

New Zealand Productivity Commission  
Via email: [info@productivity.govt.nz](mailto:info@productivity.govt.nz)

2 October 2017

## **Inquiry into Opportunities and Challenges of a Transition to a Lower Net Emissions Economy for New Zealand**

Mercury welcomes the opportunity to provide feedback to the Productivity Commission on its current inquiry. Mercury is an electricity generator and retailer providing energy services to homes, businesses and industrial consumers throughout New Zealand. We have a long heritage of renewable energy in New Zealand serving 1-in-5 homes and businesses under the Mercury brand and other speciality brands. We also have proven capability and technical expertise in smart metering services, geothermal and solar. Our goal is to be the leading energy brand in New Zealand, inspiring our customers, owners and partners in delivering value, innovation and outstanding experiences.

Mercury views the Commission's work as a crucial input to encourage greater alignment of the government's economic and environmental policy and drive greater progress towards leveraging New Zealand's strong natural advantages. The Commission is a respected institution with the ability to examine issues across the entire economy and is therefore well placed to prepare a relevant, insightful report that will provide practical assistance to central government decision makers along with businesses and consumers.

### **Support for the Inquiry Approach**

Mercury strongly supports the proposed approach to the inquiry. It is very important we take the opportunity now to examine opportunities for emission reductions across different emitting sources, technologies and processes in the economy. We support the particular focus on productivity which is a government priority and an area where New Zealand lags relative to other countries. It is also important to examine the economic institutions and policy tools that would best encourage businesses, households, consumers and government to utilise opportunities.

We support the Commission building on all domestic and international research already undertaken rather than reinventing the wheel. We recommend reviewing the World Energy Council (WEC) Energy Trilemma framework to see if there are any insights that can be gained from the policies and practices adopted by the eight countries that are ranked ahead of New Zealand (Denmark, Switzerland, Sweden, Netherlands, Germany, France, Norway and Finland) <https://www.bec.org.nz/>.

It is important that any measures adopted for New Zealand fit our circumstances and needs. Our emissions profile is unique. For example hydrogen or biomass powered cars as an alternative to conventional vehicles are far less relevant in New Zealand compared to Japan due to our significantly decarbonised renewable electricity supply which can enable greater energy security and independence in transport and industrial heat processes.

We agree with the Commission's assessment that it can best add value by being a source of independent and robust analysis. We support the intent for the Commission to provide a vision of how the New Zealand's economy could look long term, fleshing out the implications for businesses and households, investigating methods for assessing the costs and benefits of different pathways and by identifying what policies and institutions will be required.



## Support for economy wide renewable energy (rather than electricity) target

We support the focus on how to encourage businesses, households and consumers to create, find and utilise promising new technology and to choose the most efficient means of mitigating emissions. We particularly like the diagram on page 17 of the issues paper which breaks down where emissions are coming from in each sector of the economy. We believe this is helpful when thinking about where emissions reductions need to be made.

New Zealand is a world leader in renewable electricity, currently 4<sup>th</sup> in the OECD, with 85% of our electricity coming from renewable sources such as hydro, geothermal and wind in 2016. While commendable, the Government's target of 90% renewable electricity generation by 2025 will be easily achievable given the pipeline of competitive renewable electricity projects already consented (see below). In addition, the closure of Tiwai Point Aluminium smelter (at 14% of national demand) would materially accelerate the transition beyond the 90% renewable electricity target by triggering the retirement of uneconomic thermal plant from the system. This will happen without the need for any policy incentives or drivers in our view.

The greater opportunity for New Zealand is to address the real issue that around 60% of our total **energy** usage is still completely dependent on non-renewable fossil fuels, much of which is imported. This dependence on fossil fuels impacts negatively on New Zealanders through our balance of trade. It also means consumers are vulnerable to overseas oil supply and oil price shocks (as brought into sharp relief with the recent Marsden pipeline failure) and it is a significant constraint to New Zealand's efforts to reduce carbon emissions.

The single greatest green growth opportunity for New Zealand is to extend our renewable electricity advantage into other sectors of the economy. Rather than a renewable electricity target New Zealand needs a renewable **energy** target focused on reducing fossil fuel use across all sectors. This would also have important co-benefits of increasing energy independence and resilience.

The Government is contemplating setting targets for key metrics in 2030 which includes consideration of the primary energy supply that is renewable. We would recommend the Commission review the Business NZ Energy Council Deep Dive into 2030 energy targets for New Zealand and the Deep Dive into New Zealand's energy and transport sector emissions (available from the BEC website link above) which provide valuable insights through industry supported analysis which is highly relevant to the Commission's inquiry.

## Renewable electricity can transform transportation

Electrification of transport is one of the largest areas of opportunity if significant reductions in New Zealand's emissions is to be considered. New Zealand is well suited to Electric Vehicles (EVs) due to our abundance of renewable electricity, off-street parking and low average commuting distances. The cost of electricity is far lower than petrol at the equivalent of 30c/litre and the running costs of EVs are lower due to fewer moving parts. EVs also have no tailpipe emissions and therefore have the potential to significantly improve air quality and reduce healthcare costs.

Transport accounts for around 17% of New Zealand's emissions. Full adoption of EVs would save New Zealand over three billion litres of imported fossil fuel each year, worth more than \$4 billion and it would de-link the country's economic growth from carbon, freeing us from oil price shocks and supply issues. It would also give credibility to New Zealand's global "100% Pure" reputation which would aid the tourism sector and help with our goal of expanding our export opportunities. In addition, electrifying some of our rail network is worth considering especially for freight which is currently predominately moved via road and therefore contributes to our carbon emissions and road maintenance costs while keeping us dependent on imported fossil fuels.

There are sufficient least cost consented renewable electricity projects in New Zealand to power ever car in the light vehicle fleet (see chart on following page) at the equivalent of 30c/litre of petrol as mentioned. In our view biofuels will never be able to reach this level of renewability (most are blends), national scale or price point. Further, battery technology is advancing rapidly and is now becoming an increasingly viable option for heavy transport as evidenced by Waste Management NZ's recent commitments which places them at the forefront.



Businesses are leading the way on EV uptake. Air New Zealand and Mercury worked together to get 30 of New Zealand's largest companies to commit to at least 30% of their corporate fleet being EVs by 2019. This initiative represents some 1,450 vehicles, a 75% increase in the total number of EVs on New Zealand roads (at time of the announcement).

Mercury is on target to have 70% of our total fleet electric by the first half of the 2018 financial year. This leadership is important because studies of the potential for EVs in New Zealand have concluded that the market will only start to develop when corporate and government fleets start converting to them. This will help create sufficient demand for car manufacturers to bring a wider and more affordable range of new models to New Zealand. It will also create a steady supply of second-hand vehicles, (crucial as this is around 50% of the car market in New Zealand) and incentivising more public charging stations beyond the 3-pin plug in all homes and businesses (where the vast majority of charging takes place).

There is currently strong bi-partisan political support for EV's with all major political parties making commitments to converting all or some proportion of the Government fleet to electric. The Government has a fleet of about 15,500 cars and so this will help New Zealand reach its target of having 64,000 electric vehicles in New Zealand by 2021.

Mercury, along with the New Zealand Government and Contact have partnered with global EV charging location app Plugshare to launch the Electric Highway ([www.electrichighway.co.nz](http://www.electrichighway.co.nz)) to link New Zealand drivers with charging stations across the country and help diminish range anxiety, one of the identified barriers to EV uptake. We also offer a fuel savings calculator on our website for existing and potential EV owners and an off-peak electricity discount electricity tariff for EV owners. We have partnered with other companies to install EV chargers including the first in the Auckland and Hamilton CBDs and Air New Zealand's Koru club parking. Mercury has also engaged with vehicle manufacturers encouraging them to see New Zealand as an EV ready market. For example, we helped Audi launch the A3 e-tron, taking motor journalists to Ngatamariki geothermal power station to showcase New Zealand's renewable energy.

### **Geothermal makes a significant contribution to supply reliability and emissions reduction**

New Zealand has a proud heritage in the development of geothermal energy for electricity generation. The technology was first commissioned in New Zealand at Wairakei in 1958. Over the past 60 years the sector has gone from strength to strength. Geothermal energy now provides around 17% of New Zealand's total annual electricity generation and has recently surpassed gas-fired generation to become the second largest generation source behind hydro generation.

The displacement gas/coal generation by geothermal is the single-biggest reduction to date in NZ's emissions profile with over 2 million tonnes CO<sub>2</sub>-e per year permanently reduced. This has had the effect of reducing carbon emissions from the electricity sector and positively contributing to New Zealand's international climate change targets and domestic targets for renewable generation (90% by 2025).

Geothermal plays a very important role within the electricity system as it is the only renewable generation source that is not impacted by weather patterns (i.e. the availability of wind, sun or rainfall). Geothermal generation provides a constant level of electricity generation (known as base load electricity) which is critical in ensuring supply reliability given New Zealand has very limited storage in its hydro systems. In addition geothermal electricity is among the lowest cost generation options for New Zealand according to MBIE<sup>1</sup>.

### **Renewable energy can transform process heat use in manufacturing and agriculture**

We welcome and support the Commission's view that geothermal energy can also be used to leverage our renewables advantage in the process heat sector. Kawerau is the world's largest geothermal heat park, producing

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<sup>1</sup> See <http://www.mbie.govt.nz/info-services/sectors-industries/energy/energy-data-modelling/modelling/interactive-electricity-generation-cost-model>



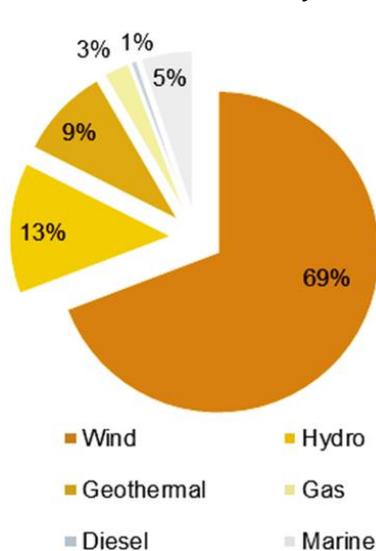
various papers, boards, tissue and speciality products. Miraka, owned by Tuaropaki Trust, is the world's first facility to use geothermal steam for milk processing operations. Milk is sourced from 85 farms in a 100km radius. There are further opportunities to leverage renewable energy in our export markets. NZ Trade and Enterprise have recognised this by placing our renewables advantage much more explicitly into the NZ Story.

Geothermal energy development could reduce emissions even further if it was utilised at greater scale for agriculture processes like milk drying which currently rely significantly on coal fired boilers. We note that in addition to its significant emissions reduction potential, greater usage of geothermal energy would also deliver important co-benefits to the New Zealand economy. It is strongly linked to the objectives of the Government's Business Growth Agenda to promote both regional and Maori economic development, green jobs and export market opportunities.

### New Zealand context important for considering emissions impacts of emerging technologies

Many international jurisdictions have relied heavily on subsidies to promote renewable generation technologies in an attempt to reduce the emissions intensity of their domestic generation sources. This has been a particularly prevalent approach for distributed generation technologies like residential roof-top solar installations.

Consented Generation by Fuel Type



New Zealand in comparison has an abundance of low cost renewable generation options. Generation projects equivalent to around 30% (or 14,000GWh) of New Zealand's current annual generation are currently consented and could be constructed with sufficient demand. Over 90% of current consented projects are renewable (wind / geothermal / hydro / marine).

Calls to increase the proportion of renewable electricity from distributed generation sources like solar in New Zealand need careful evaluation. A 2016 report by Concept Consulting on the impact on New Zealand's greenhouse gas emissions<sup>2</sup> from emerging technologies like solar batteries and electric vehicles concluded that increasing solar penetration in the medium term would displace existing renewable generation and longer term would have a negative impact on emissions. These findings were endorsed by the Parliamentary Commission for the Environment at the time.

This negative impact is due to the fact that solar generates more electricity in summer than in winter which is when New Zealand demands the most electricity. As a result, the increasing use of solar would require further

investment in controllable sources of generation which operate more frequently which is most likely to be fossil fuelled given the limited hydro storage in the New Zealand system.

In comparison Concept Consulting note that electric vehicles have the potential to cut emissions in the long term by 1.7 tonnes per annum for each car. This leads them to conclude:

"Overall if consumers wish to spend money on new technologies to deliver environmental benefits, by far the biggest emissions saving can be achieved from investing in EVs, whereas batteries and solar PVs have less benefit, and PVs are expected to increase net emissions in the longer term."<sup>3</sup>

The ability to store and transfer electricity across seasons is a key emissions related benefit that is delivered by hydro lakes in New Zealand. However, storage is limited (around 6 weeks) which means the times when we most need electricity we may not always have enough water in our dams to meet the demand. When we experience a year of below average hydro inflows (i.e. a dry year) some form of back-up generation is needed to be held in

<sup>2</sup> Concept Economics (March 2016): New Technologies Study - Part 1: Emissions impacts – available from <http://www.concept.co.nz/publications.html>

<sup>3</sup> Ibid pg vii



reserve to be started up to ensure reliability of supply is maintained. Typically this dry year shortfall in hydro generation is equivalent to around 4TWh.

Currently this year reserve is provided by having thermal generation available and ready to provide electricity if needed. Battery technology is highly unlikely to provide a cost effective reserve solution as it is not a source of generation and is mainly used to balance short-term daily energy demands rather than storing energy between seasons as is required in New Zealand. The equivalent cost of providing the 4TWh of storage required to resolve the dry year shortfall challenge on current battery technology costs would be around \$2.9 Trillion (see box below).

#### Box 1: Relative costs of battery storage



Tesla Powerwall = 14 KWh and costs ~\$10,000 installed

4TWh hydro storage (wet/dry year difference) = 4 billion KWh

To provide enough storage to cover a dry year would require:

- 4 billion / 14 = approximately 285 million powerwalls at a cost of **\$2.9 trillion**
- Even if batteries reduced to 5 per cent of current costs (\$500) = **\$142 billion**

Coupling solar with battery storage may at first appear appealing to address the dry year shortfall challenge, particularly as costs for solar continue to decline. However, the generation output of solar is around four times less in winter than in summer. This implies significant over-capacity in solar would be required to be invested in in order to provide enough electricity in winter to address a 4TWh dry year short fall.

#### Policies and institutions

Mercury agrees with the strengths and weaknesses of regulation versus market approaches as outlined in the issues paper. We favour market led approaches to policy problems as this approach encourages efficient resource allocation and avoids the issues associated with overly prescriptive regulation which lack the flexibility to adapt to changing circumstances. A common trap for pure regulatory frameworks is the well-meaning but flawed attempt to pick technology winners. There is a now a significant body of evidence from other jurisdictions highlighting how subsidising particular fuel types and technologies has resulted in unintended consequences and perverse outcomes. For this reason we support regulatory frameworks that are technology neutral which is has been a significant strength of the electricity sector to date.

We see no merit in any direct financial subsidies for subsidising any generation or storage technologies including electric vehicles, batteries, solar or biomass or biofuel uptake. However there is a strong role for government in sending the right economy wide signals as well as promoting demand side responses. These include measures such as progressively tightening the ETS, improving efficiency standards particularly for the light vehicle fleet and better promoting the total life cycle cost and emissions savings of electric vehicles in government and business procurement. Providing certainty in long term regulatory settings is also important to ensure scale investment in future renewable opportunities from private capital.

Mercury has provided feedback to the Ministry for the Environment on the re-design of the New Zealand ETS. Our submissions are available on the Ministry for the Environment website. We have also submitted to the Ministry of Business Employment and Innovation (MBIE) on the revised New Zealand Energy Efficiency and Conservation Strategy. We would be happy to provide copies of our submissions if of interest to the Commission.

We would welcome the opportunity to meet with the Commission to discuss any aspect of our submission. Please contact Nick Wilson, Manager Government and Regulatory Affairs should you have any questions regarding our submission. [Nick.wilson@mercury.co.nz](mailto:Nick.wilson@mercury.co.nz) or 09 580 3623.



Yours sincerely

A handwritten signature in black ink, consisting of a horizontal line with a vertical stroke crossing it, and a cursive 'W' below.

Nick Wilson  
**Manager Regulatory and Government Affairs**

