

Economic Bulletin.

28 May 2021



Road freight: Between a rock and a hard place on decarbonisation.

- The pressure on road freight operators to decarbonise their operations is increasing.
- However, the ability to respond is being constrained by tight margins as well as unproven and untested technologies.
- Competitive dynamics are driving consolidation within the road freight industry, but the pace of change remains slow.
- Market forces and government policy combined are likely to spur on the pace of consolidation within the industry.
- What will emerge will be an industry that is better positioned to deliver the required emission reductions.

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In addition to our in-depth industry insight reports, we are also producing a series of papers that focus on specific industry related topics. This bulletin, which focuses on what decarbonisation might mean for the road freight industry, is the first of these.

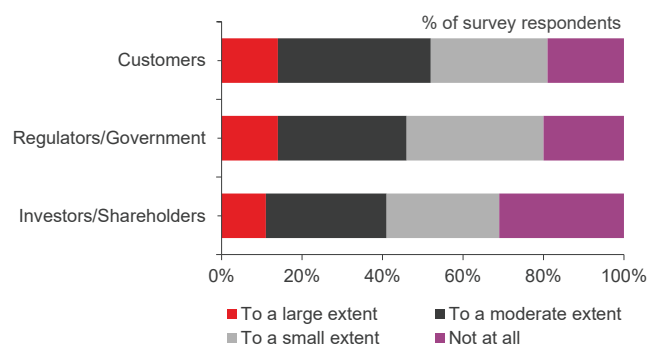
The pressure is on.

Discussions on how to address climate change have as a rule focused on the contributions made by big emitting sectors such as agriculture, heavy manufacturing, and road transport in a more general sense. However, relatively little column space has been given to the road freight industry, which makes up a third of total transport emissions.

This is beginning to change with the passing of the Climate Change Response Amendment Act and the recent release of the Climate Change Commission's draft recommendations on how to be net carbon zero by 2050. And with customer and stakeholder awareness at an all-time high, the pressure is growing on New Zealand's road freight operators to decarbonise.

That raises a few questions. How do road freight operators respond to such pressures, what constraints might they face, what risks might they be exposed to, and to what extent can policy help to move the road freight industry to a decarbonised future?

Figure 1: Source of pressure on CFO's to respond to climate change



Source: Deloitte European CFO Survey Autumn 2019



Freight emissions profile.

The road freight industry is big business in New Zealand, generating about \$6bn in turnover a year. About 260m tonnes of freight is moved by road each year, accounting for about 93% of New Zealand's total freight task. That dwarfs the 16m tonnes moved by rail and the 5m tonnes shifted by sea.

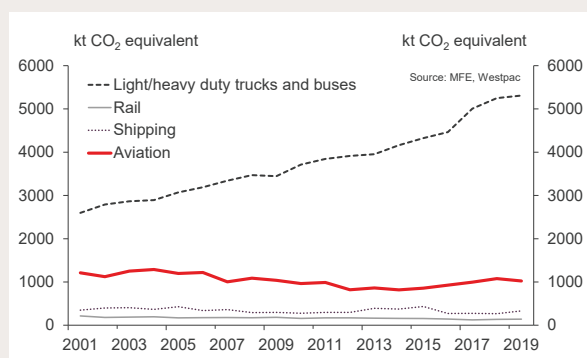
A big chunk of the freight that goes by road is moved by firms that use trucks to transport their own cargo. Although not freight operators per se, these firms are significant contributors to transport's carbon emissions. However, because freight is not core to their operations, they are often better placed to internalise the cost of decarbonisation.

The dominance of road as a mode for moving freight reflects its inherent advantages. Simply put, it provides a fast, responsive, point-to-point service that is well suited for time-sensitive loads. The physical characteristics of products to be transported, and the fact that most freight trips in New Zealand cover short travel distances, also tends to favour road haulage over other modes.

Not surprisingly, the dominance of road freight is reflected in its carbon emissions profile. New Zealand's Greenhouse Gas Inventory indicates that heavy and light trucks together with buses collectively account for about 32% of carbon emissions generated from domestic travel.

That equates to about 5.3m tonnes of CO₂ equivalent each year, the largest chunk of which is produced by heavy trucks. By comparison, rail and sea travel contributes about 1% and 2% respectively to local transport emissions.

Figure 2: Carbon emissions by mode of transport



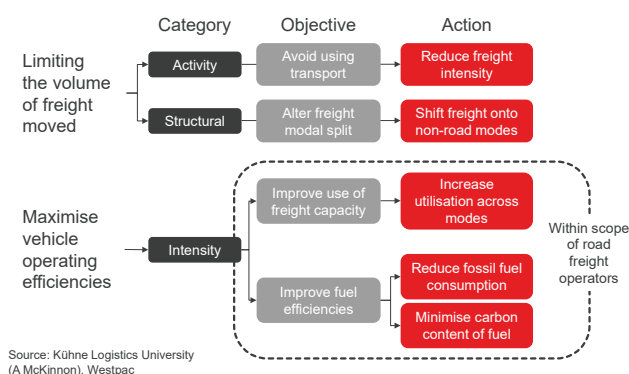
How can the freight industry cut carbon emissions?

There are two basic approaches to cutting carbon emissions in the road freight industry.

The first is simply to limit the volume of cargo carried by road for a given level of activity. That can be done, for example, by reducing the freight intensity of the economy, expressed as the volume of freight moved per unit of economic activity. Alternatively, avoiding using roads and moving more cargo onto other modes, such as rail and coastal shipping, will also deliver the desired results.

These actions, though, sit largely beyond the remit of freight operators, who respond to changes in demand. Not so government, which sets the legislative framework for such changes to take place, or downstream customers, such as logistics providers, who are best placed of all to implement the changes required. That includes moving production facilities closer to end markets, re-engineering of business processes, and shifting towards dynamic supply chain models that can integrate information from many different sources to drive procurement, production, inventory management and distribution activities. Digital technologies, such as Internet of Things (IoT), big data, blockchain, robotics automation, sensors and collaborative cloud computing tools also have a big part to play in efforts to reduce the freight intensity of the economy.

Figure 3: Approaches to decarbonising the road freight industry



The second way to cut carbon is to improve the operating efficiencies of the road freight fleet for a given freight task. In the first instance that can be achieved by improving the use of freight carrying and storage capacity that already exists, both within and across transport modes. In simple terms, that means doing more with the same. Alternatively, carbon emissions can be reduced by improving fuel efficiencies, either by taking steps to reduce fossil fuel consumption and/or by minimising the carbon content of fuel use for a given freight task.

Road freight operators clearly have a big part to play in this regard. Improving operating efficiencies is, after all, part and

parcel of normal business. In that respect, they are better placed than most to make decisions on whether to purchase newer more efficient vehicles powered by emission friendly fuels, such as electricity (generated from renewable sources), green hydrogen and biofuels. Electricity and biofuels make up less than 0.1% of all transport fuels used in New Zealand.

Freight operators hold little sway over efforts to limit the volume of cargo transported by road.

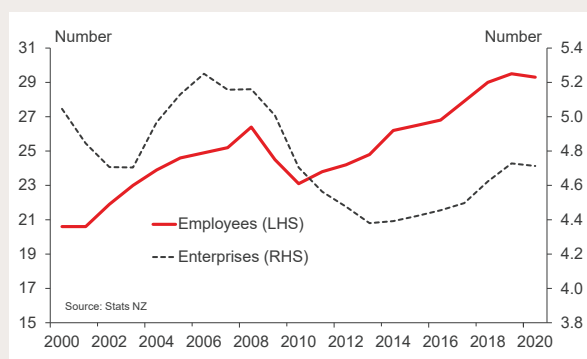
Shape of the road freight industry.

The road freight industry itself is fragmented, consisting of 4,700 firms that collectively employ just under 30,000 staff. At best, the top 4 firms account for less than 20% of industry turnover.

Most operators in the industry are small family-owned businesses, with over 75% operating five trucks or less. Many are owner-operators or independent contractors that focus solely on moving freight by road within New Zealand, and as such focus heavily on day-to-day operations. The number of these firms has trended lower over time, reflecting the highly competitive nature of the industry. However, those that remain are on average larger than before.

By contrast, larger firms in the road freight industry tend to be logistics solution providers that manage the movement of goods from origin to destination within and across national borders. They have a much broader field of view than small owner-operators. Indeed, many are vertically and horizontally integrated operations that provide multi-modal freight solutions, warehouse and storage services, postal and courier services, as well as whole of supply chain management solutions. Depending on the logistics model adopted, they may or may not own the assets they use to deliver services.

Figure 4: Number of firms and employees in the road freight sector



What constraints do freight operators face when cutting emissions?

Road freight operators clearly have a key role to play in efforts to decarbonise their industry. The question is how well placed they are to do so.

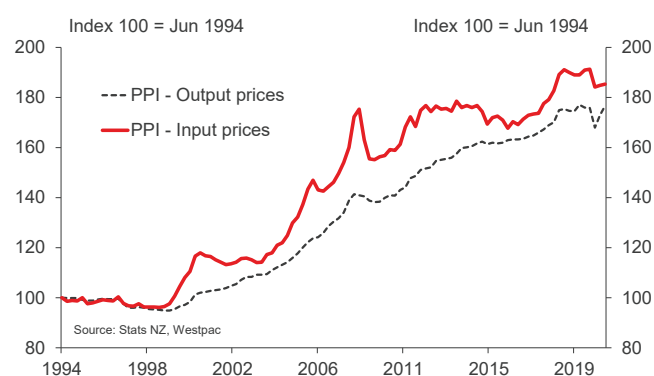
The simple answer to this question is that most road freight operators are not well placed.

This is, after all, an industry that is full of small owner-operators. Competition is cutthroat even during the good times, and in a marketplace where there is a lack of service differentiation, specifically with regards to the physical movement of freight, price is king. Admittedly, that is less true for larger firms that provide value added services, such as logistics and warehousing, but even then, price is still important.

Competition among freight operators is cutthroat.

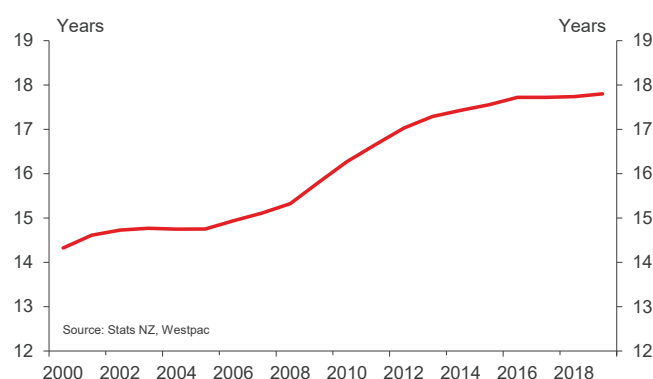
For most small owner-operators, keeping a lid on prices poses a real challenge. That is especially so in an environment where input costs are rising. That includes labour, which typically accounts for between 40% and 50% of total operating costs, and which continues to reflect the impact of growing skill shortages. The average age of truck drivers increases every year. Add to that higher minimum wages, rising energy costs and the growing burden of regulatory compliance, and it is perhaps not surprising that most road freight operators face an ongoing struggle with wafer-thin margins.

Figure 5: Input and output producer prices for road transport



This is not an ideal situation to be in. For most smaller road freight operators, a lack of margin effectively restricts their ability to invest in new equipment, which means they tend to operate their existing trucks for longer. That may explain why New Zealand's truck fleet continues to age.

Figure 6: Weighted average age of trucks in the vehicle fleet (purchased new and imported used)



Running older trucks is not good news on several fronts. Firstly, it hinders efforts by the industry to decarbonise. Older trucks, with old technology tend to generate more emissions than their newer equivalents per kilometre travelled. If freight operators cannot even invest in new trucks powered by the latest new thermally efficient diesel-powered internal combustion engines, what are the chances they will plough money into trucks powered by renewably generated electricity, green hydrogen and biofuels, all of which attract a price premium.

Secondly, older trucks are subject to more wear and tear and as such are typically less efficient than newer ones. That in turn pushes up the unit cost of moving cargo (i.e. the cost of moving one tonne of freight per kilometre travelled), which for a given freight task translates into higher production costs. In an environment where there is pressure to keep a lid on prices, that puts added pressure on margins, further reducing the ability of freight operators to invest in new machinery. That sets in motion a “race to the bottom” or vicious cycle of ever declining margins and profitability.

However, this situation is unsustainable and over time is likely to lead to an industry shakeout. Eventually, smaller freight operators will find themselves either being forced out of business or become targets for mergers and acquisition activity. The inevitable outcome of that process will be a smaller number of larger road freight operators, who are much better equipped to decarbonise their operations than at present. Given the business demographic trends shown in *Figure 4*, that seems to be already happening.

Further consolidation in the road freight industry is likely.

What risks do freight operators face?

Being better equipped though is one thing. Being able to make the jump to a decarbonised future, however, is quite something else. Indeed, even the best resourced operators are likely to face significant risks when trying to decarbonise.

Some of these relate to whether alternatively powered trucks can offer the same reliability and performance as their fossil fuelled counterparts, with most of the evidence to date suggesting not. For example, while there is scope for using batteries to power smaller trucks on short routes around urban centres, the case for heavy trucks that carry bigger payloads over longer distances is less clear. Indeed, battery performance declines quickly when subjected to high payloads and it’s likely that resulting range limitations will discourage uptake by heavy hauliers. Technology may provide a solution by increasing the energy density of batteries, but that may take some time. Swappable batteries could plug the performance gap in the short-term, especially if recharging infrastructure is not in place, but that may be sub-optimal given the environmental costs associated with manufacturing batteries and those relating to end-of-life processing.

The pace at which technology changes is itself a key risk for freight operators looking to adopt lower carbon emitting vehicles. Most of the big technologies for use in freight transportation, such as electric batteries, the IoT and robotic automation are immature, and as such are largely untried and untested. Quite a few are not even available in New Zealand. Early adopters of such technologies face the real risk of being quickly leap-frogged by newer technology as they start to mature.

The supply of alternative fuels is also likely to be an obstacle to making changes to the truck fleet. While New Zealand may have the potential to manufacture green hydrogen on a commercial basis as well as the ability to deliver biofuels nationally using existing infrastructure, it currently isn’t doing so. Getting that right is going to require large amounts of investment mainly from the private sector, not just in terms of generation, but also supporting distribution infrastructure. Without it, freight operators are unlikely to commit to purchasing new trucks. That said, New Zealand does have significant renewable electrical energy resources which it can use to power the truck fleet. The big issue here is likely to be increased demand for the same resources from other sectors of the economy, who are also looking to wean themselves off fossil fuels.

Freight operators must weigh up these risks and uncertainties against the benefits when deciding to invest in alternatively powered vehicles. There are many risks, but in an environment where customers and the Government are likely to continue to heap pressure on freight operators to reduce their carbon footprint, they may be worth taking on given the reputational kudos that result, not to mention an enhanced ability to pass on any additional costs incurred. To that end, a demonstrated ability to reduce carbon emissions may be exactly the point of service differentiation that is lacking in the industry.

How can policy help?

The Government has several tools that it can use to move the decarbonisation of the road freight industry forward.

It might, for example, look to incentivise the adoption of new emissions friendly technologies directly by reducing their cost through a system of subsidies, while simultaneously increasing the cost of new fossil fuelled powered vehicles through changes to the vehicle registration system. That's something that was proposed previously by the Government and is likely to feature prominently in coming years. However, it comes with some risk, not least of which is the possibility that unproven technology could end up being foisted on the industry.

The Government could also encourage decarbonisation by indirectly changing the nature of demand for road freight services. Examples include soon to be introduced legislation requiring firms that meet specific criteria to disclose how they are going to manage the risks and opportunities associated with moving to a carbon zero future. That in turn may prompt some affected firms to review their use of road transport, possibly increasing the amount of non-time sensitive freight that goes by rail or sea.

Alternatively, the Government could look to accelerate structural changes already underway in the industry. As indicated earlier, consolidation is already happening in the industry, albeit at a relatively slow pace. The end goal would be fewer firms, but those that remain would be larger and better resourced to make the necessary investments needed to reduce carbon emissions.

That could be achieved through New Zealand's Emission Trading Scheme (ETS). The primary role of the ETS is to reduce carbon emissions in the economy and is based on the premise that any reductions achieved are made by those that are most able to bear the cost of this adjustment, as reflected in the price of carbon. Under the ETS, the price of carbon is determined by the supply of and demand for New Zealand Units (NZUs), with one NZU representing the right to emit one tonne of carbon.

Road freight operators are not participants in the ETS, although they are still exposed to the price of carbon through the fuel that they purchase from the energy companies, who as active participants in the ETS are required to ensure they have enough NZUs to cover the emissions created from the use of the fuel they sell.

For a given level of demand, the Government can engineer an increase in the price of carbon by simply restricting the supply of NZUs to the market. A resulting rise in the price of carbon in the ETS, increases the price of diesel and in turn the input costs faced by road freight operators. Diesel is a significant cost item for most road freight operators, making up between 15% to 20% of total operating costs.

Faced with higher input costs, road freight operators have two options: either pass on the additional input costs to their

customers or internalise them. Given relative negotiating positions along the value chain, its most likely to be freight operators that will face a hit to margins.

Indeed, even if they could pass on these higher costs, there are limits to how far. If they rise too far, customers are much more likely to take action to mitigate these cost increases. That might mean, for example, reducing the amount of cargo that goes by road, putting it on rail instead.

In an industry where competition is tight, the chances are that these increased costs would be internalised. But given already tight margins, there are limits to how long that is possible. Eventually road freight operators will be forced to change the nature of their operations, and that is likely to quicken the pace of consolidation within the industry, as well as the ability to reduce carbon emissions.

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