

SUBMISSION ON 'SETTING NEW ZEALAND'S POST-2020 CLIMATE CHANGE TARGET'

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Introduction

1. Thank you for the opportunity to submit on 'Setting New Zealand's post-2020 climate change target' (called 'the discussion document' in this submission'). A particular thanks to Adolf Stroombergen who helped me understand some of the specifics of Infometrics's general equilibrium modelling (called 'the economic analysis').
2. This submission is in my capacity as a private individual.
3. I am an economist with twelve years' experience in various policy roles, all of which have had a significant economic and regulatory impact analysis component. In one of my former roles, I played a small part in the establishment of New Zealand's Emissions Trading Scheme – observing inter-departmental meetings and assessing the adequacy of the regulatory impact analysis.
4. During my studies, I was awarded the New Zealand Association of Economists & Treasury Scholarship, and all of Victoria University's prizes for economics and public policy at the time, including the School of Economics and Finance Prize in Economics, the Civil Service Institute Prize in Public Policy and Public Administration, and the Jan Whitwell Prize for Monetary and Macroeconomics.

Summary

5. Based on the lack of logical reasons for New Zealand to be treated significantly different from other wealthy countries, and the surprisingly low costs to New Zealand of reducing emissions (assuming emissions trading), I recommend an emissions reduction target in the order of 40% to 60% below 1990 levels.

Comment on the quality of the consultation process

6. The consultation process has been inadequate for the public to make fully considered submissions. This will have a detrimental impact on the quality of submissions, including my own which may contain more errors than otherwise.

Time period

7. Four weeks is an extraordinary short time frame; a time frame made shorter as Infometrics's economic analysis and Landcare's economic analysis were not released for weeks after consultation began.

Discussion document

8. The discussion document reads like a collection of random thoughts. The discussion document does not contain a clear framework with which people can easily see what the choices are and what the implications of those choices might be. The discussion document is, essentially, incoherent.

9. The discussion document contains worrying gaps in the logic and little supporting evidence. The submission form provided by the Ministry says submitters should 'explain [their] rationale and provide supporting evidence where appropriate'. This seems to require a higher standard of the submissions than the discussion document.

Economic analysis

10. As evidenced by my inability to understand it, and officials' inability to answer my straightforward questions about it, the economic analysis is also difficult to understand.
11. The economic analysis says:
An oft-used criticism of CGE models, at least historically, is that, given the vast amount of data, parameters, equations and assumptions required to compute outcomes, such models can be somewhat of a "black box" in nature. That is, it is sometimes difficult to identify exactly how certain results were obtained. This is true only to the extent that modellers are not transparent regarding what data they have put into the model, how they have modelled policy changes and how they have interpreted the results.
12. The economic analysis fails to heed its own warning, and is nearly impossible to understand what is going on in the model.
13. Again, I am grateful to Adolf Stroombergen for answering my questions, but these are things that should have been clearly detailed in the economic analysis and in the discussion document. Those who haven't had the fortune to have Adolf personally answer the questions will continue to have little idea as to the workings of the model and, therefore, the reasonableness of it.

Specific comments on the analysis

14. This section contains relatively narrow comments on the analysis in the discussion document, the economic analysis, and what was discussed at public meetings. Comments on the overall analytical framework are discussed in later sections.
15. In this submission, 'greater target' means a larger reduction in emissions.

Tone of the discussion document

16. Attendees at public meetings have said that the discussion document focuses overly on the costs and neglects the benefits. I agree with these sentiments.

Co-benefits

17. Whether there are co-benefits (eg spinoff technologies, upskilled workforce) that arise from a greater reduction in emissions and the associated technology, I cannot say. However, other countries have implemented and achieved greater targets. There should be evidence about co-benefits that could have been used in the analysis.
18. If there are co-benefits, this would suggest a greater target.

Benefits of reducing emissions

19. The economic analysis counts no benefits from reducing emissions. This is because New Zealand's emissions enter the global pool of emissions, and the harm to New Zealand of New Zealand's emissions are negligible.

20. However, every tonne of CO₂e New Zealand emits causes the same amount of harm as a tonne of CO₂e from any other country. Thus, New Zealand's CO₂e causes harm to someone, even if not in New Zealand, and reducing emissions generates benefits to those people.
21. If New Zealanders care about the welfare of people overseas harmed by our emissions, this benefit should be counted towards the analysis.
22. That New Zealanders care about the welfare of people overseas to at least some degree is evidenced by our peacekeeping and defence actions, our acceptance of refugees, and the aid (public and private) we give to other countries. The discussion document should have discussed the degree to which we care for the welfare of overseas people.
23. If New Zealanders care for the welfare of overseas people, this suggests a greater target.

Benefits of avoiding sanction

24. The analysis does not estimate the probability nor impact on New Zealand of sanctions by other countries' governments or consumers or producers (further up the value chain) should New Zealand not join an agreement or set a reasonable target.

Uncertainties

25. The discussion document notes a number of uncertainties, including technology, the rules around forestry, and whether New Zealand will have access to international carbon markets.
26. But rather than attempt to quantify these uncertainties or model what would happen in different scenarios, the discussion document leaves everything up to the imagination of the reader.
27. This does not encourage transparent decision-making.

Agriculture and domestic policy

28. Alarming, the economic analysis does not consider any options that price agricultural emissions. I note that the Ministry wishes to focus on what the target should be, with domestic policy settled later, but the two cannot be easily separated. The costs of a target depend on how broadly or narrowly the costs are borne.
29. As confirmed by Adolf at the Victoria University meeting, including agriculture lowers the cost of abatement (a broader tax that covers all sectors is more efficient than a narrow tax).
30. Including agriculture suggests a greater target.

New Zealand's agriculture is efficient by world standards

31. The discussion document notes that New Zealand is an efficient producer of agriculture. This forms the basis of an argument that we wouldn't want to risk this, and cause carbon leakage.
32. However, in a world of open trade, all countries specialise in their comparative advantage.
33. We specialise in agriculture – costs are comparatively lower, and our GDP has a higher proportion that is agriculture. Japan specialises in cars – costs are comparatively lower in Japan, and Japan's GDP has a higher proportion that is car manufacturing.
34. Saying that we have to be careful not to discourage agriculture is like saying Japan should be careful not to discourage cars. Both involve greenhouse gases.
35. This quickly becomes a reason for no country to do anything.
36. The real point is that every country is doing what they're efficient at, and any effort to reduce greenhouse gases by any country will be hard because of that. Countries are no longer inefficient monopolies where costs can be cut easily.

37. That we are efficient at agriculture is irrelevant to the discussion: it should have no bearing on setting the emissions target. To the extent that this erroneous argument has influenced the Ministry's thinking on an appropriate target, correcting this misperception suggests a greater target.

Displacing agricultural production

38. Page 10 of the discussion document says:
As no other country has yet put a direct carbon price on farmers, such a price could potentially displace agricultural production in New Zealand with less efficient farming in other countries.
39. This is only a concern if other countries are not in a global agreement. (Note that the economic analysis assumes that other countries are in an agreement)
40. If we price agriculture and other countries do not, there will be some shift of production to those countries. However, if those countries are in the agreement, they are liable for these new emissions, and have to reduce emissions elsewhere or pay others to do so. The impact on global emissions is nil.
41. Further, if other countries don't tax agriculture, they must tax other industries more to pay for their liabilities. This makes New Zealand more competitive in those industries, with production shifting here.
42. That we might displace agricultural production is irrelevant to the discussion if other countries are within the agreement: it should have no bearing on setting the emissions target. To the extent that this erroneous argument has influenced the Ministry's thinking on an appropriate target, correcting this misperception suggests a greater target.

Technological viability

43. Page 8 of the discussion document says 'there are few viable options for reducing agricultural emissions in the short term'. Page 10 says scientists 'estimate that some of these technologies may become commercially available over the next 10 to 20 years'.
44. The availability of technology depends on their being a profit available. Pricing agriculture would provide that profit motive. Not pricing agriculture because the technology doesn't exist becomes a self-fulfilling prophecy.
45. Pricing agriculture would mean faster technological adaptation, lower costs, and, therefore, suggests a greater target.

Renewables

46. Page 3 of the discussion document says:
We have one of the highest levels of renewable electricity generation in the world (around 80 per cent compare with the OECD average of 22 per cent) – leaving less room to reduce emissions in this area.
47. The footnote to that quote notes that this statistic excludes nuclear power.
48. This is quite an omission, and very misleading.
49. Nuclear power does not have greenhouse gas emissions. Nuclear power makes up about 30% of the OECD's electricity production. This takes non-greenhouse gas electricity generation for the OECD to greater than 50%.
50. Yes, our high renewables makes it difficult to reduce emissions in this area, but it's also difficult in France where nuclear power is 75% of electricity production.

51. Furthermore, all this means is that there must be other areas where we produce emissions. Areas that, for some reason, receive little attention in the discussion document. Even if we exclude agriculture – which we shouldn't (see above) – we have similar CO₂ emissions to the European Union.

Costs to households

52. Page 14 of the discussion document looks at costs to households, and includes cost estimates for different emissions targets.

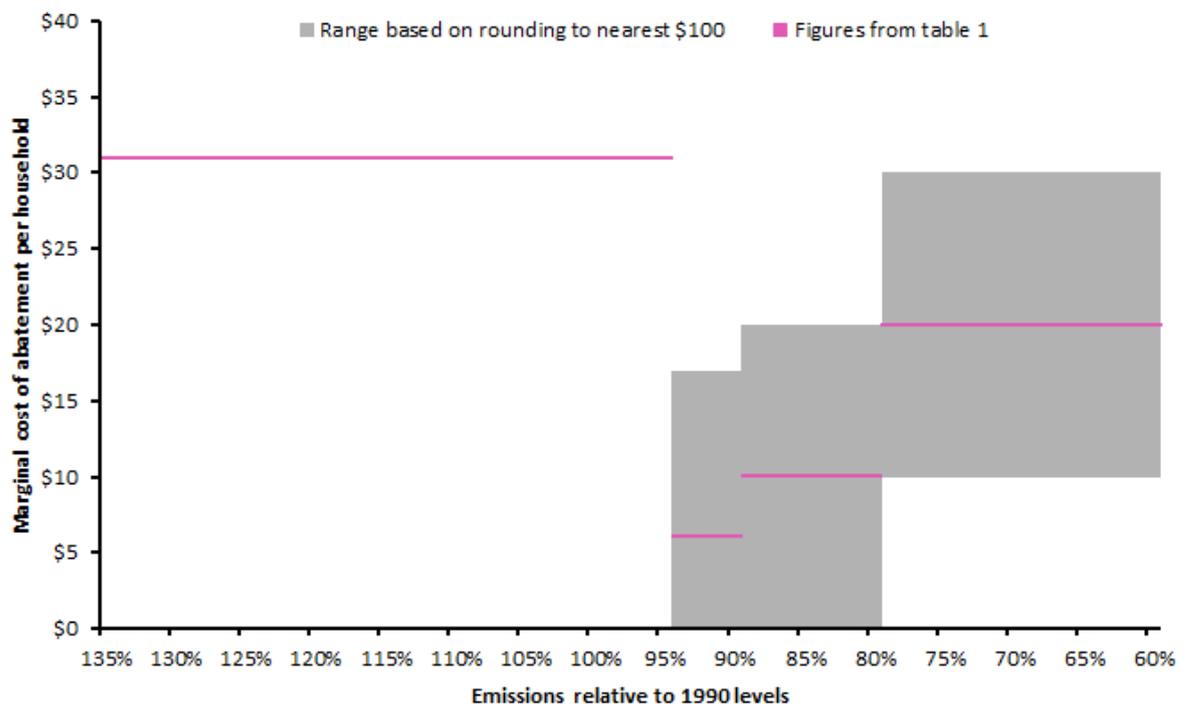
53. Curiously, the costs per percentage point reduction are highest for the smallest reduction target.

54. For example, page 14 notes that emissions will be 36% above 1990 levels by 2027. To get 5% below 1990 levels is approximately a 40 percentage point reduction. This costs about \$1,200 per household. Therefore, every percentage point reduction costs \$30 per household per annum ($\$1,200 \div 40$).

55. The next 5 percentage points from 5% below to 10% below only cost \$30 per household, or \$6 per household per annum ($\$30 \div 5$). The next 10 percentage points from 10% below to 20% below cost \$100, or \$10 per household per annum ($\$100 \div 10$), and so on.

56. Figure 1 shows the curiosity.

Figure 1: Marginal costs of abatement per household



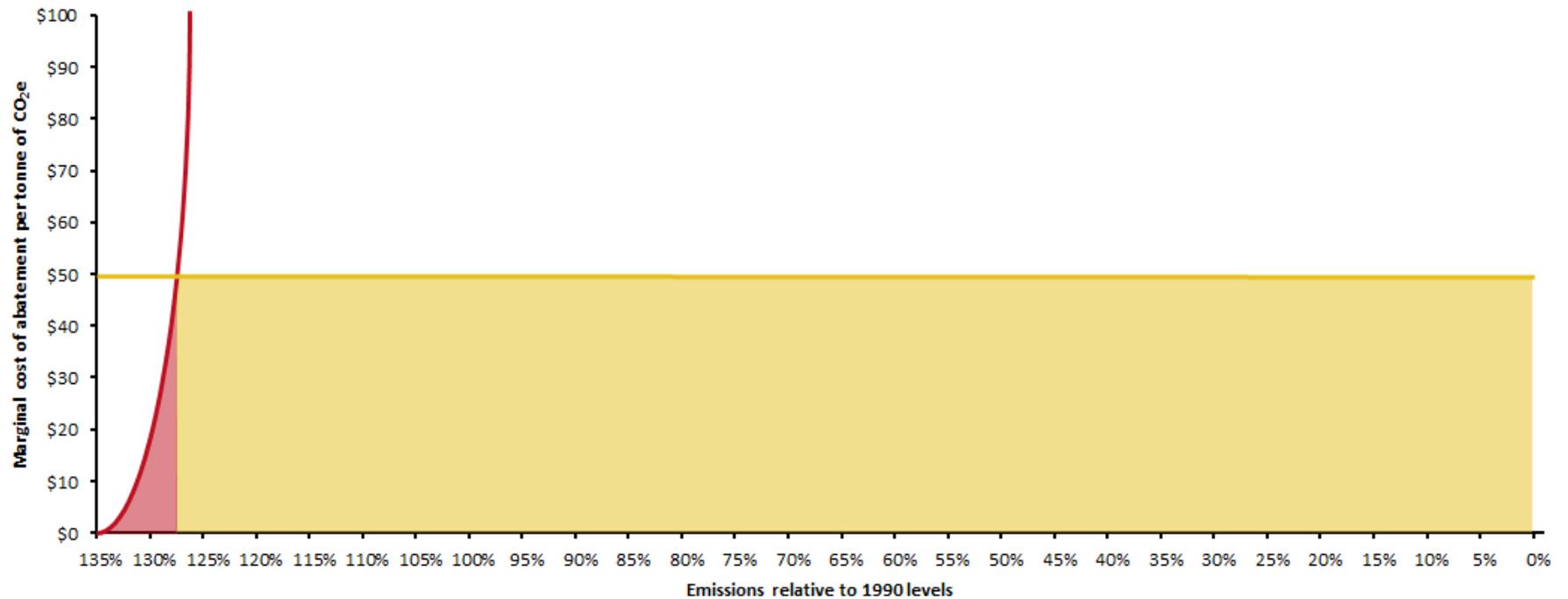
57. Officials at the second Wellington meeting could not explain why there would be higher costs for the first set of emissions reductions.

58. Possible explanations include an error in the modelling, massive fixed costs for simply joining a global agreement / signing-on for carbon trading, or both.

59. After discussions with Adolf Stroombergen, here is the explanation:

60. The assumptions:
- A. If New Zealand enters a global agreement, it will implement a domestic carbon tax.
 - B. The price encourages some domestic emissions reduction, but only 5.7% below 2027 levels (from 136% above 1990 levels to 128% above 1990 levels).
 - C. The carbon tax revenue is used to pay other countries to reduce emissions so that we can meet our target, and whatever is left over is recycled through lower income taxes.
61. Figure 2 illustrates situation where New Zealand has no target beyond whatever domestic emissions reduction occurs.

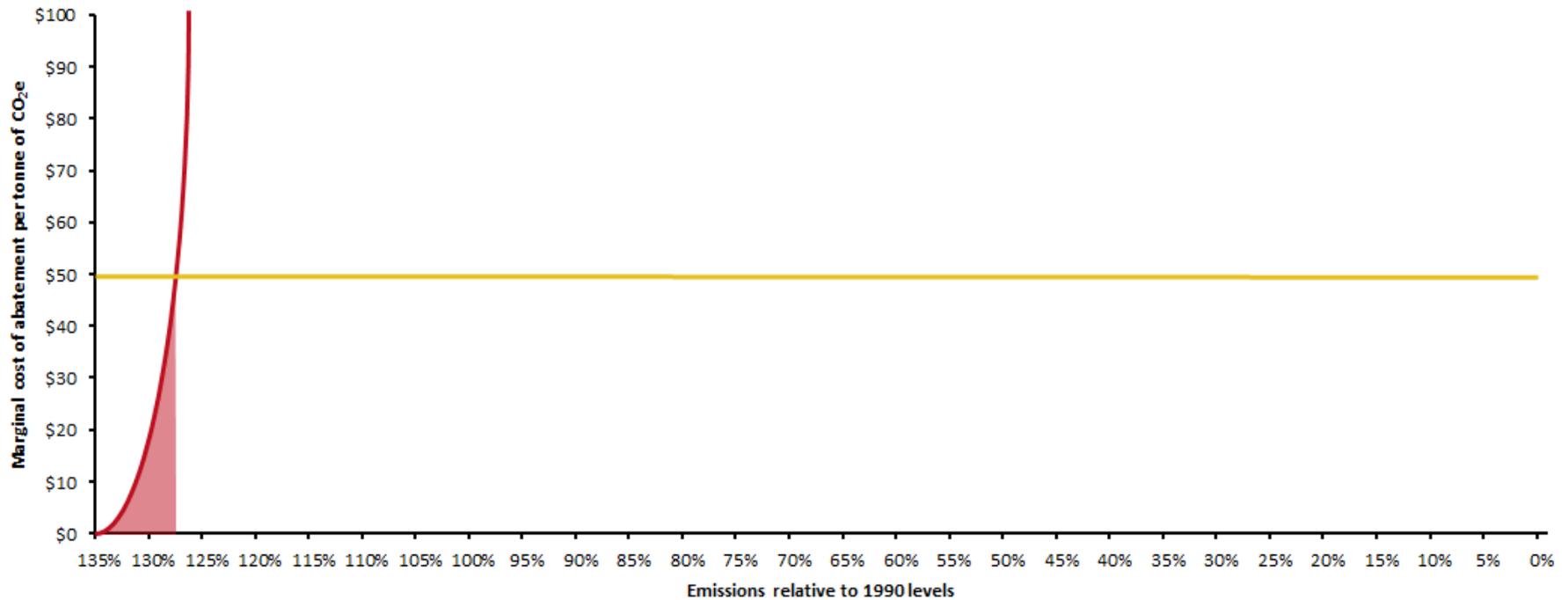
Figure 2: No target



62. The marginal cost of abatement is the red line, and the carbon tax the yellow line at \$50.
63. New Zealand reduces its emissions to 128% (given by the Infometrics analysis). New Zealand bears costs of this reduction along the red line to where it intersects the carbon price. New Zealand does not reduce emissions further as it's cheaper to pay the \$50 tax.

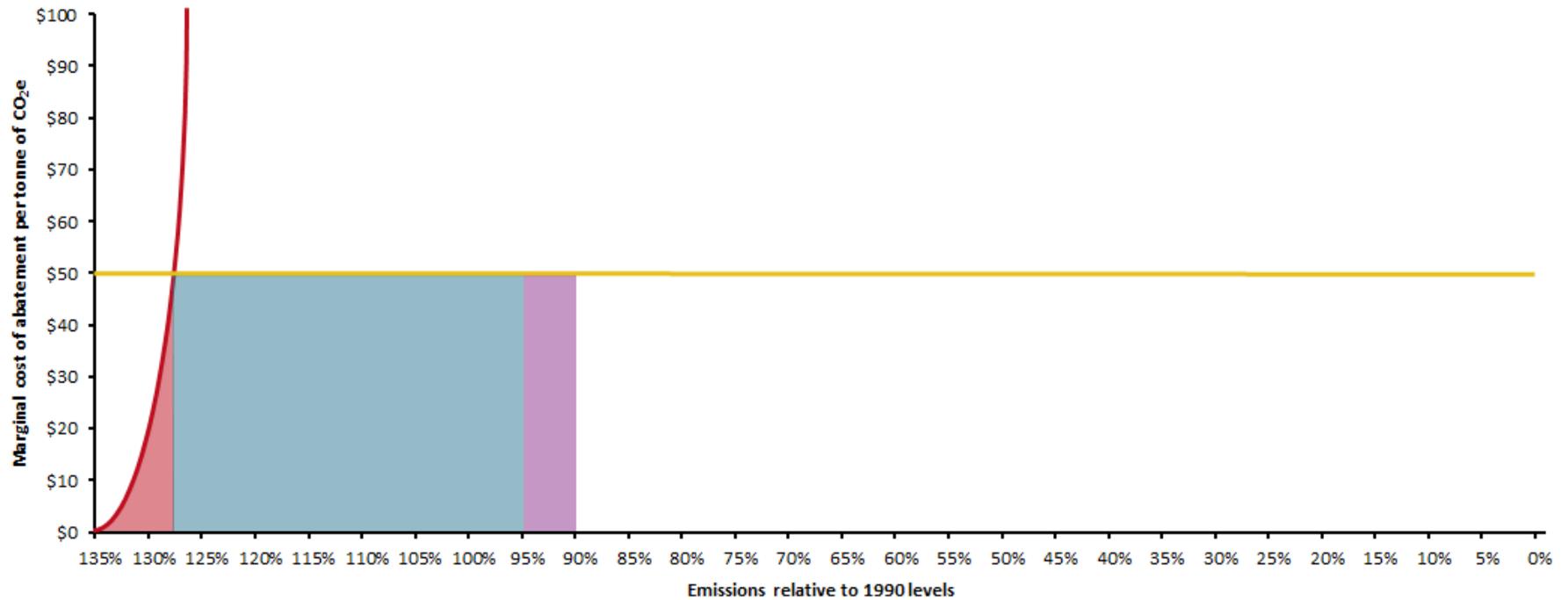
- 64. Carbon tax is collected on every emission (not really, as agriculture is unpriced, but for simplicity let's assume it is every emission). Total revenue is the yellow area.
- 65. Because there is no target, none of this revenue is used to pay other countries to reduce emissions. Instead, the revenue is recycled as lower income taxes.
- 66. This leaves just the red area as costs to New Zealand, as in Figure 3.

Figure 3: No target



- 67. This is the standard 'partial equilibrium' result. Now, the Infometrics analysis is a general equilibrium model where implementing a carbon tax and reducing income taxes has an impact.
- 68. Now, let's look at if New Zealand has a target of 5% below 1990 levels. Here some tax revenue (in blue) is used to pay other countries to reduce their emissions. If we go to 10% below, we pay the purple area as well.

Figure 4: 5% below and 10% below



69. From page 14 of the discussion document, we know that giving up this tax revenue in the purple area costs \$30 per household per annum (\$6 per percentage point). The blue area must cost less per percentage point than the purple area's \$6 per percentage point, but let's use \$6 as a conservative assumption. For simplicity, let's also assume the red area costs \$6 per percentage point even though it must be much lower than this.
70. As earlier, there are 40 percentage points in the reduction to 5% below 1990 levels. Multiplying this by \$6 gives \$240 per household per annum (40 × \$6).
71. Page 14 reports the costs to get to 5% below 1990 levels at \$1,270. If only \$240 (actually much less) can be attributed to the actual reduction in emissions, then over \$1,000 must be general equilibrium costs of raising carbon taxes on all emissions and reducing income taxes. \$1,000 is about 80% of the \$1,270, and matches what Adolf told me via email: "The largest effect on the \$1300 is the \$50/tonne CO₂ price – around 80%".
72. That is, \$1,000 of the \$1,270 are fixed costs that are incurred whatever New Zealand's target. These are fixed costs incurred for merely deciding to be a part of the global agreement.

73. There are a couple of issues that arise from this realisation:

Magnitude of the fixed costs

- 74. The cost to New Zealand of raising carbon taxes and recycling 100% of them in lower income taxes is four times as great as the cost of giving 25% of those taxes to other countries for “no benefit”.
- 75. Without knowing the model it’s difficult to test this further, but this seems like a remarkable (and maybe implausible) conclusion.
- 76. Would households really be four times as worse off if you taxed their carbon and reduced their income taxes, than if you took a quarter of that tax revenue and burned it?

Are the fixed costs relevant?

- 77. The only way to avoid this \$1,000 is to not be part of a global agreement.
- 78. This seems a highly improbable option. Even if New Zealand would make a decision not to join a global agreement, there would likely be sanctions that more than offset the gains. This suggests that the baseline should be re-specified to be no weaker than: New Zealand joins a global agreement and implements a domestic carbon tax of \$50 per tonne.
- 79. The question at hand is not ‘should we be part of an agreement?’ but ‘what is an efficient and fair target that we can agree with other countries?’. The fixed costs are borne in relation to the former question, not the latter. These costs are sunk, and should be set aside for the question of what is efficient.
- 80. Essentially, these fixed costs are raised so that we can have the option of purchasing reductions from overseas. If we don’t have a domestic carbon tax, we don’t have the revenue to pay other countries. We would then have to meet our obligation through far-costlier domestic emissions reductions.
- 81. Further, other countries will also have fixed costs of agreeing to be part of the agreement irrespective of their target. While our fixed costs will be higher than other countries with lower abatement costs, it would be strained equity argument to say that other countries should subsidise New Zealand’s fixed costs so that we can merely join the global agreement.
- 82. Removing the \$1,000 from the costs on page 14 of the discussion document leaves the following costs:

Table 1: Costs to households of different targets

Target	Reduction in household consumption from discussion document	Actual reduction in household consumption from the target
5% below 1990	-\$1,270	-\$240
10% below 1990	-\$1,300	-\$270
20% below 1990	-\$1,400	-\$370
30% below 1990	-\$1,600	-\$570
40% below 1990	-\$1,800	-\$770
Average annual consumption per household with no target	\$85,000	\$83,970

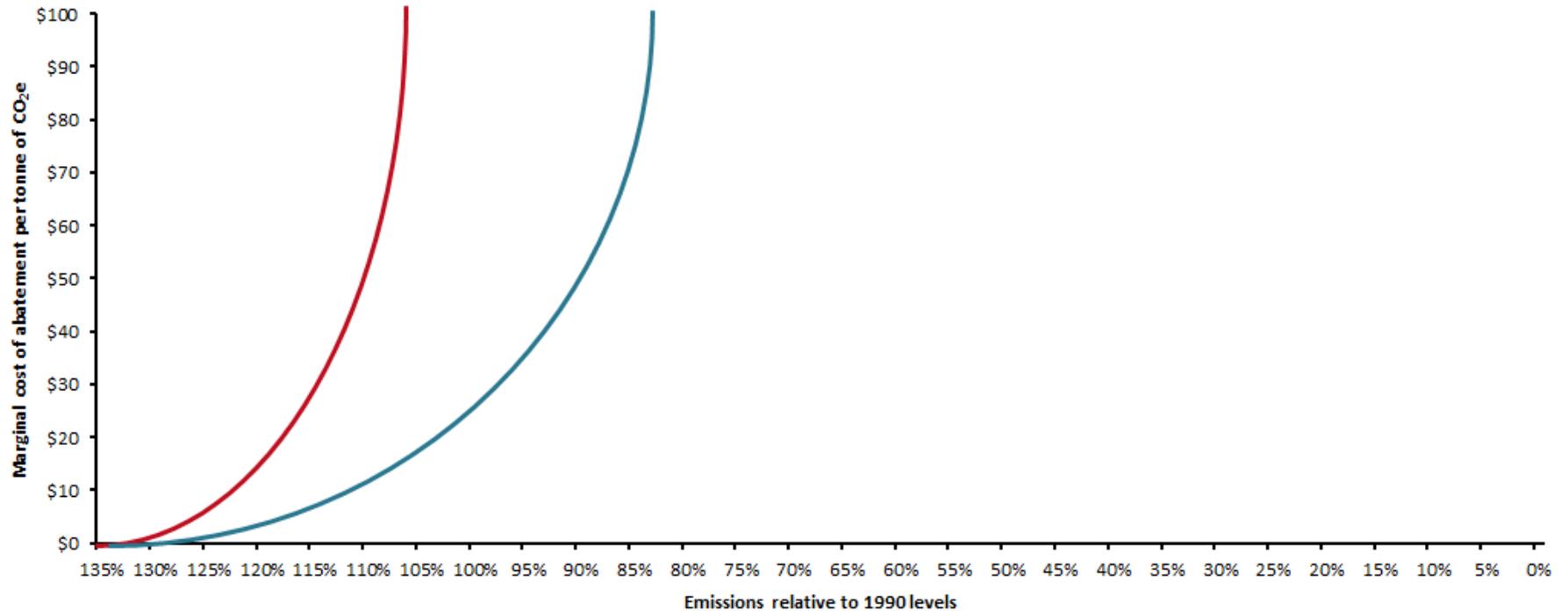
83. We can only speculate as to what people's responses to the discussion document would have been if the unavoidable/fixed costs and variable costs were separated and the third column in the above table had been included, rather than the second.
84. Finally, while other people's views may vary, these costs are surprisingly small. Less than 1% of household consumption to reduce emissions to 40% below 1990 levels seems relatively cheap.

A framework for considering a target

85. The discussion document does not contain a clear framework for considering the problem. This section begins to build that framework.

86. Figure 5 shows hypothetical marginal abatement cost curves for two countries. Let's assume New Zealand is the red country with higher costs than France in blue.

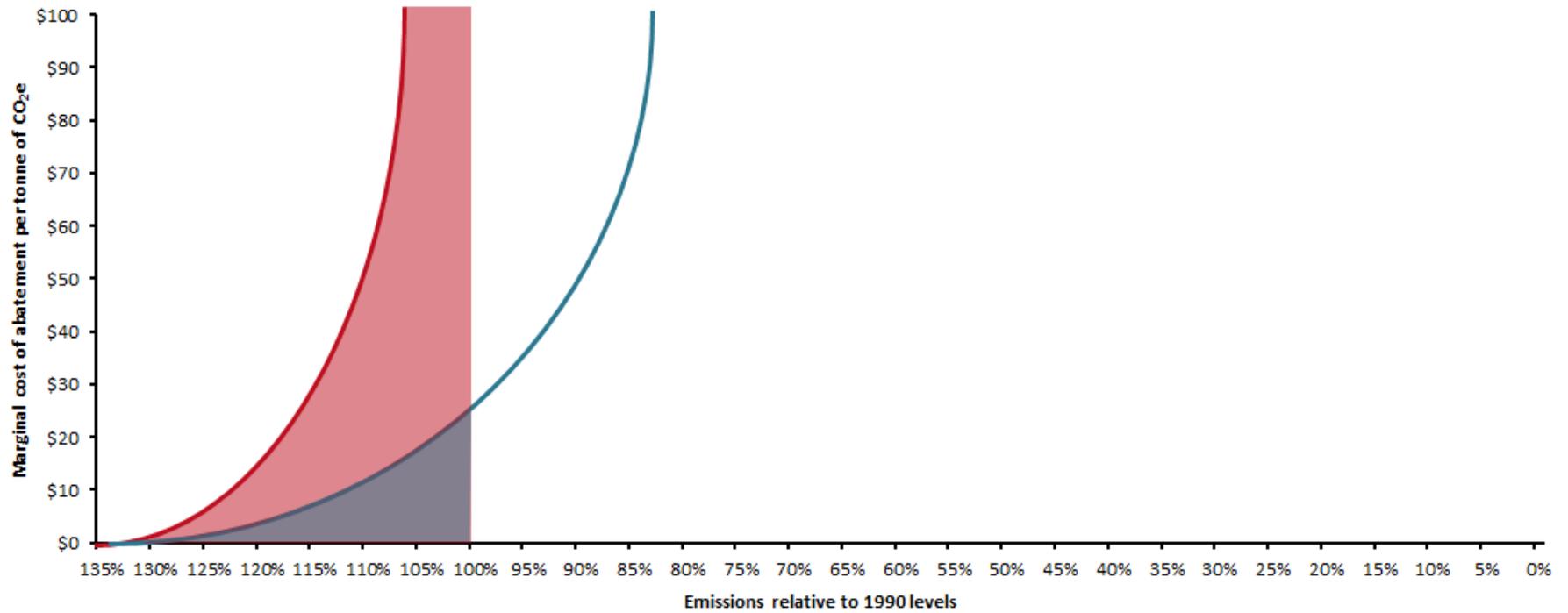
Figure 5: Two countries



87. If there is no global agreement and quota, tax, or emissions trading, both countries do not reduce emissions, and emit at 136% of 1990 levels.

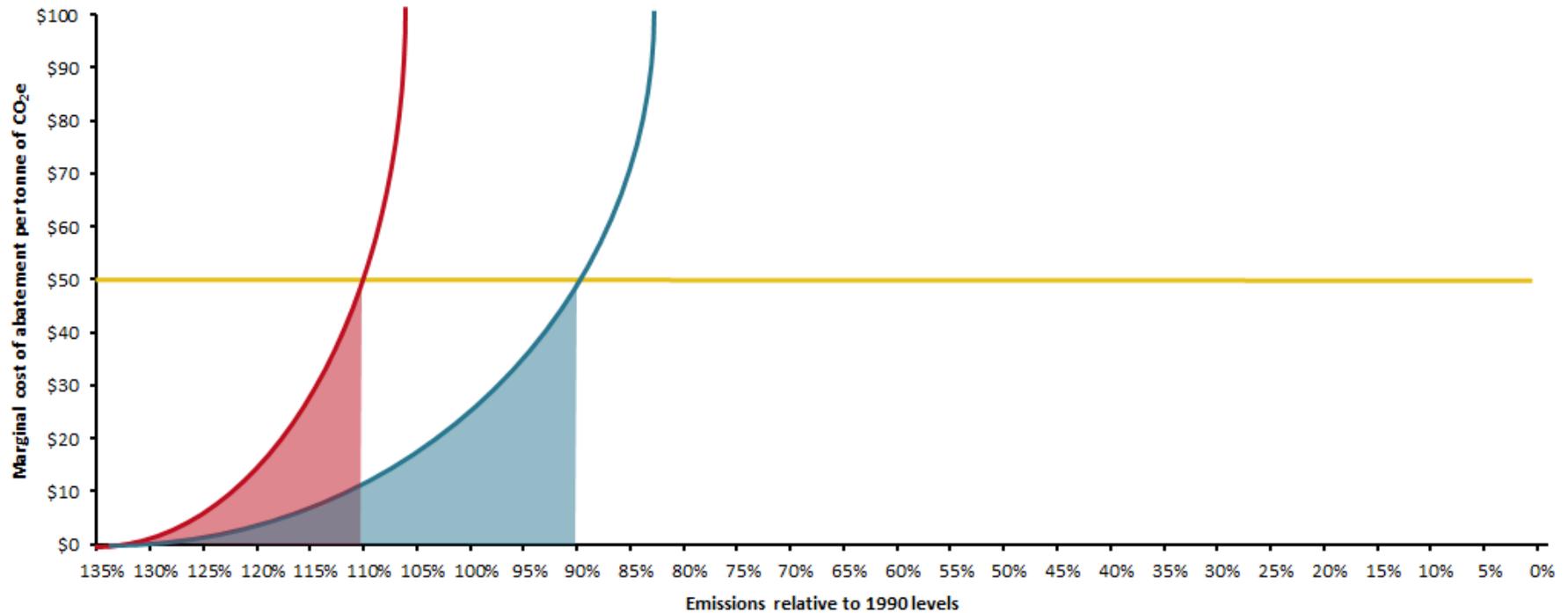
88. If the 2-degree-warming-avoiding emissions reductions are for 100% of 1990 levels (illustrative assumption only; actual reductions required are much higher), then one possible way of doing that is to require both countries to reduce domestic emissions to 100% (allow countries through non-tradeable quota to only to emit to 100% of 1990 levels). Figure 6 shows the costs to each country of doing so.

Figure 6: Cost of a quota



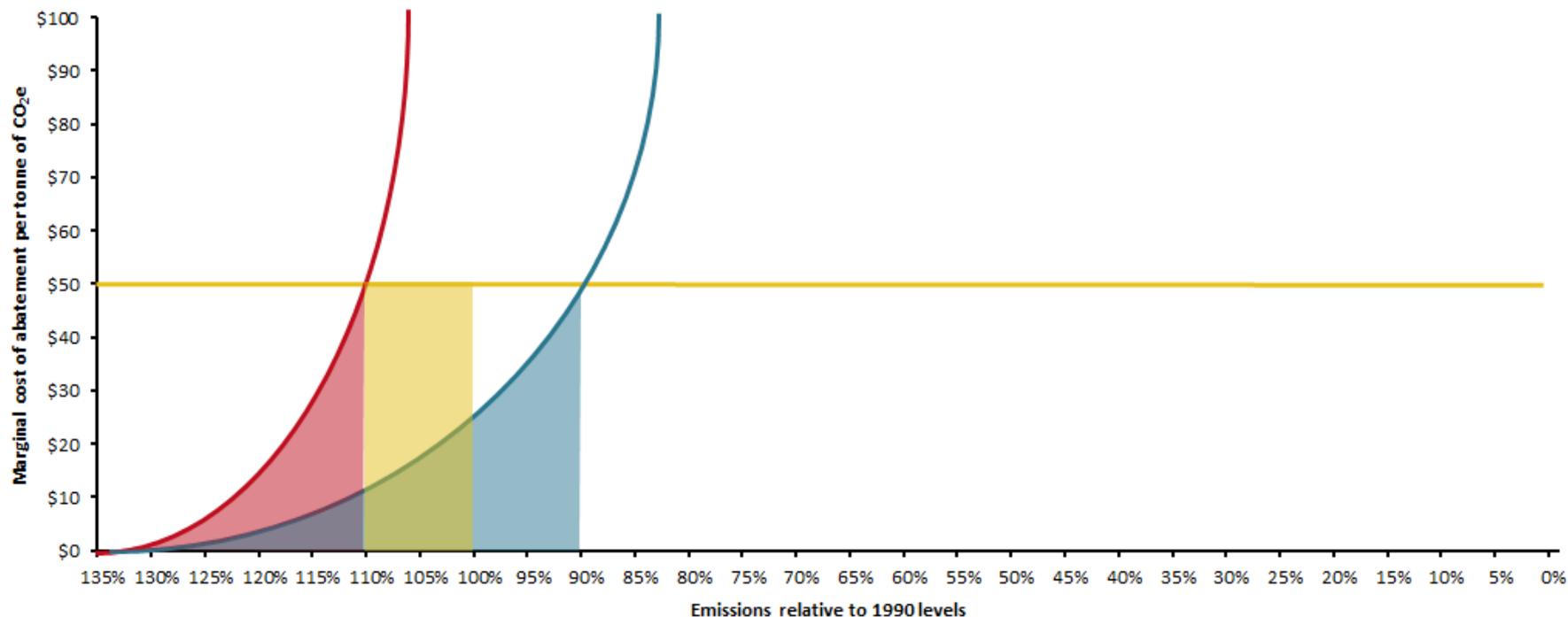
- 89. New Zealand bears massive costs. France bears few costs. France is happy with this outcome as it costs France little.
- 90. As a high-cost country, New Zealand lobbies for a market-based solution: either a tax or tradeable quota.
- 91. A tax to reduce total emissions to 100% would have the costs illustrated in Figure 7 (for simplicity, Figure 7 assumes the tax is implemented domestically and revenue is retained by each country).

Figure 7: Costs of a tax



92. In Figure 7, total emissions are reduced to 100%. New Zealand reduces to 110%, and France reduces to 90%.
93. However, now France bears the greatest costs. As New Zealand is one of the greatest emitters, it is outvoted by lower-cost countries and does not get its wish to use only a tax.
94. Worried New Zealand will be forced to undertake expensive domestic emissions, it lobbies for tradeable quota. New Zealand will pay France \$50 for every tonne it reduces so that New Zealand can emit another tonne. This is beneficial to New Zealand as \$50 is less than the cost to New Zealand of reducing domestic emissions (the yellow line is below the red line). It is also beneficial to France who receive \$50 which is more than the cost of reducing domestic emissions (the yellow line is above the blue line). The total cost to New Zealand is the yellow area in Figure 8, which is paid to France to reduce their emissions from 100% to 90% of 1990 levels.

Figure 8: Costs of a tradeable quota



95. Total costs are the same as for a tax, but everyone is happy as they are better off than for a non-tradeable quota.

96. So far, so ECON101.

How does this compare to real life?

97. The discussion document appears to ask other countries to accept tradeable quota, but then wants to minimize New Zealand’s target and burden (in yellow in Figure 8). Effectively, New Zealand is arguing for a situation closer to a tax, than tradeable quota.

98. This may be a high-risk strategy. As the discussion document notes, there is currently no guarantee that emissions will be tradeable in future. If other countries think we aren’t doing enough, the costs to New Zealand may become those in Figure 6 than Figure 9.

99. Countries will be doing us a favour by allowing emissions trading, but we have to make it worthwhile for them. This suggests a greater target.

Are there any compelling reasons for New Zealand having a weak target?

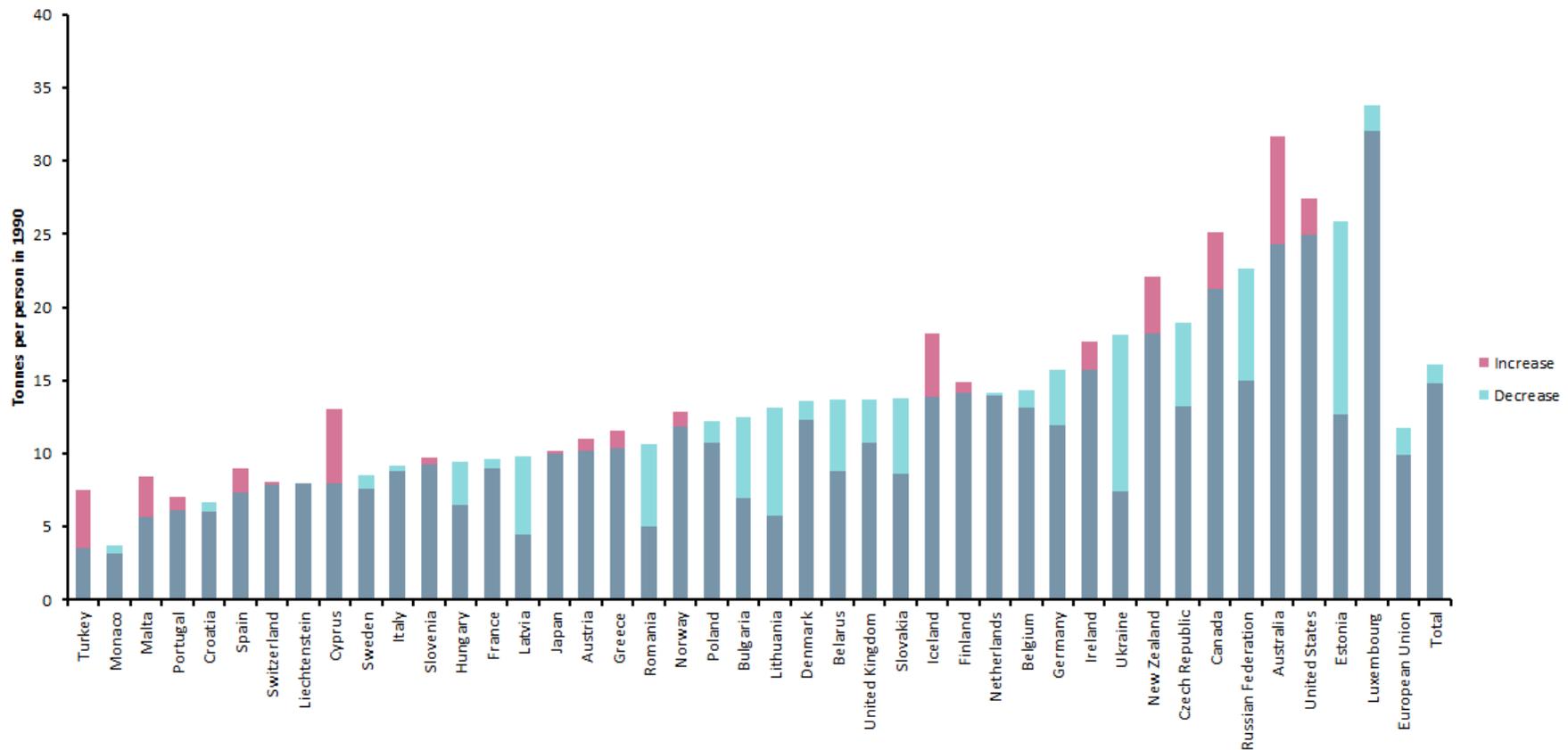
100. The answer appears to be 'no'.

101. Most of the arguments put forward in the discussion document have been discredited earlier in this paper. Other countries will see through those arguments just as quickly.

102. Climate change has been an agreed problem since 1990. Back then countries knew there was a good chance that serious action would be required in the future. Countries also knew that acting sooner might have immediate costs, with less abrupt adjustment later.

103. While other rich countries have reduced emissions, New Zealand has increased its own. Figure 9 shows emissions as they were in 1990 (the two blue areas combined). Reductions in per capita emissions (based on 1990 populations) are in light blue. Increases are in red.

Figure 9: Change in emissions by country 1990 to 2010 (Source: [United Nations data](#))



104. As New Zealand benefited from less inhibited growth from a lack of emissions adjustment, New Zealand should now be prepared to spend those benefits.
105. The only arguments that might have any validity are that New Zealand is (slightly) poorer than the other wealthy countries and has had faster-than-average population growth. However, neither of these things are huge outliers warranting more than marginal adjustments to a fair and efficient target.

What is a fair and efficient target?

106. This submission does not consider what is required in order to avoid 2-degrees warming. Instead, it compares to similar countries.
107. The European Union has announced a target of 40% below 1990 levels. As there appear to be no good reasons for markedly different targets, New Zealand's should be of a similar magnitude.
108. Even in 1990, New Zealand was one of the higher emitters, and therefore causing more harm than other wealthy countries. A reasonable view may be that New Zealand should reduce per capita emissions where the European Union's will be. That would leave New Zealand needing to reduce to 60% below 1990 levels.
109. Overall, a target of between 40% and 60% below 1990 levels is fair and efficient.