

Perspectives Series – The ‘waterbed effect’: the most important climate policy you’ve never heard of

30 November 2021

Executive Summary

1. As of June 2020, the Emissions Trading Scheme (ETS) is capped which means there is now a maximum amount of emissions allowed under the scheme. This amount is being reduced every year.
2. This will help drive emissions down and be the most important and effective climate policy any Government introduces.
3. Crucially though, it completely neutralises most other policies to reduce emissions. For example, subsidising electric vehicles might lower our transport emissions but cannot lower New Zealand’s *total* net emissions because transport is already covered by the ETS.
4. If fewer people drive petrol-powered vehicles, then emissions permits are freed up which will then be taken by other users, such as factories.
5. This is known as the ‘waterbed effect’, because pushing down in one area means emissions pop up in other areas.
6. This is one of the most important - but least understood - concepts in climate policy.
7. Every non-ETS climate policy now has to be re-assessed in light of this to avoid expensive and ineffective policies.
8. An FAQ on the waterbed effect follows as Appendix One.

Good news for the climate - the ETS now has real power

9. The ETS works through the Government issuing permits to emit which then trade for a price. This puts a direct price on emissions which flows through to nearly everything we buy.¹
10. It means that goods and services which generate emissions (like coal) are more expensive than lower emitting alternatives (like renewable energy and natural gas). Therefore it encourages people to minimise emissions as much as possible.
11. The ETS covers nearly half of New Zealand's total emissions, with the notable exception of agriculture.
12. The ETS has previously been criticised for not achieving emissions reductions over the previous 13 years it has operated, despite the fact New Zealand's per capita emissions fell by 22% between 2008 (when the ETS was introduced) and 2019 (the last available figures).² However, placing a cap and sinking lid on emissions has now fundamentally changed the ETS because it guarantees that emissions will fall.

Why the ETS is best for the environment and economy

13. Pricing emissions is the most efficient and least costly way to reach New Zealand's goal of net zero emissions by 2050. This is because it allows people and businesses to make their own decisions on the best ways for them to lower emissions.³
14. This is the finding of numerous studies, including economist William Nordhaus who won the Nobel Memorial Prize in Economic Sciences in 2018 for his work demonstrating that carbon pricing is the most efficient tool for reducing emissions.⁴
15. A real advantage of using the ETS is that it doesn't involve centralised hands-on Government co-ordination and interventions, which are complex and often unlikely to succeed. Taking a broader overall focus means we don't require a separate and detailed plan for every sector of the economy and society.

¹ An excellent explainer on how the ETS works by Matt Burgess from the New Zealand Initiative is available here: <https://www.nzinitiative.org.nz/reports-and-media/reports/the-emissions-trading-scheme-faq/>.

² Of course, this ignores that New Zealand's emissions almost certainly would be higher in the absence of an ETS. Source for the 22% figure is the Ministry for the Environment, Greenhouse Gas Inventory 1990-2019 (<https://environment.govt.nz/publications/new-zealands-greenhouse-gas-inventory-1990-2019/>); population figures from Statistics New Zealand (Infoshare).

³ We prepared a Perspectives note entitled *Why a 'least cost' approach to net zero emissions is critical* which can be found at: <https://www.energyresources.org.nz/dmsdocument/178>.

⁴ See <https://www.nobelprize.org/prizes/economic-sciences/2018/nordhaus/facts/>.

16. For example, it means the Government doesn't have to 'pick winners' and gamble on which future energy sources might be effective, like hydrogen or bio-gases. They can simply set the ETS framework and let people and businesses – who know their own circumstances best - figure this out, guided by the price signal.
17. Modelling by the Climate Change Commission shows current policies with a \$50 ETS will deliver net zero emissions by 2050.⁵ As of 4 November, the ETS price is already \$65.⁶
18. It's lower cost to use the ETS; studies show it can be up to 50 times cheaper per tonne of CO² avoided than other tools like subsidies.⁷ This is good news for household wellbeing and the wider economy.
19. The fact it is cheaper to reduce emissions by using the ETS means it is more likely that emissions *will* fall if we choose this option, rather than using more expensive tools that are less likely to succeed. We are more likely to reach our destination via an easy path than a difficult one.

What it means for climate policy: most interventions now ineffective

20. The 'waterbed effect' - as explained in the introduction - means most policies aimed at reducing emissions end up shuffling around the different sources of emissions (e.g. less in transport and then more in industrial use) without reducing overall emissions.
21. For example, subsidising people to take the bus may have other benefits (such as reducing congestion) but it cannot lower our total emissions, which is the only thing that matters to climate change.
22. This is because if fewer emissions units are used in transport, they become available for others uses and will be snapped up by those who need them as they cannot easily abate. This a relatively new concept that seems little understood and receives little media coverage.
23. The Intergovernmental Panel on Climate Change (IPCC) agrees that "*[I]f a cap-and-trade system has a sufficiently stringent cap then other policies such as renewable*

⁵ See analysis by the New Zealand Initiative "[Climate Change Commission shows economic transformation is unnecessary.](#)"

⁶ Latest prices can be seen at <https://www.carbonnews.co.nz/tag.asp?tag=Carbon+prices>.

⁷ See for example work by the New Zealand Initiative: [Switched On: Achieving a Green, Affordable and Reliable Energy Future](#) page 30 and Appendix One.

*subsidies have **no further impact on total greenhouse emissions.***" (emphasis added).⁸

24. For policy makers, it means every proposed idea on climate policy should answer a simple question: *will this policy reduce overall net emissions, given the ETS is now capped?*
25. Some recent examples of policies to reduce emissions that may not actually do so anymore include:
 - a. subsidies to private companies to replace coal boilers;
 - b. switching Crown vehicles to electric;
 - c. subsidising biofuels and hydrogen;
 - d. encouraging cycling and public transport;
 - e. subsidies for electric vehicles; and
 - f. the *Let's Get Wellington Moving* transport project which now has a top priority; of reducing emissions through initiatives such as light rail.⁹
26. Of course, some policies may still be desirable and important for other reasons – but it is impossible for them to lower New Zealand's total emissions under a capped ETS scheme.
27. This is good news for Governments both local and central, as it makes their job a lot easier. It does, however, mean we need to recalibrate the expected costs and benefits of many policies. It also means that policies which may have merit overseas in jurisdictions without a capped ETS simply do not make sense here.

The capped ETS is already working

28. A number of investment decisions have been made recently that are either directly or in part due to the ETS putting a price on emissions. Some examples include:
 - a. a 15% increase in solar panel installations over 2020;¹⁰
 - b. WEL Networks planning to build a new storage battery in Waikato to reduce the use of fossil fuels for electricity;¹¹

⁸ Intergovernmental Panel on Climate Change (IPCC), "AR5 Climate Change 2014: Mitigation of Climate Change," Working Group III Contribution to the Fifth Assessment Report (Cambridge University Press, 2014) – Assessment Report 5," Working Group 3 [2014].

⁹ "A greater focus on climate change and reducing carbon emissions is just one of the changes to emerge from an update to the objectives of the *Let's Get Wellington Moving* programme" – [media release](#) 1 July 2021.

¹⁰ "NZ Solar take-up still low but economics are changing, says installer" – [Stuff](#) 10th April 2021.

¹¹ "Big battery to help cut Waikato's fossil fuel use" – [Stuff](#) 18th October 2021

- c. decreasing use of coal over the last decade (until the last couple of years);¹²
 - d. Todd Energy's new solar power plant in South Taranaki;¹³ and
 - e. oil and gas companies phasing out 'flaring' (burning of excess natural gas from production sites).¹⁴
29. Given the ETS impacts the cost of nearly every product and service, there will be countless other minor changes in behaviour that can't be measured but certainly mean our emissions are lower than would otherwise be the case.
30. For an overseas example, in the UK emissions from the electricity sector have dropped 55% since 2013 as operators move away from coal, largely driven by the availability of low emissions North Sea gas and their ETS.¹⁵

How to give politicians (and the ETS) more credit

31. Even with the waterbed effect, there still remains strong political incentives for policymakers to bring in additional policies for the simple reason they are more visible than simply using the ETS. Understandably, politicians want to show specific and immediate actions they have taken to reduce emissions in different areas (even if the impact on *total* emissions is zero).
32. To change this, we would like to see policymakers give more credit to the ETS. Some ideas to help drive this could include:
- a. companies publicly acknowledging how the ETS has influenced decisions when they announce new initiatives and investments;
 - b. politicians doing the same when welcoming private sector moves;
 - c. politicians referencing the role and success of the ETS in public communications on climate issues; and
 - d. the media questioning all new climate policies on whether they will actually reduce overall net emissions, given the ETS is now capped.

Are there any times that policies beyond the ETS are a good idea?

¹² See *Energy in New Zealand 2021*, Ministry of Business, Innovation and Employment.

¹³ "New Zealand's largest grid-connected solar farm now open in Taranaki" – [Stuff](#) 25th June 2021.

¹⁴ See for example "Petroleum Conference 2019 Award winners announced" – PEPANZ [media release](#) 1 October 2019.

¹⁵ See "[Defending the ETS](#)" by Matt Burgess, New Zealand Initiative 30th March 2021.

33. Given the ETS is clearly the most efficient tool at reducing net emissions, it should be the default tool used unless there are residual genuine and material market failures or harmful consequences that the ETS is not designed to address.
34. In these cases, the problem should be clearly identified, the costs and benefits of intervention clearly demonstrated, and the right tool for the job used. For example:
 - a. if imperfect information exists, then a public information campaign might be warranted to help people make properly informed decisions; and
 - b. if the ETS is causing harm to lower income communities, then the Government could use tax and welfare payments to directly compensate rather than tinkering with the ETS and undermining the benefits it brings to climate policy.
35. An FAQ section follows as Appendix One.

Appendix One: FAQ on the waterbed effect¹

Using the ETS alone is not enough to reduce emissions as much as required?

The ETS is enough. Modelling by the Climate Change Commission shows current policies with a \$50 ETS will deliver net zero emissions by 2050.² As of 4 November, the ETS price is already \$65.³

Even if the ETS was not enough, that is not a reason to ignore the waterbed effect. Any new climate policy still has to show it can reduce total net emissions under a capped ETS.

But the public are silly and make the wrong decisions, even with pricing – like sticking with petrol powered cars?

If the ETS is capped then it doesn't matter. The total amount of emissions allowed stays the same, so if people really are wedded to petrol-powered cars then more emissions reduction will be required in other areas.

What about 'sunk assets' – people buying cars or building factories that will run on fossil fuels for decades?

People can (and do) factor in the expected long-term price increases for themselves when making these decisions. Again though, it doesn't matter if the ETS is capped because there are a finite amount of emissions allowed; reductions will just have to occur in different areas instead.

The fact that existing assets continue to operate under the ETS reflects the fact that there are other ways to reduce emissions more effectively. This is a benefit of the ETS, rather than a downside.

If we just rely on the ETS, won't we end up with trees planted across the whole country (which is a temporary solution anyway?)

If landowners decide that planting trees is the best option for them then their choice should be respected, unless there are wider impacts that affect other people.

¹ See the above paper by Matt Burgess for a much more detailed and comprehensive analysis of these arguments.

² See analysis by the New Zealand Initiative "[Climate Change Commission shows economic transformation is unnecessary.](#)"

³ Latest prices can be seen at <https://www.carbonnews.co.nz/tag.asp?tag=Carbon+prices>

In that case there could be targeted interventions at a local level (or potentially amendments to the ETS), rather than undermining the ETS as our best nation-wide tool for reducing emissions.

However, there is no danger of running out of land. If we did nothing else to reduce gross emissions (extremely unlikely) and only planted trees to lower net emissions, and only planted trees on farms, by 2050 we would have covered 9% of farmland in trees. The earliest date we run out of land on the most generous assumptions is some time in the 2500s.⁴

Planting trees may well be a temporary solution, but the time they buy us (likely several decades) will be invaluable for developing new solutions and technologies for emitters.

And if the carbon in trees is not released back into the atmosphere (e.g. permanently stored or embedded), then we would only need to replant existing plots rather than find new areas.

Relying on the ETS too much will end up costing households too much, and particularly lower-income households – making it politically impossible?

As noted above, modelling by the Climate Change Commission shows current policies with a \$50 ETS will deliver net zero emissions by 2050. As of 4 November, the ETS price is already \$65.

If there are concerns about equity effects then the best way to respond is by compensating households through the tax and welfare system, rather than tinkering with our best climate tool (the ETS).

Another good suggestion is a ‘carbon dividend’ - simply returning all of the revenue raised by the ETS back to households.⁵

But agriculture generates half of New Zealand’s emissions and isn’t covered by the ETS?

Work is underway for a pricing scheme for agricultural emissions which will help rectify this – we think it is only fair that all sectors contribute.

But even with current settings, modelling by the Climate Change Commission shows current policies with a \$50 ETS will deliver net zero emissions by 2050.⁶

⁴ See <https://greatsociety.nz/2021/08/24/how-much-land-do-we-really-need-to-plant-with-trees/>.

⁵ See more detail here: <https://greatsociety.nz/2021/10/21/the-case-for-a-carbon-dividend-in-two-charts/>.

⁶ See footnote 2.