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LEFC – System Demand

Final Report

29/08/2025

NZ-25284-RPT-002-R4.0 - LEFC Demand Report

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Steering Group

Contributing Specialists

Contents

Executive Summary

The potential supply (certificate generation) and demand (certificate use) of Low Emissions Freight Certificates (LEFCs) was investigated through conversations with various organisations (including major retailers, food suppliers, general manufacturers and freighting companies) and technical research. This has helped to outline the general demand situation and inform the price and incentives for freight providers to participate in the generation of LEFCs.

While most organisations were supportive of the certification scheme and having the ability to purchase certificates:

- Many outlined that they would struggle to justify the premium on freight costs.
- Some mentioned they would be willing to pay a premium, but splitting costs between beneficiaries would help make costs more attractive to participants.
- Four of the 20 organisations approached as part of this project indicated that they would want to utilise the system and would be willing to pay for it – this is a good hit rate from these discussions and indicates that there will likely be sufficient demand for certificates, although this is dependent on price.

Discussions have outlined that certificate generation would occur where it is most suited for the vehicle technology and purchase scenarios would be varied. A current hard to abate scenario that they are ideal for is non-dedicated vehicle operations, where the freight provider is delivering to two or more freight receivers and only some of the receivers are interested in low carbon delivery.

Greenwashing was a common concern and ensuring frameworks and methodologies follow existing standards such as the GHG Protocol and SBTi is critical.

Using the Ara Ake Heavy Freight Total Cost of Ownership Tool[1] to determine the carbon abatement cost for low emission vehicle types indicates that **pricing of between \$200/tCO_2e to \$600/tCO_2e would be required** to offset the marginal cost of the BEV and FCEV decarbonisation options (in certain circumstances) with a certificate system, however lower rates would still improve the economics of the solutions. This pricing would ultimately be set by the market matching supply and demand. Further:

- Costs could be reduced for individual participants by spreading the certificate cost over the beneficiaries of the reduced emissions (ie with multiple Scope 3 reductions through the supply chain). For example, the freight provider, a third-party logistics (3PL) company and the end customer could all see a much-reduced cost while still gaining all the benefits.
- Given that a range of clients would pay \$50/tCO_2e - \$100/tCO_2e, some technologies could be paid for directly (with allocating costs across beneficiaries), and others have improved economics, while not fully covering costs.

[1] Heavy freight total cost of ownership tool | EECA

While there are barriers preventing businesses from adopting more low emissions vehicles for certificate generation, there are sufficient low emissions vehicles currently in New Zealand to provide a base of potential participation in the near term. This would help to provide proof of concept and incentivise further purchases of low emissions vehicles. Additional vehicles would be required in order to fund a self-sustaining certificate system, but how many will be dependent on the overhead cost of the registry.

We believe that targeted marketing would greatly help with system uptake. In particular, the focus on the incremental cost of certificates in comparison to the total cost of the items purchased/freight moved.

Market based measures are becoming more common around the world and the movement of the GHG Protocol and SBTi to incorporate Scope 3 measures into their emissions and targeting frameworks will help to normalise their use further.

Overall, we believe there is sufficient demand for certificates to justify a system, and there is enough supply capacity to demonstrate proof of concept. However, additional supply (and demand) would be needed to create a self-funding system. Additional supply would require more vehicles and enhanced infrastructure.

1. Introduction

Sufficient supply and demand of Low Emissions Freight Certificates (LEFCs) is essential for the success of the system, and assessing these factors is crucial. While the participants in the project recognise the likely benefits of the system, additional review is needed to gain an understanding of:

- The price of certificates required to incentivise freight providers to participate in generation
- The likelihood of freight receivers purchasing certificates
- The price freight receivers are willing to pay
- The overall supply and demand picture

A range of discussions have been had with participating companies, clients of participating companies and other organisations.

This report summarises the overall findings of these discussions. For privacy reasons, organisation names are not disclosed, and we have not included details of each conversation.

Note that this report is designed to be read in conjunction with the subsequent Project Summary report.

1.1 Certificate Use Case Scenarios

For clarity, there are different situations where certificates are and aren't suitable for generation or purchasing. Table 1 and Figure 1 shows where certificates are suitable when freight providers and freight receivers want to, or don't want to/can't, decarbonise.

Table 1: Certificate Use Case Scenario

Scenario	Freight Provider	Freight Receiver 1	Freight Receiver 2 (ie split load)	Result
1	Wants to, and can, decarbonise	Wants to decarbonise	N/A	LEFC can be used, but direct decarbonisation options also available
2	Wants to, and can, decarbonise	Does not want to decarbonise	N/A	Freight provider can generate LEFC for sale via the registry
3	Wants to, and can, decarbonise	Wants to decarbonise	Does not want to decarbonise	Freight provider can generate LEFC for sale via the registry. These can be purchased by Freight Receiver 1, or others, as desired
4	Does not want to, or can't, decarbonise	Wants to decarbonise	N/A	Freight Receiver 1 can buy LEFC from the registry
5	Does not want to, or can't, decarbonise	Wants to decarbonise	Does not want to decarbonise	Freight Receiver 1 can buy LEFC from the registry

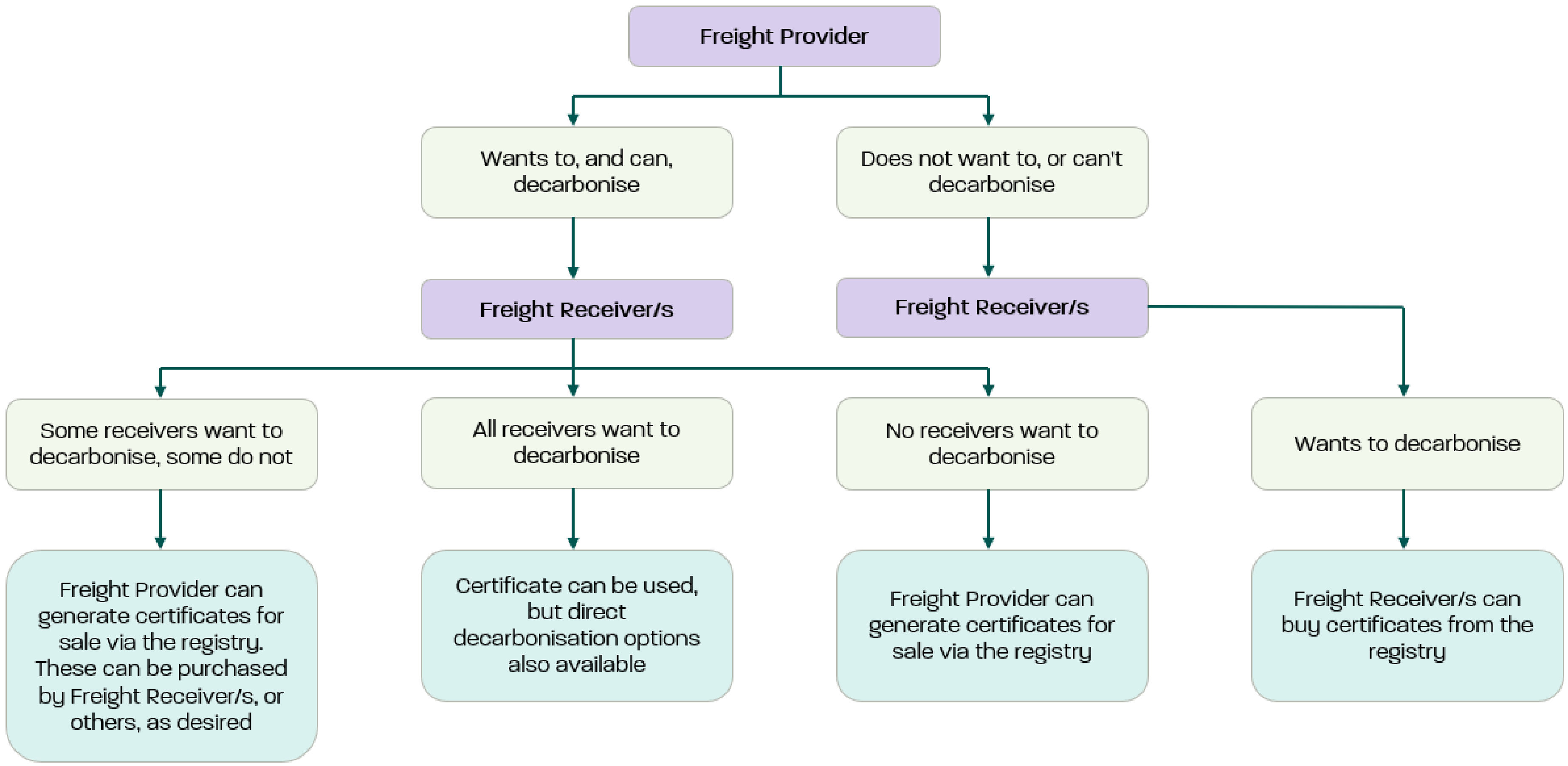

Figure 1: Certificate Use Case Scenarios

1.2 Demand Drivers

As part of the demand assessment, approximately 20 organisations were approached for conversations to gauge interest in both certificate generation (supply side) and certificate use (demand side). This included a range of industrial and commercial businesses that utilise freight as part of their day-to-day operations, third party logistics (3PL) companies, and end consumers.

Of the groups contacted:

- Conversations/meetings were undertaken with 14
- Six did not respond or declined to engage, citing limited interest or relevance

A range of key questions were asked of each organisation, including:

- Would LEFCs be applicable to their operations
- Is the organisation interested in LEFCs
- What is the driver behind the above decision
- What price is fair, and would you be willing to pay for LEFC decarbonisation
- If you were participating in the system, how many certificates would be required i.e. in tkm.

1.3 Global Context

Market-based measures are a relatively new decarbonisation methodology but to date have much support. There are a range of these systems operating around the world, primarily for Scope 2 emissions (i.e. electricity) and liquid fuels (i.e. sustainable aviation and maritime fuels).

A range of methodologies and frameworks (such as those by the Smart Freight Centre) have been developed to adhere to best practice and international carbon accounting processes and standards, such as those outlined by the Greenhouse Gas Protocol.

While SBTi does not currently recognise Scope 3 Book and Claim systems, they are in the process of reviewing their standards and it is likely that they will approve the use of market-based measures in their target setting. Once this occurs, it will help to drive demand and normalise the use of such systems.

1.4 Competition

There are currently no direct competitors to a system such as this in New Zealand. However:

- **Doing nothing** is currently the default which will stop uptake of the system. It is designed to reduce Scope 3 emissions for participants, and without a drive for organisations to reduce these emissions, uptake will be limited. However, Scope 3 reductions are increasingly being targeted and seen as essential to reduce global warming, which will aid uptake.
- **Direct decarbonisation** is a viable option for a range of organisations. This sees a freight provider decarbonise the asset which supplies freight services to an organisation who wants to reduce their Scope 3 emissions. Where direct decarbonisation is possible, this may well be seen as the most desirable option in order to reduce compliance costs.

With a market the size of New Zealand, we believe that only one system would have sufficient demand to be feasible. At the time of writing, we are not aware of any other systems under investigation or development.

2. Certificate Generation (Supply)

In order for the LEFC system to be successful, there must be sufficient supply of certificates, and as such the prices paid for the certificates must be high enough to drive participation. This section covers what pricing would need to be in order to make the Total Cost of Ownership of low carbon assets equal to diesel fuelled assets, and the potential level of supply with the existing low emissions vehicle stock in New Zealand.

2.1 Pricing

The Ara Ake Heavy Freight Total Cost of Ownership Tool[2] was used to compare the total cost of ownership (TCO) per tonne-kilometre of moving heavy freight in New Zealand and estimate the cost of carbon abatement for various vehicles/fuels. The default scenario for large heavy goods vehicles (HGV) were used for comparison, with slight adjustments to key assumptions to reflect the aging nature of the calculator. These assumptions can be found in Appendix B, with default scenario assumptions detailed on the Ara Ake tool here. Note that these costs are designed to reflect the total costs that operators of the vehicles see (including capital purchases and a wide range of operating costs). Costs are exclusive of EECA's Low Emissions Heavy Vehicle Fund grants and include RUC charges (which are under an exemption until July 2027).

Note that the National Road Carriers have recently released a TCO calculation tool in association with EECA which could also be used to help calculate numbers[3].

These figures are designed to be indicative only. The specific operational profiles of different organisations, different vehicle makes/models and charging/fuelling considerations will result in variations to the figures below, and organisations should perform their own calculations to determine the TCO and abatement cost of a low emissions vehicle in their own organisation and with their particular operational inputs.

Figure 2 illustrates the carbon abatement cost for each vehicle/fuel type assuming the large heavy goods vehicle scenario and 5 years of ownership. The BEV delivered cost of fuel is based on current ChargeNet public charging prices[4] (excluding GST) and therefore includes infrastructure and network costs. These are estimates only, with energy rates, locations and existing/future infrastructure requirements all having a significant impact on the rates. As above, businesses should perform their own independent calculations to determine the economics and practicality of a low emissions vehicle in their business operations.

[2] Heavy freight total cost of ownership tool | EECA
[3] Cost Model | National Road Carriers
[4] ChargeNet Pricing Update 2025 | ChargeNet

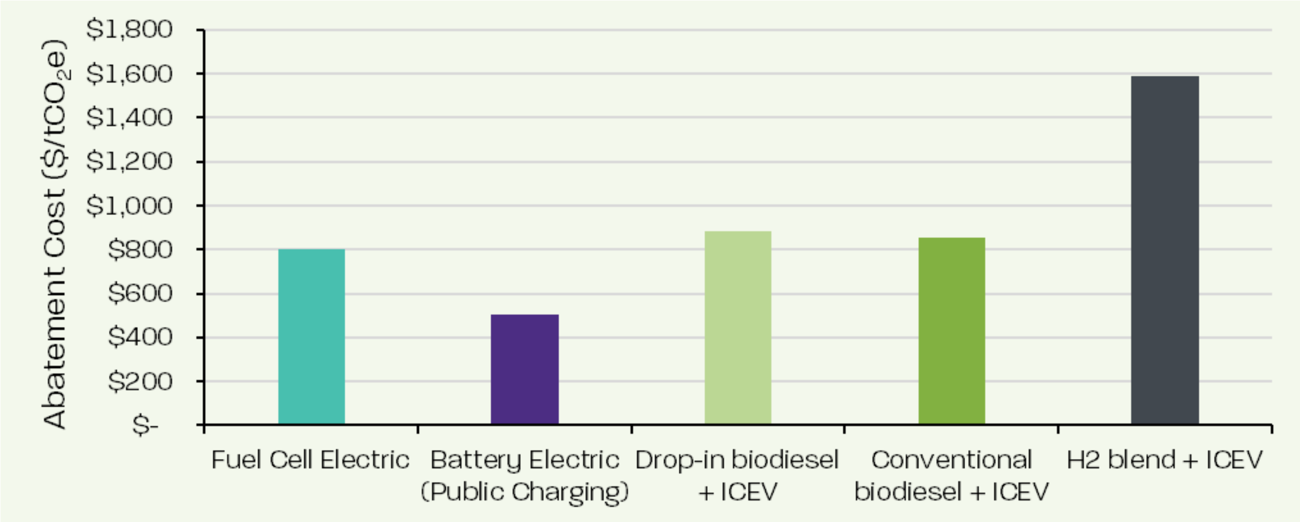

Figure 2: Carbon Abatement Cost Comparison for Vehicle/Fuel Types

Among the options:

- Hydrogen blended with diesel in internal combustion engine vehicles (H_2 blend + ICEV) is the most expensive to abate, reaching up to $1,600/t$CO_2$e.
- Green hydrogen combined with fuel cell electric vehicles (FCEV) is cheaper than the hydrogen blend alternative or biodiesel options at ~$800/t$CO_2$e.
- Battery electric vehicles (BEV) are generally the lowest-cost solution, at $500/t$CO_2$e (with a fully inclusive charge rate of 80 c/kWh).
- Biodiesel options (drop-in and conventional) combined with combustion engines fall in the mid-range, generally costing between $800 and $900 per tonne. It should be noted that existing conventional biodiesel supplies are limited and drop in biodiesel supplies are not available in the country currently – as such pricing could vary from the above.

As above, the numbers included here will not be indicative of every operational scenario. An example of this is for BEV operation, where the effective charge rates will vary based on public vs private charging, site infrastructure requirements, number of vehicles using the infrastructure, charging regimes, electricity and network rates. Further, there are a variety of purchase options in terms of cost and performance of vehicles, and these will also impact the TCO and MAC.

The battery electric scenario above assumes current ChargeNet prices for BEV charging (~$0.80/kWh). We anticipate that organisations that purchase and own a number of electric trucks will have a depot setup to perform the charging themselves. In this case, with a well-designed depot, it is likely the charge price would be much less. Current Bus charge depots are achieving charge rates (inclusive of infrastructure) of 35-50 c/kWh, and at 50 c/kWh, the Are Ake modelling suggests a MAC of $150/t$CO_2$e.

It should be noted that while depot charging provides a much lower effective charge rate, it can come with considerable setup costs. These vary depending on the existing setup/infrastructure, planned operational regime and location, but costs are likely $1M-$2M per MW. However, there will likely be depot charging as-a-service providers established to help mitigate this.

Given the above, it is important that depots are planned and setup correctly – the NZTA has released an advisory document[5] on the electrical supply for Bus charging depots, and this is largely applicable for trucking depots also.

Figure 3 shows the total cost of ownership (TCO) per tkm using the scenario from Figure 2.

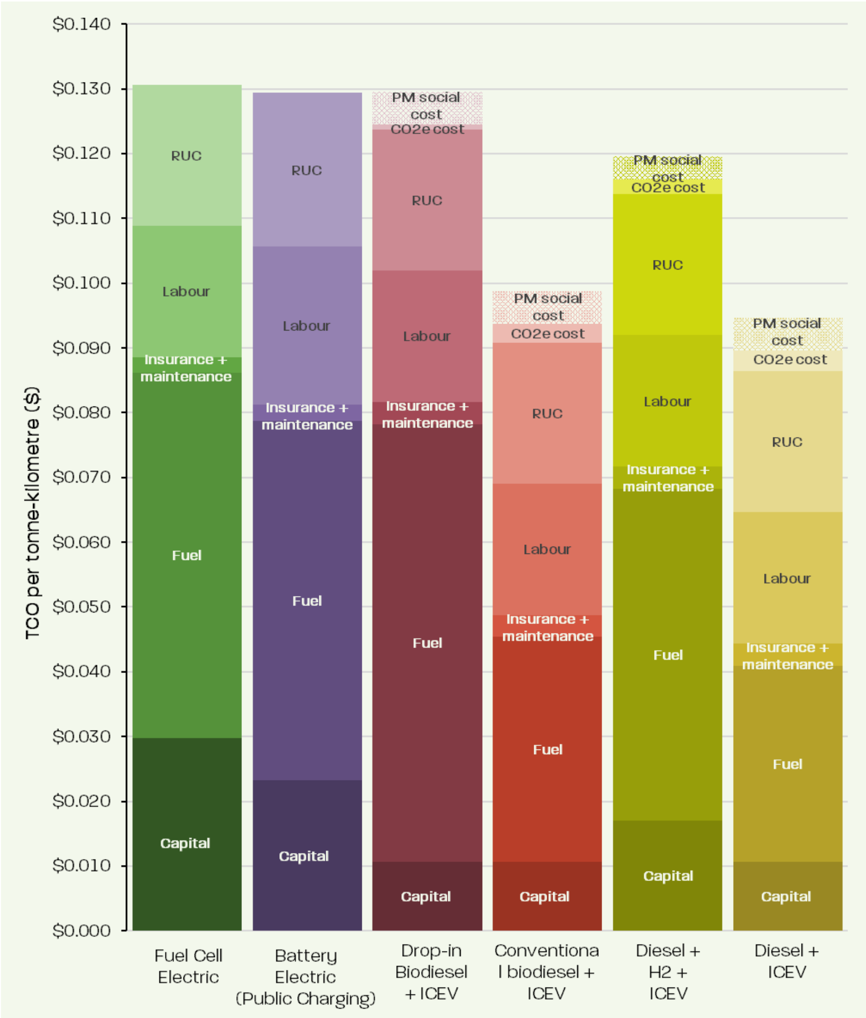

Figure 3: Total Cost of Ownership (TCO) per Tonne-kilometre for Large HGVs

While BEV's are generally the most effective option in terms of carbon abatement, conventional biodiesel (20% blend) has the lowest overall cost of ownership of the low emissions options at around $0.10/tkm, but the carbon reduction of this option is relatively low. Hydrogen and diesel blends sit at $0.12/tkm, with hydrogen fuel cell vehicles at $0.13/tkm. Drop-in biodiesel and BEVs have similar costs at around $0.13/tkm, mainly due to the higher fuel costs.

Overall, battery electric vehicles currently provide the most cost-effective choice for reducing emissions in HGVs in terms of carbon abatement, however the use cases of these can be limited based on range and haul capacity. Hydrogen-based solutions, particularly those using blended hydrogen, remain more expensive, but provide an operational profile more similar to existing internal combustion engine technology.

[5] NZTA - Electricity Market Guidance

In general, there will not be a single solution to heavy vehicle decarbonisation, and different technologies will be best suited to different scenarios.

Note that the costs of low carbon technology are generally decreasing which should reduce the abatement costs into the future.

With the LEFC focus on large HGV, the above indicates that **pricing of \$200/tCO_2e to \$600/tCO_2e would be required** to offset the additional cost of BEV and FCEV decarbonisation options (in some circumstances). Lower rates wouldn't fully offset the cost, but they would allow business to recoup a portion of capital investment for low emissions options, particularly fuel cell electric and battery electric vehicles. It is envisioned that this pricing would ultimately be set by the market and matching supply and demand.

2.2 Current Asset Availability

The NZTA Open Data Portal[6] showed that as of 30th April 2025, there are 58 heavy goods vehicles (Classes NB and NC, greater than 10,000 t GVM) registered in New Zealand that are either battery electric (55) or fuel cell electric (3). Low emissions heavy vehicles are expected to increase over the coming years as the technologies become more efficient and costs are reduced.

For electric trucks specifically, 24 of these were first registered in the last 3 years, showing a growing uptake of EV trucks in New Zealand. In January 2025, TR Group also confirmed new purchase agreements to bring 20 hydrogen fuel cell electric trucks to New Zealand, with first deliveries expected in 2025[7]. These trucks are to be used for urban pick-ups and deliveries and could be a perfect low carbon asset for certificate generation.

If the current 55 EVs on the road were doing an average of 10 t loads for 40,000 km per year, this would generate 22 Mtkm of certificates, resulting in approximately 2,700 tCO_2e of emissions reductions, assuming grid electricity is used for charging. Charging with renewable electricity could provide a further 300 tCO_2e reduction.

Assuming the 20 FCEVs from TR Group are transporting an average of 20 t loads for 130,000 km per year, they could be generating 52 Mtkm annually. This would result in 6,300 tCO_2e of emissions reductions if grid electricity is used to generate the hydrogen, with a further 700 tCO_2e reduction if renewable electricity is used.

With the tkm figures above, and the pricing from Section 2.1, potential cost transfers equate to:

Certificate Price	Revenue per Vehicle	Total Revenue (75 Vehicles)	Registry Revenue (10% of total)
\$200/tCO_2e	\$9,000 - \$63,000	\$1,755,000	\$175,500
\$600/tCO_2e	\$29,000 -\$190,000	\$5,395,000	\$539,500

[6] New Zealand vehicle fleet open data sets | NZ Transport Agency Waka Kotahi
[7] TR Group lands hydrogen truck supplier deal - NZ Trucking

While it is very unlikely that all vehicles would participate in the system, this gives an indication of the potential pool of vehicles currently in New Zealand that could be utilised. We believe there is sufficient vehicle stock in the country to warrant setting up a system and to perform proof of concept.

2.3 Future Asset Availability

While the BEV and FCEV fleets are growing in New Zealand, there are several barriers that may prevent businesses from adopting more low emission vehicles and increasing the potential certificate generating assets:

- High capital costs (from Ara Ake Calculator[8] and discussions with demand group participants)
  - Large Diesel HGV: ~$250,000
  - Large BEVs: ~$500,000
  - Large FCEVs: ~$800,000
- Higher total vehicle weight from battery or fuel cell system
- Less payload due to weight of battery or fuel cell
- Charging/refilling locations and infrastructure are less available than standard diesel fuel stations, particular for hydrogen refilling and BEV fast chargers
- Lower range for BEVs and FCEVs compared to standard diesel trucks

To help overcome these barriers, the New Zealand Government released the Low Emissions Heavy Vehicle Fund (LEHVF)[9] in 2024. The fund will contribute up to 25% of the cost of net zero and low-emissions heavy vehicles, and up to 25% of the cost to convert existing heavy vehicles to incorporate low emissions technology. It is worth noting that there are limits on the numbers of a particular make/model of truck, so not all low emissions trucks will have access to the grants.

Further, as technology improves and pricing reduces, we expect the number of vehicles in the country to naturally trend upwards, however concerted effort will be required in order to meaningfully increase the low emission vehicle numbers utilised.

The current emissions from road transport are approximately 3,500,000 tCO_2e per year[10], coming from ~166,000 HGVs. Assuming the current 75 registered and planned low emissions vehicles can generate certificates, approximately 0.013% of road transport emissions could be moved with certificates. While this is a relatively low percentage it would be sufficient to demonstrate the effectiveness of a system and encourage additional low emission vehicles. Further, with so many vehicles in the country, there is a large amount of system expansion available.

In comparison, Renewable Energy Certificates (RECs) started in 2019, contributing to approximately 0.12% of the electricity market and currently contributing 4.46% in 2025.

[8] Heavy freight total cost of ownership tool | EECA
[9] Low Emissions Heavy Vehicle Fund | EECA
[10] Green Freight Strategic Working Paper | Ministry of Transport

3. Certificate Use / Purchasing (Demand)

As outlined earlier, discussions were undertaken with a wide range of potential participants and key points are included below, and many themes are common.

3.1 Interview Key Points

3.1.1 Current Freight Landscape

- Freight operations are generally managed through a mix of company-owned assets, directly controlled leased fleets, and third-party logistics providers
- Emissions tracking is a major challenge, especially with mixed-consignment (non-dedicated) vehicles
- Many diesel trucks still have significant usable life, delaying fleet transition plans
- The freight market is very competitive, and increased costs are generally thought to be untenable
- Some freight clients actively value sustainable options, but many do not

3.1.2 Decarbonisation Priorities and Focus

- Decarbonisation priorities depend on where emissions are most material:
  - Businesses with high shipping volumes prefer to focus on reducing marine emissions
  - Businesses with high electricity use prefer to focus on reducing consumption or purchasing renewable electricity
  - Certificates were most attractive where freight is the primary source of emissions
- Scope 3 emissions are lower priority as they are not mandated by reporting standards
- Direct decarbonisation, such as electrification or fuel switching, is preferred where feasible
- Businesses with developed or developing decarbonisation targets were most interested in certificates as they can build it into their reduction plans
- Brands with economic and sustainability advantages can do well through increased market share compared to standard products

3.1.3 Barriers and Risks

- Some organisations have set net zero or decarbonisation targets but lack the financial resources to pursue them effectively. Certificates have potential to reduce emissions with lower financial investment
- Economic pressures and limited government support have made decarbonisation more difficult
- Investment in low-emissions freight projects typically requires a clear brand or economic advantage to proceed
- Some organisations are bound by external certification or reporting standards (e.g. CRD, SBTi, Toitū), meaning any system introduced must align with these requirements.
- Challenges to electrify processing sites will impact on uptake of electric vehicle options.
- The optics of direct decarbonisation are better than purchasing of certificates

- Concerns were raised about the number of low emission vehicles that could feed into the system and the availability of potentially scarce certificates

3.1.4 Pricing and Market Demand

- General support for certificates, but willingness to pay is low with limited freight or decarbonisation budgets:
  - Most businesses were not willing to pay for a system
  - Two businesses saw a price of ~\$50/tCO_2e fair
  - Two businesses were happy to pay a premium of \$85-100/tCO_2e
- Growing interest in low-carbon delivery options from end-customers, but not yet mainstream
- Organisations looking to increase their sustainability credentials and offerings were the most interested in the system
- Clients were interested in how to distribute the cost for certificates, through cost pass through to customers or shared responsibility among beneficiaries

3.1.5 Trust and Transparency

- Credibility of frameworks and methodologies is critical for stakeholder trust and long-term support
- Greenwashing concerns are common amongst most businesses
- Businesses want alignment with existing frameworks and reporting standards

3.1.6 Summary

These conversations allowed for a good gauge of interest in certificate use from freight users, 3PL companies, and end consumers.

While there are a wide range of scenarios where certificates could be used, they are most suited for non-dedicated vehicle operations, where the freight provider is delivering to two or more freight receivers and only some of the receivers are interested in low carbon delivery – this means that the benefits of a low emission vehicle can be directed where users are willing to pay for it. There was also a common concern around credibility to reduce the risk of greenwashing, thus ensuring frameworks and methodologies follow existing standards such as the GHG Protocol and SBTi, is crucial.

While many organisations were supportive of certificates, most mentioned that they would struggle to justify the premium on freight costs. Some organisations mentioned they would be willing to pay a premium, but splitting costs between beneficiaries would go a long way to making costs more attractive to participants. Overall, four organisations of the 20 indicated that they would want to utilise the system, and would be willing to pay for it – this is a good hit rate when compared to similar systems and indicates that there will likely be sufficient demand for certificates.

3.2 Pricing

The interviews raised various discussion points regarding the pricing of certificates; in particular how many organisations would not be willing/able to pay additional costs or pass these through to the end client.

However, these perceptions are challenged by additional information and what has been observed in the market. The sections below discuss this.

3.2.1 ETS Comparison

As certificates will provide a gross reduction to emissions, rather than a net reduction through offsets, they should be priced higher than credits purchased through the ETS (which currently sits between \$40-60/tCO_2e) in order to recognise their higher value.

However, multiple organisations spoken to who purchase credits in order to provide a carbon neutral offering, said that they would likely want to pay less for LEFC given they're an unknown quantity and due to potential issues of greenwashing.

We believe that once the LEFC system was established in the market that this may alleviate these issues, and that a key target market would be those organisations who value gross reductions, over net reductions.

3.2.2 RECs Comparison

The Renewable Electricity Certificate system is a direct comparison of a Market Based Measure system operating in New Zealand. Currently ~5% of NZ electricity consumption is purchased through this system, where users pay a premium in order to reduce their Scope 2 carbon emissions.

The price for this is ~0.3 c/kWh, which correlates to a MAC of \$30/tCO_2e at 0.10kgCO_2e/kWh and \$40/tCO_2e at 0.075kgCO_2e/kWh.

Many organisations are happy to pay this price and see it as a very low premium for the significant benefit of reduced emissions. Even some organisations who we talked with utilise this system but would not pay extra for LEFC to reduce their Scope 3 emissions, citing costs.

We believe the key driver for this is the ratio of the additional cost vs the supplied product. Many users are paying 25c/kWh for their electricity (energy and network), so a 0.3c/kWh premium is only 1%.

Comparatively, at \$200/tCO_2e, the cost of fuel for freight increases by ~40%. Assuming fuel currently makes up 25% of freight cost, this increases the overall cost of freight by 10%. At \$600/tCO_2e, the total cost increase is likely to rise by 30%. These costs are harder to justify for many businesses.

3.2.3 Pricing Scenarios

As mentioned, many organisations are supportive of certificates but said they would struggle to justify the additional cost to deliver low carbon freight.

Diesel trucks produce 2.7 $kgCO_2e/L$[11]. At $200/$tCO_2e$, this would correlate to an additional $0.54 per L of fuel, adding an extra 36% on top of the base diesel price (assumed $1.50/L). However, these costs could be distributed to reduce upfront costs on a business, whether by passing them on to customers or sharing them among the beneficiaries.

Pricing scenarios have been developed to demonstrate how the cost of certificates would apply to a consumer product if a purchaser chose to pass on the certificate costs.

All scenarios assume a diesel road freight emission factor of 0.135 $kgCO_2e/tkm$.

We believe one of the key considerations with reviewing this is how it impacts the cost of the product to the end consumer in just the same way that RECs impact the end cost of electricity. Once this is taken into consideration, the change in costs has a much-reduced overall impact.

Bulk Load Example

A construction company based in Taupo purchases bulk materials from a supplier in Auckland and requires the freight to be zero carbon.

The supplier uses a 3rd party logistics company to deliver 100 t of bulk materials to Taupo. The 3PL company delivers this on diesel trucks. The supplier purchases certificates to reduce their Scope 3 emissions and passes the cost through to the customer. The 100 t of material travels approximately 250 km, resulting in 25,000 tkm for the delivery of the materials:

- With a certificate price of $200/$tCO_2e$, the additional cost is approximately $675 for the 100 t, or $6.75 per tonne of material.
- With a certificate price of $600/$tCO_2e$, the additional cost is approximately $2,025 for the 100 t, or $20.25 per tonne of material

The original cost is $550 per tonne of material (including freight costs), therefore the incremental cost of adding certificates would be 1.2% of the material cost at $100/$tCO_2e$ and 3.7% at $600/$tCO_2e$.

Whiteware Example

A customer purchases a washing machine from an appliance store and asks for it to be delivered to their house with zero carbon delivery. The store utilises a 3PL company to transport the washing machine from their distribution centre to the customer's home, which travels 150 km. At 70 kg, the delivery of the washing machine moves 10.5 tkm.

- Customer pays an additional $0.28 at $200/$tCO_2e$
- Customer pays an additional $0.85 at $600/$tCO_2e$

[11] Measuring emissions: A guide for organisations: 2024 detailed guide | Ministry for the Environment

The washing machine costs $1,200 with a $50 delivery fee. Therefore, the certificates only add on an extra 0.02% to the total cost at $200/tCO$_2$e or 0.07% at $600/tCO$_2$e.

The incremental cost on the delivery fee itself ($50) is only 0.57% at $200/tCO$_2$e or 1.7% at $600/tCO$_2$e.

Food & Beverage Example

A small supermarket wants their products to be delivered at zero emissions and decides to purchase certificates to eliminate their Scope 3 freight emissions and pass on the incremental cost to their customers.

A one litre bottle of milk was bought from a milk plant and transported 400 km to the supermarket. A litre of milk weighs approximately 1 kg, so the metric is 0.4 tkm. The certificate cost at $200/tCO$_2$e correlates to 1.1 c per L of milk, or 3.3 c/L at $600/tCO$_2$e.

Assuming the litre of milk costs $3, the certificates add an additional 0.37% onto the cost for the customer at $200/tCO$_2$e, or 1.11% at $600/tCO$_2$e.

Technology Example

A tech store sells an iPhone 16 to a customer in Christchurch, but currently only has stock in Auckland. The customer agrees to pay the courier fee to get it delivered from Auckland to their house (~1,000 km).

The store purchases certificates to reduce their Scope 3 emissions and pass these costs through to their customers. An iPhone 16 weighs approximately 170 grams, resulting in 0.17 tkm, and a certificate cost of 0.5 cents for the delivery of the iPhone at $200/tCO$_2$e, or 1.4 cents at $600/tCO$_2$e.

The base price of the iPhone 16 is $1,600 with a $10 courier fee. Therefore, the certificate adds a negligible amount of additional cost to the consumer.

Scenario Summary

Scenario	Weight	Distance	Base Price + Freight	Certificate Cost		Additional Cost	
				$200/tCO$_2$e	$600/tCO$_2$e	$200/tCO$_2$e	$600/tCO$_2$e
Bulk Load	100 t	250 km	$55,000	$675	$2,025	1.2%	3.7%
Whiteware	70 kg	150 km	$1,250	$0.28	$0.85	0.02%	0.07%
Food & Beverage	1 kg	400 km	$3	$0.011	$0.033	0.37%	1.11%
Technology	170 g	1,000 km	$1,610	$0.005	$0.014	0.0003%	0.0009%

4. Conclusions

Demand for both the generation and use of Low Emissions Freight Certificates was investigated to inform the price and incentives for freight providers and receivers to participate in the system. The discussions allowed for a general gauge of interest to purchase certificates and what price they may be willing to pay.

It was found that there is significant interest for decarbonisation in the freight space, with growing customer desire for low carbon deliveries. While budgets are tight and many organisations would not be willing to pay for this decarbonisation, ~20% of businesses spoken to indicated an ability and willingness to purchase certificates at between \$50-\$100/tCO_2e.

It was also noted that often businesses prefer direct decarbonisation where it is viable, either in freight or other emissions scopes, as this would provide a clear brand advantage over certificates for reduction.

A review of the TCO of various low carbon transport options outlined that certificate pricing of \$200/tCO_2e - \$600/tCO_2e would be required to offset the marginal cost of key technologies in certain circumstances. Further:

- Costs could be reduced for individual participants by spreading costs over the beneficiaries of the reduced emissions. As such, the freight provider, 3PL company and the end customer could all see a much-reduced cost while still gaining all the benefits.
- Given that a range of clients would pay \$50/tCO_2e - \$100/tCO_2e, some technologies could be paid for directly, and others have greatly improved economics, while not fully covering costs.

While there are barriers preventing businesses from adopting more low emissions vehicles for potential certificate generation, such as high capital costs, lower ranges, limited charging/refilling stations and the additional weight from batteries and fuel cell systems resulting in reduced payloads, there are sufficient low emissions vehicles in the country to provide a base of potential certificate generation in the near term. This would help to provide proof of concept and incentivise further purchases. Additional vehicles would be required in order to fund a self-sustaining certificate system.

We believe that targeted marketing would greatly help the system uptake, in particular the focus on the incremental cost of certificates in comparison to the total cost of the items purchased/freight moved.

Overall, we believe this is sufficient demand for certificates to justify a system, and there is enough supply capacity to demonstrate proof of concept. However, additional supply (and demand) would likely be needed to create a self-funding system and enable profitable operation of a registry.

Appendix A: Glossary

LEFC	Low Emissions Freight Certificate
EV	Electric Vehicle
BEV	Battery Electric Vehicle
FCEV	Fuel Cell Electric Vehicle
ICEV	Internal Combustion Engine Vehicle
3PL	Third-Party Logistics
tkm	Tonne Kilometre – Metric for freight movements
Generator	Business generating certificates
Purchaser	Business purchasing certificates
Participant	Generator or purchaser of certificates
Generating Asset	Vehicle that is generating certificates
Framework Group	A team of organisations who have provided financial support and industry views regarding how the system should operate and pertinent inclusions and exclusions for various aspects
Steering Group	A team of industry experts who have helped to direct and develop the project, while offering guidance regarding sensitive issues
Contributing Specialists	Various organisations who have provided their time and expertise to offer advice and guidance to help develop a robust, compliant and effective system

Appendix B: Ara Ake Tool – Key Assumptions

Detailed assumptions can be found on the Ara Ake tool here. Note that some of the below figures have been altered from the default scenarios due to being out of date – mainly carbon pricing, electricity costs, and fuel costs. Before a decision regarding the purchase of a low carbon vehicle, the organisation should review their own numbers and operational profiles to confirm numbers for their particular circumstance.

Parameter	Value
General	
Carbon price	\$60 / tCO_2e (+14.54% annual change)
Duration of ownership	5 years
Driver wages	\$30 per hour
Driver days/year	243 days
Large HGV	
Trip distance	630 km
Payload for non-BEV	27.5 t
Road User Charges	\$0.599
Number of 60 min stops	1.30
Medium HGV	
Trip distance	450 km
Payload for non-BEV	18 t
Road User Charges	\$0.434
Number of 60 min stops	1.07
FCEV	
Fuel efficiency	0.094 kgs/km
Vehicle capital cost	\$800,000 (-6% annual change)
Green H_2	
Estimated delivered cost per kg	\$16.50 / kg (-5% annual change)
BEV	
Delivered cost of fuel	\$0.80 / kWh (current ChargeNet prices)
Battery capacity	265 - 435 kWh (Medium - Large HGV)
Vehicle capital cost	\$500,000 (-3.2% annual change)
Fuel efficiency	1.75 kWh/km
Payload	133 Wh/kg
ICEV	
Vehicle capital cost	\$250,000
Fuel efficiency	0.37 - 0.56 L/km
Delivered Cost of Fuels	
Diesel	\$1.50 \$/L
Conventional biodiesel (20%)	\$2.60 \$/L
Drop-in biodiesel	\$3.35 \$/L