Interim Climate Change Committee

Action on agricultural emissions

Accelerated electrification

SUMMARY REPORTS AND RECOMMENDATIONS
30 APRIL 2019

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Overview from the Committee

The independent Interim Climate Change Committee began work on 1 May 2018. Although our Terms of Reference were set by the Government, we are an independent committee. We have engaged across key sectors, industry, iwi/Māori, non-governmental organisations, the research community, agencies and commercial organisations.

Within the Terms of Reference, we were asked to answer two questions – on agricultural greenhouse gases and on electricity – and to do so using evidence and analysis.

On 30 April 2019, we presented our two reports to the Minister for Climate Change:

Action on agricultural emissions

Accelerated electrification

These reports recommend a series of actions the Government can take to reduce greenhouse gas emissions in agriculture and electricity, including using electricity to reduce transport and process heat emissions.

The actions we recommend are the first steps in a long journey – a journey that will stretch over decades. Continued delay is not an option. The globe is not on track to achieve the goals of the Paris Agreement. Yet almost daily, right here at home, the reality of a changing climate is apparent – whether it be coastal erosion and rising sea levels, more intensive floods, or the loss of New Zealand's glaciers.

Action on agricultural emissions

In our agriculture inquiry we have endeavoured to listen to farmers to create fair policy recommendations. We have been conscious of the impacts on rural communities, the international context in which New Zealand operates, and other related environmental issues such as water quality and biodiversity conservation.

However, one thing is clear – New Zealand must take action to reduce agricultural methane and nitrous oxide emissions because these gases form such a large proportion of our national greenhouse gas profile. There is a debate about whether New Zealand can, and should, reduce its methane emissions. This is a valid discussion to have. Whatever the eventual methane target, we know that we need to reduce methane emissions. There is often less focus put on nitrous oxide – but this is a potent and long-lived gas and must be a part of efforts to achieve a net zero target.

The policy package we put forward in *Action on agricultural emissions* recognises farmers as stewards of their land. We have designed the package to integrate into farmers' day to day planning, and to ensure that over time this results in real change. Many other countries are watching New Zealand and the way we tackle our agricultural emissions. New Zealand must show that the farming sector can remain profitable while contributing to climate change goals.

Executive summary

The need to reduce greenhouse gas emissions is becoming increasingly urgent. In 2015, countries met in Paris and successfully negotiated a new international greenhouse gas agreement.

As part of the Paris Agreement, New Zealand has committed to reducing greenhouse gas emissions by 30% below 2005 levels. The New Zealand Government is now looking to set a 2050 reduction target in the *Zero Carbon Bill* expected to be introduced to the House of Representatives in the coming months. The Committee has not had a role in setting the 2050 target but has been asked to develop recommendations for policy that will help New Zealand meet whatever target/s are adopted as part of the Bill.

Agricultural emissions, methane and nitrous oxide, make up about half of New Zealand's reported emissions. Over the last 25 years, farmers have become more efficient and have reduced *emissions intensity* – or greenhouse gas emissions per unit of product – by about 1% each year. These improvements have helped stabilise methane and nitrous oxide emissions.

But this is not enough. Emissions of long-lived greenhouse gases (carbon dioxide and nitrous oxide) must collectively go to net zero to achieve the 'well below' 2°C temperature target set in the Paris Agreement. Methane emissions do not have to go to zero to achieve this target, but they must reduce.

Currently there is no policy in place in New Zealand to reduce agricultural emissions. The emissions from all other sectors are priced through the New Zealand Emissions Trading Scheme (NZ ETS). Originally the NZ ETS was designed to include all sectors and all gases, but agricultural emissions are not yet priced.

Policy is needed so that the agriculture sector plays its part in reducing emissions and helps the country meet future emissions targets cost effectively. If not, the burden of meeting targets will fall disproportionately on other sectors of the economy.

Any policy must fulfil the Tiriti o Waitangi principle of partnership and good faith with iwi/hapū and recognise the unique characteristics of Māori land.

There are ways to reduce agricultural emissions on farms now using existing management practices and through land use change, and there are promising options on the horizon, such as methane inhibitors.

Farmers are already working hard to address other environmental issues such as water quality. While reducing greenhouse gases could also be integrated into farmers' planning, many farmers do not currently have the information and support they need to reduce emissions on their farms.

Therefore, a policy package is needed that motivates all farmers to play a part in reducing agricultural emissions while supporting them to change farming practices or move toward lower emissions land uses. A policy that rewards actions at farm-level is critical in the long term to realise the full potential for emissions reductions.

The Committee has concluded that the best way to reduce livestock emissions is to price them through a farm-level levy/rebate scheme. A levy/rebate scheme is a simpler and less costly approach than including the 20,000 to 30,000 small farm businesses in the NZ ETS as it would avoid the need for farmers to trade emissions units.

The levy/rebate scheme should be integrated with the NZ ETS – specifically, the emissions covered should be part of the same decision-making process and rules for setting the NZ ETS cap.

This farm-level levy/rebate proposal is flexible and can deal with different targets for different gases so there is no need for a separate policy for different gases. The relative prices for the different gases can be adjusted. For example, if the Government was to set a different target for methane, the methane levy rate could be adjusted over time to ensure it reflects that target.

However, a farm-level levy/rebate scheme could not be fully implemented until 2025. For the agriculture sector to play its part in reducing emissions in the interim, the Committee recommends that agricultural emissions be priced through the NZ ETS at processor-level as soon as feasible, ideally from 2020. Processors are already reporting agricultural emissions through the NZ ETS.

Fertiliser manufacturers and importers should also be fully included in the NZ ETS to cover emissions from nitrogen fertiliser. Pricing fertiliser emissions at this level would provide the same incentives as pricing them at farm-level. Unlike livestock emissions, this obligation should therefore remain at manufacturer/importer level until science progresses such that there is a material benefit of pricing these emissions at the farm level.

The Government has stated that it would assist farmers and rural communities by providing 95% free allocation. Free allocation can be distributed in different ways. The Committee considers that the main reason for providing free allocation is to help manage the social impacts of emissions pricing, such as impacts on employment. The best way to do this at farm-level, while maintaining a strong incentive to reduce emissions, would be to base free allocation on a combination of both a farm's output and inherent land productivity. At processor-level, output-based free allocation is the most appropriate method.

The Government has also stated that it would recycle the funds generated from pricing agricultural emissions back to the sector to *"encourage agricultural innovation, mitigation and additional planting of forestry."* The Committee considers that the funds should be put into a dedicated Agricultural Emissions Fund, with spending overseen by a board that includes representatives from the agriculture sector and iwi/Māori.

The Fund should be spent on programmes that directly help farmers and owners of Māori land to reduce emissions. For example, it could assist in getting information out to farmers through extension programmes, developing a greenhouse gas module for farm environment plans, developing tools to support decision-making, and building a knowledgeable farm adviser network.

New Zealand should not shy away from making these changes. The agriculture sector needs to get started on reducing methane and nitrous oxide emissions now. This will allow a just transition while avoiding abrupt and disruptive changes such as those seen in the 1980s from the removal of agricultural subsidies and other policy changes.

New Zealand farmers are innovative and well-placed to take advantage of the opportunities that a well-managed transition can offer.

Recommendations

Introduce a farm-level levy/rebate scheme on livestock emissions by 2025

The Committee recommends that the Government:

a. Specifies in legislation that farmers will start reporting their emissions in 2023, and face obligations for their livestock emissions under a levy/rebate scheme by 2025.

b. Develops an action plan with the agriculture sector and iwi/Māori, including owners of Māori land, outlining the necessary processes to introduce a farm-level levy/rebate scheme on livestock emissions by 2025.

c. Outlines in law the process by which any decisions will be made on changes to the price on methane to achieve different targets for different gases.

Price livestock emissions at processor-level through the NZ ETS in the interim

The Committee recommends that the Government amends the *Climate Change Response Act* to price methane and nitrous oxide emissions from livestock at processor level in the NZ ETS as soon as practicable.

Price nitrogen fertiliser emissions through the NZ ETS

The Committee recommends that the Government amends the *Climate Change Response Act* to price synthetic nitrogen fertiliser emissions at the manufacturer and importer level in the NZ ETS as soon as practicable.

Assisting farmers and rural communities through free allocation

The Committee recommends that the Government:

a. Uses a hybrid of output- and land-based allocation for livestock emissions in a farm-level levy/rebate scheme, subject to further work and consultation on

   – a suitable proxy for the productive capacity of land
   – determining the ratio of output- to land-based allocation
   – eligibility rules.

b. Considers an option for farmers to capitalise their allocation in exchange for facing the full costs of their livestock emissions for the period covered by the lump-sum.

c. Sets livestock-related allocation factors so that they reduce in line with expected improvements in emissions intensity, with periodic reviews to account for less predictable changes in emissions intensity.

d. Outlines in law the process by which any decisions on the phase down of the free allocation rate will be made.

Recycling funds through an Agricultural Emissions Fund

The Committee recommends that the Government, in amending the *Climate Change Response Act*, includes the requirement that the funds generated from pricing methane and nitrous oxide emissions from agriculture are recycled directly back into programmes that help farmers to reduce emissions. This should specifically include:

a. The establishment of an Agricultural Emissions Fund.

b. The establishment of a Board to oversee spending of the Fund that ensures co-governance with iwi/Māori, including owners of Māori land. All Board members must understand and take into account the unique characteristics of Māori land.

c. Criteria for allocating money from the Fund, including providing appropriate support to owners of Māori land.

d. The requirement for the Board to report annually on how funds have been spent and the effectiveness of that spending.

Counting carbon sequestration by trees and vegetation on farm

The Committee recommends that the Government:

a. Prioritises work underway to improve the NZ ETS for forestry, to make it easier for forest owners to identify eligible forest land and register it in the NZ ETS.

b. Investigates opportunities to recognise and reward forestry management practices that store additional carbon in pre-1990 forests.

c. Investigates opportunities to recognise and reward small plantings on farms.

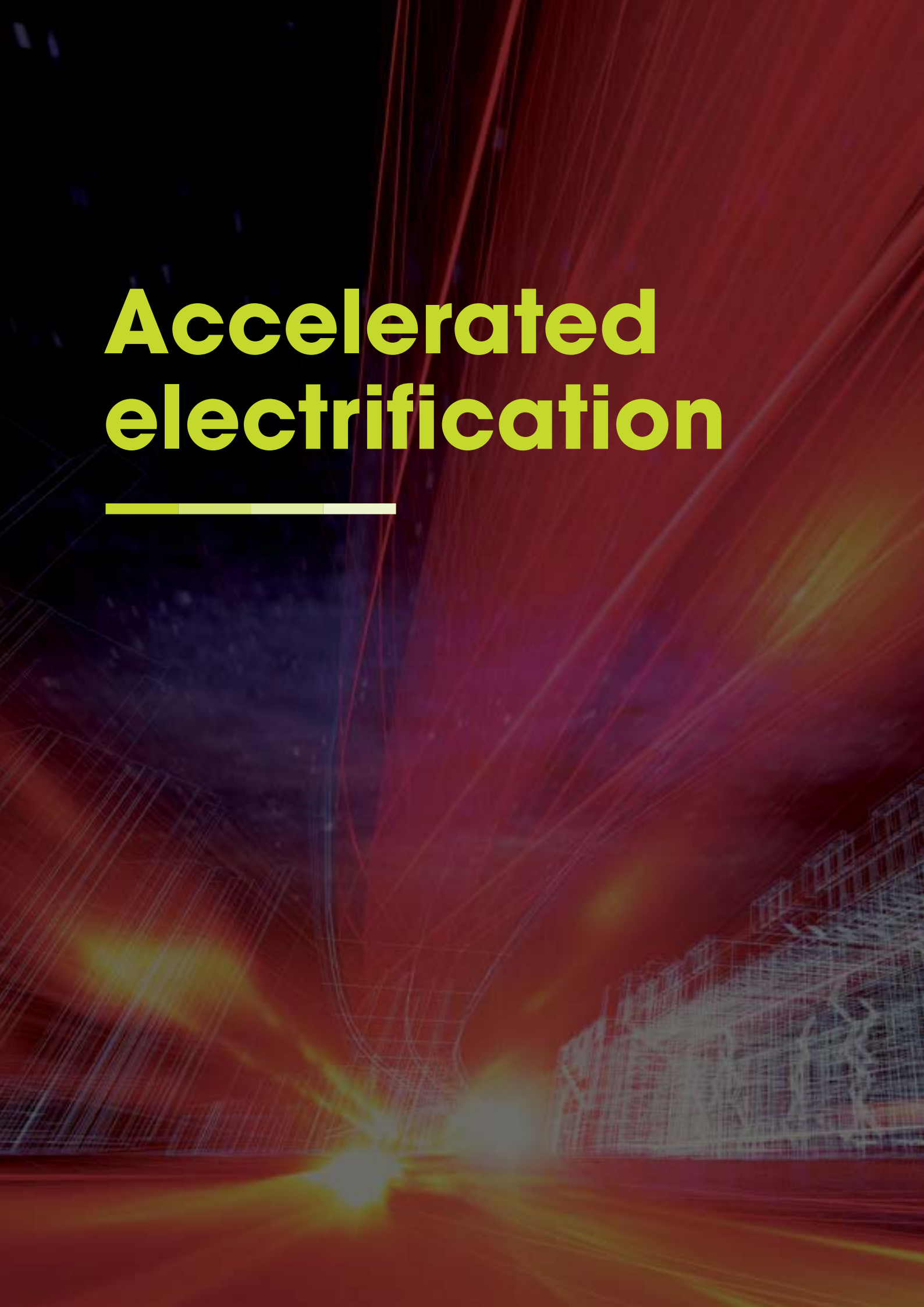
d. Investigates the feasibility of 'netting-off' carbon removals and agricultural emissions within the farm-level levy/rebate scheme.

Opening up opportunities

The Committee recommends that the Government:

a. Investigates barriers to reducing emissions created by non-climate regulation and options to remove them.

b. Investigates how to facilitate opportunities to create new markets for low-emissions products.



Accelerated electrification

New Zealand has long benefited from a high percentage of renewable electricity generated from hydropower and, increasingly, from wind. As a result, electricity generation is responsible for only 5% of New Zealand's greenhouse gas emissions, whereas fossil fuels used in transport and process heat account for over 30%. There is a major opportunity to reduce emissions from transport and process heat by switching from fossil fuels to electricity. To achieve these emissions reductions it is vital that electricity is affordable in order to encourage switching.

In the electricity report we have explored a future of 'accelerated electrification' – electrifying up to half our vehicle fleet by 2035 and accelerating the amount of process heat provided by electricity instead of by coal or natural gas. This amount of electrification will need significant policy action.

Executive summary

New Zealand has set a target for reducing the country's greenhouse gas emissions under the Paris Agreement. However, without considerable change from the status quo, that target will not be met. New Zealand's commitment to address climate change also seeks to align with the ideals of kaitiakitanga – the need to care for and be active stewards and custodians of our taonga, our environment, and our planet for future generations.

As part of its efforts to reduce emissions, the Government asked the Interim Climate Change Committee to provide advice on planning for the transition to 100% renewable electricity by 2035. The Terms of Reference for this work state that the Committee must take into account the objective of minimising emissions from electricity generation, together with security of supply and affordability for consumers.

At present New Zealand's electricity system is about 82% renewable. Electricity represents about 5% of New Zealand's total greenhouse gas emissions – about 4 million tonnes carbon dioxide equivalent (Mt CO_2e) out of a total of around 80 Mt CO_2e. New Zealand is fortunate to already have such a high proportion of renewable electricity. But due to the heavy reliance of the electricity system on hydropower, its key challenge is coping with a 'dry year' when hydro inflows are low.

To investigate future possibilities for the electricity system out to 2035, the Committee commissioned a modelling exercise, the results of which form the backbone of this report.

The modelling shows that, under a business as usual future, New Zealand is likely to reach an average of 93% renewable electricity by 2035. More wind, solar and geothermal will be built, and more batteries will be deployed.

The modelling also shows that it is technically feasible to achieve 100% renewable electricity by 'overbuilding'. This means building additional renewable generation like wind and solar to cover dry years, and substantially increasing battery storage and demand response.

However, such a solution is very costly, particularly in terms of achieving the last few percent of renewable electricity. Going from 99% to 100% renewable electricity by overbuilding would avoid only 0.3 Mt CO_2e of emissions at a cost of over $1,200 per tonne of CO_2e avoided. It is also likely to result in much higher electricity prices than in the business as usual future.

The Committee investigated an alternative future, aiming to understand whether accelerated electrification of transport and process heat could achieve larger emissions reductions while keeping electricity affordable.

The modelling showed that, in this accelerated electrification future, generating the required electricity would result in about 3.6 Mt CO_2e of greenhouse gas emissions in 2035. However, this would be more than offset by 6.4 Mt CO_2e of avoided emissions from transport and 2.6 Mt CO_2e of avoided emissions from process heat. Added

together, the net emissions reductions would be 5.4 Mt CO_2e in 2035.

Under the accelerated electrification future, electricity prices remain affordable. This is vital because consumers will not switch to electricity if it is too expensive compared to fossil fuels, and so potential emissions savings would be less.

The Committee therefore recommends that the Government prioritises the accelerated electrification of transport and process heat over pursuing 100% renewable electricity by 2035 in a normal hydrological year.

Policy changes will be needed to achieve this level of accelerated electrification. These policies must fulfil the Tiriti o Waitangi principle of partnership and good faith with iwi and hapū.

The Committee recommends that the Government sets a target for reducing annual transport emissions by at least 6 Mt CO_2e in the year 2035 relative to current levels. Policies to achieve this target will be needed without delay. Such policies should also proactively enable low-emissions mobility for low-income and rural households.

The Committee recommends that the Government strongly encourages the phase out of fossil fuels for process heat by deterring the development of any new fossil fuel process heat, and setting a clearly defined timetable to phase out fossil fuels in existing process heat (with a priority phase out of coal). Government should also reduce regulatory barriers relating to electrification.

To support accelerated electrification, the Committee has identified changes needed in the resource management system and in the electricity regulatory system.

The Committee recommends that the Government ensures that the value of existing hydro to New Zealand's climate change objectives is given sufficient weight when decisions about freshwater are made. The Government should work collaboratively with iwi/Māori to co-design solutions so that rights and interests in freshwater (including geothermal fluids) are resolved within the context of the Māori-Crown partnership. The Government should also provide for the large-scale development of wind generation and its associated transmission and distribution infrastructure.

A responsive regulatory system must facilitate changes in the market, while ensuring that appropriate consumer protections are in place. The Committee recommends that regulators be required to take emissions reductions objectives into account, as well as facilitating and enabling new generation and both market and distribution innovation.

Finally, while a future with accelerated electrification of transport and process heat should be pursued, eliminating fossil fuels from the electricity system must occur at some point. Emissions from geothermal must also be reduced.

A well-functioning New Zealand Emissions Trading Scheme will be a critical tool in encouraging the adoption of geothermal emissions capture technology.

The Committee examined ways, other than overbuilding, to achieve 100% renewable electricity and eliminate the use of fossil fuels in the electricity system. These included biomass, hydrogen and pumped hydro (with storage).

A pumped hydro scheme at a scale that could solve New Zealand's dry year problem shows promise. Such a scheme could also help manage demand peaks and increased levels of intermittency. The Committee recommends that the Government investigates the potential for pumped hydro storage to eliminate the use of fossil fuels in the electricity system.

Recommendations

100% renewable electricity

The Committee recommends that the Government:

a. Prioritises the accelerated electrification of transport and process heat over pursuing 100% renewable electricity by 2035 in a normal hydrological year because this could result in greater greenhouse gas emissions savings while keeping electricity prices affordable.

b. Investigates the potential for pumped hydro storage to eliminate the use of fossil fuels in the electricity system.

Transport

The Committee recommends that the Government:

a. Sets a target to reduce emissions from transport by at least 6 Mt CO_2e in the year 2035 relative to current levels and, without delay, introduces policies to achieve this target.

b. Ensures that New Zealand does not become a dumping ground for fossil-fuelled vehicles.

c. Proactively enables low-emissions mobility for low-income and rural households.

Process heat

The Committee recommends that the Government strongly encourages the phase out of fossil fuels in process heat by:

a. Deterring the development of any new fossil fuel process heat.

b. Setting a clearly defined timetable to phase out fossil fuels in existing process heat, with the phase out of coal as a priority.

c. Reducing regulatory barriers relating to electrification.

Valuing hydropower

The Committee recommends that the Government ensures the value of existing hydro generation to New Zealand's climate change objectives is given sufficient weight when decisions about freshwater are made, including by:

a. Strengthening and clarifying national direction on making trade-offs between hydro generation and freshwater objectives across National Policy Statements.

b. Working collaboratively with iwi/Māori to co-design solutions so that rights and interests in freshwater are resolved within the context of the Māori-Crown partnership.

Providing for the development of wind generation at scale

The Committee recommends that the Government provides for the development of wind generation and its associated transmission and distribution infrastructure at scale by:

a. Revising the National Policy Statement for Renewable Electricity Generation to resolve issues relating to lapsing and varying consents, and re-powering existing wind farms.

b. Developing National Environmental Standards to enable timely consenting of wind generation, both large and small, and transmission and distribution infrastructure. This should include proactively identifying which types of landscapes are likely to be particularly suitable for wind infrastructure.

A responsive regulatory system

The Committee recommends that the Government ensures that:

a. Regulators be required to take the objective of reducing emissions into account through mechanisms such as Government Policy Statements.

b. The regulatory system:

- Facilitates timely investment in the transmission network that optimises the development of new lines with the building of new power generation.
- Contains clear processes for approving, consenting and constructing new or upgraded electricity lines for process heat and electric vehicle infrastructure.
- Enables distributors and retailers to innovate and adapt to increasing levels of consumer-based technology.
- Enables consumers to get the right pricing signals to engage in demand response and make best use of new technologies.

c. Barriers to distributed and off-grid renewable generation are identified and addressed, and ways to ensure communities can participate are considered.

The full reports and recommendations are online at:

www.iccc.mfe.govt.nz/what-we-do/energy/electricity-inquiry-final-report

www.iccc.mfe.govt.nz/what-we-do/agriculture/agriculture-inquiry-final-report

www.iccc.mfe.govt.nz