

Interim Climate Change Committee: Accelerated Electrification Report

FAQs

What is the Committee's inquiry about?

The Government asked the Interim Climate Change Committee for evidence and analysis on: 'How to plan for the transition to 100% renewable electricity by 2035.' This inquiry examines the practicalities of transitioning to 100% renewable electricity by 2035. It also investigates what role electricity generation can play in reducing greenhouse gas emissions across the economy by investigating a future of 'accelerated electrification' – electrifying up to half our vehicle fleet and converting a substantial amount of process heat to electricity by 2035.

What is the Committee recommending?

The Committee recommends that Government prioritises accelerated electrification of transport and process heat, over pursuing 100% renewable electricity by 2035.

The Committee also recommends policies to reduce emissions from transport and process heat; policies to support the development of new, renewable electricity; and actions to ensure the regulatory system helps, rather than hinders, investment in low-emissions technologies.

Why prioritise accelerated electrification?

Electricity generation is only responsible for 5% of New Zealand's total greenhouse gas emissions, whereas transport and process heat together account for about 30%. Accelerated electrification of these two sectors would result in greater greenhouse gas reductions than achieving 100% renewable electricity, while also keeping electricity prices affordable.

What about 100% renewable electricity?

New Zealand electricity generation is currently around 82% renewable and is on track to reach an average of 93%, but possibly as high as 97%, by 2035 through the deployment of wind, geothermal and solar. The key challenge with moving all the way to 100% renewable is what is known as the 'dry year' problem – one where hydro inflows are low. The Committee's analysis identified a number of technologies to achieve 100% renewable electricity by 2035. All are technically feasible, although most currently appear very expensive. Pumped hydro storage shows the most promise and the Committee has recommended that this be further investigated.

Do we need more renewable electricity generation?

To reduce greenhouse gas emissions through accelerated electrification, New Zealand will need more renewable generation to supply the additional demand for electricity. This will require installing more wind farms, more geothermal, more transmission lines, and possibly large scale solar and more hydro storage.

Will accelerated electrification achieve New Zealand's climate goals?

The actions the Committee recommends are the first steps in a journey that will take decades. The Committee is clear that what is recommended in this report is, on its own, not enough. According to the Intergovernmental Panel on Climate Change (IPCC), emissions from fossil fuel use must eventually be eliminated if we are to limit warming to well below 2 degrees compared with pre-industrial levels¹.

What will 100% renewable electricity mean for power prices?

The Committee's modelling indicates that moving to a higher proportion of renewable electricity is unlikely to substantially affect power prices, but taking the last step from 99% to 100% could be very expensive. For example, achieving 100% by 'overbuilding' renewable generation could result in power price increases in the region of 15% for residential consumers, and 40% for industrial consumers. However, overbuilding is not the only option and there are alternatives.

Is electrification the only way to reduce emissions?

Electrification is not the only way to reduce emissions in transport and process heat. Other options for reducing transport emissions include low-emissions public transport and car-sharing schemes. Other options for process heat include energy efficiency measures and using biomass. This report, however, is focussed on the role electricity can play in reducing greenhouse gas emissions.

Is accelerated electrification of transport achievable?

Electrifying 50% of New Zealand's vehicle fleet by 2035 is ambitious, but consistent with goals set by other countries such as the UK and Norway. Swift Government action will be needed. Every additional petrol or diesel vehicle imported into the country will be around for the next 10 to 20 years. The Committee has recommended the Government implement ambitious policies, including ways to ensure low income and rural communities can access electric transport.

What does the Committee think of the Government's recent Clean Car announcement?

The Committee hasn't analysed the details of the Government's recent announcement on incentivising the shift to low emission vehicles. However, the Committee welcomes efforts that

result in genuine reductions in transport emissions. It is also pleasing to see that the policy proposal specifically considers the implications for rural and low-income households.

Is accelerated electrification of process heat achievable?

Electrifying a significant proportion of process heat is technically feasible, but it will be essential that electricity remains affordable and regulatory barriers to electrification are addressed. The Committee also recommends that Government sets a timetable for the phase out of fossil fuelled process heat.

Will solar play more of a role in our future?

Accelerated electrification will result in more demand for electricity. Solar, along-side other renewable electricity generation, has a role to play in meeting this demand. The Committee's modelling estimated 13 times more solar generation by 2035. This is based on assumptions about technology costs – which could change, costs could fall faster than anticipated. The exact mix could well be different in reality.

What is the role of natural gas?

The Committee's modelling shows natural gas will play a diminishing role in electricity generation compared to today, but will be of particular use during dry years. However, the Committee is clear that New Zealand cannot rely on generation from natural gas indefinitely and work must continue on alternatives, for example, pumped hydro storage.

What role will batteries play in the electricity system?

Batteries can support the electricity system by storing energy to meet periods of peak demand avoiding the need for expensive new infrastructure. The cost of batteries is falling fast. The Committee modelled different amounts of battery deployment – ranging between 100MW and 1,100 MW. Battery deployment is just beginning in New Zealand.

What role will hydrogen play in the electricity system?

Hydrogen is a versatile fuel that, globally, may have a role to play in transport, industry, and electricity generation. The Committee considered hydrogen's potential in the New Zealand electricity system, as a backup fuel for dry years by 2035. The Committee's analysis showed that it is currently an inefficient and expensive way of producing a backup fuel for dry years due to losses involved in production and storage (resulting in a conversion efficiency of only 14%). The Committee suggested that hydrogen may be a suitable candidate for further research and development, where other objectives could also be achieved.

What role will pumped hydro storage play in the electricity system?

Pumped hydro storage has the potential to provide backup electricity during dry years. It works by using electricity to pump water up to a reservoir when electricity is cheap, and then releasing the water to generate electricity when prices are high. It is a way of storing and using water independent of rain and snow-melt. Pumped hydro also has the ability to help manage intermittency from renewable generation, and meet daily demand peaks. However, building a pumped hydro scheme would have a large impact on the local environment. Any scheme would also need to meet commitments under Te Tiriti o Waitangi. The Committee has recommended that the Government investigate the potential for pumped hydro to eliminate the use of fossil fuels in the electricity system.

What is process heat?

Process heat is steam, hot water or hot gases used in industrial processes, manufacturing, and the public sector. Around 60% of process heat in New Zealand is generated by burning fossil fuels. For example, large industrial boilers run on fossil fuels and are used to dry liquid milk into milk powder. Some schools use gas or coal fuelled boilers to provide heat for classrooms. Process heat is responsible for about 8% of New Zealand's greenhouse gas emissions.

Who did the Committee meet with during its investigations?

The Committee spoke with over 600 individuals, representing more than 200 organisations, over 12 months. This includes key iwi/Māori representatives, an electricity forum with leaders from the sector, and targeted forums and workshops with industry, youth, and environmental groups. The Committee members also conducted a series of field trips around the country to understand the reality on the ground.

Where can I find a copy of the report?

The full report *Accelerated electrification: Evidence, analysis and recommendations*, as well as supplementary material can be found on our website at: www.iccc.mfe.govt.nz.

So what is the Interim Climate Change Committee doing now?

We are underway with the next phase of our work programme with a focus on leadership, evidence and connectedness – the critical elements required for the independent Climate Change Commission to start work as soon as it is established. The Commission will present its first advice in February 2021, for which they will need a range of tools and a broad evidence base. To prepare the Commission's technical foundations, the Committee is working on:

- Prototyping a sectoral approach, focusing on the transport sector
- Assessing data and modelling needs in the land use sector

- Developing high-quality, sector-wide models and analysis to inform emissions budgets

We are also building foundations for assessing impacts on iwi/Māori, communities and regions, and across generations.

Our priorities, outlined in our letter of 7 May 2019 to the Climate Change Minister, are online [here](#).

How can I get in touch with the Interim Climate Change Committee?

Please send any feedback you have regarding this report to enquiries@iccc.mfe.govt.nz. Our full contact information can be found on our website: www.iccc.mfe.govt.nz

ⁱ In model pathways with no or limited overshoot of 1.5°C, global net anthropogenic CO₂ emissions decline by about 45% from 2010 levels by 2030 (40–60% interquartile range), reaching net zero around 2050 (2045–2055 interquartile range). For limiting global warming to below 2°C CO₂ emissions are projected to decline by about 25% by 2030 in most pathways (10–30% interquartile range) and reach net zero around 2070 (2065–2080 interquartile range).

https://www.ipcc.ch/site/assets/uploads/sites/2/2018/07/SR15_SPM_version_stand_alone_LR.pdf