

Your submission to Zero Carbon Bill

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Do you have any other comments you'd like to make?

Notes

The intent of the Bill to combat climate disruption is good. However the approach, questions and suggested solutions may not be the most appropriate response for New Zealand to ameliorate the immanent future climatic catastrophe. See attached document.

Supporting documents from your Submission

Response_to_climate_change_mitigation_proposals-..

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Response to climate change mitigation proposals in the Zero Carbon Bill

The intent of the Bill to combat climate disruption is good. However the approach, questions and suggested solutions may not be the most appropriate response for New Zealand to ameliorate the immanent future climatic catastrophe. The intent to comply with the requirements of the Paris Agreement is praiseworthy, but because of our unique pattern of emissions, a focus on ghg **emissions** is not an optimal contribution for New Zealand. It is the total ghg **content** in the atmosphere, which has been and is still being increased by human activity, which is responsible for the current climate disruption.

New Zealand contributes an insignificant proportion of the global green-house gas emissions responsible for increasing climate disruption, but as a responsible global citizen must do what it can to ameliorate the problem. Carbon-free by 2050 is an appropriate target, but as ever, the devil is in the detail.

We have taken a “not specified” stance on all the questions as will be seen from our submission below. We consider that at a national level any legislation needs to be broad, flexible and acceptable to a majority of the population. Hence we are suggesting an overall tax on all carbon fuels would be the simplest, fairest and most effective response, providing incentives to “decarbonize” the economy at all levels. This should at first be set at a low level, but be steadily ramped up until the “carbon free” target is achieved. The tax collected should be used partly to foster carbon-reducing developments and partly to compensate citizens for resulting cost increases.

The proposals in the questionnaire focus on reducing nett greenhouse gas (ghg) **emissions** to zero by 2050. But, climate disruption is driven by total ghg **content** in the atmosphere, not by current **emissions**.

It would be a mistake to focus on nett **emissions** because the different ghgs have very different impacts on the long-term total ghg **content** in the atmosphere. The primary greenhouse gas culprits are carbon dioxide, methane and nitrous oxide.

The residence time of added **carbon dioxide** in the atmosphere is thousands of years. This carbon dioxide primarily arises from the burning of fossil fuels, in order of obnoxiousness: coal, oil, natural gas.

The residence time of **methane** is about 12 years (on average) as it is converted to carbon dioxide.

However, there are two principle sources of methane, biological and fossil.

Biological methane arises from anaerobic biological processes, as from swamps, paddy fields and ruminants. The carbon in this methane came from carbon dioxide in the atmosphere, via photosynthesis, so this emission has no long-term impact on the ghg **content** of the atmosphere.

Fossil methane comes from coal mining, leaks of natural gas from wells, pipelines and fracking, and from methane clathrates in the arctic tundra and sea floor. After

conversion to carbon dioxide this methane adds to the permanent ghg **content** of the atmosphere, and so contributes to the long-term problem.

Nitrous oxide is the third important ghg. It is a potent ghg, but is slowly converted into dinitrogen, with a half-life of about 120 years. Nitrous oxide is part of the natural nitrogen cycle. Dinitrogen from the atmosphere is “fixed” by electrical storms and by nitrogen-fixing bacteria in the soil and plant roots and then becomes available to plants, and ultimately to all life forms. In the natural cycle this nitrogen is returned to the soil by decay, where it is biologically converted into nitrous oxide and released to the atmosphere, where it is converted back into dinitrogen. The natural system is in equilibrium, with no net change in the nitrous oxide content of the atmosphere over time, or on the climate. Humans have upset this balance by using the Haber process to manufacture nitrogenous fertilizers. The nitrogen in this comes from the atmosphere, and ultimately returns to the atmosphere, but in the overall process the equilibrium nitrous oxide content in the atmosphere is increased. More seriously, the manufacturing process uses methane (as natural gas) which is released as carbon dioxide and adds to the permanent ghg **content** of the atmosphere.

The optimal response to the climate disruption debate is to focus on reducing the total radiative “forcing” in the atmosphere, but the best specific actions depend on the chosen time-frame. Carbon dioxide is permanent, methane is 200 times as effective as a ghg gas as carbon dioxide, but has a half-life of 12 years, and nitrous oxide is 330 times as effective and has a half-life of 120 years. Mitigation by tree planting reduces carbon dioxide levels until the forest is mature (hundreds of years for permanent forestry, 30 years for pine plantation forestry), thereafter has no effect.

Short-term emissions would be best reduced by reducing intensive dairy farming and planting trees. Growth in **long-term ghg content** would be best reduced by targeting the use of fossil fuels. Choosing between these options depends on whether the priority is to focus on complying with the Paris Accord targets or minimizing long-term climate change.

New Zealand is in an anomalous position because of the way emissions under the Paris Accord are calculated. We are (almost) unique in generating most of our electricity sustainably, so our agricultural emissions become a more significant fraction of our overall emissions. Attempting to comply with **emission** targets would divert effort from reducing our contribution to the ghg **content** in the atmosphere, which would be our most useful contribution to the world’s problem.

An overall tax on all carbon fuels would be the simplest, fairest and most effective response, providing incentives to “decarbonize” the economy at all levels. A tax at the source on **all** fossil carbon fuels: all oil (local and imported), coal mined, and natural gas extracted would be simple to implement and difficult to evade. A tariff on embedded carbon in imports from countries without effective local carbon charges would be necessary to protect local industries. The tax collected could be used to foster carbon-reducing developments, distributed equally to all citizens or compensate citizens for increased costs. Carbon trading schemes, while superficially attractive, seem to be inherently avoidable, corruptible and ineffective.

Focussing attention on ghg **emissions** diverts attention in New Zealand towards agriculture, particularly intensive dairy farming. Methane emissions from grass-fed ruminants do not add to the long-term ghg **content** of the atmosphere and are largely irrelevant to climate change. More problematic nitrous oxide emissions could be reduced by modifying farming practices, reduced ruminant density, and reduced and more selective use of nitrogenous fertilizers – effectively less intensive farming. These changes would also reduce the serious and growing problem of nitrate leaching into waterways. A carbon tax would provide incentives for agriculture to reduce the carbon dioxide emissions from agricultural machinery, associated transport and nitrogenous fertilizer manufacture, without any troublesome specific taxes on farming activities.

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