



Report PE19.231
Date 11 September 2019
File CCAB-20-712

Committee Sustainable Transport
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Strategic assessment for transitioning to a zero emission bus fleet

1. Purpose

To consider a strategic assessment of options for transitioning the Metlink bus fleet to zero emissions.

2. Exclusion of the public

Grounds for exclusion of the public under section 48(1) of the Local Government Official Information and Meetings Act 1987 are:

Certain information contained in this report relates to future bus service procurement and contracting in the Wellington Region. Release of this information would be likely to prejudice or disadvantage the ability of Greater Wellington Regional Council (GWRC) to carry on negotiations with bus operators and/or other suppliers of future fleet for the Metlink public transport network. GWRC has not been able to identify a public interest favouring disclosure of this particular information in public proceedings of the meeting that would override the need to withhold the information.

3. Background

Fleet improvements are a key element in reducing journey times, increasing service reliability, improving passenger amenity, and contributing to increasing patronage. Fleet improvements are also important in GWRC's strategies for improving operating efficiency and environmental outcomes across the region, particularly in relation to climate change and local air quality.

GWRC is in the midst of a modernisation of its bus fleet to deliver Metlink bus services. Due to the cost of maintenance and constraints on operational efficiencies, the trolley buses were retired in October 2017 and the oldest diesel buses were replaced by modern low emission diesel buses and a small number of electric buses as part of the new bus contracting regime implemented in

mid-2018 as part of changes enabled by the Public Transport Operating Model (PTOM).

Modelling undertaken by GWRC prior to the 2018 changes indicated that replacing the trolleys and pre-Euro III standard buses with new Euro V buses would result in a 33% decrease in total emissions per kilometre across the Wellington city fleet, including a 74% decrease in particulate matter emissions. While there would be a small increase in GHG emissions by replacing trolley buses with diesel buses in the short term, GHG emissions from public transport represent less than 1% of regional GHG emissions from all sources, and with trolleys performing around 10% of the public transport bus task, changes in the fleet mix resulted in very minor increases to regional GHG emissions.

The PTOM tender clearly signalled GWRC's preference for lower emission vehicles and ambitions to move to an all-electric bus fleet. GWRC's tender evaluation methodology monetised different emissions outcomes from the different fleet types submitted by different tenderers. These monetised valuations contributed to the final assessments to choose successful operators.

The incentives and signals given for low emission fleets in the tender contributed to the realisation of GWRC's desired outcomes. The majority of the buses that have been introduced under the new contracts have been new Euro VI diesel buses. The modelled improvement in fleet emissions (based on the PTOM tender process) was an estimated 38 per cent reduction in harmful pollutants in Wellington city and 84 per cent reduction in the Hutt Valley.

A subsequent agreement with Tranzurban has enabled the introduction of 10 electric double-decker buses (EVDD) to Wellington, with a commitment to introduce another 10 in 2020 and a further 12 in 2021. This will represent a further improvement in the region's transport emissions and a significant step towards GWRC's goal of an all-electric bus fleet.

Ongoing fleet renewals and expansion represent further opportunities to further upgrade the region's bus fleet.

4. Strategic context

4.1 Carbon neutrality target for GWRC

On 21 August 2019, Council agreed to a series of greenhouse gas (carbon) reduction targets for its corporate operations and areas of direct influence:

- 40% net reduction in 2024-25 financial year
- 100% net reduction (carbon neutral) in 2029-30 financial year and thereafter
- Become a net producer of carbon credits (carbon negative) by the 2034-35 financial year.

As public transport is considered an area of direct influence, the targets are relevant for future decisions around public transport fleet and motive power.

More specifically for public transport, the associated action plan puts forward a preference to ‘Accelerate the implementation of an electric bus fleet in the region by 2030’. This paper is the starting point for clarifying how the preference to ‘accelerate the implementation’ will be achieved.

4.2 Regional Land Transport Plan

The Regional Land Transport Plan (RLTP) is relevant for this discussion as it provides the strategic vision and context for land transport (including public transport) for the Wellington region.

The RLTP is owned by all councils in the region and the NZ Transport Agency. The current RLTP includes targets for public transport fleet emissions. The current aim is for at least a 50% reduction in public transport fleet emissions by 2025, from a 2013 base. A new region-wide emissions target will be developed via the development of the next RLTP.

The Programme component of the RLTP is also relevant for funding decisions around EV fleet. For example, the current programme includes indicative funding (\$38m) from 2021 to enable additional electric buses to be added to the fleet. Inclusion in the RLTP does not guarantee funding from the NZ Transport Agency.

The RLTP is soon to be reviewed, which is timely for this paper as it will help inform discussion on funding priorities and the role of public transport in reducing carbon emissions in the Wellington region.

4.3 Regional Public Transport Plan (PT Plan)

Building on the forward planning component of the RLTP, the PT Plan is primarily about delivery of public transport over the shorter term.

The current PT includes a discussion on Wellington City bus fleet options in section 4.2 of the PT Plan, however this is out of date and requires review. Work to date via the pre-engagement process has identified ‘Transition to a zero-carbon fully electric bus fleet’ as a key strategic priority for the upcoming years.

Development of the next PT Plan is expected to begin early in the new Council triennium, which provides an ideal opportunity to set out in much greater detail any targets and how a pathway to a fully electric fleet can be pursued.

5. Strategic assessment

5.1 Introduction

Council has a stated ambition to be the first region in New Zealand with an all-electric bus fleet.¹

¹ For the purposes of this report and the strategic assessment paper, the terms ‘all electric’ and ‘zero emissions’ are used interchangeably. Zero emission vehicles refers to vehicles that emit zero tailpipe greenhouse gas and other harmful emissions. ‘All electric’ and ‘battery electric’ buses are a subset of zero emission buses. Other zero emission buses include electric buses that use supercapacitors, rather than batteries, and hydrogen fuel cell buses.

To inform a transition pathway that is likely to achieve an all-electric bus fleet prior to other regions, GWRC has undertaken a strategic assessment of the motive power options for the Metlink bus fleet and the options for the rate of transition to a zero emission fleet.

All transition options are feasible but come with a price tag. The two modelled transition scenarios are more expensive than the Base Case of all diesel buses, indicating that the still relatively high capital costs for electric buses and associated infrastructure are not yet offset by operating cost and emission reduction savings over the 11 year modelling period.

As noted above, the strategic assessment will inform the development of the next RLTP (context and funding) and the next PT Plan (priorities, policies and actions). This will enable the community and key stakeholders to be consulted on Council's preferred transition pathway.

The strategic assessment is provided in **Attachment 1** to this report.

5.2 A possible Wellington zero emission bus pathway

It can be concluded that with the imperative to reduce greenhouse gas emissions from transport, coupled with advances in electric vehicle technology and New Zealand's high levels of renewably generated electricity, GWRC will transition to an all-electric bus fleet over time. The question, and therefore the options in relation to transition, is about timing and how rapidly the transition may occur.

To achieve its stated ambition to be the first region in New Zealand to have an all-electric bus fleet, GWRC must reach the milestone prior to other regions. Auckland is currently the only region in New Zealand with a published pathway to a zero emission bus fleet, though other regions, in particular Bay of Plenty and Canterbury, have initiated their transitions to zero emission bus fleets with small numbers of electric buses being added to their fleets in 2019. Auckland's pathway, as documented in Auckland Transport's 'Low Emission Bus Roadmap', targets a zero emission bus fleet by 2040.

A growth and replacement pathway (Scenario A) will achieve a zero emission bus fleet for the Greater Wellington region by 2037. This pathway assumes that NZ Bus procures 51 new electric buses to replace 51 interim buses in its current fleet, rather than new diesel buses.

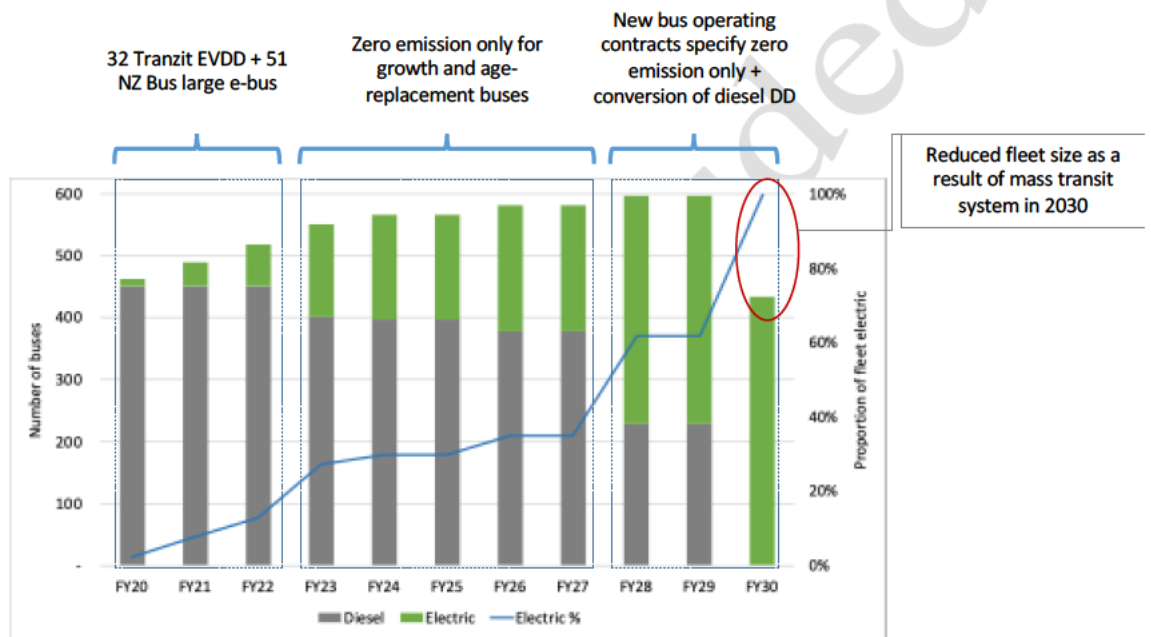
A more aggressive transition pathway (Scenario B) would see a zero emission bus fleet for the region by 2030. Under this pathway future bus contracts from 2027 specify zero-emission buses only. In the intervening period between now and 2030, operators will be required to procure only zero-emission buses for end-of-life bus replacements and fleet growth.

The exception will be high capacity double decker buses as there is no known battery electric bus options that can deliver to this capacity under New Zealand’s currently restrictive axle weight regulations.²

To achieve a 100% electric fleet by 2030, it is necessary to assume that options will exist to economically convert current and future diesel double deckers to electric by 2030.

Both scenarios and the base case assume the commencement of a mass transit solution in Wellington city in 2030, at which time the bus fleet in Wellington city reduces by approximately 160 buses.³

Potential zero emission bus pathway – Scenario B



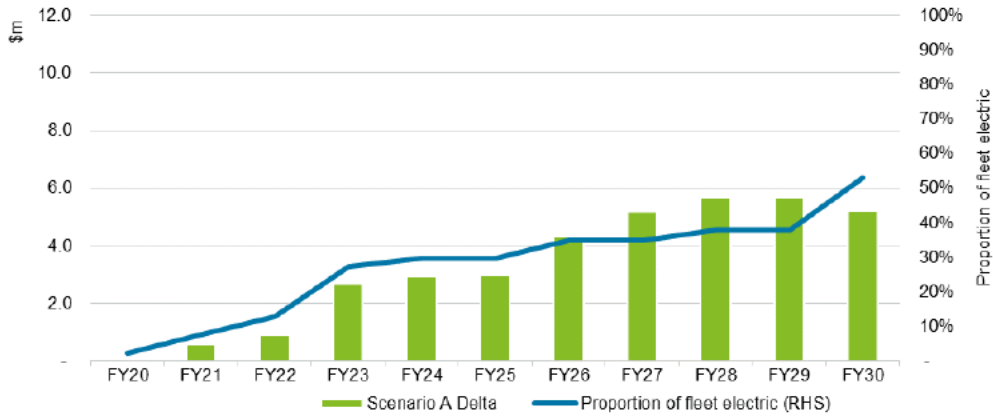
5.3 Financial impact

The incremental cashflow of the two transition options, relative to the base case of diesel buses only, is illustrated as follows:

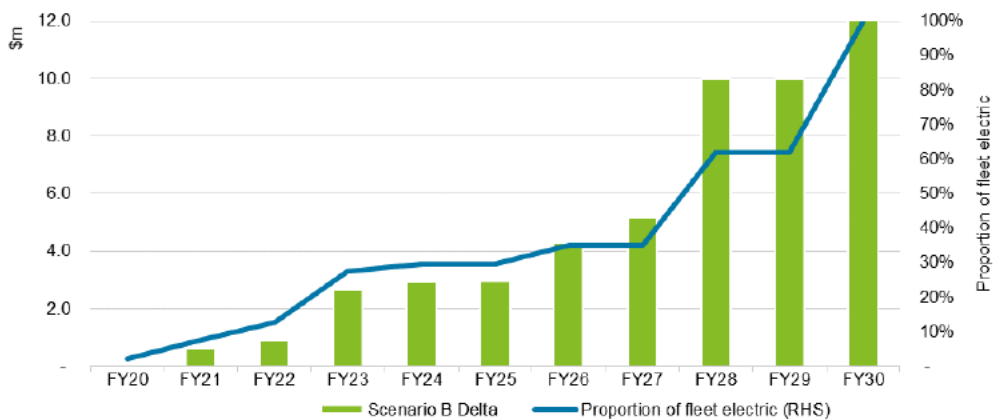
² Tranzit’s EV double deckers have a maximum capacity of 82 passengers and are officially classified as a Large Vehicle (LV) and not a double decker (DD) for timetabling purposes.

³ Ian Wallis & Associates, LGWM rapid transit network options final draft, 2018

Annual Net Cash Flow Impact - Base Case vs Scenario A



Annual Net Cash Flow Impact - Base Case vs Scenario B



As the above figure indicates, the step change of specifying zero emission buses only in all future bus contracts from 2027 (FY28) represents a substantial increase in annual operating costs to GWRC over the base case – in the order of \$10-12m per annum.

This incremental cost is the result of the capital cost differential between new buses and existing buses with depreciated values, multiplied over the estimated 300 diesel buses which will still exist in the regional fleet in 2027. This situation occurs irrespective of the motive power differences, with capital costs of electric buses and diesel buses expected to be close to parity by 2030.

A number of simplifying assumptions were used for modelling purposes that may overstate the estimated annual net cashflow impacts, including:

7(2)(b)(ii)

- a) [REDACTED]
- b) For Scenario B, all remaining diesel fleet is replaced as PTOM contracts expire and are retendered – for contracts outside Wellington city this is assumed to occur in 2027 at the current expiry time, and all Wellington city contracts are assumed to be extended until 2030 to coincide with the opening of the future mass transit system.

- c) The diesel fleet is replaced in 2027 and 2030 by new electric buses, however a lower cost alternative scenario may be the conversion of diesel buses to electric buses.
- d) RUC is reinstated in December 2025 at existing diesel rates – RUC reinstatement on electric vehicles may be at lower rates.

5.4 Budget impact

From FY22, additional budget has been allowed in the Long-term Plan 2018-2028 (LTP) for the future introduction of electric buses. This line item has been included as a “motive power premium” for the express purpose of funding the uptake of zero emission buses. At the time that the premium was included in the LTP, 2022 was the expected timing in which suitable electric buses for Wellington conditions would become available.

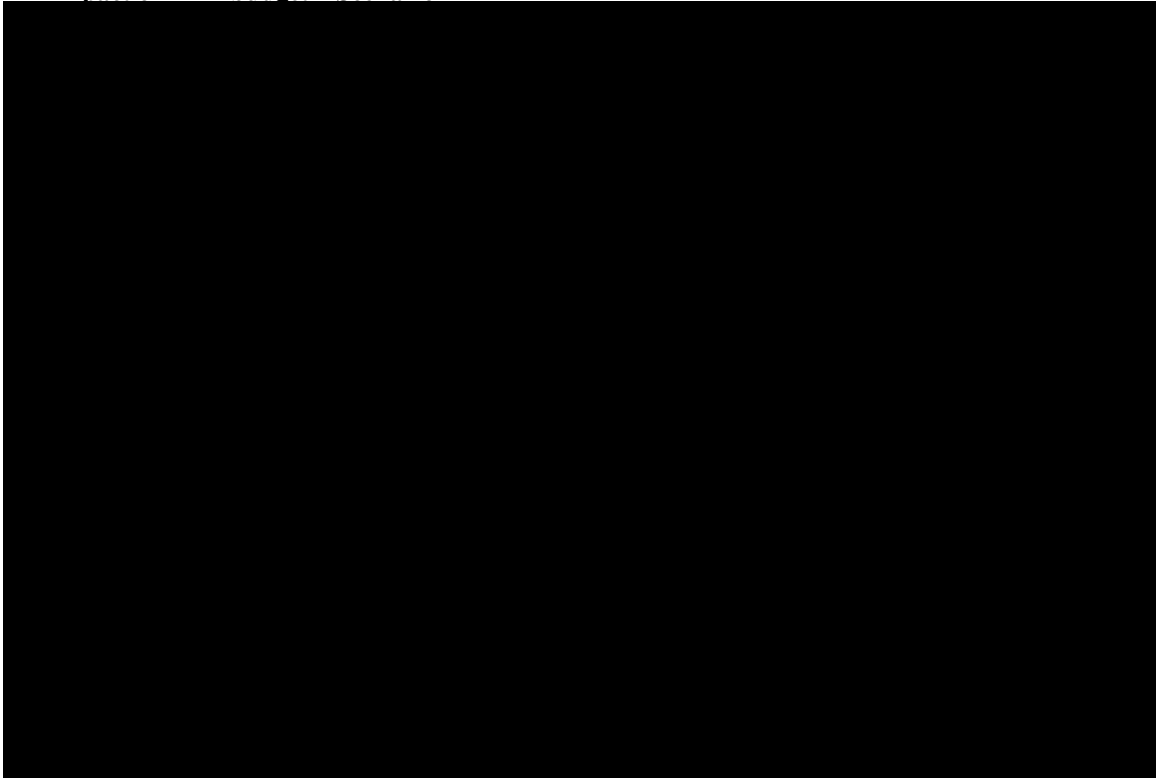
Report RPE19.188 sought Council approval of the proposal from NZ Bus to seek proposals for the procurement and introduction of 51 new electric buses to replace the trolley fleet. This strategic assessment assumes that that procurement proceeds. Report RPE19.188 noted that additional funding would be required to enable the procurement of the 51 electric buses and that this funding could come from the motive power premium, thereby reducing the funding available for additional electric fleet. This funding is factored into the analysis below.

7(2)(b)(ii)

[REDACTED]

The financial impact of the two scenarios for the period to FY28 against the remaining “motive power premium” in the 2018-2028 LTP budget is shown below.

Impact on LTP budget – Scenario A



7(2)(i)

Impact on LTP budget – Scenario B



The financial impact in FY28 and beyond is particularly uncertain due to the technology changes over the next ten years and the impacts of a mass transit solution on the future bus network in Wellington city, in particular the timing

of bus contract replacements and the number and types of buses that will form future bus contracts in Wellington city.

5.5 Conclusion

To deliver on Council's aspiration to be the first region in New Zealand with an all-electric bus fleet GWRC must reach the milestone prior to other regions.

Notionally Auckland's pathway targets a zero emission bus fleet by 2040, however depending on technology advancements and/or political decisions, Auckland may achieve their target sooner than 2040. No other region has published a target date.

A growth and replacement pathway would see a zero emission bus fleet serving the Greater Wellington region by around 2037. This assumption is premised on NZ Bus procuring 51 new electric buses to replace 51 interim buses in its current fleet, rather than new diesel buses.

A more aggressive pathway could see a zero emission bus fleet in the Wellington region by 2030 if zero emission only buses are specified in future bus contracts from 2027, and a solution is identified over the next decade to convert diesel double deckers to electric.

The more aggressive pathway presents two primary implications:

1. There is a significant incremental cost impact to GWRC as a result of the price differential between new buses and existing depreciated value buses. This occurs irrespective of the motive power – it is a function of depreciated bus values versus new bus values multiplied over an estimated 300 diesel buses that will still make up the regional bus fleet in 2027.

2. [REDACTED]

Point 2 above may be mitigated if cost effective solutions to convert diesel buses to electric, such as to battery electric or hydrogen, become available by 2027. The conversion of diesel buses at their mid-life could potentially provide a valuable 're-use' option for existing buses and even a competitive advantage to current incumbent operators.

Due to the significant annual incremental cost from FY28 of specifying zero emission buses only in all future bus contracts, Council may wish to commit to an official zero emission bus fleet target of 2037. Such a target is consistent with many international cities and ahead of Auckland's current target of 2040. Council is then able to retain the flexibility to advance the target at any time in the future, dependent on considerations such as the evolution of future technologies, the impacts of a mass transit solution in Wellington city and the nature of future bus contracts from 2027.

7(2)(i)

5.6 Next steps

Council endorsement of a pathway to a zero emission bus fleet will inform the fleet related priorities, policies and actions in the future PT Plan review process. This will enable the community and key stakeholders to be consulted on Council's preferred transition pathway.

In the interim officers will work with NZ Bus to commence the procurement process for the 51 vehicles to replace the trolley fleet and with Tranzurban to procure the additional 22 double decker electric vehicles.

6. Communication

[REDACTED]

7(2)(i)

7. Consideration of climate change

The matters requiring decision in this report have been considered by officers in accordance with the process set out in the GWRC Climate Change Consideration Guide. As outlined in the report, a zero emissions bus fleet will have a significant impact on reducing greenhouse gas emissions.

8. The decision-making process and significance

Officers recognise that the matters referenced in this report may have a high degree of importance to affected or interested parties.

The matters requiring decision in this report have been considered by officers against the requirements of Part 6 of the Local Government Act 2002 (the Act). Part 6 sets out the obligations of local authorities in relation to the making of decisions.

8.1 Significance of the decision

Part 6 requires Greater Wellington Regional Council to consider the significance of the decision. The term 'significance' has a statutory definition set out in the Act.

Officers have considered the significance of the matter, taking the Council's significance and engagement policy and decision-making guidelines into account. Officers recommend that the matter be considered to have low significance. The zero emissions target that is being considered in this report will, if approved be consulted on as part of the review of the PT Plan

Officers do not consider that a formal record outlining consideration of the decision-making process is required in this instance.

8.2 Engagement

Engagement with members of the public on a zero emissions target will occur via consultation as part of the PT Plan review.

9. Recommendations

That the Committee:

1. **Receives** the report.
2. **Notes** the content of the report.
3. **Notes** that there is provision in the Long-term Plan 2018 – 2028 for the future introduction of electric buses, but that this provision is unlikely to be sufficient to cover the full costs of either of the future fleet scenarios in this report together with the additional costs of the 51 trolley replacement fleet as electric buses and the 22 additional electric double deckers.
4. **Notes** the assumptions in the paper associated with each scenario.
5. [REDACTED]
6. **Adopts** either Scenario A or Scenario B as a potential future pathway.
7. **Requests** officers to include this target and information on the preferred approach for implementation in the future PT Plan review for consultation with the public and stakeholders.
8. **Notes** that the zero emissions bus fleet target and information on the preferred approach for implementation will be used to inform development of the 2021 Regional Land Transport Plan.

7(2)(i)

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Attachment 1: Strategic assessment