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BUS INDUSTRY COSTS AND CHALLENGES

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ABSTRACT

With ever increasing fuel and labour costs, controlling the cost of bus service provision, particularly in the light of the NZ Transport Agency's (NZTA) farebox recovery policy, will always be a challenge for New Zealand Regional Council's and bus operators.

This paper seeks to help better inform the debate about improving bus services and making them more affordable to potential users. It explains how much it costs to run a bus service, outlines the main cost elements and trends, discusses the ways in which costs can be controlled and operating and maintenance efficiencies achieved and the significance of traffic congestion and road works on bus operating costs.

The paper includes a discussion of how the general trend of bus services becoming slower, costs increase, fare increases, revenue reductions and the threat of service cuts can be reversed, and a 'virtuous circle' of improving bus speeds, patronage and revenue increases, more investment in services takes place, fare increases are smaller, services are more attractive and patronage and revenue increase.

The paper also discusses how bus operating costs in New Zealand compare to those in similar countries elsewhere in the world.

CONTEXT: THE ROLE OF THE BUS

For many urban areas, good bus services are the answer to combat the ever looming problems of traffic congestion. In most cases, the bus will form the backbone of the public transport because of its versatility and low cost relative to other modes. Whether public transport should be provided by the state or by private sectors through competitive tendering process, and whether it should be subsidized or commercially operated have invited much debate. There are different models and practices adopted worldwide, but whatever the model, the bus can provide a cost effective method of meeting urban transit needs.

NEW ZEALAND TRANSPORT AGENCY FAREBOX RECOVERY POLICY

Farebox recovery is the proportion of operating costs that are covered by fares. In October 2009, the NZTA released a discussion document which proposed that Regional Councils be required to have farebox recovery policies which included a target minimum recovery ratio for that region. The NZTA released its farebox recovery policy in June 2010. Features of the policy included:

- Regional Councils are required to use their Regional Public Transport Plans to set a farebox recovery policy for the whole network, and for each mode, by 1 January 2012
- A farebox recovery target or target range is required, plus an explanation as to why this target has been chosen and how it will be achieved
- The NZTA (and others) will be able to influence that policy and target through the Regional Public Transport Plan consultation process
- Council should achieve the target within three years of it being set
- No direction or guidelines as to what the target for each region should be are provided, but a national target of 50% will be set, to be achieved by 2018 (and it is implied that this is should be the target for at least Auckland, Wellington and Canterbury)

- A standard formula for calculating farebox recovery
- Regional Councils must undertake annual reviews of fare price levels, discounts, concessions and ticket types
- Regional Councils must review their fare structures at least every six years.

The NZTA farebox recovery policy therefore provides an important context to this paper.

It should be noted however that the paper does not consider how revenues can be maximised, or the debate over whether the social benefits of providing bus services go in some way towards meeting the operating costs.

HOW MUCH DOES ITS COST TO BUY A BUS?

Capital costs are significant. New full size buses typically cost around $350-450,000 each to purchase, though they can be leased.

Smaller buses are generally cheaper, but often not by much (and generally not proportional to the number of seats).

HOW MUCH DOES IT COST TO OPERATE A BUS?

Each week a typical full size urban bus single deck operates for 75-85 hours, uses about 500-600 litres (110-120 gallons) of fuel and needs 2-2.5 drivers to keep it in service.

It currently costs around $200-300,000 each year to operate a single vehicle operating services, depending on the number of hours of operation, the number of days a week the buses operate, labour costs and fuel costs.

This estimate is based on only a very limited amount of data which is available publically in New Zealand.

A smaller bus is cheaper to operate, but not by much.

Consequently each bus operating normally needs to earn at least $50 per hour to cover its operating costs.

The marginal costs of operating a bus are very variable, and therefore it is difficult to generalise about what the marginal cost of operations are. In some circumstances, it is may only be necessary to cover the marginal operating costs.

WHAT ARE THE MAJOR ELEMENTS OF BUS OPERATING COSTS?

Labour is the biggest element of bus operating costs, accounting for 50-70% of all costs. This proportion may be lower for a smaller bus.

Other major cost elements are fuel (which makes up around 10-20% of all costs), tyres, maintenance (fixed and variable), and insurance.

Overhead costs include supervision, marketing, accounts, payroll, management and building costs. There are also increasing costs related to satisfying both health and safety and training requirements.

Fuel costs are, to a large extent, outside the control of the bus operators, although many have a ‘hedging’ policy for their fuel requirements, generally covering their requirements for one to two years in advance.

Again, fuel costs will be lower for smaller buses.

Direct wage costs are a factor of the number of buses operated and the levels of pay and conditions. Often, labour contracts and licensing requirements can allow drivers of smaller buses to be paid less than drivers of larger buses.

Having a relatively young fleet tends to keep engineering costs low (and usually improves service reliability and customer experience), but requires a large investment.

Often, overall costs can only be controlled by seeking efficiencies in operating the network of services.

COST TRENDS

Bus costs have generally been increasing faster than the rate of inflation. This is largely due to increasing fuel costs and because buses get slower due to congestion (and the need to reschedule services to make them more reliable). Labour costs therefore have tended to increase above the rate of inflation, even if even if there has been no wage increase.

THE COST OF ROADWORKS

Road works can require the diversion of services, which often requires additional resources to maintain existing service levels, as well as having an untold long term impact on revenues.

By way of an example, a half hourly service uses four buses and takes 56 minutes end to end. If journey times increase by, say, seven minutes, an extra bus and driver is needed, which means costs increase by 25% (well above the normal level of profit that could be expected). A small increase in the journey time therefore leads to a 25% increase in operating cost.

The impact of road works on bus operating costs is therefore often significant.

ACHIEVING EFFICIENCY GAINS

Unlike trains, buses move in a mixed traffic stream and are subject to delays that other vehicles face. Bus speeds are typically only around 60-80% of car speeds because they have to stop regularly to drop and pick up passengers.

Efficiency gains can also be made from increasing bus speeds – a 1% increase in bus speed typically results in a 0.8% cost saving – or the reliability of bus travel times.

Peak congestion, leads to longer journey times (greater costs to maintain the same service frequency) and longer journey times make the service less attractive (therefore patronage and profitability falls).

A small deterioration in speed can cause sudden big changes in operating cost, as was illustrated earlier in the discussion concerning the impact of road works on bus operating costs.

A clear choice therefore exists between a vicious circle and a virtuous circle. In the former, buses get slower, costs increase, patronage and revenue fall, fares increase, services are cut, patronage and revenue fall, etc. (i.e. the old old story). In the latter, bus speeds improve, patronage and revenue increases, more investment in services, smaller fare increase, services are more attractive, patronage and revenue increase.

Bus priority measures backed up with enforcement are therefore an essential

traffic management measure for any city hoping to reduce bus operating costs and improve bus usage.

Significant efficiency gains can often be made from good bus service planning.

There may be some scope to use larger vehicles to meet demand, which may reduce the number of buses and drivers required and to 'squeeze' driver conditions.

COST ALLOCATION

Costs can be allocated in a number of ways, usually by bus, hours operated or miles operated.

Generally, fuel and tyre costs are mileage related, driver costs are related to hours operated and maintenance costs tend to be related to hours or the number of buses operated.

A bus 'makes a contribution' if it takes enough revenue to cover the cost of the driver, fuel and tyres, and some of the maintenance. It is often sufficient for a bus to make a contribution when costing the operation of late evening or early morning services.

'Making a contribution' is less acceptable when costing weekend services – a bus operator can only tolerate so many services which only make a contribution.

OPERATIONAL EFFICIENCY OF BUS SERVICES IN NEW ZEALAND

In 2010/11 Ian Wallis Associated Limited undertook a commission for the (then) Auckland Regional Council (now Auckland Council) to benchmark the efficiency and effectiveness of Auckland's passenger transport performance against similar (comparator) cities. These cities included five cities in Australia (Melbourne, Perth, Sydney Brisbane and Adelaide), four in Canada (Vancouver, Edmonton, Ottawa and Calgary), and three in the USA (Portland, Seattle and Honolulu).

The review included consideration of the following measures of cost efficiency and effectiveness:

- **Working expenses per vehicle kilometre** – a measure of the cost efficiency of modes between different cities.
- **Average vehicle loadings** (the ratio of passenger km of travel to vehicle km operated in service) this represents the average passenger load averaged over the full route length and over all periods.
- **Working expenses per passenger kilometre** (the total working expenses divided by total passenger km) is a useful measure for comparing overall cost-effectiveness across modes and cities.

The ratio of total fare revenue to total working expenses – referred to as the working expenses recovery ratio (WER) or 'farebox recovery ratio'.

For Auckland, the bus working expenses per vehicle kilometre were found to be around the middle of the range for Australasian cities, but 31% higher than the corresponding cost rate for diesel bus services in Wellington.

The very low level of competition for provision of services in Auckland is a key factor behind its high cost rate.

Auckland was found to have the lowest average bus loadings of all the comparator cities. Average boardings are 15-30% lower than the Wellington average and 1-32% lower than Brisbane, Perth and Adelaide.

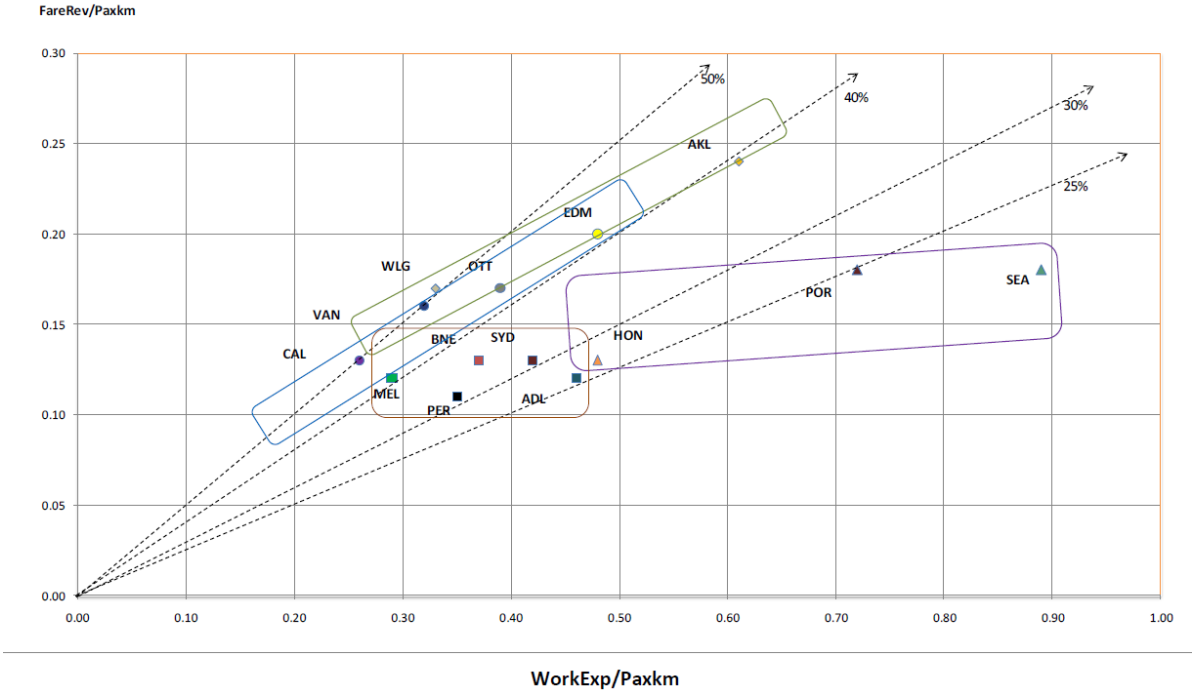
The low loadings may be explained, in part, by the relatively low frequency of services on a

relatively large number of routes (often operating a considerable proportion of their distance through low density areas) - which is likely to result in lower average loadings than would be likely to be achieved with a higher frequency/lower coverage network - and the likelihood that the market for bus services is still growing in response to relatively recent service improvements.

Auckland has the third highest working expenses per passenger kilometre of the ten cities for which data are available. It is significantly higher than the Wellington figure and all the Australasian cities. This reflects the combination of moderately high costs and relatively low average loadings.

Auckland has the second highest WER ratio (38%) of the ten comparator cities for which data are available, with only Wellington having a superior performance (45%). Auckland's relatively high fares are due in part to its relatively high costs (relative to the Australian cities in particular).

Figure 5.1 – Working Expenses Recovery Components – Fare Rev/Pax Km v Working Exp/Pax Km



ECONOMIES OF SCALE IN BUS OPERATING COSTS

In 2010, the UK competition commission investigated whether there was evidence that operators of local bus services in the UK (excluding Northern Ireland and Greater London) benefit from economies of scale.

This was assessed by benchmarking cost ratios at a local level. In respect of the four largest multi-regional operators and medium-sized operators, this was done by looking at cost ratios at the depot level and in the case of smaller operators, cost ratios at the company level were looked at.

The investigation examined the relationship between:

- These operators' cost ratios and the scale of the parent company (e.g. large multi-regional operator, medium or smaller operator)
- These operators' cost ratios and the scale of the local operations (e.g. in terms of annual miles/hours operated).

The benchmarking analysis showed that whilst on average, the four large multi-regional operators benefit from lower cost ratios than the medium-sized and smaller operators, the wide ranging

values for each cost ratio showed that an individual depot of a large multi-regional operator did not necessarily benefit from a lower cost ratio than an individual depot of a medium-sized or smaller operator. Therefore, a firm conclusion could not be made on the presence of a strong relationship between an operator's size at a group level (e.g. between a large multi-regional operator and a medium-sized operator) and its cost ratios.

The benchmarking exercise could not find a clear trend between the kilometres operated out of a depot, i.e. its scale of operation, and its cost per kilometre or cost per hour.

The investigation also assessed whether there were other measures which may be a more appropriate proxy for scale at a local level. For this analysis, the investigation assessed the relationship between:

- Cost ratios and bus passenger kilometres (defined as the number of passenger boardings multiplied by the total number of kilometres travelled)
- Cost ratios and bus fleet size.

The investigation found that it was difficult to conclude from this analysis the presence of economies of scale. Whilst passenger kilometres appear to have little effect on cost ratios, bus fleet size appears to have some impact, although the greater the size of the fleet, the higher the cost per kilometre and cost per hour ratios.

One possible explanation for the different findings of the benchmarking exercise is that there may be local market factors affecting a local operator's costs, which are distorting the comparability of the cost ratios. A side-by-side analysis was therefore conducted, whereby the analysis attempted to focus on benchmarking the cost ratios of operators within the same local market.

This analysis concluded that it is difficult to arrive at a firm conclusion in relation to whether smaller operators incur higher total costs per kilometre ratios relative to the depots of the medium-sized and large multi-regional operators within the same local area. Whilst this analysis has focused on similar geographical areas to reduce some of the effects of local factors, there may well be many other factors, for example service type (e.g. rural vs urban), which have not been taken into account and so mean that the benchmarking comparisons are not necessarily comparing like with like.

Some of the investigation findings are summarised in the figures below:

FIGURE 1

(VC + SVC) per km vs operated kms

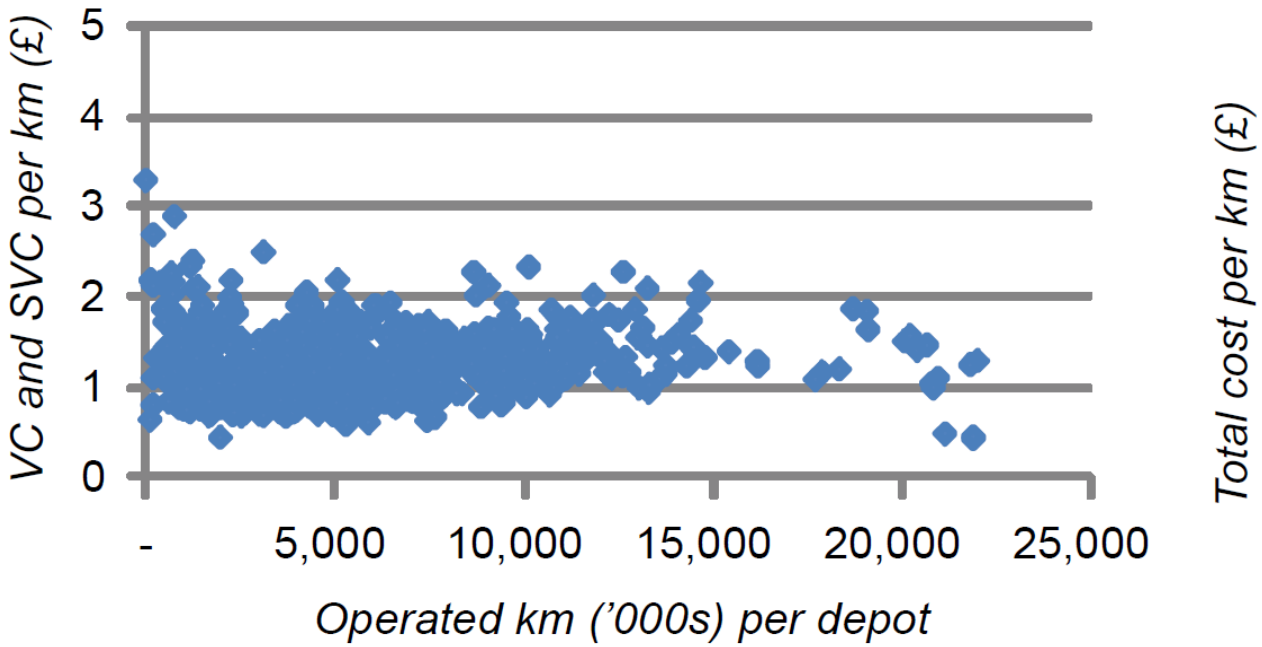


FIGURE 2

TC per km vs operated kms

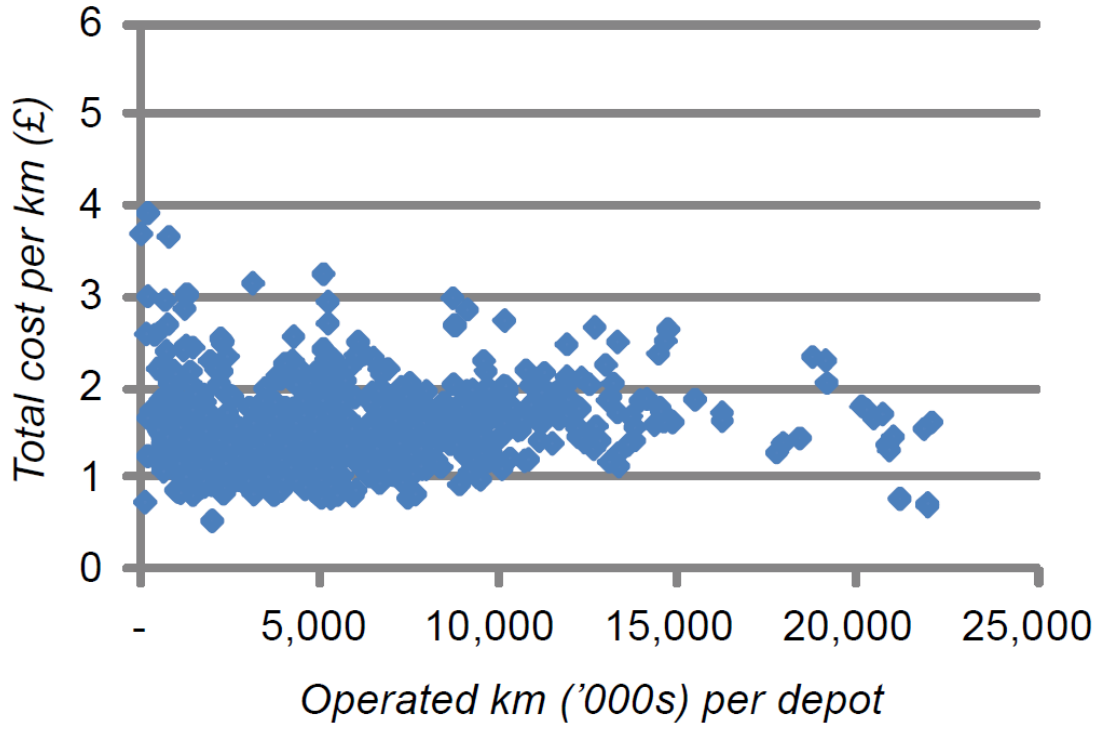


FIGURE 3

TC per km vs passenger kms

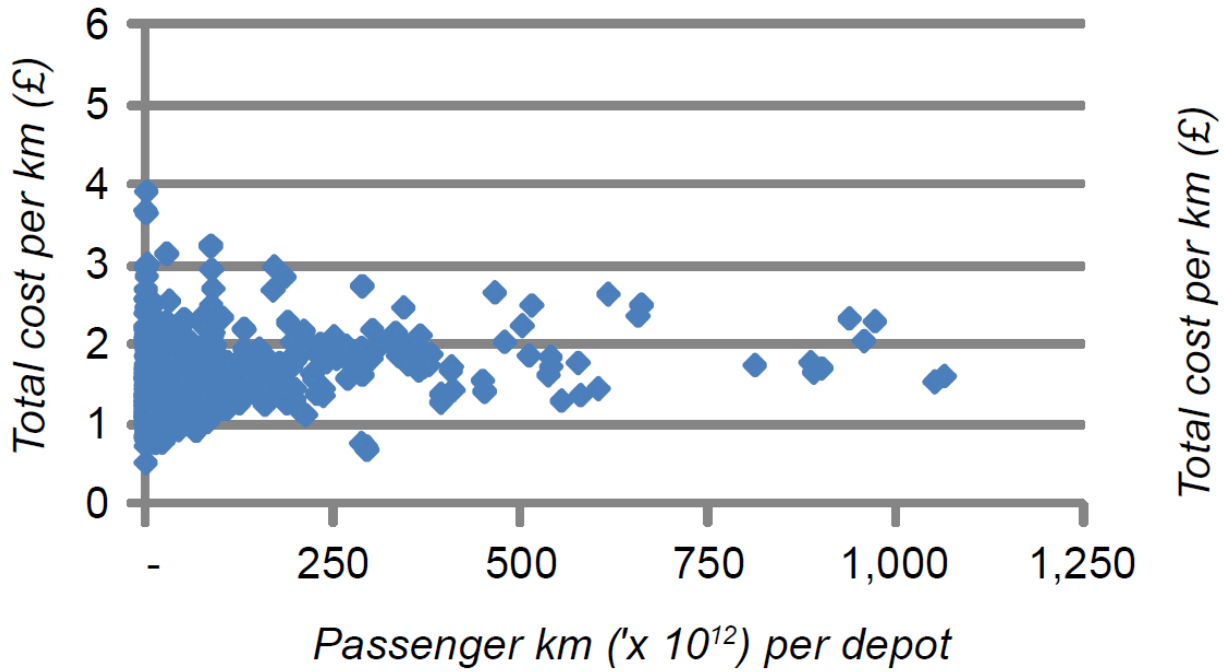
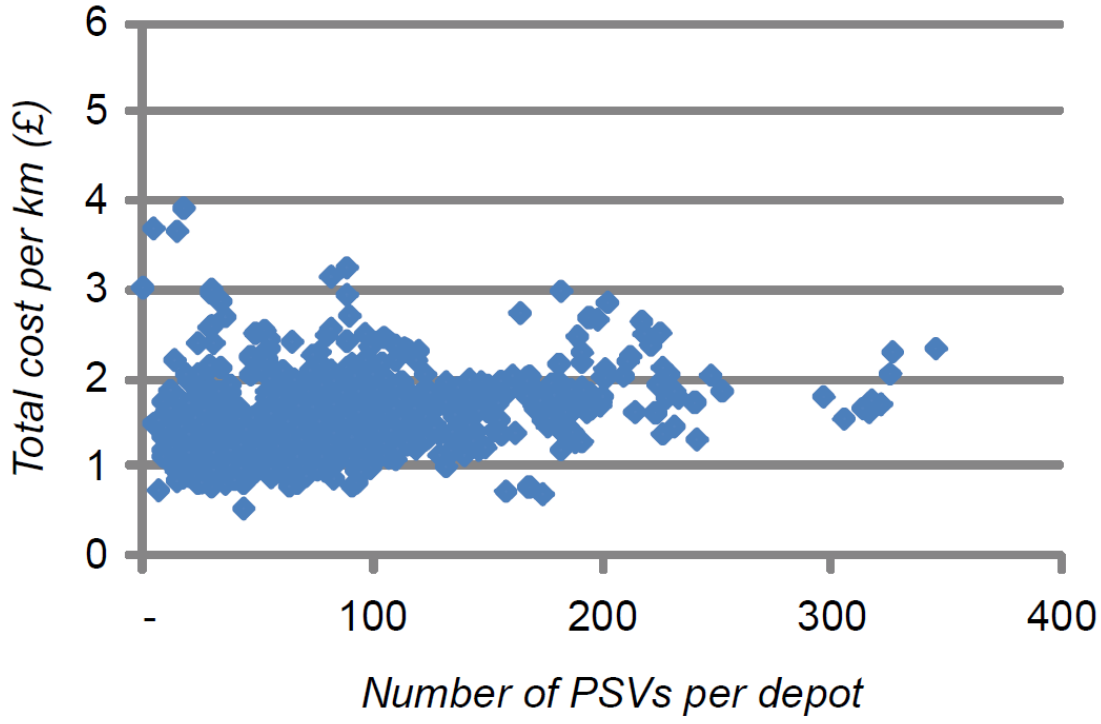


FIGURE 4

TC per km vs PSV fleet size



Overall, therefore, the cost benchmarking exercise did not conclude that larger operators benefit from economies of scale or suffer from diseconomies of scale at either a group or local level. This situation is likely to be the case in New Zealand also, though at present there is very little data which is publicly available on which to demonstrate that this is the case.