Submission

By

THE NEW ZEALAND INITIATIVE

to the Ministry of the Environment

on

Transitioning to a low-emissions and climate-resilient future

24 November 2021

Prepared by:
Matt Burgess, Senior Economist
The New Zealand Initiative
PO Box 10147
Wellington 6143
matt.burgess@nzinitiative.org.nz

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THE NEW ZEALAND INITIATIVE

Ms. Vicky Robertson
Chief Executive
Ministry for the Environment
Wellington

Dear Vicky,

New Zealand Initiative Submission on *"Transitioning to a low-emissions and climate-resilient future: emissions reduction plan discussion document"*

Our submission is the Emissions Reduction Plan cannot reduce emissions under a binding ETS.

The Appendix has details.

Best wishes,

Matt Burgess
Senior Economist
New Zealand Initiative

Appendix: When do complementary policies lower emissions under the ETS?

This paper does not consider the question of whether the government should only rely on the ETS.

Instead, it asks under what circumstances do complementary policies reduce emissions under a binding emissions cap?

Complementary policies are sometimes justified by "the ETS is not enough." But complementary policies cannot help if they do not lower emissions. A binding emissions cap neutralises other emissions policies.

Regardless of whether the ETS can deliver targets, the onus of proof rests with the government to show how it is logically possible for the Emissions Reduction Plan to reduce emissions.

Other policies besides the ETS are justified if they remove legal barriers to least-cost emissions reductions ("enabling policies").

The government is about to commit to new policies in its Emissions Reduction Plan ostensibly to reduce greenhouse gas emissions. It is unclear how the policies will reduce emissions when the government has already capped emissions with the Emissions Trading Scheme ("ETS").

Reforms to the ETS in 2020 introduced a quantity cap for greenhouse gases. The cap is among the most comprehensive in the world. It covers more than 90% of the economy, though only about half this country's emissions since the ETS excludes agriculture. Nearly all of the government's existing and new emissions policies will be covered by the ETS cap.

If the ETS caps emissions and most of the government's emissions policies are subject to the cap, it is not clear how complementary policies can affect overall emissions. It is well-accepted that cap-and-trade schemes including the ETS can stop other policies from reducing emissions. This neutralising effect of cap-and-trade schemes is known as the 'waterbed effect.'

Some see the waterbed effect as a theoretical nicety. We see the waterbed effect as an unmanaged threat to the government's climate change strategy. The consequences of last year's reforms which gave the ETS its quantity cap have not sunk in. Our analysis suggests the waterbed effect applies generally and will be difficult to avoid. The Emissions Reduction Plan must find a way around the waterbed effect to reduce emissions. Otherwise, the government's unprecedented interventions will contribute little or no progress towards emissions targets.

We proceed first by describing the waterbed effect. We then consider the arguments advanced by the government and academics for how the waterbed effect can be circumvented. There are two versions of this argument, one which takes into account political constraints on the ETS and a second simpler version which ignores political constraints.

A note on terminology: throughout this note, ***complementary policies*** direct how and where emissions should come down. Examples include electric vehicle ("EV") subsidies, the 100% renewable electricity policy, the coal boiler replacement programme, and the offshore oil and gas exploration ban.

Complementary policies should be distinguished from ***enabling policies*** which remove legal barriers to emissions reduction or level the playing field which supports discovery of least-cost ways to reduce emissions. Enabling policies could include reforms to planning laws which remove undue barriers to wind generation.

A binding ETS cap neutralises the emissions benefits of both complementary and enabling policies. However, complementary policies increase the cost of achieving a given emissions reduction (by overriding the ETS and forcing emissions to be reduced via high-cost channels). By contrast, enabling policies lower the cost of achieving a given emissions reduction (by expanding the set of opportunities for reducing emissions via the cap).

We support enabling policies which allow a given quantity of emissions to be reduced for a lower cost.

The waterbed effect

It is well-recognised that cap-and-trade schemes can neutralise other emissions policies. For example, the Intergovernmental Panel on Climate Change has said:[1]

> *[I]f a cap-and-trade system has a sufficiently stringent cap then other policies such as renewable subsidies have no further impact on total greenhouse emissions.*

This neutralising effect of an emissions cap is sometimes called the 'waterbed effect.' Here is how the effect works.

The government caps emissions by issuing limited numbers of ETS emissions permits. Each permit entitles its holder to emit one tonne of CO2 (or equivalent). Businesses must surrender one emission permit back to the government per tonne of emissions. Permits never expire, and there are penalties for non-compliance. The government lowers emissions by issuing fewer permits each year.

In addition to the permits issued each year, there is a stockpile of permits purchased in earlier years that have not yet been redeemed. The overall cap on emissions, on the path to 2050, includes those permits. The government issues fewer emission permits each year than it would if that stockpile did not exist.

The cap on emissions is *binding* when desired emissions, absent the ETS, exceed the number of available permits. A binding cap makes the right to emit scarce and emissions costly. Issuing fewer permits reduces emissions while increasing the price of emission permits.

[1] Intergovernmental Panel on Climate Change (2014), "AR5 Climate Change 2014: Mitigation of Climate Change," *Working Group III Contribution to the Fifth Assessment Report*, Cambridge University Press.

When the emissions cap is binding, other complementary policies cannot affect overall emissions which are covered by the cap. In effect, a binding cap neutralises other policies. This is the waterbed effect.

To illustrate, consider this example:

> *Imagine an economy which normally produces 100 tonnes of emissions. This year, the government decides to cap emissions at 80 tonnes. It issues 80 emissions permits and demands the surrender of one permit per tonne of CO2. Emissions fall to 80 tonnes.*
>
> *Next year, the government issues another 80 permits and introduces a new EV subsidy. The subsidy successfully reduces transport emissions by five tonnes.*
>
> *Total emissions remain at 80 tonnes. Why? Because there are 80 emissions permits available. The five permits which transport no longer needs due to the subsidy will be used elsewhere. That will raise emissions (or postpone reductions) by exactly five tonnes.*

So, the subsidy reduces emissions from one sector. But overall emissions do not change. A binding emissions cap neutralises the emissions benefit of a complementary policy.

Circumventing the waterbed effect

Up to this point, we believe we are on common ground with officials and ministers and most (not all) academics by claiming:

- The ETS caps the quantity of emissions;
- Complementary policies under the cap free up emissions units for others to use; and
- A fixed[2] emissions cap neutralises complementary policies under the cap.

As far as we know, the government does not argue the waterbed effect is avoided because the ETS is not a binding cap on emissions.

Instead, the government argues the waterbed effect is avoided when complementary policies influence the level of the cap. Complementary policies can lead to a tighter cap. This is for one of two reasons. The cap can be directly linked to the emissions reductions achieved by complementary policies. Alternatively, complementary policies can help create conditions which supports a tighter cap than would otherwise be possible.

We consider two versions of the argument for avoiding the waterbed effect. A 'constrained' version which considers the effect of political constraints; and an 'unconstrained' version which ignores politics. We consider the simpler unconstrained version first.

Version 1: The unconstrained argument

In this version, the waterbed effect is avoided by directly linking the ETS cap with the emissions reductions from complementary policies. For each tonne of emissions abated by complementary policies, the cap is lowered by one tonne. Thus, the neutralising effect of the cap on complementary policies is avoided.

[2] That is, if the cap is invariant to complementary policies.

Consider the earlier hypothetical. Emissions stayed at 80 tonnes even after the EV subsidy cut transport emissions by five tonnes because 80 emissions units remained in circulation. The intuitively obvious solution is to lower the emissions cap by five tonnes to 75 tonnes. The complementary policy then lowers total emissions.

The cap could be linked with one or many emissions policies. Adjustments to the cap could occur immediately or years later. The link between policies and the cap could be noisy or imprecise. These issues do not materially alter the argument.

Linking the emissions cap with policies is sometimes called 'harmonisation' or 'integration.' For example, a recent working paper argues "the waterbed effect could be mitigated by a Minister who chooses to harmonise emissions budgets, ETS unit supply settings and emissions reduction plan measures as an integrated package."

In other words, the cap is set by Ministers; Ministers can link the cap to complementary policies; complementary policies, therefore, lower emissions and thus evade the waterbed effect.

We disagree. In this unconstrained version of the argument, the government can always tighten the emissions cap without the policy. "Harmonising" the cap with complementary policies may imply the policies lowered emissions. However, this is an illusion. To see why consider this from the earlier example:

- If the government reduced the cap to 75 tonnes without the complementary policy, emissions would fall to 75 tonnes.
- If the government did the complementary policy but left the cap at 80 tonnes, emissions would remain at 80 tonnes.

The cap is doing all the work.[3]

Accordingly, it is wrong to say that linking the cap to complementary policies means complementary policies reduce emissions. The connection is arbitrary. Ministers could link the cap to, say, cumulative rainfall, but nobody would suggest last week's storm had lowered emissions. It is the cap, not the complementary policies, which lowers emissions. Complementary policies are still neutralised by the emissions cap. The waterbed effect is not avoided.[4]

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[3] In this appendix, we focus on the question of what circumstances lead to complementary policies causing greater emissions reduction under a binding emissions cap. However, we note another effect of introducing complementary policies under a cap is to raise the cost of achieving a given reduction in emissions. Reducing the cap without the complementary policy means emissions come down from the most cost-effective sources of emission reduction. If the cap is reduced in conjunction with the complementary policy, emissions fall in the area targeted by policy, regardless of whether that is the most cost-effective way of reducing emissions. It costs more to achieve a given reduction in emissions with the complementary policy than without.

[4] We also make the practical point that the government is not measuring the emissions benefits of most of its policies after they are launched; it has no plans to introduce such measures; and no plans to link any policy to the ETS cap. Instead, the government will set the ETS cap to fall in line with emissions targets, the right approach. But this point is redundant: even if the government did plan to measure the emissions

Version 2: The constrained argument

What, then, is the test for avoiding the waterbed effect? We wish to identify the circumstances when complementary policies can reduce overall emissions by more than what could be achieved without those policies.[5]

It is possible to imagine this test could be met when politics constrains the ETS cap (which is why we call this the constrained version of the argument for avoiding the waterbed effect). Politics constrains all public policy, including for climate change. As the government tightens the ETS cap, higher carbon prices flow into the cost of living. The government cannot tighten the ETS cap indefinitely: eventually, voters confronted by rising costs will demand an end to further tightening of the cap.

We do not know where this critical point of political breakeven is for the ETS, but it must exist. Its position will vary over time according to economic conditions, carbon prices in other countries, and so on. If the ETS cap becomes politically constrained – that is, if there is no Parliamentary majority or median voter support for further tightening of the cap – complementary policies may be able to reduce emissions even under a binding ETS cap.

There is much to unpack here.

The ETS becomes politically constrained (i.e. no majority for further tightening of the ETS cap) when it exhausts its pool of political capital. Complementary policies can lower emissions under a cap by being the more efficient user of political capital and/or increasing the available pool of political capital.[6] We can compare two scenarios:

1. The ETS acting alone becomes politically constrained; and
2. The ETS with complementary policies becomes politically constrained.

Complementary policies reduce emissions if the second scenario has lower emissions than the first.

This is an indirect and fraught pathway for complementary policies to lower emissions.

First, it seems highly unlikely to us that complementary policies are more politically efficient than the ETS. It is well accepted that top-down emissions policies are less cost effective than the ETS. In 2019, we reviewed evidence on the relative performance of different policies and concluded with a rule of thumb that top-down emissions policies spend 5-10 times more per tonne abated than the ETS.[7] Voters care about the cost of living, so the higher cost of complementary policies compared to the ETS will plausibly translate to lower political efficiency (i.e. a higher burn rate of political capital per tonne) as well. The government's

benefits of its complementary policies and link those benefits with policies, complementary policies would still have no effect on overall emissions.

[5] We note that Strategas Consulting (2021), in a commissioned paper for MBIE, appears to agree with this test for the emissions benefits of complementary policies under an emissions cap (para. 55).

[6] H&M correctly note complementary policies create political capital.

[7] New Zealand Initiative (2019), *Switched On!*, Wellington. Link.

Feebate policy, which will add thousands of dollars to the cost of many vehicle imports for only limited emissions benefits, has already attracted protests.

However, complementary policies can also be a source of political capital. Governments are clearly rewarded for being seen to take action on climate change. Otherwise, they would not do it. We believe complementary policies provide something akin to a one-off boost to political capital (or perhaps a stream of political capital over time) which is mostly fixed with respect to the scale of each complementary policy.

We wish to identify when complementary policies will reduce emissions under a politically-constrained ETS cap. If complementary policies expand the pool of political capital, but burn capital at a higher rate per tonne of abated emissions than the ETS, this implies a breakeven point for the scale of complementary policies:

- Below this breakeven point, complementary policies will reduce total emissions by more than the ETS alone because complementary policies expand the available pool of political capital to reduce emissions. Complementary policies lower total emissions.
- At this breakeven point, the additional political capital which complementary policies brought in is exactly offset by their higher burn rate of political capital per tonne of emissions abated relative to the ETS. Complementary policies have no effect on total emissions.
- If complementary policies are scaled past this breakeven point, then their lower relative political efficiency per tonne of emissions overwhelms the political capital they brought in. Complementary policies *raise* total emissions.

A reminder that this analysis only applies where the ETS cap is politically constrained. So long as the ETS cap is not politically constrained, so that the government has the option to tighten the ETS cap without any other policies, then complementary policies cannot reduce emissions.

Unfortunately, we have seen no evidence that ministers and officials have considered the possibility that complementary policies could raise emissions. The Emissions Reduction Plan is a vast programme of complementary policies. The preceding analysis suggests only a limited window of opportunity for complementary policies to cut more emissions than the ETS alone. Moreover, if complementary policies are less politically efficient than the ETS, they can only reduce emissions by more than the ETS so long as they remain small. Otherwise, their lower efficiency will overwhelm the political capital they brought in, leading to higher emissions. So, even if complementary policies can reduce emissions by more than the ETS alone, it is difficult to see anything more than a minor additional contribution from complementary policies.

But what if complementary policies are *more* politically efficient than the ETS? Some officials hold this view. In that case, complementary policies will be scalable and the combination of ETS and complementary policies will certainly lower emissions by more than the ETS alone (again, provided the ETS becomes politically constrained in the first place).

We think it is highly unlikely complementary policies are more politically efficient than the ETS. If the reason the ETS becomes politically constrained is its effect on the cost of living, then it is difficult to see how complementary policies, with their higher cost of abatement, are a credible solution. We have heard it argued that the lower visibility of complementary policies means they can do more without voters noticing. We think complementary policies are more visible than the ETS, and that no policy can remain hidden at the scale that is needed to achieve emissions targets.[8]

Nevertheless, even if complementary policies both bring in political capital and are more politically efficient, the questions are, first, by how much will complementary policies further lower emissions, and secondly, whether this extra reduction is worth the cost and risk of the vast commitments to complementary policies which the government is now considering.

We suggest there are two things to keep in mind. First, extra reductions comes from the *difference* between the relative political efficiency of complementary policies versus the ETS. Even if this gap is positive, it is likely to be small, at most a few percent. It is hard to imagine complementary policies could deliver gains of 20% or more (in which case, there should be evidence to show this, in which case why do the ETS at all?). Second, any reduction in emissions from complementary policies could be achieved at less cost and virtually zero risk with additional removals (whether by trees or other carbon capture technologies) and/or offshore mitigation. Both of these channels are available under the *Climate Change Response Act* and the Paris Climate Agreement.

Even with a politically constrained ETS, we are unable to discern any sufficiently credible pathway to lower emissions which would justify a commitment to complementary policies on the basis of emissions reductions.

Why should the ETS ever become politically constrained?

We have argued complementary policies can only reduce emissions under a politically-constrained ETS cap. If the government has the option to tighten the emissions cap without other policies, then complementary policies cannot lower emissions. Thus, a politically constrained ETS before 2050 is essential to the case for complementary policies today.

It is hard to see any reason why the ETS should become politically constrained before 2050:

- Voters appear to have sufficient tolerance for carbon prices to achieve net zero emissions.
    - In New Zealand, the ETS price doubled from $30 to $65 in the 15 months to September 2021 without any political fallout.
    - The EU ETS price is close to NZ$100, with only limited evidence of political problems (the *gilet jaune* protests are mostly not directed at the current carbon price).
    - The carbon price in Sweden is approaching NZ$200.[9]

[8] That argument also raises questions about democratic legitimacy.

[9] https://www.iea.org/policies/12725-sweden-carbon-tax

- There is evidence that an ETS price of NZ$50-$120 will deliver net zero emissions by 2050.
    - The Climate Change Commission estimated a $50 ETS and current policies will deliver net zero emissions.[10]
    - The Ministry for the Environment ("MfE") says a $50 ETS will lead to 4.7 million hectares of afforestation by 2050. New Zealand only needs around one quarter of that amount to achieve net zero emissions by 2050.[11]
    - Other studies for New Zealand estimate ETS prices in the range of $85-$127 will deliver net zero emissions in 2050.[12]
    - Offshore mitigation[13] is effectively unlimited and, with so many options, it is difficult to believe this country will have any trouble finding affordable options.[14]
    - There are a number of carbon capture and storage technologies, besides trees, which all cost less than US$120/tonne.[15] New technologies are coming on line.[16]

With the ETS at $65, advice from the Climate Change Commission and MfE suggests New Zealand is *comfortably* on track to net zero emissions.

However, the government expects (or states that it wants) a higher ETS price in the future, possibly as high as $250 per tonne by 2050.[17] To achieve this price, the government will have to significantly limit access to more cost-effective removals (including but not limited to exotic forestry) technologies and offshore mitigation.

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[10] Climate Change Commission (2021), *Ināia tonu nei: a low emissions future for Aotearoa*, section 6.3, p91. The Commission argued the ETS is not enough due to concerns about reliance on forestry. The Commission's demonstration path plants almost as many hectares of trees as current policies, but with a higher proportion of native trees. As far as we are aware, the Commission has not said it believes the outcomes from current policies are politically infeasible. Our impression is the Commission simply prefers different outcomes. Currently, the Commission's preferences do not determine the political feasibility of emissions policies.

[11] Ministry for the Environment (2020), *Marginal abatement cost curves analysis for New Zealand*, Wellington, p.21. Link

[12] See Wang, Yue, Basil Sharp, Stephen Poletti and Kyung-Min Nam (2021), "Economic and land use impacts of net zero-emission target in New Zealand," *International Journal of Urban Sciences*, https://doi.org/10.1080/12265934.2020.1869582; and Concept Consulting, Motu Economic and Public Policy Research, Vivid Economics (2018) "Modelling the transition to A lower Net emissions New Zealand: Interim results," Wellington, New Zealand: NZ Productivity Commission. Reported in Wang et al. (2021).

[13] As the *Climate Change Response Act* requires, we refer only to robust offshore mitigation.

[14] For example, US company Terraformation replants rainforest and can achieve removals for US$7/tonne. Link. Air New Zealand relies in part on offshore mitigation and charges approximately NZ$23/tonne for offsets.

[15] National Academies of Sciences, Engineering, and Medicine (2019), *Negative Emissions Technologies and Reliable Sequestration: A Research Agenda*. Washington, DC: The National Academies Press. https://doi.org/10.17226/25259.

[16] To give one of many examples, the University of NSW has developed a chemical process which captures and stores CO2 at an estimated cost of US$100/tonne. Link.

[17] The Climate Change Commission modelled an ETS price of $250 in 2050. The government has adopted annual increases in the ETS price floor.

An ETS price of $250 may be politically unattainable. Even if $250 can be achieved, a future government may choose to allow the ETS price to rise until the political constraint binds. In other words, a future government may decide to spend its political capital to minimise removals and offshore mitigation.

This possibility, that a future government could choose to tighten the ETS cap up to the point its majority is threatened, does not justify complementary policies today. We must distinguish between *choosing* to tighten the ETS cap until it reaches the political constraint, versus the ETS becoming politically constrained before 2050 beyond the government's control. In view of the evidence listed above, we see almost no possibility of the latter scenario.

If the government can avoid the political constraint simply by allowing a few more trees to be planted, or slightly greater use of another removals technology, then we are in the unconstrained version of the argument for avoiding the waterbed effect. Here, the waterbed effect applies and complementary policies do not reduce emissions.

The door is opened to complementary policies reducing emissions only when the government has no alternative ways to reach emissions targets.

Carbon dividend

If the argument for complementary policies is that they expand the pool of political capital which leads to a tighter ETS cap and lower emissions, we see no reason why the same logic should not apply to the ETS itself.

A carbon dividend expands the available pool of political capital for the ETS which allows for a tighter cap.

Currently, revenues raised from auctions of ETS permits are ring-fenced for projects related to climate change. The government instead could rebate ETS auction revenues back to households. A carbon dividend would embed political support for rising ETS prices, at least for the next decade.

A carbon dividend mitigates equity-based concerns about rising ETS prices. It is generally accepted that low-income households spend a higher proportion of their incomes on carbon and therefore that carbon pricing is mildly regressive. The combination of a carbon price and a carbon dividend reliably makes the ETS progressive.

Eventually, rising ETS prices will not make up for decreases in auction volumes as net emissions approach zero. The pool of funding from a carbon dividend rises for a period, peaks, and then will begin to fall. The dividend can be considered as helping households fund their transitions to lower carbon footprints.

Caveats and other notes

The argument for the neutralising effect of a binding ETS cap only applies to the parts of the economy where the cap applies. The ETS does not neutralise the emissions benefits of complementary policies outside the cap, such as livestock emissions in agriculture.

A non-binding emissions cap (i.e. a cap which is not tight enough to constrain emissions) does not neutralise the emissions benefits of complementary policies.[18]

As far as we are aware, the New Zealand ETS is the most comprehensive of any cap-and-trade scheme in the world. This makes New Zealand different from other countries in an important way. Policies and policy prescriptions which might make sense in other countries, where emissions are not capped or the cap is not comprehensive, may not apply here. Complementary policies which are not neutralised in other countries may be neutralised here. Apart from agriculture, the government should not simply import consensus policy positions from other countries without considering the consequences of New Zealand's comprehensive cap for those policies. Regulations, subsidies and bans may well cut emissions in countries without a comprehensive ETS. That does not make them good policy options in other countries with a comprehensive ETS (again, excluding agriculture).

It is essential that the government takes proper account of our different foundational policy framework in its climate change strategy.

Conclusion

The government should have written this paper years ago. It is about to make unprecedented policy commitments under its Emissions Reduction Plan without any basis to believe its plan will reduce emissions.

The framework and analysis in this paper is only preliminary, but our findings are clear. The waterbed effect is a sufficiently general phenomenon that nearly all of the government's current and proposed complementary policies will be caught by it. We can see no credible pathway for complementary policies under the Emissions Reduction Plan to further reduce emissions given the government has already capped emissions via the ETS:

- Emissions will come down in line with the ETS cap (including the stockpile) with or without complementary policies.
- Complementary policies can only reduce emissions if the ETS becomes politically constrained before 2050. Even then
    - complementary policies can only make any material difference to emissions if they are more scalable (i.e. more politically efficient per tonne abated) than the ETS, which seems implausible
    - complementary policies are probably less politically efficient than the ETS, in which case complementary policies could raise emissions.
- We see no plausible way for the ETS to become politically constrained before 2050 except as the result of governments choosing to limit access to removals technologies (not just trees) and access to offshore mitigation.

[18] For example, if an economy produces 100 tonnes of emissions and the government sets the cap at 200 tonnes (by issuing 200 emissions permits), the cap will not determine total emissions, which will remain at 100 tonnes, and the waterbed effect will not apply.

In short, we see no credible or sufficiently general combination of events in which complementary policies lower emissions under a binding ETS cap.[19] Complementary policies require an exceptionally unlikely combination of events to reduce emissions. Even then, the same reduction in emissions could be achieved for a fraction of the cost and virtually zero risk via removals or offshore mitigation. Over the medium term, a carbon dividend supports a tighter ETS cap.

In all, complementary policies look like a bad bet, at least if the primary goal of the Emissions Reduction Plan is to reduce emissions.

The New Zealand Initiative calls on Climate Change Minister James Shaw to urgently explain how complementary policies will lower emissions under a binding emissions cap.

Matt Burgess
24 November 2021

[19] We repeat the distinction between complementary and enabling policies. The emissions benefits of both types of policies are neutralised by a binding ETS cap. However, enabling policies, which remove legal barriers to opportunities to reduce emissions or support a level playing field for discovering least-cost ways to reduce emissions, allow a given quantity of emissions to be reduced by the cap at a lower cost per tonne. In the terminology used by this paper, EV subsidies, 100% renewable electricity, and the coal boiler replacement programme are *not* examples of enabling policies.