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Submission on EECA 2020/21 levy funding proposal

This is Vector Limited's (Vector) submission on the Energy Efficiency and Conservation Authority (EECA) 2020/21 levy funding proposal consultation, released on 18th November, 2019.

Vector supports the proposed programmes, as they are well aligned with government policies targeting decarbonisation and innovation in the energy sector. EECA's proposed activities in efficient and low-emissions transport, the equipment energy efficiency programme, and productive and low-emissions business are appropriate uses of levy funds and provide value to our customers.

We also see possible opportunities for EECA to investigate efficient electrification, the value of energy efficiency at peak times, the value of electric vehicle (EV) smart charging, and the promotion of EV smart charging installations.

No part of this submission is confidential. Vector's contact person for this submission is:

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1. Alignment with Government Policies

Realising the affordable and equitable transition to the low carbon future that the Climate Change Response (Zero Carbon) Amendment Act sets out for New Zealand will require continued support for innovation in the energy sector. This was highlighted by the Electricity Price Review (EPR) which found that there is insufficient innovation taking place in the electricity sector and increased innovation, research and development could assist in meeting the challenges of electrification and decarbonisation. We note the subsequent decision to encourage a range of agencies to facilitate more innovation in the energy sector and to issue a GPS to the Electricity Authority and the Commerce Commission to promote energy sector innovation.

EECA's proposed levy programmes, which focus on energy efficiency, peak demand management and the integration to electric vehicles, align well with the ICCC's preferred pathway to prioritising the electrification of transport and industrial process heat to reduce greenhouse gas emissions from the energy sector.

It is important that government continues to support EECA's funding to facilitate coordinated research efforts in energy technologies to benefit all New Zealand consumers as a means of supporting wider policy goals.

2. EECA programmes deliver benefits for our customers

As EECA noted in the “Energy Efficiency First”¹ report published in July 2019, the pathway to a low carbon future should prioritise and support energy efficiency and demand management over purely building new generation to reduce the costs of transitioning to a low-carbon future. The critical role of demand response in supporting emissions reductions is supported by the work of the Intergovernmental Panel on Climate Change (IPCC).² This found that as well as transitioning from fossil fuels to electricity in end-use sectors, greater mitigation efforts on the demand side is also a key characteristic of pathways to reduce global temperature increases in line with the Paris Agreement³ – demand side mitigation efforts includes smart demand management and energy efficiency technology. Thus, we support continued work by EECA to support the programmes in Equipment Energy Efficiency (E3), large energy users, and technology demonstrations. These programmes target both operational and equipment solutions for energy efficient and productive buildings. The possible inclusion of regulations for “smart (demand response capable) appliances and dishwashers, washing machines and clothes dryers”, noted on page 18 of the consultation, is something that we support as a low cost option to increase the future opportunities for demand management in homes and businesses, provided open international standards are utilised.

Auckland has seen the highest numbers of newly registered electric vehicles (EVs) in New Zealand over the last several years, and therefore efficiently managing the impacts of EV charging is becoming more urgent at Vector. As stated by the EECA report on residential EV charging, “The need for managed charging accelerates with higher EV adoption in order to maintain the stability of the electricity network”.⁴ With the Interim Climate Change Commission’s (ICCC) report *Accelerated Electrification* highlighting the electrification of transport as a key option in reducing emissions to 2035 and beyond, we strongly support EECA’s Low Emission Vehicles Contestable Fund (LEVCF) to help find solutions for managing peak demand and the Electric Vehicle Information Campaign to encourage wider adoption of EVs to support decarbonisation.

At Vector we are actively researching demand management and other non-network solutions that better utilise the current network before investing in new network capacity. We have started a trial utilising the LEVCF to explore the distribution network and customer resiliency benefits of vehicle-to-home (V2H) technology in Piha.⁵ Customers will be able to rely on their own backup electricity supply from their vehicle until power is restored during short-term outages, as well as saving on power bills by reducing their network usage during peak times. Vector is also evaluating demand management technology with smart EV chargers in a trial that launched on the 4th of October 2019 in Auckland. This will study the impact of managed charging schedules on customer charging behaviour to develop the evidence base for managing demand peaks with smart EV charging.⁶ Additionally, with support from the LEVCF, 80 home smart chargers and 10 public smart chargers will be installed on the island of Waiheke⁷ to support island electrification and gain valuable data

¹ <https://www.eeca.govt.nz/assets/Resources-EECA/research-publications-resources/EECA-Energy-Efficiency-First-Overview.pdf>

² Special Report: Global Warming of 1.5 °C”, Chapter 2 Mitigation Pathway Compatible with 1.5 in the Context of Sustainable Development. Intergovernmental Panel on Climate Change. 2018.

³ Global Warming of 1.5 degrees. IPCC. 2018.

⁴ *Electric Vehicle Charging Technology: New Zealand residential charging perspective*. KPMG report prepared for the Energy Efficiency and Conservation Authority (EECA). 2019.

⁵ <https://www.vector.co.nz/news/trial-of-vehicle-to-home-tech>

⁶ Smart EV Charger trial put to the test in New Zealand First. Vector. 2019

⁷ <https://www.vector.co.nz/news/vector-to-help-waiheke>

about the impacts of concentrated smart EV charging on network constraints and the resiliency of the island's power supply.

3. Opportunities for additional research

a. Efficient Electrification

There is a need to better understand where the opportunities for electrification of end use loads would provide the biggest impact in New Zealand. This would support forecasting of load growth for electricity distribution businesses (EDBs) and identify the most efficient opportunities for electrification for customers. In some applications or locations, the impacts of electrification may require significant infrastructure upgrades – such as for the electrification of the heavy vehicle fleet, which is currently being investigated by the Ministry of Transport's Green Freight Project. EECA could support these efforts by updating the end-use database, including seasonal load shapes for end-uses, reporting on efficient equipment sales data for different regions in New Zealand, and mapping where significant electrification opportunities exist. Trials of electrification efforts could follow with partner EDBs to understand and evaluate the impacts on the electricity infrastructure.

b. Value of Energy Efficiency at Peak Times

To further support energy efficiency deployment, EECA could apply the principles outlined in the *Time-varying value of electric energy efficiency*⁸ from Lawrence Berkeley National Laboratory to evaluate the benefits that could be expected from an energy efficient device or appliance during the system peaks in New Zealand. One of the benefits of using this approach is that a reduction in system peaks can then be tied to a reduction in peak time generation and greenhouse gas emissions, additionally it would help address system peaks which drive typical low voltage network investments. To achieve this, hourly or half hourly load shapes of typical equipment would be needed to map against system-wide New Zealand peaks. By understanding the potential peak demand savings from deployment of energy efficiency solutions, Vector would then be able to evaluate energy efficiency as an option alongside other network infrastructure investments.

c. Value of EV Smart Charging

In the report *Electric Vehicle Charging Technology*, EECA noted, “The need for managed charging accelerates with higher EV adoption in order to maintain the stability of the electricity network”.⁹ The report also referred to analysis undertaken by Concept Consulting,¹⁰ where a passive charging scenario is likely to result in an additional \$6.1bn in distribution and transmission costs compared with a managed charging scenario by 2050. As follow-on research, EECA should explore the types of demand management services EV smart charging can deliver, and what the economic value of those services would be to the different parties in the energy sector.

d. Promote Installations of EV Smart Charging

The *Electric Vehicle Charging Technology* report showed that the incremental cost of installing a smart wall charger over a standard dedicated wall charger was relatively low,

⁸ http://eta-publications.lbl.gov/sites/default/files/lbnl_bto_time_varying_ee_final_070317.pdf

⁹ *Electric Vehicle Charging Technology: New Zealand residential charging perspective*. KPMG report prepared for the Energy Efficiency and Conservation Authority (EECA). 2019.

¹⁰ http://www.concept.co.nz/uploads/2/5/5/4/25542442/ev_study_v1.0.pdf, Page 20

suggesting that there is an opportunity for market influence with a relatively small intervention. With estimates showing that in just 4 years we could have 15,000 EVs capable of charging at rates higher than 3.7 kW in New Zealand, smart charging deployment would enable approximately 55 MW of demand management potential. Therefore, we recommend exploring a new programme supporting smart vehicle charging installations, so that an opportunity to enable the value in these customer owned assets isn't missed. Like the Office of Low Emissions Vehicles (OLEV) Electric Vehicle Homecharge Scheme¹¹ in the UK, this could take the form of an incentive to install smart EV charging that utilises open international standards or possibly as part of the Electric Vehicle Information Campaign. In the future, interested parties in the energy sector would then be able to easily connect, manage, and offer remuneration for the services delivered by EV smart charging once demand management markets are more mature.

4. An Opportunity for Coordination

EECA is one of several government agencies involved in supporting innovation and research in the energy sector. To facilitate the effective transition of technologies from research and development to wider customer and energy system outcomes, Vector supports the development of a Ministry of Energy. Given the high-risk nature of research and development and innovation, many businesses are incentivised to under-invest. Enabling businesses to overcome this market failure will require collaboration between all participants in the energy markets to build a framework which enables, rather than inhibits, innovation. We subsequently support the recommendation from the EPR to undertake a review of policy and regulatory settings. A dedicated Energy Ministry will help coordinate decision making and ensure that regulatory settings align with wider policy goals. This includes settings which provide the industry the certainty it needs to continue to make smart investment decisions in innovation and technology.

Kind regards



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¹¹ <https://www.gov.uk/government/collections/government-grants-for-low-emission-vehicles#electric-vehicle-homecharge-scheme>