Submission to the Electricity Authority on network connections and network pricing

19 December 2024

Photo: Charging infrastructure for the East by West electric ferry in Wellington, photo © Elizabeth Yeaman 2022

Submitter

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Introduction and context

Thank you for the opportunity to submit on the two complementary consultations from the Electricity Authority Te Mana Hiko on:

- Distribution connection pricing proposed Code amendment; and
- Network connections project – stage one.

Retyna Ltd is a specialist consultancy that provides advice to companies along their transport electrification journey. We have assisted truck and bus fleet operators, ferry operators, mobile machinery operators, vehicle manufacturers' representatives, charging infrastructure manufacturers, Charge Point Operators, and local government.

Many of these companies, particularly heavy transport fleet operators needing to install charging infrastructure at their depots for their own vehicles, have never interacted with the electricity sector before regarding a new or upgraded network connection. Many operate nationwide and have a choice about which geographic locations to select first to trial electric vehicle (EV) fleets or to grow the number of EVs in their fleet beyond the trial stage. They want to be able to compare options for network connection costs and total electricity operating costs across a project life to understand when and where to invest first.

At the heavy EV trial stage, the load profile for a single DC high-power charger installed at a depot is likely to be very peaky. The electricity distributor may typically propose a transformer upgrade, resulting in very high lines charges for an infrequent high load when the trial heavy EV is charging. From the customer's perspective, a better solution may be a smaller transformer and/or battery (potentially at a similar cost to the electricity distributor) but with lower lines charges for the customer. The combination of triggering a transformer upgrade and high lines charges due to the peaky nature of a heavy EV trial, combined with a lack of transparency and slow timeframes, has sunk many potential projects for companies making their first steps into heavy electric vehicles.

Waka Kotahi New Zealand Transport Agency has published guidance[1] to help address the knowledge gap for many heavy fleet operators regarding the issues and options associated with electrifying heavy vehicle depots (Retyna was one of the consultants that assisted Waka Kotahi with writing this guide). The guidance is intended to assist fleet operators to have informed discussions and negotiations with electricity sector participants and illustrates the extent of information asymmetry between transport sector end-customers considering electrification and the electricity distributors.

This submission aims to help bring to these consultations the end-customer viewpoint for fleet and other transport sector operators wanting to electrify. It also reflects Retyna's experience of very different timeframes, costs and approaches between electricity distributors across the country.

[1] https://www.nzta.govt.nz/assets/resources/local-electricity-market-guidance-for-the-transport-sector/local-electricity-market-guidance-for-the-transport-sector.pdf

Distribution connection pricing proposed Code amendment

Retyna agrees with the Electricity Authority's current situation and context for connection pricing. It also agrees with the problem statement and supports the general direction of the Code amendments proposed.

Retyna supports a fast-track process as part of the proposed pathway to full reform. However, many freight and other transport sector fleet operators have depots with electricity network connections through embedded networks at places like airports, inland ports and seaports. At these transport hub locations, competing transport sector operators and public Charge Point Operators may be seeking to connect new load for charging a wide range of vehicle types, including vessels and aircraft.

The fast-track process coincides with the time that the Energy Efficiency and Conservation Authority (EECA) is offering grants of up to 25% towards the capital costs of heavy zero-emission vehicles through Low-Emission Heavy Transport Fund[2]. There is funding cap per end-user company to encourage as many operators as possible to buy their first heavy EVs. The Fund was jointly launched in September 2024 by the Minister of Energy and the Minister of Climate Change and is budgeted for three years. Many freight sector operators and other companies planning to buy heavy electric trucks and coaches will be seeking new connections for charging infrastructure during this period.

It is, therefore, vital that embedded networks that serve transport hubs are included in the fast-track process at this critical time for accelerating heavy EV uptake.

Retyna supports a pioneer scheme pricing methodology that would improve connection pricing efficiency. It is important that this is implemented as soon as possible, otherwise end-users that are about to make a significant customer contribution to an electricity distributor may wait until the pioneer scheme is in place before investing, delaying decarbonisation.

Network connections project – stage one

Proposal A

Retyna supports the concept of a Medium Distributed Generation (DG) process. However, the threshold should be aligned with the Medium load process, which is discussed below. An important reason for alignment is that with vehicle-to-grid charging technology EV batteries connected by bi-directional EVSE will be both a demand source and also a supply.

Proposal B

Retyna supports the concept of a Medium load process. However, the upper threshold does not make sense from the perspective of an end-user needing to install a high-power Electric Vehicle Supply Equipment (EVSE)/"charger", and may result in EVSE market distortions and sub-optimal investment.

The Combined Charging System Combo 2 (CCS2) is NZTA's recommended charging connector for new electric vehicles in New Zealand[3]. The CCS2 connector specifications are standardised by the International Electrotechnical Commission (IEC) for EVSE and are for a maximum of 1,000V DC and a

[2] https://www.eeca.govt.nz/co-funding-and-support/products/low-emissions-heavy-vehicle-fund/
[3] Charging point connectors and socket outlets | NZ Transport Agency Waka Kotahi

maximum of 500A, giving a maximum of 500kVA. (IEC TS 62196-3-1 references for connector and inlet configuration "FF" describes CCS2)[4].

Typically today, a large electric truck may be able to accept a charge rate of up to 300-350kW using a CCS2 connector and, for a 24/7 freight operation, an EV charger of 200-400 kW may be needed at the freight depot to get vehicles quickly back on the road.

The lower threshold of the large load application process is 300kVA, which is in the middle of the product range from different suppliers for high-power charging (HPC) EVSE using the CCS2 connector standard. A threshold in the middle of a product range from different suppliers risks creating distortion in the EVSE market.

For example, a freight sector operator selecting a single high-power charger for an electric truck trial may be choosing between one brand of EVSE with a 350kW model and another brand of EVSE with a 275kW model. Obtaining a connection for the first would need to go through the Large load connection process, while the connection for the second could go through the Medium load process.

To avoid distorting the EVSE market, the threshold between the Medium and Large load application processes should recognise the IEC standard related to EVSE with CCS2 connectors and be greater than 500kVA.

Retyna notes that from 2025, the MegaWatt Charging System (MCS) connector and inlets will allow some trucks, buses, ferries and aircraft to charge at rates between 1 MW and 3.75MW. Only some trucks, buses, ferries and aircraft will need these extremely high charging rates and network connections for EVSE in these cases will likely need to go through the Large load process. However, anything that can be done to streamline the process for the installation of MCS EVSE would be welcomed and would help accelerate the decarbonization benefits of electrifying these transport modes.

Proposals C and D

Retyna supports the requirements for electricity distributors to publish a "network connections pipeline" and "provide more information on network capacity". This information needs to be in a format that is easily accessible, understandable by end-users such as freight companies, and consistent between electricity distributors such that end-users can use the information to help them make decisions about where to connect. It should ideally include presentation in the form of online maps of network capacity.

Proposal E

Clarity is needed as to whether the terms for DG would apply to a connection contract for EV charging using a bidirectional EVSE.

Proposal F

Retyna supports this proposal to add regulated and prescribed terms for load applications and amend dispute resolution requirements. However, the requirement should ensure that it does not preclude end-users from seeking other (potentially faster or lower cost) ways to resolve disputes.

[4] https://webstore.iec.ch/en/publication/59654