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

Farms, Forests and Fossil Fuels:
The next great landscape transformation?

Frequently Asked Questions

What is the report about?

The report proposes an approach to emissions reduction targets and climate policies that deals with biological greenhouse gases from farming and carbon uptake by forests together, with a separate target for carbon dioxide emissions from burning fossil fuels. The report also proposes taking a landscape approach to managing New Zealand's climate and environmental issues.

What is a landscape approach?

A landscape approach integrates climate policy with other environmental and social objectives (such as water quality, soil erosion, biodiversity and resilient rural communities) at the local level. For example, planting next to rivers can reduce nutrient run-off, improve biodiversity and prevent soil erosion, in addition to removing carbon from the atmosphere. By managing forest sinks and biological emissions together with other environmental issues, a landscape-based approach would focus on giving those who live in a landscape the incentives and means to address multiple objectives at the same time.

Why do biological greenhouse gases not necessarily have to be reduced to zero, yet fossil carbon dioxide does?

Since carbon dioxide is the main driver of rising global temperature, any serious climate action plan has to get fossil carbon dioxide emissions down. When carbon dioxide is emitted, some of it stays in the atmosphere for thousands of years. To stabilise the concentration of carbon dioxide in the atmosphere and its contribution to warming, fossil carbon dioxide emissions therefore need to go to zero. By contrast, biological greenhouse gases are removed more quickly from the atmosphere by natural processes. This means emissions do not need to go to zero to stabilise the atmospheric concentration (and warming contribution) of these gases.

Why is reducing fossil carbon dioxide the top priority?

Carbon dioxide has been the main driver of warming since pre-industrial times and currently traps significantly more heat than methane or nitrous oxide. Not taking strong action on fossil carbon dioxide will eventually result in massive climatic disruption. This is because the global average temperature will not peak at any level until the atmospheric concentration of carbon dioxide stops rising. Emitting carbon dioxide is like turning up a thermostat that cannot easily be turned down. Unless large reductions in carbon dioxide emissions are achieved, efforts to reduce methane and nitrous oxide will be of limited long-term value.

Isn't nitrous oxide a long-lived gas like carbon dioxide?

The three main anthropogenic greenhouse gases have different characteristics. For example, the lifetimes of methane and nitrous oxide are around 12 and 120 years, respectively. By contrast, some carbon dioxide remains in the atmosphere for thousands of years. Hence, whether nitrous oxide is considered a long-lived gas depends on how far out we look.

Why are you proposing the use of forest offsets for biological gases, but not for fossil carbon dioxide?

There is a mismatch between the very long-lasting warming effects caused by fossil carbon dioxide emissions, and the much shorter cooling effects of forests. This suggests that using carbon sequestration by trees to offset fossil carbon dioxide emissions is risky because trees are impermanent (e.g. they can burn down or be devastated by disease or pests). On the other hand, using forests to offset the warming effects of biological gases leads to a better alignment of risks. While forests cannot absorb significant amounts of methane or nitrous oxide from the atmosphere, the duration of their climate cooling benefits is more closely matched with the warming effects of biological gases.

Aren't the risks of fire, pests and diseases to forests used to offset biological gases exactly the same as those that would apply if they were used to offset fossil carbon dioxide?

Yes they are. While there is a better alignment between the duration of temperature effects of biological gases and forests, heavy reliance on forest offsets would still entail risks because of their impermanence. For this reason, a buffer of more trees could be required than a straight one-for-one trade. Furthermore, adopting a landscape approach could increase the diversity of land uses and encourage greater diversity of tree species, making landscapes more resilient to climate change.

Is carbon sequestration using trees ever a good way to offset fossil emissions?

In the short term, tree planting could be used to offset fossil emissions during the transfer of forestry from the New Zealand Emissions Trading Scheme (NZ ETS) to a pricing instrument for biological gases. Temporary assistance for some emissions-intensive, trade-exposed industries could be provided, in part, through limited access to forest offsets during this transfer. Some businesses are already undertaking tree planting programmes, which can provide some environmental benefits like improvements to water quality and biodiversity. But in the long run, relying on tree planting to offset fossil fuel emissions is no substitute for eliminating fossil carbon emissions.

Will your approach result in less forest planting?

Yes, but it would still see a lot more trees planted compared to today's levels as the emitters of biological gases would include tree planting in their emissions reduction efforts. Also, a rising fossil emissions price should increase demand for forest products, wood and biofuels. Adopting a landscape approach would also recognise the wide range of environmental and economic benefits that forests provide, not just their climate benefits.

Planting trees has got to be a good thing – why not incentivise as many as possible?

Using trees as a low cost way of avoiding making reductions in gross fossil carbon emissions is not a good idea. Blanketing the country in pine trees could leave New Zealand more vulnerable as forests are susceptible to fire and to diseases. The right trees need to be planted in the right place or problems emerge – for example with logjams and silt runoff from harvesting forests on steep slopes.

Do emissions trading schemes in other countries allow forest offsets?

Some emissions trading schemes in other countries allow limited use of offsets from forestry projects. For example, the California ETS allows up to eight per cent of total compliance obligations to be offset with trees to 2020 and four per cent between 2021 and 2025. The NZ ETS is the only emissions trading scheme in the world that has full coverage of forestry. In this respect New Zealand is an outlier. Removing forestry from the NZ ETS would therefore make it easier to link with other emissions trading schemes in the future, if New Zealand wished to do so.

Aren't you just letting farming off the hook?

No. It is true that the biological emissions price faced by farmers under the alternative approach would be significantly lower than those faced by fossil emitters. But a higher fossil emissions price would reflect the very different risks carbon dioxide poses in comparison with biological gases. Farmers are also heavy users of fossil fuels when it comes to processing raw materials and moving commodities to market. So they would face the same fossil emissions prices for those activities as other fossil emitters.

But New Zealand is such a small emitter, reducing our greenhouse gases won't have any impact on the global average temperature, will it?

Any small emitter can make this claim. The world is full of small countries whose emissions add up to a large total. This view gets us nowhere and just delays climate action. New Zealand's greenhouse gas emissions still cause warming. New Zealand has also undertaken international commitments under the Paris Agreement to reduce its greenhouse gases.

How much should methane emissions be reduced by to help inform the target set in the Government's Climate Change Bill?

This report does not recommend a specific percentage reduction for biological methane. Rather it proposes an alternative approach that would involve setting a target that embraces both methane and nitrous oxide. The international community has not yet focused on what the level of reduction for biological methane or biological gases should be. As an acknowledged leader in both the measurement and management of biological sources and sinks, New Zealand cannot avoid taking a leading role in this debate. The report recommends that the Government seek advice from the new Climate Commission in determining an appropriate target level for reducing biological emissions.

Are cost-effective options available for reducing on-farm biological emissions?

There are a number of things farmers can be doing now, including changes to feeds, fertiliser application, stocking rates, and the stock mix. For example, feed additives given to dairy cows could reduce methane emissions. The science of the biological gases is complex, and reducing them will not be easy. Reducing stocking rates and focusing on profitability instead of production is one way.

Is your approach consistent with a 1.5 degrees Celsius global temperature objective?

The proposed approach provides an alternative way of framing targets and policies regardless of the level of ambition. It could therefore be used to meet different temperature objectives.

Why did you choose the year 2075 rather than 2050?

While 2050 has been the subject of political commitments, there is no magic about this year. At the international level, the Paris Agreement simply indicates the need to balance sources and sinks in the second half of this century. For this reason, 2075 was considered to be an appropriate long-term target year consistent with the Paris Agreement. However, New Zealand needs to be well down the track to meeting the Paris Agreement's goal by 2050.

Tackling climate change requires changing our diets. Why doesn't the report mention this?

If global diets change away from red meat and dairy products to diets based on crops and non-ruminant animals (e.g. chicken), this would result in lower biological emissions and may also reduce other environmental impacts. These are certainly things New Zealand farmers could consider, but it should be noted that New Zealand's food production is largely driven by overseas food demand.

What can industries like aviation and steelmaking do if forest sinks aren't available as offsets?

For industries where fossil emissions may be hard to reduce because no realistic alternatives exist, a number of pragmatic industry-specific solutions could be explored. These include the continuing use of free allocations, access to international units and using some of the NZ ETS revenues for the research and development of low carbon technologies for these industries. It would even be possible to deliver some assistance to these industries through limited access to forest offsets. The purpose of any of these policy 'fixes' should be acknowledged as buying time and not be regarded as a permanent solution.

Could negative emissions technologies be counted towards the fossil emissions target?

Negative emissions technologies, unlike forests, could provide a near-permanent removal of carbon dioxide from the atmosphere. To offset fossil carbon dioxide emissions, sequestered carbon needs to remain safely stored for millennia. However, negative emissions technologies are still at the early stages of development.