz/comms-and-engagement/cc2f075f/user_uploads/monitoring-report---emissions-reduction---july-2024--final-web-ready.pdf*.

[6] PCE, 2023a. *How ministers and officials developed the first emissions reduction plan – and how to do it better next time*. https://pce.parliament.nz/publications/how-ministers-and-officials-developed-the-first-emissions-reduction-plan.

[7] He Pou a Rangi Climate Change Commission, 2021. *2021 Draft advice for consultation*. https://haveyoursay.climatecommission.govt.nz/comms-and-engagement/future-climate-action-for-aotearoa/supporting_documents/CCCADVICETOGOVT31JAN2021pdf.pdf.

a number of risks for the NZ ETS to achieve future targets. Some of these risks could prove existential for the NZ ETS itself.

The degree to which distributional impacts have been considered, or the balance between near-term reductions and investments in laying the foundations for future reductions, is unclear. If the Government did consider, as I recommended, the key trade-offs that alternative policies throw up, there is no reference to such a discussion. In particular, there is no discussion of the risks thrown up by a reliance on unlimited forestry offsets. Instead, the plan assures us that officials are thinking about these issues. This is of limited comfort.

In terms of distributional impacts, my chief concern – and one that is not reflected in the report – is the potential burden this plan places on future generations. As noted above, the approach assumes that cheaper emissions reductions options are just around the corner. If these do not materialise, future generations will be saddled not only with the cost of transition, but the need to maintain a much larger forestry estate in a warmer world. The plan contains scant evidence that these trade-offs have been carefully considered.

Another one of my key criticisms of the ERP1 process was that "too much emphasis was placed, too early, on adding up sector-specific policies" and as a result "it [shed] no light on whether the totality of the policies make for a coherent package".[8] In a different, but ultimately similar way, ERP2 is made up of a mixed bag of policies designed to deliver *just enough* reductions, on paper at least, to meet the second budget. There is a strong sense that the plan addresses not so much an emissions challenge as an accounting challenge.

There is a real risk that New Zealand will fail to achieve the second budget with the policy mix that is proposed. The margin by which ERP2 is sufficient to meet the budgets is very thin. The total reductions predicted to result from the proposed mix of policies only just deliver the required budget and are within the margin of error of the modelling for the base case. In other words, the mix of policies, even if they achieve the estimated reductions, may make little to no difference.

Worse, no margins for error have been assessed for the estimated reductions of each individual policy. Nor have any estimates of uncertainty for each policy been provided. The veracity of the assumptions used is not tested. The total of the proposed reductions is within the margin of error for the baseline model. As such, the plan only just meets the required budget as it stands. The uncertainties and margins of error of each individual policy are not presented, which adds more uncertainty about whether the second budget will be met or not.

I recommend that, in finalising ERP2, the Government should provide uncertainty estimates and margins of error for each of its proposed policy reductions for both the second and third emissions budgets.

I recommend that, given the reliance on unlimited forestry offsets to reach emissions targets, the Government should build a much greater margin for error into emissions budgets by including more complementary policies.

[8] PCE, 2023a, p.37.

Uncertain that budget targets will be met

Even the first emissions budget is now at risk. In the Climate Change Commission's most recent monitoring report there is high uncertainty that the first emissions budget will be met, due to unknown levels of forest harvest, the potential for dry years to decrease hydroelectricity generation (and increase our reliance on fossil energy), and an anticipated rise in transport emissions.[9] As it stands, these concerns remain valid. In particular, we are currently experiencing a dry year and as a result, large amounts of coal are being used to keep the lights on.

This highlights another risk with the reliance on unlimited forestry offsets. If carbon emissions are higher than expected, it takes time for the NZ ETS price to encourage additional afforestation. It then takes several years before that new planting generates carbon credits. As a result, forestry cannot possibly offset unexpected increases in emissions that occur in the next two budget periods.

The outcome for the third emissions budget is even more precarious. The plan estimates that the third budget will be missed by 17.4 megatonnes of carbon dioxide equivalent, albeit with the target being just within the large margin of error.[10] A large portion of the hoped-for reductions for the third period come from technologies that are not currently commercially available in New Zealand, such as a methane inhibitor (particularly one suitable to New Zealand's pastoral farming systems), or require further research and development in the New Zealand context prior to their uptake, such as carbon capture, utilisation and storage.

Those technologies remain speculative and are based on optimistic assumptions, particularly in respect of their timing. No estimates of uncertainty for those technologies have been provided. Given the long-term uncertainty over carbon prices (which I will return to later) there is no certainty that afforestation will save the third emissions budgets either.

One of the key considerations I set out in my review of ERP1 was considering the balance of near-term reductions versus laying the foundations for future reductions. Investment in future reductions now is sensible as there can be quite a lag between a policy or technology being implemented and the reductions being realised. Given the large gap between the third budget and what is proposed in ERP2, it is clear that insufficient investment is being made in laying the foundation for future emissions reductions.

Net-based approach is risky and locks up land in perpetuity

This section addresses question:

0.2. The Government is taking a 'net-based approach' that uses both emissions reductions and removals to reduce overall emissions in the atmosphere (rather than an approach that focuses only on reducing emissions at the source). A net-based approach is helpful for managing emissions in a cost-effective way that helps grow the economy and increase productivity in New Zealand.

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[9] He Pou a Rangi Climate Change Commission, 2024. *Monitoring report: Emissions reduction*. *https://haveyoursay.climatecommission.govt.nz/comms-and-engagement/cc2f075f/user_uploads/monitoring-report---emissions-reduction---july-2024--final-web-ready.pdf*

[10] Ministry for the Environment (MfE), 2024. *New Zealand's second emissions reduction plan Tā Aotearoa mahere whakaheke tukunga tuarua (2026–30): Technical Annex*. https://environment.govt.nz/assets/publications/climate-change/New-Zealands-second-emissions-reduction-plan-Technical-annex.pdf

a. What do you see as the key advantages of taking a net-based approach?
b. What do you see as the key challenges to taking a net-based approach?

It is critical to note at the outset that there is a distinction between taking a net-based approach as a country and passing on the incentives of a net-based approach to the economy via the NZ ETS. It is entirely plausible for the Government to pursue a net-based approach but use different tools to achieve the goals within that (i.e. reducing gross emissions using the NZ ETS and encouraging forest sequestration using a different mechanism).

There are a number of challenges with taking a net-based approach *via the NZ ETS* that have not been sufficiently covered in ERP2 discussion document. These include:

1. The Crown carrying an implicit liability due to the risk of offset impermanence.
2. Uncertainty generated by forests registered in the NZ ETS under stock change accounting.
3. The lock-up, in perpetuity, of large areas of land used for forestry offsets.
4. The loss of productive land and the impact of afforestation on rural communities.
5. The impact of unlimited offsets on NZ ETS auction revenue and prices.
6. The indiscriminate nature of the NZ ETS preventing 'the right tree in the right place for the right purpose'.

I consider that the country is taking a massive gamble in relying on unlimited forestry offsets via the NZ ETS to drive its net-based approach. I discuss, below, the first five of these challenges. The sixth is dealt with under the section covering 'Forestry on Crown Land' (chapter 8).

Risk of forest impermanence and Crown liability

The ERP2 discussion document asks what the key challenges are of taking a net-based approach to emissions reductions. Principal among these is the risk of offset impermanence. Once emitted, carbon dioxide stays in the atmosphere for thousands of years – in human timeframes that is effectively in perpetuity. The equivalent cannot be guaranteed for carbon stored in forests. If forestry is used to offset fossil carbon (as incentivised through the NZ ETS), threats to permanence come from fire, disease and insect outbreaks, climate change, extreme weather events, and human mismanagement or changing management incentives.

The document glosses over these serious risks and states that "the Government has had to judge the likelihood and scale of these benefits and risks in forming its least-cost strategy" – but no information is provided about how this judgement was carried out.[11]

I recommend that the Government publish the analysis of the benefits and risks that underpin its strategy.

In other jurisdictions, insurance systems have been created that require NZ ETS participants to contribute a specific percentage of carbon credits earned through afforestation to a so-called 'buffer pool'. In California, a portion of this buffer was intended to insure against losses due to wildfires. Despite the intention of this insurance system covering wildfire risk for a period of 100 years, the portion of the buffer dedicated to fire protection was exhausted in less than a

[11] MfE, 2024, p.24.

decade,[12] with recent fires compounding the problem.[13] The Californian example paints a bleak picture. While New Zealand is climatically different, the fire risk is increasing,[14] and the absence of any requirement for insurance means that we are running an even higher risk. NZ ETS settings require a forest to be replanted if temporarily damaged by an adverse event if the owner is to avoid surrender liabilities. But over long timeframes, there is a risk of companies dissolving and leaving the liability for replanting with the Crown.

Forestry losses from adverse events have negative implications for the ability of New Zealand to meet our emissions budgets and international targets if large amounts of sequestered carbon are re-emitted. The Climate Change Commission has recently highlighted uncertainties regarding the impact of major weather events such as Cyclone Gabrielle, which have the capacity to damage large areas of forestry, and the achievement of emissions budgets. It is important to address issues around how New Zealand monitors and measures the carbon lost in such events to ensure this can be appropriately accounted for.

It should also be noted that due to recent favourable NZU prices the extent of permanent exotic forestry registered in the NZ ETS has been increasing. In 2022, the Ministry for Primary Industries (MPI) estimated that extensive sheep and beef farming would return $4,500 Net Present Value (NPV) per hectare,[15] and without a carbon price, production forestry was expected to return $4,000$_{NPV}$ per hectare.[16] Given fluctuations in commodity prices the decision to change land use was finely balanced.

However, with a carbon price of $70, MPI estimated the economic return for production forestry would rise to up to $25,000$_{NPV}$ per hectare. Under the same NZU price, MPI estimated that the economic returns per hectare would be upwards of $35,000$_{NPV}$ for *permanent* exotic forestry (with returns solely driven by the carbon price).

Considering this, the observed increase in permanent exotic forest extent is unsurprising. In 2019 new afforestation with permanent exotic forestry was expected to cover 5,300 hectares of land. In 2022 and 2023 this had risen to 10,900 and 10,200 hectares of land respectively. Recent uncertainty about the NZ ETS has caused the forecast area of permanent exotic forestry planting to be somewhat lower at 6,400 hectares for 2024.[17]

Permanent exotic forests are not subjected to a cycle of clear-fell harvesting and can thus store greater quantities of carbon. However, if they are brought down by an adverse event, more carbon is lost. Furthermore, once the forest stops sequestering additional carbon, revenue from the sale of forestry units dries up. In the absence of low-intensity timber harvest or some other commercial activity, the owner has no ongoing income stream available to fund forest

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[12] https://www.frontiersin.org/journals/forests-and-global-change/articles/10.3389/ffgc.2022.930426/full.

[13] https://www.ft.com/content/a3eb4cd4-b9df-458a-83c0-9a38d5202a48.

[14] The average fire season length is extending, and in some locations, the number of days with 'very high' or 'extreme' fire risk will increase by up to 400% by 2040. https://environment.govt.nz/assets/Publications/Files/Climate-change-projections-2nd-edition-final.pdf.

[15] "Net present value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. NPV is used in capital budgeting and investment planning to analyse a project's projected profitability." https://www.investopedia.com/terms/n/npv.asp.

[16] https://www.mpi.govt.nz/dmsdocument/53992-Managing-Permanent-Exotic-Afforestation-Incentives-Regulatory-Impact-Statement.

[17] https://www.mpi.govt.nz/dmsdocument/52405-Afforestation-and-Deforestation-Intentions-Survey-2021; https://www.mpi.govt.nz/dmsdocument/62313-Afforestation-and-Deforestation-Intentions-Survey-2023.

management and maintenance. By contrast, production forests earn fewer NZUs, but they retain an ongoing financial incentive for replanting in the form of revenue from wood.

Uncertainty generated by forests under stock change accounting

The ability of production forestry registered under stock change accounting to transition to permanent (or longer rotation) exotic forestry creates considerable uncertainty within the NZ ETS. Most forests planted prior to 2023 are registered under previous stock change accounting rules. Under these rules, a forest earns units as it grows and sequesters carbon. These units must be paid back when the forest is harvested. Thus, under stock change accounting, forest owners earn increasing numbers of units if they leave their forests unharvested.

Units currently being held by owners of stock change forests could be used to meet future surrender obligations when the forest is harvested. Or the forest could be left to become permanent, and the carbon credits could be sold into the market. The Crown has no control over this decision, which will no doubt be made over the coming decade based on log and carbon prices. The carbon price necessary to make permanent forestry more profitable than production forestry has been estimated at $50 for 71% of land area (using measured carbon),[18] and at an NZU price of $100, permanent forestry would be more profitable than production forestry for all land areas.[19]

This situation creates considerable uncertainty within the NZ ETS as it is difficult to predict what magnitude of production forestry will make this transition into the permanent category. At present, areas currently considered to be in production forestry could really be *permanent* if the land holder has made up their mind not to harvest.

Recently, the price of some logs for export has been subdued due to decreased demand from China. China represents about 54% of New Zealand's forestry exports, and therefore demand fluctuations in China can exert a significant influence over the price of logs in New Zealand.[20] Subdued log prices make it more likely that production forests become permanent, as foresters avoid NZU surrenders and earn additional units without missing out on meaningful returns for forestry products.

For production forests registered after 2023 it is mandatory to use averaging accounting rules. These rules stipulate that the forest can only earn units up to the average amount of carbon stored in a production forest over time; estimated at 16 years of growth. Thus, it is anticipated that all units earned by these post-2023 forests will add to the surplus, reducing the associated uncertainty. However, even under the averaging approach some uncertainty remains. As noted above, there is a delay before pine plantations start to store substantial amounts of carbon, making meeting short-term budgets and international obligations difficult through forestry alone.

Given the risks in this and the previous section, *if the Government continues to encourage permanent forestry via the NZ ETS then greater regulation is required to manage the long-term risks to the Crown*.

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[18] 'Measured carbon' means using the Field Measurement Approach; if using the NZ ETS look-up table carbon, a $50 carbon price makes permanent forestry more profitable on 26% of land area.

[19] https://www.sciencedirect.com/science/article/pii/S1389934123001521?via%3Dihub.

[20] https://www.mpi.govt.nz/forestry/forest-industry-and-workforce/forestry-wood-processing-data/wood-product-markets-data/.

Locking up increasing amounts of land in forestry in perpetuity

Offset impermanence is a critical issue because the nature of carbon dioxide as a stock pollutant requires that every molecule emitted must be offset to achieve and maintain net zero. Consequently, if gross emissions reductions are not prioritised within the NZ ETS there will be an ongoing requirement to plant ever increasing areas of land in forests to offset emissions into the future.

The ERP2 discussion document estimates that around 700,000 hectares of land will be converted into forestry by 2050 as a result of the NZ ETS. This is about 15% of the remaining sheep and beef land that is suitable for planting. Note that this does not include any additional planting required to offset emissions from industrial allocation or the agricultural sector. It is assumed that the agricultural sector will hit its emissions reductions targets without offsetting. This is a heroic assumption given that the rest of the economy is not able to achieve the same thing. The discussion document acknowledges that additional planting will likely be required outside that generated by the NZ ETS but provides no detail on the potential scale of that planting nor how it will be incentivised.

It must also be underlined that the need for offsetting will not magically end in 2050 just because New Zealand is net zero in that year. Any continued gross emissions will need to be offset by increased areas of land being converted into forestry. According to projections there will still be gross emissions of around 14 million tonnes of greenhouse gases in 2050 from within the NZ ETS. I am concerned this is an underestimate. But whatever the result, tree planting will need to continue. Again, there is no analysis of the impact of this continued need for planting.

This is not a sustainable solution as it permanently precludes an increasing fraction of New Zealand's surface area being available for alternative uses and imposes a burden on future generations who must continue to pay for afforestation (or emissions reductions) *and* the ongoing maintenance of the existing forest estate. The NZ ETS would also effectively be forced to remain in perpetuity, with no clear economic incentives for afforestation other than the necessity for future generations to balance their ongoing legacy of positive emissions.

Even with the current Government's planned reforms around what land can be eligible for the NZ ETS, this level of planting is likely to eventually encroach on more productive land currently used for agricultural production. This has both social and economic repercussions for rural New Zealand communities, some of whom are already pushing back. The ERP2 discussion document is cognisant of the risks from land conversion to forestry and proposes to mitigate this by limiting the amount of planting permitted on different land use classes. Land use class restrictions are not anticipated to constrain the overall rate of afforestation going forwards but will limit where forestry is located. This is unfortunate in many ways, as more effectively restricting the amount of forestry in the NZ ETS would have provided a valuable mechanism for setting the appropriate level of gross reductions while still allowing some offsetting.

The banning of new NZ ETS-registered forestry on certain land classes may help protect agricultural production in the short term but will focus tree planting onto areas that may be less suitable. For example, land in land use capability classes 7 and 8 may be steep and erosion prone, requiring careful consideration of what species can best provide stability.

Exotic pine species incentivised by the NZ ETS are unlikely to be the most appropriate species in some highly erodible areas such as Tairāwhiti. In these places, entire trees have been toppled by extreme weather events, not to mention huge volumes of woody debris. Diverse native forests could be more appropriate but are not economically competitive with pine under the NZ

ETS because it rewards rapid carbon sequestration. The best way of establishing permanent, protective vegetation in these areas is still being worked out but it is already clear that the indiscriminate use of pine trees is not the solution.

The Government explicitly acknowledges in the ERP2 discussion document that native forests are likely better suited to steep and erosion-prone land as they are more able to withstand extreme weather.[21] That native afforestation is unlikely to occur under current NZ ETS settings. Further work is required to incentivise native afforestation. This includes revising what type of forests are incentivised by the NZ ETS, where these will be located following proposed land use class restrictions, and any interactions with the Government's adaptation objectives. Policies outside the NZ ETS will also be needed.

I recommend that the Government publish a thorough analysis of the long-term implications of continuing to allow unlimited forestry offsetting in the NZ ETS (and any additional mechanisms needed to offset emissions from emissions intensive and trade exposed (EITE) companies or agriculture).

Loss of productive land and impact on rural communities

While the Government is attempting to use regulation to limit the loss of productive land, the calculations above demonstrate that delaying gross emissions reductions can only delay the need to lock up more productive land *permanently* in forestry. This is a deliberate consequence of decisions that seems to have been entirely overlooked in ERP2.

A more immediately pressing issue than the loss of productive land is the social and economic impact of converting sheep and beef land to pine production or permanent carbon forestry. This is a hotly debated issue and both industries have published research to support their arguments.[22]

On a very localised scale it seems that production forestry provides fewer jobs, instead providing more jobs at a regional level. Around 70% of plantation forestry is also owned by large overseas companies, whereas most sheep and beef farmers are owner–operators.[23] The answer ultimately lies in the eye of the beholder; on a judgement of 'who matters', both on spatial and socio-economic (landowners versus workers) scales. What is clear, is that permanent (unharvested) carbon forestry provides less employment than production forestry or sheep and beef farming.[24]

It is worth noting that in deciding to impose differential rates, Wairoa District Council on the East Coast has determined that forestry activities are of minimal benefit to the Wairoa community and forestry has a negative impact on employment in the district. The High Court did not dispute the council's reliance on the 'disbenefits' of forestry to community wellbeing when

[21] https://environment.govt.nz/assets/publications/climate-change/New-Zealands-second-emissions-reduction-plan-Discussion-document.pdf, p.80.

[22] See, for example, Harnett (2019) and Harrison and Bruce (2019).

[23] https://www.treasury.govt.nz/sites/default/files/2019-02/forestry-cabinetpaper.pdf.

[24] Noting that continuous cover production forestry involves low intensity harvest and is distinct from permanent unharvested carbon forestry.

considering its rating decision.[25] Similar concerns were noted by local communities in the course of previous PCE case studies.[26]

Some rural communities will continue to challenge the conversion of land into forestry. Arguments centre on the disruption and displacement of traditional land use practices, and the decline in local employment opportunities, eventually leading to the decay of the fabric of the local community. This is inequitable in that urban populations disproportionally benefit from the carbon storage services, which increase 'rights to emit' utilised most fully in the transport, electricity and industrial sectors. The decline of the fabric of rural New Zealand is problematic as the New Zealand economy relies heavily on agricultural productivity, with export revenue from the food and fibre sector (excluding forestry and seafood) in 2023/24 anticipated as being $46.5 billion.[27]

While there is certainly sheep and beef land in production that is generating negative returns, damaging the environment and would be better in trees, the NZ ETS is not the best way to incentivise their conversion. My report, *Going with the grain*, discusses the trade-offs involved in some detail.[28] ERP2 fails to address these issues.

The use of unlimited forestry offsets suppresses the volume and price of units that may be made available at auction, denying the Crown significant revenue streams

The use of unlimited forestry units in the NZ ETS reduces the number of units the Government is able to auction while remaining on-track to meet domestic emissions budgets. This was emphasised in the Climate Change Commission's most recent advice and has led the Government to significantly reduce the total volume of NZUs auctionable by just over 20 million. The effect of this has cost the Government $1 billion based on a $50 NZU price. While the reduction in units is to be welcomed it does not resolve the underlying issue of the market's access to unlimited forestry offsets going forward.

Total NZUs available by auction (includes reserve amount of NZUs)			
Calendar year	**2023 decision**	**2024 decision**	**Difference**
2025	19.7	13.1	6.6
2026	17.2	11.7	5.5
2027	15	10.2	4.8
2028	12.3	8.6	3.7
2029	N/A	7.1	N/A
Total reduction in auction volume by 2028			**20.6**

The Climate Change Commission's surplus estimate of 68 million NZUs is based on the additional surplus within the *existing* stockpile as of September 2023 and does not factor in

[25] *New Zealand Forest Owners Association Incorporated v Wairoa District Council* [2023] NZCA 398.

[26] PCE, 2024a. *Exploring land use change under different policy settings in two case study catchments*. https://pce.parliament.nz/media/ut0dxela/exploring-land-use-change-under-different-policy-settings-in-two-case-study-catchments.pdf.

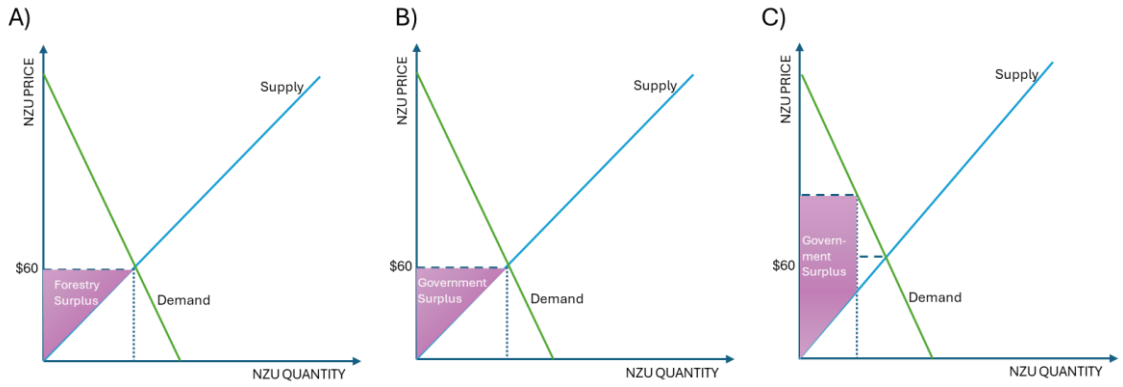
[27] https://www.mpi.govt.nz/dmsdocument/62637-Situation-and-Outlook-for-Primary-Industries-SOPI-June-2024.

[28] PCE, 2024b. *Going with the grain: Changing land uses to fit a changing landscape*. https://pce.parliament.nz/publications/going-with-the-grain-changing-land-uses-to-fit-a-changing-landscape.

NZUs allocated to forestry after September 2023. As explored above, there remains considerable uncertainty regarding the number of forestry units available for offsetting in the NZ ETS at any one point in time.

Removing forestry from the NZ ETS and setting up another mechanism to encourage planting could generate considerable revenue for the Crown. At present, most foresters receive a price higher than the level they would be willing to receive in order to participate in the NZ ETS.[29] Research indicates that a NZU price of around $35–$40 would be sufficient to generate an appropriate rate of return on a new radiata pine forest that was planted under a production timber regime and harvested at 27 years.[30]

Currently the NZU price is sitting at around $60.[31] If forestry was removed from the NZ ETS the Government could auction the right to purchase services from foresters (including but not limited to carbon storage)[32] at the correct marginal cost of carbon sequestration ($35–$40). This means the Government could recapture approximately $20–$25 for every tonne of carbon stored (which is currently being captured by foresters) (shifting from A to B in the diagram below).



Source: PCE

Figure 1: Graph A) shows the supply and demand curves within the NZ ETS assuming a long-run $50 NZU price. Graph B) highlights the producer surplus going to foresters, who are earning and supplying NZUs into the market at a $50 NZU price. Graph C) shows the surplus the Government could earn if forestry were removed from the NZ ETS (all NZUs then supplied by the Government), and carbon prices were allowed to rise over time.

Removing forestry from the NZ ETS would at the same time remove the price-suppressing effect that cheap forestry units have on the value of auctioned NZUs, thereby enabling the Government to earn greater revenue from the NZ ETS auctions (shifting from B to C on the diagram above). Some of this additional revenue could be invested in purchasing a greater variety of ecosystem services from landowners. Challenges such as erosion control and water

[29] In economic terms this is known as a 'producer surplus'.

[30] https://www.linkedin.com/pulse/government-proposed-four-options-evolve-new-zealands/ and https://www.treasury.govt.nz/sites/default/files/2022-12/ria-mpi-mpeai-sep22.pdf, p.18, MPI calculations.

[31] https://carbonmatch.co.nz/.

[32] Such as improving biodiversity, stabilising steep, erosion-prone land, improving soil and water quality, and moderating river flows.

regulation in regions such as Tairāwhiti would benefit from planting natives. It would also provide the Crown with the means to compensate Māori for any loss of revenue from carbon farming under current, unsustainable settings.

The use of unlimited forestry offsets suppresses the price of units long term; in the short to medium term it may lead to boom/bust cycles

The unlimited inclusion of forestry offsets in the NZ ETS will suppress the price of NZUs at around $50 per tonne in the long term. Nevertheless, in the short term the ability of forestry to suppress the price of NZUs may be compromised due to the harvesting of NZ ETS-registered production forests. When post-1989 forests registered in the NZ ETS under the stock change accounting rules are harvested,[33] they must surrender NZUs. The surrender liabilities of post-1989 forest units have the potential to significantly increase demand for NZUs this decade, as forests planned in the 1990s are due to be harvested.[34] Given that the Government is following the Climate Change Commission's 2024 advice and reducing auctioning volumes to draw down surplus units within the ETS,[35] the current liabilities of these forests may cause carbon prices to rise temporarily in the late 2020s.

This will reverse in the 2030s as trees planted during the recent extensive burst of afforestation start earning significant NZUs.[36] Depending on demand for units and the level of afforestation, this could lead to a glut of units in the NZ ETS. If unit holders decide to hold on to their units over the long term, this glut could suppress the price once more and, in the extreme case, lead to a price collapse. Whether or not this happens will depend on the long-term credibility of the NZ ETS – an issue I will return to under the 'New Zealand Emissions Trading Scheme' (chapter 3, below).

This delayed effect on price may set the NZ ETS up to generate boom and bust cycles, with periodic high carbon prices due to high NZU demand leading to increased afforestation, which, after a time lag, leads in turn to a glut of units with an accompanying price collapse causing reducing afforestation (and so on). This is because of the delayed response between plantings and significant rates of tree growth (and associated NZU earning potential). Available data support the potential for such boom and bust cycles operating within the NZ ETS, with research showing a positive correlation between short-term carbon price returns and afforestation rates.[37]

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[33] From 1 January 2023 averaging accounting will be available for use in the NZ ETS for forest land registered between 2019 and 2022 and will be the mandatory accounting method for forest land registered from 2023 onwards. Under averaging accounting, the surrender of units when production forests are harvested will be *eliminated*. However, currently the majority of forested land registered in the NZ ETS has been planted under the stock change rules. https://www.mpi.govt.nz/forestry/forestry-in-the-emissions-trading-scheme/emissions-returns-and-carbon-units-nzus-for-forestry/accounting-for-carbon-in-the-ets/.

[34] This depends on how much of the surplus are banked NZUs to cover their surrender liability at harvest.

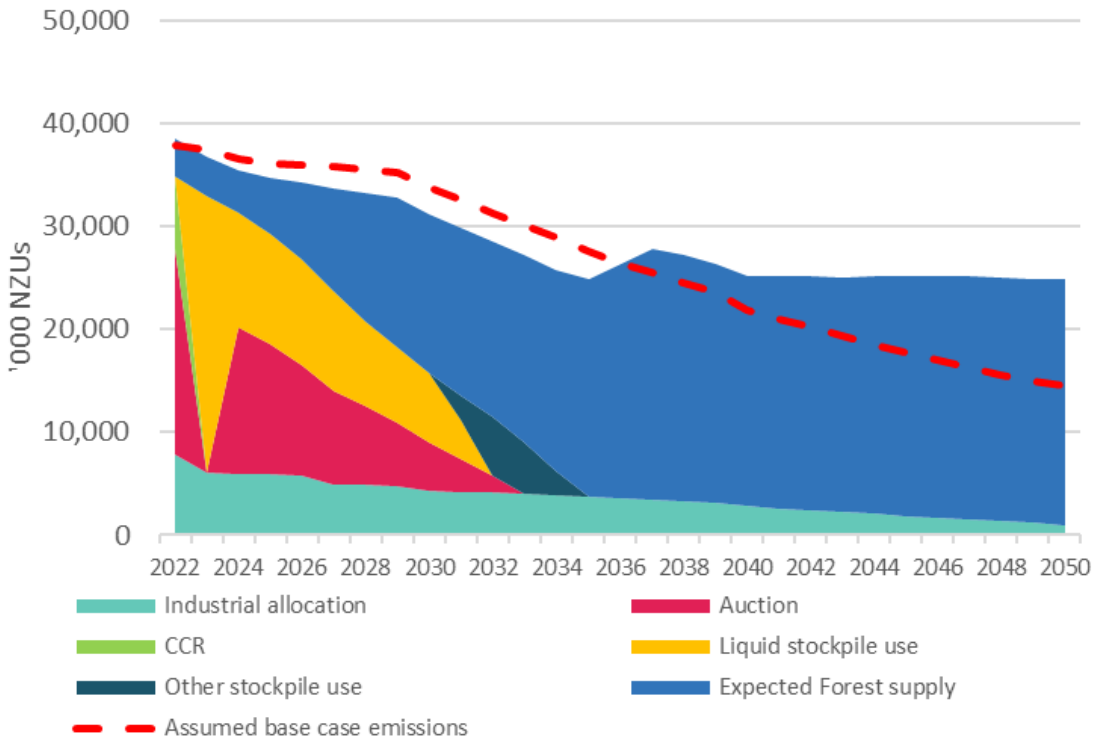
[35] https://www.climatecommission.govt.nz/our-work/advice-to-government-topic/nz-ets/our-advice-on-the-nz-ets/nzets-advice-2025-29/full-report-nzets-2025-29/.

[36] https://www.carbonnews.co.nz/story.asp?storyID=31085.

[37] https://www.treasury.govt.nz/sites/default/files/2022-12/ria-mpi-mpeai-sep22.pdf, p.16.

Using the MfE NZ ETS model, it is easy to generate plausible scenarios that could lead to an oversupply of forestry units in the NZ ETS.[38] Depending on the behavioural response of those holding units, this oversupply could quite easily generate a price crash.

Previous estimates of afforestation from MPI generated an oversupply of units in the 2030s (see Figure 2).



Previous MPI afforestation estimates. Assumptions: percentage of stock change shifts to permanent: 10%. Output: oversupply of units from 2036, no auction revenue after 2033.

[38] All scenarios are based on calculations in the MfE NZ ETS supply and demand model, assuming a liquid stockpile of 68,000 units and current stockpile of 160,800 units. When afforestation projections are specified in the MfE supply and demand model exogenously, only demand for units (and not afforestation rates) can respond to the model's price signal. This results in an oversupply of units from forestry in the 2030's (the exact year varies depending on assumptions around the amount of production forestry which transitions into permanent). The benefits of using the Manley formula within the MfE supply and demand model is that the formula and the price of NZUs can both be calculated endogenously. By modelling both forestry and price endogenously within the model afforestation can vary in response to the price signal, consequently afforestation and price projections more fairly reflect one another. The Manley projections are therefore the only afforestation projections for which MfE model's price path has also been included. The Manley formula calculates the marginal afforestation response to historical changes in emissions prices (and changes in prices of land and of logs). The 'low' specification of the Manley formula is generally preferred (this constrains the maximum new afforestation per annum to 60,000 hectares and assumes an average land market value per hectare of $10,000). The low scenario has explained recent afforestation rates reasonably well and produces similar results to MPI afforestation projections.

The updated estimates in ERP2 essentially remove that surplus (potentially leading to an undersupply of units and missing targets) (see Figure 3).

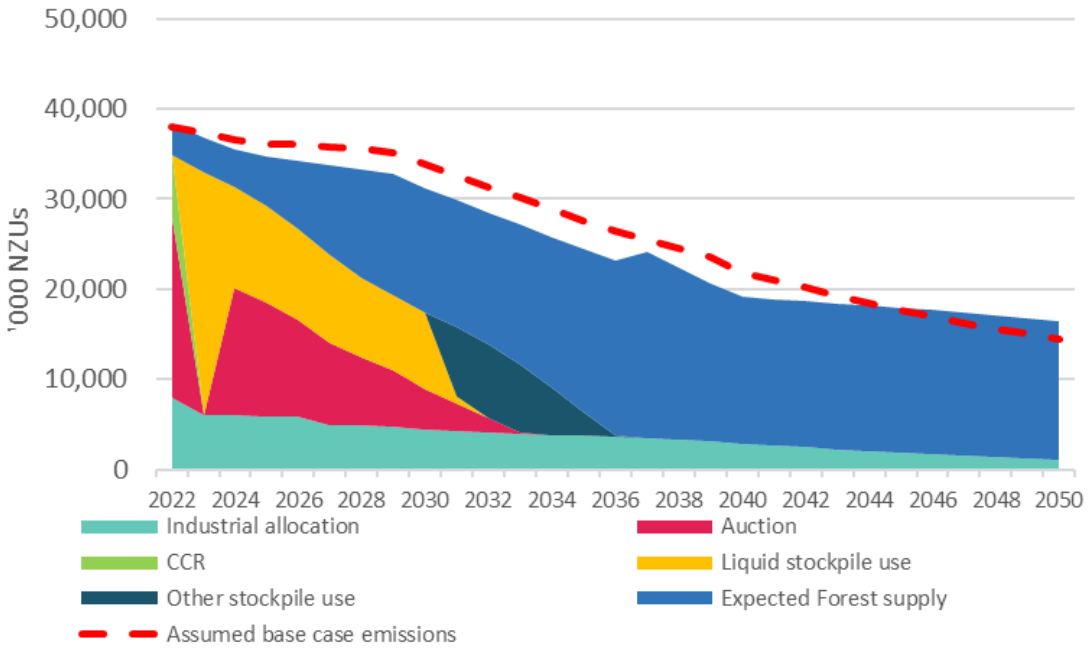


Figure 3: Updated ERP2 afforestation estimates. Assumptions: percentage of stock change shifts to permanent: 10%. Output: oversupply of units from 2039, no auction revenue after 2033.

However, depending on the actions of the foresters holding stock change accounting units, there is still a huge scope for oversupply. This scenario assumes that none of them harvest their forest and instead accumulate NZ ETS units (see Figure 4).

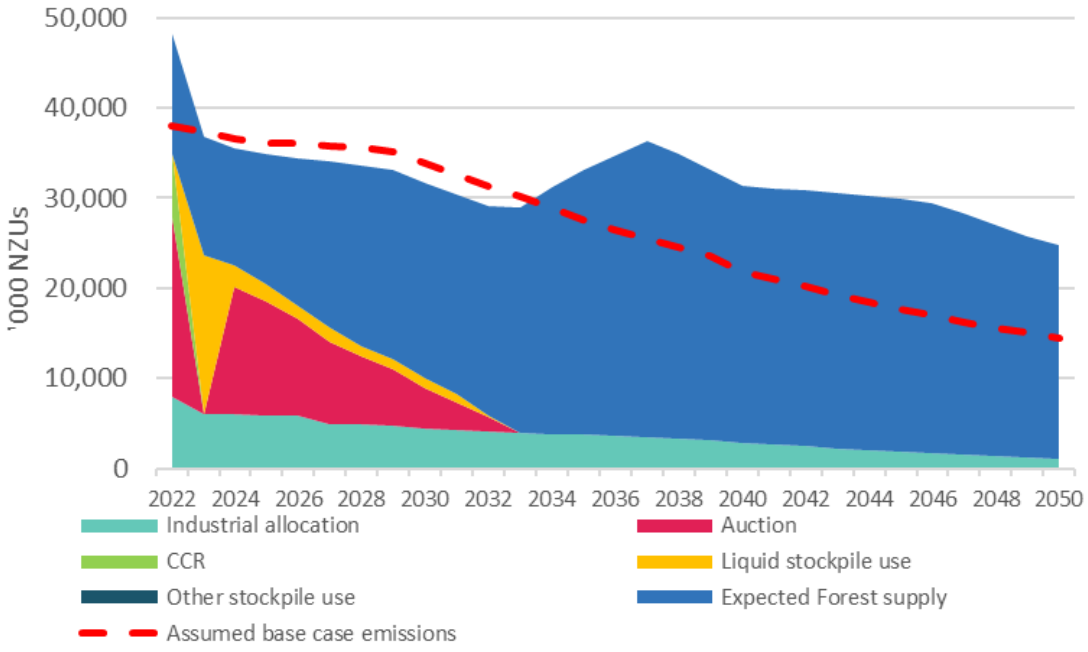


Figure 4: ERP2 estimates with no harvest of stock change forest. Assumptions: percentage of stock change shifts to permanent: 100%. Output: oversupply of units from 2032, no auction revenue after 2033.

One weakness of the MfE NZ ETS supply and demand model is that when afforestation is specified exogenously, only demand for units (and not afforestation rates) can respond to the model's price signal. For this reason the price pathways for the above model runs have not been included, as these do not accurately reflect how price and afforestation would interact.

However, if we let the model determine both price *and* afforestation endogenously, afforestation can vary in response to the price signal, and the price adjusts leading to changes in afforestation. This allows afforestation and price projections to more fairly reflect one another, preventing an oversupply of units. This is achieved using the so-called 'Manley model' specification within the MfE NZ ETS supply and demand model. Using the Manley model suggests a declining price over time (see figures 5 and 6).

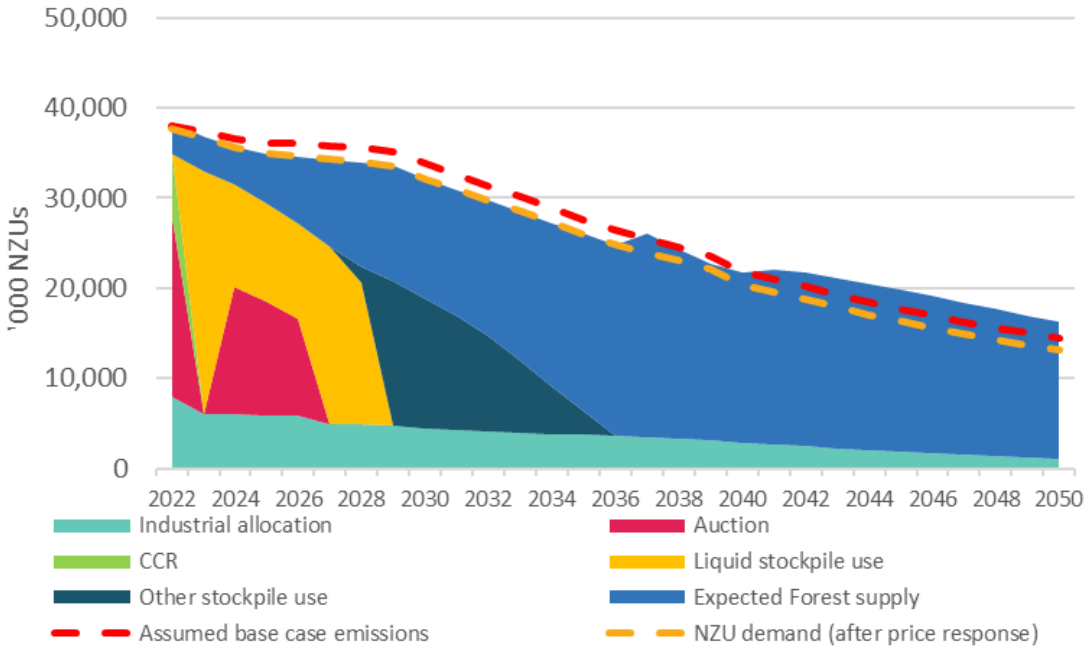


Figure 5: Manley model. Assumptions: percentage of stock change shifts to permanent: 10%. Output: oversupply of units from 2041, no auction revenue after 2028.

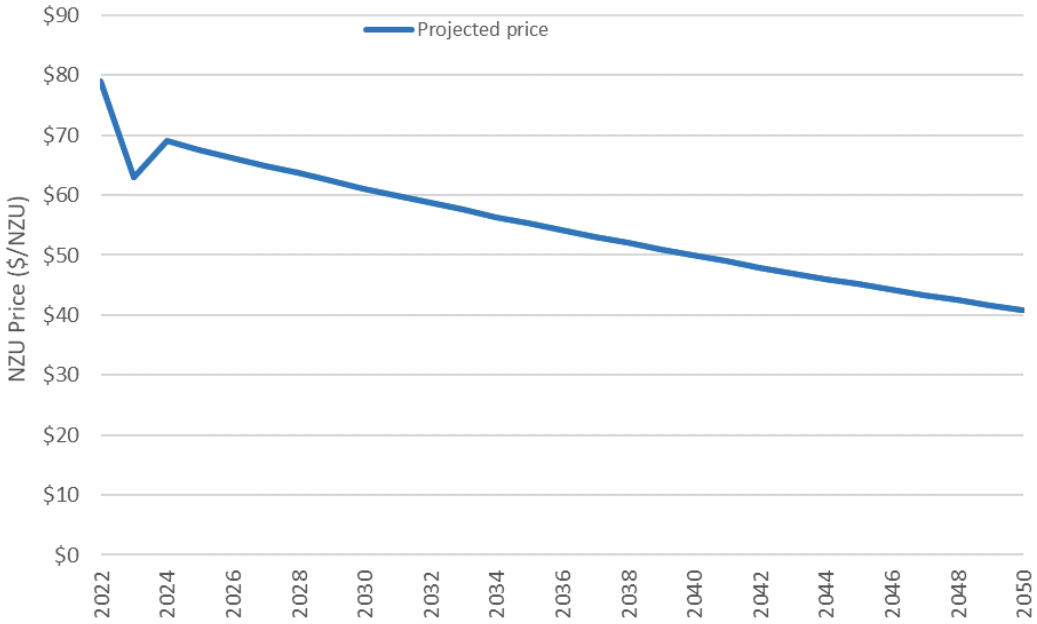


Figure 6: Price path based on Figure 5

If we assume the stock change foresters do not harvest, the model now crashes the price (see figures 7 and 8).

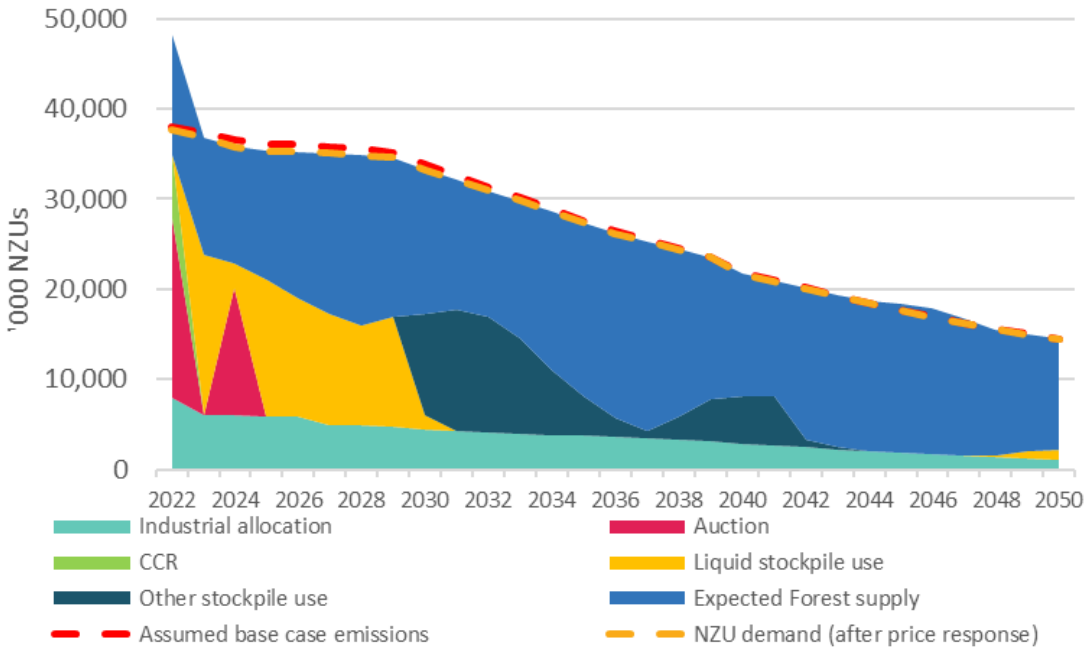


Figure 7: Manley model without stock change harvest. Assumptions: percentage of stock change shifts to permanent: 100%. Output: no auction revenue after 2026, NZU demand = base case emissions.

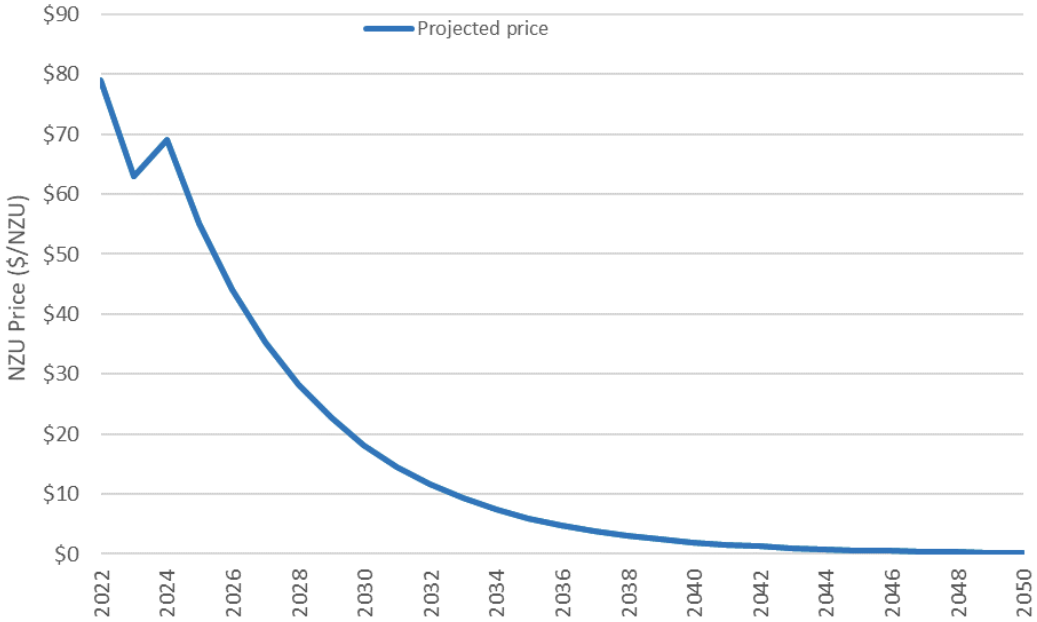


Figure 8: Price path based on Figure 7

As this analysis illustrates, apart from the afforestation estimates the other major assumption is the number of foresters on the stock change accounting method that switch their forests to permanent. This can greatly increase the supply of units available over time. Importantly, this change could happen at any stage, although the model is not sensitive enough to show this. It assumes the change would happen at the next rotation. In the immediate short term this could be very large because the concentrated level of planting that occurred in the 1990s is coming of harvestable age.

In the short term, the model responds to shortages by assuming the stockpile is used up to buffer any changes. This is a reasonable assumption in the case of a shortage of units and accounts for the fact that many unit holders have accumulated a stockpile. However, if the stockpile does not get used up in the short term, it increases the risk of future price crashes as any oversupply of units emerges.

Given that the Crown has little control over rates of afforestation or the harvesting decisions of stock change foresters, the NZ ETS as currently constructed is neither strong nor stable. As noted above, afforestation cannot help the Crown meet its targets when there are fluctuations in the demand for units as a result of economic growth, industrial change (as the current dry year and recent deal to keep Tiwai operating illustrate), technological change, behavioural change, policy change and population change. All of these introduce considerable uncertainty, which could lead to price fluctuations in the future.

As will be discussed later, suppressing the carbon price will reduce the pace of gross emissions reductions leading to more land being locked up permanently in forestry than would otherwise have been the case.

New Zealand Emissions Trading Scheme (chapter 3)

This section addresses questions:

- *3.1. What else can the Government do to support NZ ETS market credibility and ensure the NZ ETS continues to help us to meet our targets and stay within budgets?*
- *3.2. What are the potential risks of using the NZ ETS as a key tool to reduce emissions?*
- *3.3. How can the Government manage these risks of using the NZ ETS as the key lever to reduce emissions?*
- *3.4. Do you support or not support the Government's approach of looking at other ways to create incentives for carbon dioxide removals from forestry, in addition to using the NZ ETS?*
- *3.5. Apart from the NZ ETS, what three other main incentives could the Government use to encourage removals through forestry?*

The section above already provides significant commentary and evidence in relation to the NZ ETS. This section includes additional information to help inform specific questions asked in Chapter 3 of the consultation document. Rules governing the NZ ETS create significant additional uncertainty in meeting budgets and international obligations

Reliance on the NZ ETS in its current form presents a very real risk of missing emissions reduction targets. New Zealand's national targets are split into smaller time-limited budgets. By contrast, units in the NZ ETS are fungible over the life of the scheme (which is at this stage indefinite). This is the central fallacy of the theory of the 'waterbed effect' – that any action

outside the NZ ETS will be counterbalanced by changes within the NZ ETS. As the Climate Change Commission comments:[39]

> The "waterbed effect" is an objection frequently raised against using policies, such as regulation or targeted investment, alongside an ETS. It refers to the idea that emissions reductions achieved through other policies displace more cost-effective reductions that would have otherwise occurred due to the ETS. This is akin to the way pushing down on a waterbed causes a bulge on the other side.
>
> The assumption is that in a system with an emissions cap (a limit on total emissions imposed by the ETS), each tonne of emissions not emitted by one party will be available for someone else to emit. It follows that reduction measures induced by non-ETS actions will simply increase costs for some and make it cheaper for others to keep emitting, rather than contributing to more reductions overall.
>
> The way the New Zealand ETS is managed, however, can prevent this scenario. The design of the scheme's cap, enabled by recent reforms, is flexible. The unit volumes are set on a five-year rolling basis, which gives two avenues to adjust for the impact of other policies or investments on emissions:
>
> 1. Anticipated emissions reductions can be factored in upfront. ...
> 2. The cap can be adjusted over time to reflect observed emission reductions due to other polices.

The issue to note here is that any waterbed effects from the NZ ETS will be spread over the expected life of the scheme. As currently designed, the NZ ETS can lead to net zero emissions by a certain time (at least for sectors within the NZ ETS), but it cannot guarantee that the road there follows a certain pathway. In other words, even if the NZ ETS is one big waterbed out to 2050, meeting various targets along the way requires a number of different compartments within the waterbed. If the NZ ETS is the Government's main policy tool this makes meeting short-term budgets – or international obligations – very difficult.

Long-term threats to the credibility of the NZ ETS

The risk of boom-and-bust cycles resulting from the unlimited use of forestry offsets has already been discussed. These threaten to undermine the credibility of the NZ ETS over time. This section explores some other long-term credibility problems.

In 2022 the NZ ETS covered just 43% of gross emissions.[40] Crucially, the scheme does not cover biogenic methane or nitrous oxide emissions despite their significant contribution to New Zealand's emissions profile. The Government also gives free units to EITE businesses. Consequently, at present the NZ ETS will reach net zero in supply and demand terms *prior* to achieving the goal of net zero long-lived greenhouse gas emissions or achieving targets for biogenic methane. According to the Climate Change Commission's model using its demonstration pathway, net-zero in NZ ETS supply and demand will be reached in 2037.[41] After

[39] https://www.climatecommission.govt.nz/public/Our-approach-to-developing-advice-on-policy-direction.pdf.

[40] https://haveyoursay.climatecommission.govt.nz/comms-and-engagement/cc2f075f/user_uploads/monitoring-report---emissions-reduction---july-2024--final-web-ready.pdf.

[41] https://www.climatecommission.govt.nz/our-work/advice-to-government-topic/advice-for-preparation-of-emissions-reduction-plans/2023-advice-to-inform-the-strategic-direction-of-the-governments-second-emissions-reduction-plan-april-2023/.

this point, the NZ ETS will no longer incentivise sufficient afforestation removals despite these being needed to offset the greenhouse gas emissions that exist outside the scheme.[42]

Unless cuts in gross emissions are made in EITE or agricultural sectors, once net zero is reached for sectors covered by the NZ ETS, the Crown will likely need to pay for additional afforestation to meet our emissions reductions targets. Based on current policies the Crown will start incurring those costs beyond 2037. The only solutions to this problem are to find ways to reduce emissions from EITE companies and agriculture, and/or remove forestry from the NZ ETS. As noted above, removing forestry from the NZ ETS would allow the Crown to encourage afforestation by other means while pushing up the NZ ETS price and generating additional revenue as a result.

A similar problem is also apparent when considering New Zealand's nationally determined contribution. By 2030, a 101 megatonne of carbon dioxide equivalent gap is anticipated between domestic emissions reductions and the nationally determined contribution.[43] This gap cannot be addressed by the NZ ETS because the system was designed to align with the Government's 2050 target, not five-year emissions budgets or international obligations. Thus, the NZ ETS will be unable to incentivise emissions reductions or afforestation that could aid New Zealand in meeting its international emissions reduction commitments. Additional government spending will likely be required if our current targets are to be met.

After 2050 there are still expected to be residual greenhouse gas emissions from certain sectors of the economy. This is because some sectors will be unable to abate the totality of their emissions due to technological, financial or physical constraints. For example, some level of nitrous oxide emissions from food production are unavoidable at present, and although alternative fuels and new technology are capable of reducing emissions from aviation, technologies are not yet cost competitive or available at scale. A more sensibly conceived policy would see forestry offsets reserved for those emissions that are most difficult to abate rather than simply allocate them to current NZ ETS participants.

Beyond this, as carbon dioxide is a long-lived greenhouse gas, achieving net zero simply locks in the warming already caused, and prevents it from rising higher. It appears increasingly likely that the 1.5 °C target under the Paris Agreement will be significantly exceeded. To stabilise the level of anthropogenic warming at anything like an acceptable level, it will be necessary for countries to establish future targets that are net negative, and actively remove carbon dioxide from the atmosphere.[44]

These uncomfortable but highly likely outcomes underline the importance of leaving future generations with the option of afforestation as one means of offsetting residual emissions and leaving the possibility of net negative emissions open. If extensive afforestation has already occurred because of the unlimited inclusion of forestry within the NZ ETS, there may be a dearth of less productive land remaining for this necessary afforestation. If there is no remaining unproductive land, productive land better suited for other uses – such as agriculture – will be further encroached upon.[45]

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[42] Ibid.

[43] Op. cit. 1

[44] https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf.

[45] At an NZU price of $50/t MfE modelling has suggested the area of farmland economic to convert to forest is 4.7 million hectares. At over $100/t, forestry conversions are economic across almost the entire land area available for

A final point, which pulls together some of the threads cited above, concerns the future of the NZ ETS itself. Once the NZ ETS sectors have reached net zero, will the NZ ETS be extended to cover sectors currently outside its remit? What about when the entire economy, covering the totality of our gross emissions, reaches net zero? By using forestry as an unlimited offset for emissions, we have implicitly promised that we will retain the NZ ETS indefinitely. Yet, at some point in the late 2020s or early 2030s, the Crown will no longer earn revenue from the NZ ETS (when the amount of units available to auction will fall to zero). As noted above, later in the 2030s the NZ ETS might become a cost to the Crown when it has to pay to offset ongoing emissions from the EITE sectors.

The NZ ETS will be needed to enable emitters to continue to buy units from foresters to maintain in perpetuity a net-zero balance of accounts. Even once we eliminate all gross emissions, the NZ ETS will need to continue to ensure that the accounting triumph represented by all that forest carbon will be managed, maintained and restored in the event of natural disasters. This imposes enduring administrative costs on future generations for little benefit. More disturbingly, one might ask how policy decisions taken today can guarantee that sort of institutional durability?

When viewing the big picture, the use of forestry as an unlimited offset is a gamble on the part of the Crown. The gamble is that in the future new technologies will make reducing emissions – and perhaps even negative emissions – very cheap. This hypothetical scenario would allow us to remove the forests where the carbon is stored and leave us free to use the land again.

This was indeed the original idea of allowing forestry as an unlimited offset when New Zealand argued for it in the 1990s. But while the intervening decades have seen zero emissions technologies emerge at scale, it appears that New Zealand is not willing to do any more than it did thirty years ago to support the transition to lower gross emissions.

Having not used the time to prepare for a transition away from fossil fuels, we are now using offsets as a way to declare an accounting triumph. The question to be asked is whether, as a society, are we prepared to risk massive land use change and a costly transition if delay does not pay off?

Forestry should be outside the NZ ETS (or significantly scaled back)

These incentives would properly value the multitude of ecosystem services provided by different kinds of forestry, from erosion control to biodiversity enhancement, and not solely focus on carbon storage. Any benefits would be contingent on foresters planting trees that are able to realise gains along these three dimensions.

The Government is aiming to reduce whole-farm conversions and encourage farmers to plant low productivity parts of their land with trees. Realising this objective would require more than changes to NZ ETS eligibility. Pilot schemes have shown this requires on-farm support services to educate landowners on appropriate planting plans, and develop business plans for finance and management practices needed to cultivate and maintain species. I will be providing advice on some of these matters early next year.

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planting, which includes of 3.3 million hectares of hill country sheep and beef land, 1.9 million hectares of intensive sheep and beef land, and 1.9 million hectares of dairy land.
https://environment.govt.nz/assets/Publications/Files/marginal-abatement-cost-curves-analysis_0.pdf.

I note this statement in the ERP2 discussion document:

> New Zealand needs the right settings to unlock private investment in carbon and biodiversity markets. The settings include consistent rules aligned with best international practice, and markets that are accessible to landowners. … we intend to work further with the private sector to find other ways to unlock investment potential in these markets. This may include considering the accessibility and governance of the markets to ensure they are operating cost-effectively and with integrity.[46]

I have already submitted in detail on the proposal for biodiversity credits so I will not repeat those comments here.[47]

As noted in my answer in the section covering 'Forestry on Crown Land' (chapter 8, below), I do not believe that biodiversity credits will make much difference to native tree planting, unless there is reform that reduces the returns that exotic afforestation receives through the NZ ETS.

If the use of forest offsets in the NZ ETS was discontinued or significantly scaled back, it would enable the NZ ETS to operate effectively as a true cap-and trade scheme, promote *gross* emissions reductions, and provide the Government with a stream of auction revenue to fund targeted afforestation of the most suitable species for a given area. This would achieve outcomes additional to carbon sequestration, including enhancing biodiversity and stabilising erosion-prone land.

I recommend that the Government decouple forestry from the NZ ETS and using alternative incentives to drive afforestation.

Energy (chapter 5)

This section addresses questions:

- *5.1. What three main barriers/challenges that are not addressed in this chapter do businesses face related to investing in renewable electricity supply (generation and network infrastructure)?*
- *5.2. How much will the Government's approach to driving investment in renewable energy support businesses to switch their energy use during 2026–30 (the second emissions budget period)?*
- *5.3. What three main barriers/challenges do businesses and households face related to electrifying or improving energy efficiency, in addition to those already covered in the discussion document?*
- *5.4. How much will existing policies support private investment in low-emissions fuels and carbon-capture technologies?*
- *5.5. What three main additional actions could the Government do to enable businesses to take up low-emissions fuels and carbon-capture technology?*

[46] MfE, 2024, p.45.

[47] PCE, 2023b. Submission on Helping nature and people thrive: Exploring a biodiversity credit system for Aotearoa New Zealand discussion document. https://pce.parliament.nz/publications/submission-on-helping-nature-and-people-thrive-exploring-a-biodiversity-credit-system.

A stable energy strategy is essential

An affordable and reliable electricity system is absolutely essential if the electrification of energy based on renewable generation is to win the support of consumers. This has been the rationale for my ongoing interest in this sector.

I repeatedly advised the previous Minister for Energy to expedite an energy strategy. While I understand – and am broadly supportive – of the current Government's preference for a market-led approach over a centrally planned one, I believe an energy strategy or something like it would still be a useful undertaking. A well-articulated strategy can help to manage uncertainty and technological change and can clarify who is expected to bear any risks. Focusing on a purely market-led approach presupposes that existing market settings are sufficient to generate the outcomes that we want from our energy system. Bearing in mind the artificial and highly regulated nature of the energy market and the fact that it was designed in another era, that supposition is questionable.

The current market – and the behaviours of the key players – has been shaped by easy and convenient reliance on fossil energy (gas and coal) as the backstop for what is, by international standards, already a highly renewables-based generation system. New Zealand has always faced the risk of dry years. Increasing reliance on wind and solar energy adds new short-run risks to supply.

Any credible ERP has to proceed on the basis that recourse to fossil firming – whether to cover intermittency or longer supply constraints caused by dry periods – has to be phased out. These risks can be made manageable, but the investment needed to cover them will only flow smoothly if the market can accommodate both supply and demand side innovations.

In many ways the shock currently being caused by very high spot prices highlights some of the issues that will continue to be faced in a renewable transition, and we have to question whether existing market settings are fit for purpose as we continue that journey. Responding to these issues is complex because any changes to market settings could have unintended consequences.

For example, a strong focus on complete reliability of supply (such as trying to avoid any demand response) would require increased investment, leading to higher costs of the transition to a renewable energy system. This could in turn prompt some communities to abandon the grid entirely – opting instead to work together using solar and batteries. This could push up the cost of the grid for other users, prompting others to exit. Clearly this would be an outcome that is not good for the country.

The work of the Market Development Advisory Group on the role of pricing in a renewable energy system was very useful in exploring the growing issues (such as market power) as we transition to a renewable system. The Market Development Advisory Group's many recommendations – while focused largely on the wholesale market – highlight the numerous market settings that are at odds with the role we want the market to play. This process has led to a useful roadmap for the sector to adapt in a way that manages these issues, and I note that the market regulator appears to be acting on these recommendations.

There are many other issues that would benefit from a similar approach, including consideration of:

- how to manage the dry year risk
- how to manage and incentivise appropriate peak capacity within the system

- whether the distribution system is fit for purpose
- how to make the most of the opportunity afforded by demand response and distributed generation (and ensure consumers see the benefit).

Each of these issues is interrelated, and if they were pursued separately there would need to be some coordination of these different conversations to ensure consistency.

There is a lot of debate about industry structure and governance in light of the current energy issues this winter. While this is an important conversation, form should follow function: any changes to industry structure and governance (or price incentives) need to flow from what we want from our energy system. Whether or not this is called an "energy strategy", I believe the work would be useful.

I recommend that the Government prepare an energy strategy that addresses the above long-term issues facing the energy sector.

Improving electricity market competition

In my view a competitive market is essential to ensuring we have an affordable transition. The most obvious reason is the direct role competition can play in keeping prices affordable. In addition, a competitive market should allow for innovation, which in turn benefits everyone. For example, if we maximise the opportunity posed by distributed generation and demand response it should lead to a cheaper energy system overall.

But we need to ensure that consumers see the benefit as a result. The Commerce Commission has acknowledged that there are issues with competition in the sector and identified a possible breach of section 36 of the Commerce Act 1986.[48] However, it chose not to prosecute, relying instead on processes available to the Electricity Authority to deal with the issue.

Regardless of the current competitive situation, the Market Development Advisory Group found that competition issues are likely to increase in times of scarcity with the shift to a renewable energy system:[49]

> "Analysis in the Options Paper showed that larger generators with substantial flexible hydro bases may well have greater means and incentive to exercise market power in the supply of flexibility products as thermal generation declines."

As noted above, I am supportive of the work programme set out in the Market Development Advisory Group report on price discovery in a renewables-based electricity system. I understand that these recommendations are included in the Electricity Authority's work programme (as briefly mentioned in the ERP2). I look forward to seeing these actions progressed.

A higher carbon price is needed to incentivise investment

Existing policies are unlikely to have any impact on driving investment in renewable energy, low emissions fuels, energy efficiency or carbon capture and storage. The carbon price is likely to remain too low to incentivise any action. As noted above, allowing for some fluctuations in the

[48] https://businessdesk.co.nz/article/markets/electricity-generators-on-notice-over-potential-competition-law-breaches.

[49] https://www.ea.govt.nz/documents/4335/Appendix_A2_-_Final_recommendations_report.pdf, p.18.

short term, access to unlimited forestry offsets is likely to contain the NZ ETS price at around $50 per tonne. This is considerably lower than the cost of many abatement solutions.

For example, Contact Energy's chief financial officer has stated that a carbon price of around $130 would be required for companies to switch to clean energy for process heat.[50] It is, quite simply, usually cheaper to use forestry offsets than pursue gross emissions reductions. The large upfront capital expenditure necessary for abatement projects is avoided, as NZUs can be bought as and when required. However, delayed action on gross emissions reductions in favour of cheaper afforestation does not solve the problem long term. It simply pushes the cost to future generations.

As noted in the transport section below, a carbon price will incentivise large businesses to make cost-effective investments in emissions reductions. This is unlikely to be the case for households and small businesses, who often are not aware of the benefits. Overcoming this 'market failure' will require better information and, potentially, access to finance. Consumers need to be able to make decisions that fairly compare the upfront costs of these products with the savings (and emissions reductions) available over their lifetime. These issues are completely overlooked in the ERP2 and will ultimately impact on our economic and environmental outcomes. It would be a case of extreme market purism to deny a role for government as an information broker.

The other main barrier faced by households and businesses is a lack of information and price incentives to make appropriate investments in demand response and distributed generation. As noted above, government needs to convene a process to ensure we have the appropriate market settings to make the most of this opportunity.

In the short term, taking up the proposal made by Rewiring Aotearoa for symmetrical export tariffs would be an important step towards improving the uptake of low emissions energy technologies. Existing pricing structures (at least in theory) reward households and businesses for reducing usage at peak times. In simple terms, symmetrical export tariffs would provide a similar reward for exporting power to the grid at those times.

Longer term there are ongoing questions about whether the pricing structure is fit for purpose. This point relates to the need for an energy strategy.

Transport (chapter 6)

This section addresses questions:

- *6.1. Do you support the proposed actions to enable EV charging infrastructure?*
- *6.2. What are the three main actions the Government can do to reduce barriers to and enable the development of a more extensive public EV charging infrastructure in New Zealand (without adding too much cost for households and businesses)?*
- *6.7. What are the three main actions the Government can do to make it easier to reduce emissions from aviation and maritime fuels (without adding too much cost for households and businesses)?*

[50] https://www.rnz.co.nz/news/business/509582/contact-energy-warns-of-much-higher-power-bills-from-2025.

Additional policies are necessary because the NZ ETS is insufficient

According to provisional estimates from Stats NZ, emissions from transport increased 4% from 2022 to 2023.[51] This followed a period of lower than anticipated emissions prior to 2022 likely attributable to high oil prices, COVID-19 restrictions and the now discontinued clean car discount scheme.

The recent rebound in transport emissions should prompt the Government to ensure it is taking appropriate action in this sector. It is unlikely that carbon prices transmitted through the NZ ETS will be sufficient, with several studies highlighting the unresponsiveness of transport sector emissions to carbon prices. For example, the value of an NZU may need to rise to over $200 for modest emissions reductions of between 10–20%.[52]

A doubling in the current carbon price to around $100 would still only mean a 15 cent per litre increase at the pump. Increases much larger than this are transmitted to drivers as a result of international events and exchange rate movements without affecting driver behaviour. Believing that the NZ ETS as currently designed will assist the shift to zero emissions transport lacks credibility. That is all the more so if forestry remains in the NZ ETS thereby constraining the long-run NZU price close to $50.

Barriers to the efficient operation of market-based mechanisms for reducing greenhouse gas emissions in the transport sector are numerous. Customers contemplating the purchase of a new vehicle confront the higher cost of an electric option without being able to make a reliable estimate of the lifetime savings from reduced fuel costs. The upfront saving of staying with an internal combustion engine car will often win out, particularly if the potential customer does not have access to affordable capital.

Complementary policies are therefore needed to ensure consumers take ongoing costs into account in their purchase decisions. Options could include:

- requiring car retailers to advertise the lifetime costs of vehicle ownership in addition to upfront costs
- considering access to finance options (a similar issue to rooftop solar)
- embedding more of the carbon costs up front, for example, by integrating carbon costs into the price of the car or road user charges (which will soon apply to cars).

The Clean Car Standard represents the sole complementary mechanism the Government has committed to retaining in the transport space. The standards have recently been revised down to align with standards adopted in Australia, with expected increases in emissions in the order of 0.3–0.5 megatonnes of carbon dioxide over 2024–2050, although these could be much higher.[53] This alignment with Australia is reasonable. However, the changes did not include alignment on fines. The fines for not adhering to Clean Car Standard requirements are currently set below comparable regimes internationally, such as those in Australia, where fines are more

[51] https://haveyoursay.climatecommission.govt.nz/comms-and-engagement/cc2f075f/user_uploads/monitoring-report---emissions-reduction---july-2024--final-web-ready.pdf.

[52] https://ojs.victoria.ac.nz/pq/article/view/7496/6650; https://openaccess.wgtn.ac.nz/articles/thesis/Understanding_the_costs_benefits_mitigation_potentials_and_ethical_aspects_of_New_Zealand_s_transport_emissions_reduction_policies/17148269?file=31709363.

[53] https://www.carbonnews.co.nz/story.asp?storyID=32037&src=newsletter.

than double those set in New Zealand.[54] If we are to follow the lower standards adopted by Australia, it is important that fines are revised upwards to maintain the credibility of the Clean Car Standard.

The absence of complementary policies almost certainly mean that New Zealanders will take up electric vehicles more slowly. This also means that our balance of payments will continue to be impacted negatively as we send billions of dollars overseas to pay for fossil fuels.

Expediting congestion charging and providing public and active transport options are also important to ensure that communities face the right incentives on where to live.

Based on the analysis in this section and the previous one **I recommend that the Government give greater consideration to encouraging the uptake of existing and affordable emissions reduction technologies for transport and energy.**

Improving electric vehicle infrastructure

The ERP2 discussion document focuses on the Government's target to enable a network of 10,000 public electric vehicle charging points by 2030. A lack of charging infrastructure and resulting range anxiety have been assessed by EY as the top two most important obstacles to switching to electric vehicles.[55] The provision of adequate charging facilities consequently represents an important demand-side policy.

Private investment in this infrastructure could be enabled by ensuring uniformity in the way local lines companies operate. There is a need for careful coordination to avoid the concentration of charging infrastructure in areas where connection costs are cheaper, rather than the strategic localisation of charging stations in areas best placed to permit longer distance travel.

Private investment in charging infrastructure could also be enabled through demand-side policies promoting the adoption of electric vehicles (as discussed above), which would signal to investors a commitment to increasing requirements for their stations looking forwards.

Interestingly, the high upfront cost of electric vehicles was ranked as the third most important concern for motorists. It is hard to see why the Government considers that addressing range anxiety and access to charging should attract public subsidy but not the upfront cost of electric vehicles. The likely consequence is that charging infrastructure will be underutilised while providing a benefit only to those who can afford to purchase electric vehicle.

Fund research to reduce aviation emissions

As discussed in my report *Not 100% – but four steps closer to sustainable tourism*,[56] there are currently no viable ways to decarbonise aviation. In that report I proposed that a departure tax be introduced that reflects the environmental cost of flying internationally from New Zealand. We have pursued a similar approach with agricultural greenhouse gas research. We should do the same for the aviation sector, another major foreign exchange earner.

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[54] Ibid.

[55] https://assets.ey.com/content/dam/ey-sites/ey-com/sv_se/topics/power-and-utilities/pdf/ey-the-six-essentials-for-e-mobility.pdf.

[56] PCE, 2021. *Not 100% – but four steps closer to sustainable tourism*. https://pce.parliament.nz/publications/not-100-but-four-steps-closer-to-sustainable-tourism.

I recommend that the Government impose a levy on all people departing from New Zealand and invest the money in finding solutions for aviation emissions, ideally in collaboration with other countries reliant on tourism from distant markets.

Agriculture (chapter 7)

This section addresses questions:

- *7.1. What are the three main barriers or challenges to farmer uptake of emissions reduction technology?*
- *7.2. How can the Government better support farm- and/or industry-led action to reduce emissions?*
- *7.5. What are the key factors to consider when developing a fair and equitable pricing system?*
- *7.6. Please provide any additional feedback on the Government's thinking about how to reduce emissions in the agriculture sector.*

Make more use of existing options to reduce agricultural emissions

There are currently several ways for some New Zealand farmers to reduce emissions at little or no additional cost. These different practices can be described collectively as improving the efficiency of production. Practices include reducing stocking rates while maintaining output, reducing inputs, improving animal genetics, once-a-day milking (for dairy) and raising bobby calves for beef (for sheep/beef).[57]

These changes would represent an easy win–win but have not yet found support in policy over successive governments. Greater help should be provided to farmers to ensure that practices that reduce emissions while maintaining productivity are well-known, accepted and implemented.

It is currently also possible to breed sheep with low-methane genetics. For this trait to become widely adopted, ram breeders must be willing to select for it, and at present there is a bottle neck to adoption caused by the low availability of rams with this breeding value.[58] To address this issue in the absence of any price on methane, incentives could be put in place to encourage farmers to preferentially purchase low-methane rams, which would drive up demand.

Presently, the incentives for farmers to select low-methane genetics are less clear than those for selecting high-productivity genetics, as there is currently no benefit to farmers from reducing agricultural greenhouse gas emissions. Unless low-methane genetics are linked with productivity enhancements it is unlikely they will be adopted.

A lack of incentives for adoption will similarly affect the take up of any existing and anticipated technologies, including methane and nitrous oxide inhibitors, methane vaccines and feed supplements. The Government has committed to a pricing system for agricultural emissions by 2030, which would provide a technology adoption incentive.

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[57] https://www.mpi.govt.nz/funding-rural-support/environment-and-natural-resources/biological-emissions-reference-group/.

[58] https://www.climatecommission.govt.nz/public/Uploads/EB4/supporting-docs/Report-on-agricultural-mitigation-technologies-Final.pdf.

However, it remains unclear what will drive uptake of low-emissions technologies prior to this point. As the first domestic target for biogenic methane emissions is a 10% reduction by 2030, there is work needed to ensure policies are in place to drive the changes needed to achieve this target. The most recent monitoring report from the Climate Change Commission has found a significant risk that the 2030 biogenic methane target will not be met.[59]

Currently the only incentive driving reductions in agricultural emissions is the NZ ETS, which is encouraging sheep and beef land to be converted into forestry.

Be cautious of over-optimism

While it is positive that the Government has committed funding for researching and developing low-emissions technologies for the agricultural sector, this does not guarantee a solution (or combination of solutions) will be found capable of achieving the targeted emissions reductions. Research has been ongoing in pursuit of a methane vaccine in New Zealand since 2007 and remains at the development stage,[60] and technologies being developed abroad are often not suitable for New Zealand's pastoral agriculture system.[61]

There is also a risk that by focusing on advancing novel technologies, which will require time to progress through trials prior to becoming commercially available, current mechanisms for reducing emissions are not adequately utilised. This represents a threat to New Zealand achieving more proximate emissions targets and budgets, such as a 10% reduction in biogenic methane by 2030.

It is also possible the Government has been overly optimistic when considering the development trajectory of novel emissions reduction technologies. Assumptions around the timelines at which different technologies become available differ from those described by the Climate Change Commission. It would be helpful if projected timelines were accompanied by quantified error measurements or qualitative confidence statements, to enable a more complete understanding of the Government's expectations.

If technological development does not progress as anticipated it would be particularly problematic for meeting the third emissions budget, over which agricultural technologies are expected to make a significant contribution. The third budget is already currently projected to be missed and if agricultural technologies do not progress as anticipated the situation could become markedly worse. This is a significant risk that should be highlighted in ERP2.

Agricultural pricing needs to be carefully designed

Any pricing system that aims to make a formerly free right to emit exclusive must have the understanding, if not support, of those who will be forced to pay it. It is therefore important that the Government communicates the environmental externalities associated with agricultural greenhouse gas emissions in a way that ensures farmers understand why they are being asked to pay.

The nature of methane as a short-lived greenhouse gas makes its behaviour in the atmosphere more challenging to communicate, and narratives around 'no additional warming' are easily misconstrued as methane having no effect on temperature. While I believe the science on

[59] https://haveyoursay.climatecommission.govt.nz/comms-and-engagement/cc2f075f/user_uploads/monitoring-report---emissions-reduction---july-2024--final-web-ready.pdf.

[60] https://www.rnz.co.nz/news/country/513979/efforts-to-create-methane-vaccine-bolstered.

[61] https://www.nzagrc.org.nz/domestic/methane-research-programme/methane-inhibitors.

methane to be well established, the communication of this science will be an important challenge the Government must carefully address to ensure buy-in for any pricing system.

The key issue the Government will need to grapple with is why it is allowing fossil fuel emitters the right to offset emissions but not agricultural emitters. In my view, using forestry to offset agricultural methane emissions would be a far more appropriate use of whatever offset capacity we have.

The nature of methane as a short-lived gas means offsetting emissions using forestry is a responsible mitigation option. Using forestry to offset biogenic methane emissions would not fall victim to issues associated with offsetting a long lived greenhouse gas such as carbon dioxide. This is because there is a broad commensurability between the lifetime of the cooling effect of a pine production forest and the lifetime of the warming effect of the biogenic methane from a herd of ruminants.

This means there would be no need for ongoing planting after the requisite area of forest had been established. Furthermore, if the herd size were reduced the area forested could also be decreased, maintaining the option value of the land for future generations. The risk of impermanence would also be decreased as the area of forestry estate could decrease in extent if ruminant numbers declined.

It would therefore make sense to enable farmers to offset their methane emissions using trees, and incorporate such offsetting into calculations of farm emissions prior to pricing. It is important that ways of assessing on-farm emissions are also seen as credible and implementable by farmers, and do not result in overly burdensome fees for monitoring, verification, and reporting. Farmers may not like the idea, but these factors might be more easily managed by processors (or well-resourced catchment groups).

Finally, for any pricing system to work it must be perceived as durable. The NZ ETS has suffered significant price volatility as a result of successive proposals to amend the system, and changes to unit limit and price control settings that deviated from the advice of the Climate Change Commission. The Government needs to ensure that its current review of the methane science and targets, removal of agriculture from the NZ ETS, and the delay in pricing agricultural emissions until 2030 are not interpreted as a lack of ambition to seriously address agricultural greenhouse gas emissions.

Forestry on Crown land (chapter 8)

This section addresses question:

- *8.1. How could partnerships be structured between the Government and the private sector to plant trees on Crown land (land owned and managed by the Government)?*

From the text of ERP2, the Government appears to be interested in encouraging increased planting of native trees. Currently, the major barrier to increased native planting is the incentive structure of the NZ ETS, which provides the greatest rewards for planting fast-growing exotic trees like *Pinus radiata*. There are two major reasons for this; pine has lower establishment and management costs and delivers higher returns on account of its rapid rate of carbon sequestration.

Native trees cost more to establish. This is partly due to higher costs for seedlings and planting, but is also due to more intensive management costs in the first few years after planting (to

prevent weeds taking over and losses to pests). Overall, pine forests are cheaper to establish at approximately $3000 per hectare, compared with natives, which can cost anything from $6,100 per hectare to $188,000 per hectare (worst case scenario).[62] In fact, apart from natural regeneration where seed sources are nearby, there are no proven examples of native forests being established at a large scale.

The second issue is the higher returns for exotics via the NZ ETS. As the NZ ETS is a cap-and-trade system operating with units of carbon as its currency, the only value placed on forestry is its carbon sequestration capability. Private investors naturally have higher discount rates and are therefore more concerned with short-term returns. These two points taken together mean the NZ ETS incentivises the planting of fast-growing exotic pine trees, as opposed to slower growing native species. An average newly planted pine forest sequesters between four and seven times as much carbon as the equivalent area of newly established indigenous forest over a 50-year timeframe,[63] with variation attributable to location and carbon measurement method.[64]

The large gap in sequestration returns and establishment costs between pine and natives makes it difficult to incentivise the establishment of native forests, despite natives providing a wider range of ecosystem services. Many native tree species are also longer lived than pine and therefore likely to retain the carbon they sequester for longer.[65]

The incentives within the NZ ETS currently operate in contradiction to the objectives of Te Uru Rākau, which aims instead to plant the right trees, in the right places, for the right purpose.[66]

Biodiversity credits – even if we ignore all the complexities of setting them up and finding buyers – are unlikely to bridge this gap. Overseas experience is that biodiversity credits can add a 50% premium to carbon returns. This could reduce the gap in returns between natives and pines to a factor of three times (at best). Again, this calculation still ignores the higher establishment costs of natives.

An important way to make natives more alluring would be to remove the ability to register or constrain permanent exotic forestry in the NZ ETS. This would need to be done in combination with providing an incentive (outside the NZ ETS) for native afforestation. Government objectives relating to biodiversity improvement and adaptation (through the stabilisation of erosion-prone land), should be properly factored into any incentive structure in combination with rewarding carbon sequestration. Consideration should also be given as to how the ongoing management of native forests will be funded over the long term to ensure they remain healthy and resilient.

In my view, any permanent forestry on the most erodible land should ideally be native or have a reasonable plan to transition to natives. At the very least, it should be species that are

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[62] Dungey et al., 2023. https://nzif.org.nz/nzif-journal/publications/article/23180.

[63] Note that the lower figure is based on look up tables which are based on limited data for native forests.

[64] https://www.treasury.govt.nz/sites/default/files/2022-12/ria-mpi-mpeai-sep22.pdf. MPI calculations made in August 2022, which were based on the carbon for weighted average Field Measurement Approach (FMA). If instead the default tables of forest carbon stocks taken from Climate Change (Forestry) Regulations 2022 are used, radiata pine sequesters approximately 4 times as much carbon as natives over a 50 year period: https://www.legislation.govt.nz/regulation/public/2022/0266/latest/LMS709973.html.

[65] Some native conifers can live for 600–1,200 years.

[66] https://www.mpi.govt.nz/forestry/funding-tree-planting-research/one-billion-trees-programme/about-the-one-billion-trees-programme/.

specifically selected for their erosion control properties. The ERP2 discussion document claims that adaptation includes:

- considering where forests are planted
- considering opportunities to adapt and diversify the way we practise forestry, which includes diversifying tree species, management practices, products and markets that can strengthen the resilience of landscape and supply
- designing forests to mitigate the increased risk of wildfires and reduce their impact
- considering the erosion control benefits from forests (eg, roots anchor erosion-prone soils; the forest canopy intercepts rain, reducing runoff and sedimentation; and forests moderate fluctuating temperatures and slow river flood flows)
- controlling the spread of wilding conifers.

With increasing storms and the need to maintain social licence, adapting to climate risks will become increasingly important

The document contains no detail on how these issues should be addressed.

What cyclones Hale and Gabrielle did to pine plantations (and unforested erodible areas) in Tairāwhiti is but a small taste of what may be in store. I will be exploring this issue more in a forthcoming report.[67]

In my view, the best way to encourage the planting of natives on Crown land would be to allow the Department of Conservation to keep any NZ ETS/ biodiversity credits. It is important to note that these forests will require ongoing management over time – even once mature. Therefore, it is important that the Department of Conservation has an ongoing revenue stream to support their management.

Investment in science is needed to understand the benefits of improved pest control on the ability of our native forests to store carbon.[68] Ideally the Department of Conservation would be rewarded for this so that it could invest in pest control. This will need to include a long overdue public conversation about how to manage ungulates.

I must reiterate that all these recommendations are academic without NZ ETS reform. The carbon price is too low to incentivise natives, and the comparative rewards from planting exotics are too high. Both these issues will need to be dealt with to incentivise greater native planting. As set out in *Going with the grain*, I believe that the best way to deal with this is to phase out forestry from the NZ ETS and set up a separate mechanism (using NZ ETS proceeds) to encourage appropriate planting on erosion-prone land.

Conclusion and recommendations

This has been a long, detailed and sometimes technical submission that has had to repeat itself given the number and overlapping nature of the questions raised in ERP2.

The plan falls short. ERP2 is a mixed bag of policies designed to deliver *just enough* reductions. For reasons explained at length, serious shortcomings in the operation of the NZ ETS mean that

[67] https://pce.parliament.nz/our-work/current-work.

[68] Some work is underway in this area through the Maximising Forest Carbon programme at MPI.

reliance on it cannot be claimed as a coherent policy framework to underpin the plan. There is a very real risk that the Government will not even meet the first or second budget with the policy mix it has proposed. The projected reduction only just adds up and remains within the margin of error for the base case with no allowance being made for the uncertainty that surrounds the reductions that are claimed for each proposed policy measure.

ERP2 currently plans for the third budget to be missed by 17.4 megatonnes of carbon dioxide. The plan incentivises insufficient investment now in future reductions. Investment in future reductions now is sensible as there can be quite a lag between a policy or technology being implemented and the reductions being realised.

ERP2 relies almost wholly on a net-based approach driven almost exclusively by the NZ ETS. The critical thread that runs through this submission is the long shadow that the use of unlimited forestry offsets within the NZ ETS casts over our transition to a low emissions economy.

My central recommendation is that the Government decouple forestry from the NZ ETS and using alternative incentives to drive afforestation.

Failing that, I believe there are a number of second-best options that should be considered to manage the impact of unlimited forestry offsets on the NZ ETS. The Government should:

- **Build a much greater margin for error into emissions budgets by including more complementary policies.**
- **Publish a thorough analysis of the long-term implications of continuing to allow unlimited forestry offsetting in the NZ ETS (and any additional mechanisms needed to offset emissions from EITE companies or agriculture).**
- **Publish the analysis of the benefits and risks that underpin its strategy.**
- **Provide uncertainty estimates and margins of error for each of its proposed policy reductions for both the second and third emissions budgets.**

I also recommend that the Government:

- **Prepare an energy strategy that addresses the long-term issues facing the energy sector.**
- **Give greater consideration to encouraging the uptake of existing and affordable emissions reduction technologies for transport, energy and agriculture through complementary policies.**
- **Impose a levy on all people departing from New Zealand and invest the money in finding solutions for aviation emissions, ideally in collaboration with other countries reliant on tourism from distant markets.**

Simon Upton
Parliamentary Commissioner for the Environment
Te Kaitiaki Taiao a Te Whare Pāremata