**TRANSPORTATION 2024 CONFERENCE**

**Elevating Urban Mobility:**

**Cable Cars as Urban Transport**

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**ABSTRACT**

Cable cars (also known as gondolas), once associated with picturesque mountain landscapes, are now emerging as a viable solution for urban transport, challenging traditional thinking on commuting possibilities. New Zealand is facing a pressing transportation challenge. Our population is growing at a rate that has exceeded forecasts for nearly a decade (after removing the Covid-19 shutdown), and this trend is set to continue. As people live longer and we welcome more migrants the strain on our infrastructure, particularly road capacity, is becoming increasingly evident.

New Zealand urban centres face a future of rising traffic congestion and declining productivity in the face of population increases – unless there is a response to improving public transport. This response should include the exploration of new public transport options.

Cable cars can seamlessly integrate with existing public transport networks while also serving as independent Mass Rapid Transit (MRT) solutions. By utilising the three-dimensional urban space above congested streets and challenging terrain, cable cars offer a reliable, efficient, and low-emission mode of transportation. They address regional and urban congestion and enhance the connection between communities, making them a compelling solution to New Zealand's transportation challenges.

This presentation will explore an assessment of the effectiveness of cable cars in an urban planning and transport context and the opportunities for implementation across New Zealand. Many potential cable car routes in New Zealand were explored and a short list of potential options in main urban centres was produced. The study indicated that cable cars can compete effectively with proposed MRT solutions. This is an exciting development, as the recent cancellation of light rail programmes in Auckland and Wellington opens the door to considering cable car options.

The presentation will also examine cable cars' strengths, weaknesses, opportunities, and threats as an MRT option.

**INTRODUCTION**

The transport system in New Zealand is about to go through a transformative change as a variety of factors cause a rethink in how the system is designed and operated. There are increasing commitments to reduce emissions in the transport sector from the national government and at the regional and local levels to reduce the Vehicle Kilometres Travelled (VKT). In responding to these challenges, we need to explore all the available transport options, not just traditional land-based modes.

The use of cable cars for public transport in New Zealand represents an innovative approach to addressing urban transport challenges while aligning with sustainable infrastructure, economic growth, and environmental principles. While they are becoming a common sight through adoption in various global locations such as New York, USA, Mexico City (Mexico), La Paz (Bolivia), Koblenz (Germany), Portland (Oregon, USA), soon to be in Paris (France), their potential in New Zealand remains untapped.

The potential for cable cars to become part of New Zealand’s public transport is evident, as they address several challenges outlined in national frameworks and policies, such as the recent draft versions of the 2024 Government Policy Statement (GPS) – Land Transport and the draft Investment Prioritisation Method for potential funding via the National Land Transport Fund (NLTF).

Mass Rapid Transit (MRT) typically has high construction costs, causes significant economic disruption, involves long construction periods, and then presents ongoing significant operational and maintenance costs.

Elevated infrastructure can bypass ground-level congestion, geographical obstacles, and densely populated urban areas, reducing travel times and traffic congestion. Additionally, the modular nature of cable cars allows for scalability and flexibility in areas of need, ensuring equity of opportunity across growing regions. Cable car systems boast a low environmental impact when powered by renewable energy sources and occupy considerably less land than equivalent MRT options.

There is potential for New Zealand to implement cable car systems as an innovative addition to the public transport network or as an MRT solution. A strategic opportunity for adoption in New Zealand's largest cities is identified where cable cars would positively impact urban mobility challenges and align with Government policies. This paper aims to provide insights into the integration of cable cars within the broader framework of sustainable infrastructure, economic development, and environmental stewardship, integrating with existing transport networks and embracing principles of multimodal transport. It will identify successful implementations globally and compare and contrast cable car solutions with traditional MRT options. Cable cars fit strategic transport routes and align with the four strategic priorities of the GPS.

**INTRODUCTION TO CABLE CARS AS PUBLIC TRANSPORT**

The aim of public transport is to provide efficient, affordable, and accessible transportation options for the public. Public transport is also important for providing equitable access to transport and supporting space efficiency by moving more people per trip than a private vehicle journey. This requires consideration of the following characteristics:

* **Connecting people where they want to go**. If public transport does not provide connections to and from key destinations, people will not use it.
* **Service frequency.** When deciding whether to walk, bike, use public transport, or drive, the customer seeks to choose when they want to go. They will select a different mode if they have an unacceptable delay to their journey, such as through poor frequency levels.
* **Reliable journey times.** Users want consistent travel time across the day, week, or year. If travel times vary dramatically, such as due to congestion or poor service levels, the user cannot rely on it and either must allow additional time for their journey or choose a different mode. When public transport patrons consider mode choice, travel time is key. The elevated nature of urban cable cars, which avoids typical ground-based travel issues such as congestion and road works, offers a competitive travel time. Although cable cars may occasionally face disruptions due to high winds, this risk is mitigated by strategically spacing the towers to accommodate local wind conditions. Cable cars are engineered for security and can operate safely under harsh climatic conditions, including winds exceeding 100 km/h.
* **Integration with other public transport modes.** Public transport modes should be integrated with each other to create a user-friendly public transport system. For example, creating easy transfers and allowing for the use of one ticketing system for all public transport modes.

Several secondary characteristics are important to Public Transport:

* **Environmental sustainability**. Public transportation is crucial in reducing our carbon footprint. Promoting more eco-friendly modes of transportation, such as cable cars, reduces greenhouse gas emissions and lessens our reliance on fossil fuels, protecting our planet for future generations. Cable cars are 100% electric, and with New Zealand’s high proportion of renewable electricity generation, the usage would emit very little CO2 compared to other modes.
* **Space saving.** Modern transport solutions do not have to take up large spaces or displace people from their communities and homes. Unlike traditional modes of public transport that need to factor in considerations such as extra space for stations, depots, vehicle lanes, and proximity to residential areas (due to noise, pollution, etc.), cable cars build upwards and only need minimal space for towers (as little as 4-10m2) and garaging. Stations can also be built into existing infrastructure, such as malls and commercial buildings, limiting the need to build outwards.
* **Supporting economic development:** Enhancing connectivity within urban areas would support economic growth by improving equitable access to employment, education, healthcare, and other essential services.
* **Accessibility:** Accessible public transport is crucial for promoting inclusivity, equality, and economic growth by ensuring that everyone, including people with disabilities and the elderly, can travel independently. It enhances quality of life, increases ridership, and supports environmental sustainability by encouraging the use of public services over private cars. Cable cars are designed to accommodate those with accessibility needs. Cable cars have step-free access and easy boarding and alighting, so those using wheelchairs or with mobility impairments can board comfortably without feeling rushed.
* **Privacy:** Cable cars are planned and designed with the privacy of surrounding neighbourhood’s in mind. Cable cars are built wherever possible along existing roadways and over public spaces. The height of a cable car (typically 20m-70m), the design of windows to prevent downward views, and the availability of ‘smart glass’ that can render window glass opaque are among the measures that can be used to prevent passengers from being able to look down onto private residents.

Cable cars are one of the most effective ways of delivering an attractive public transport mode. One of their greatest benefits is consistency, as cable cars are unaffected by traffic, congestion, or road works. This also means reliable headways for passengers – when traveling on traditional modes such as a bus, it is common to wait for a delayed service and then have more than one of the same buses arrive at one time. Such occurrences in a cable car system are impossible as the cabins move interdependently. Passengers are connected to key locations quickly and easily, with high frequency and capacity operations allowing users to turn up without needing to plan their journey ahead of time.

**International Applications**

***New York, United States of America***

A cable car going over a city street

Description automatically generatedThis aerial tramway (cable car) was the first tram in the USA to be used for urban transportation; it was opened in May 1976. The tram was originally developed as a temporary mode of transport while Roosevelt Island residents waited for the completion of the subway link. By the time the subway station finally opened in 1990, the tram had become a popular and necessary mode of transportation. The tram continued to operate, serving two million passengers annually, for 34 years – double its projected service life of 17 years, after which it was closed for modernisation work in March 2010 and re-opened in November 2010.

***Mexico City, Mexico***

In 2021, Mexico City opened Cablebús Línea 1, an almost 10km long route connection that directly links the 3.5 million residents of Cuautepec to the city’s largest transport hub, Indios Verdes, where passengers can easily transfer to the bus and metro. The cable car has shortened journey times by up to a half and can accommodate 4,000 people per hour in each direction. The construction and operation of the first line of the network directly created 300 jobs, with the improved mobility gained from the cable car also boosting the surrounding area's economy. By constructing cable cars, Mexico City improved social equity by improving public transport, creating open public spaces, and bringing social services to underserved areas.

***La Paz, Bolivia***

A cable car going over a city

Description automatically generatedCommencing with its first line 2014, the La Paz area in Bolivia now has the largest cable car network in the world. Originally it was introduced to address a significant topography challenge as the two initial communities were separated by a 400m vertical drop, linked by only a few congested, winding roads. The stations were also designed to be multi-modal hubs that connect with buses. Combined, this has enabled the citizens to have a significantly safer and quicker journey than otherwise, and its success has seen the service extended to a total of 10 lines, varying in length between 700m and 4.7km and carrying over 300,000 people per day.

***Paris, France***

The C1 cable car in Paris, currently under construction, traverses 4.6km with five stations supported by 30 towers approximately 160m apart. The cabins have a 10-seat capacity and run every 30 seconds, enabling the system to carry up to 2,000 passengers per hour per direction (pphpd). The journey time will be approximately 18 minutes, compared to 75 minutes walking, 27 minutes by bike, 35 minutes by bus, and 15 minutes by car. A key benefit of the cable car is that it is not affected by the road network, enabling it to travel directly across major road and rail links without additional bridges or accessways, attributing to the reduction in journey times.

***Portland, Oregon, USA***

*A rainbow over a city

Description automatically generated*Since December 2006, the cable car, the Portland Aerial Tram, can carry 79 people per cabin and links the Oregon Health and Science Hospital with the South Waterfront district. It addressed a relatively steep gradient and a relatively indirect road network, providing a key link to the wider Portland public transport system. With a 5-minute travel time, and cabins departing every 5 minutes, it is a highly competitive and attractive alternative to the other choices: a 45-minute bus ride, a 27-minute bike ride, a 30-minute walk, or a 12-minute car journey.

**NEW ZEALAND CONTEXT**

As urban centres expand, the strain on transportation systems intensifies. Over the past decade, New Zealand's population has experienced significant growth. In 2013, the population was approximately 4.44 million. By 2024, it has grown to about 5.34 million, marking an increase of roughly 900,000 people, or around 20% over ten years​ (Stats NZ)​​. Expanding road infrastructure is not feasible due to space and funding constraints. The dominance of private vehicles for commuting, business, and leisure is not sustainable and adversely impacts road safety, public health, and urban amenity.

Efforts to promote public transport are evident in governmental policies. Yet, traditional mass rapid transit strategies such as light rail and bus rapid transit have limitations, with little room for reallocation on current road networks, without land purchase or significant reallocation of the existing road corridor. This is especially true in Wellington, where the topography constrains MRT solutions. A fundamental shift is needed to optimise road space effectively. This requires innovative solutions beyond traditional approaches, acknowledging the limitations of solely relying on existing streets and roads to meet future transportation needs.

The relevant national and regional strategies have been reviewed to understand the strategic context for investing in cable car installations that meet New Zealand’s transport needs. The development, direction, and funding for land-based transport in New Zealand are guided primarily by the strategic goals and priorities of the Ministry of Transport and the New Zealand Transport Agency Waka Kotahi. The relevant strategies are discussed below.

**Government Policy Statement on Land Transport 2024 (Draft)**

The Ministry of Transport published the draft GPS on Land Transport as a strategic guide for land transport investment from 2024-2034. The GPS has identified four strategic priorities that best contribute to improving the well-being and liveability of New Zealand’s communities and are outlined in Table 1:

|  |  |
| --- | --- |
| **Strategic Priority** | |
| **Economic Growth and Productivity** | The primary focus of the Government's investment through this GPS is increasing economic growth and productivity. Strategic investment in our land transport infrastructure will ensure swift and secure connections for people and freight, fostering economic expansion and paving the way for social and economic opportunities. |
| **Increased Maintenance and Resilience** | Increasing maintenance standards and enhancing resilience across our state highways, local roads, and rural routes is paramount in fulfilling the Government's overarching goal of bolstering economic growth and productivity. |
| **Safety** | Ensuring safety across our transportation systems remains paramount. While we witnessed a consistent decrease in fatalities and severe injuries from the 1980s to the early 2010s, progress has slowed in the past decade. Each year, road-related fatalities and severe injuries impose a heavy toll on families, society, the economy, and the healthcare sector. |
| **Value for Money** | GPS 2024 will invest over $20 billion into the transport network. This investment must deliver better outcomes for New Zealanders through increased public transport fare box recovery, third-party revenue, and a focus on whole-of-life costs. |

Table 1 Government Policy Statement (Draft) 2024 strategic priorities. These priorities are discussed further in the following sections of the paper.

**Emissions Reduction Plan 2022**

Transport is one of New Zealand’s largest sources of greenhouse gas emissions and reducing carbon emissions generated by public transport will play an important role in achieving the net-zero emissions target by 2050. The Ministry for the Environment outlined in Chapter 10 of The Emissions Reduction Plan 2022 that to reach this goal, there are three key actions for New Zealand to adopt:

* Reduce reliance on cars and encourage people to walk, cycle, and use public transport.
* Rapidly adopt low-emissions vehicles.
* Begin work now to decarbonise heavy transport and freight.

These actions are supported by various initiatives that aim to address the equity issues ingrained in the transport system.

The provision of a cable car system aligns most closely with the first key action and its initiatives. Cable cars encourage mode shift, as they help to fill gaps in public transport access when it is not feasible to increase/expand bus or train services (due to issues such as funding or geographical limitations).

Cable cars are also bike-friendly and incentivise walking, forming a component of a multimodal trip by active modes and public Transport. Cable car stations are strategically located within walking distance of key destinations, public transport hubs, and residential areas to create a seamless transition between different modes of transportation. They can also incorporate other features such as wi-fi and panic alarms to further increase security.

**NEW ZEALAND OPPORTUNITY**

In New Zealand, the potential of cable cars is often underestimated and overlooked within the traditional business case process. Despite their proven success in international cities and their ability to address unique challenges in New Zealand, cable cars are overshadowed by more conventional modes of transport such as buses, trains, and light rail. Aligned with national frameworks like the GPS and the Emissions Reduction Plan 2022, cable cars provide competitive options to equivalent MRT options, making them an appealing urban mobility solution. However, they are often overlooked due to their perception as a novelty used for tourist attraction.

**Research Overview**

The research presents a comprehensive assessment of the scope, at a pre-feasibility level, for cable cars as a mode of public transport in New Zealand's main urban areas. Its primary focus is on options for urban areas as an alternative to light rail or bus-based options currently under consideration. The routes identified through a three-stage methodology can offer a competitive alternative transport solution.

The methodology for route identification was:

1. Minimum population densities were identified in urban localities that could be shown to support a cable car system.
2. An accessibility tool was used to identify key demand opportunities in the public transport system - where public transport travel time greatly exceeded private vehicle travel time - to identify potential cable car connection points.
3. Expert institutional knowledge of known existing or planned public transport corridors and tested these for cable car potential. This included end-of-transit system deployments (a model that has been successful overseas) and testing in known strategic corridors where other mass transit systems are planned.

The economic benefits of New Zealand cable car opportunities were evaluated using the same methodology used to assess public transport options in a New Zealand government and local authority context. Benefits were conservatively estimated from a first principal basis using only the main relevant factors according to the New Zealand 2021 Monetary Cost and Benefits Manual (MBCM).

The following will address the four strategic priorities in the GPS and how cable cars align.

**Strategic Priority: Economic Growth and Productivity**

The Government’s main priority for investment through the GPS is to foster economic growth. Effective public transport options should alleviate congestion and reduce travel time and emissions. The objective of promoting economic growth through public transport reflects the understanding that New Zealand cannot solely rely on road expansion to alleviate congestion. Additionally, it supports establishing a well-functioning multimodal transport system that reduces travel times to local social and economic opportunities. Cable car systems offer optimised travel connections without contributing to increased road traffic volumes. Airport to Botany is an example of a potential cable car route that aligns with this priority.

***Airport to Botany***

Implementing cable cars along the Airport to Botany (A2B) corridor in East Auckland presents a strategic advantage over traditional infrastructure development, particularly in addressing the region's rapid growth and transportation challenges.

The existing roads in East Auckland are reaching capacity, making it challenging and costly to implement new infrastructure like dedicated bus lanes. Cable cars offer a cost-effective alternative, requiring minimal road space and avoiding the need for significant roadworks. This reduces initial construction costs and minimises ongoing maintenance expenses associated with traditional road infrastructure.

Unlike Bus Rapid Transit (BRT), which may impact private car travel time and corridor capacity, cable cars offer an alternative that optimises corridor space and reduces congestion. By operating above ground, cable cars alleviate network congestion and reduce the demand for valuable corridor space, reducing private vehicle travel times as well. Table 2 compares travel time for the Airport to Botany route.

|  |  |  |  |
| --- | --- | --- | --- |
| **Trip Movements** | **Estimated Travel Times (min)** | | |
| Est. Trips (JTW & JTE) Return and airport passenger demand | Car | Public Transport (Bus) | Cable Car |
| 11,110 | 53 | 56 | 53 |

Table 2 Airport to Botany: Trips and Travel Times

Reducing travel times fosters economic growth in a variety of ways. It enhances efficiency by minimising time spent travelling, resulting in cost savings and increased productivity for businesses and individuals. Additionally, it improves accessibility to economic opportunities, encouraging business growth. Areas that are easily accessible via efficient public transport attract businesses and workers, fostering growth and economic activity. Improved transportation infrastructure, including cable cars, which can be considered a novel public transport solution, also boosts tourism by making destinations more accessible and appealing to visitors, stimulating local economies, and adding further interest to the journey. Ultimately, reducing travel times drives economic growth and enhances quality of life by alleviating congestion, pollution, and the stress associated with long commutes.

**Strategic Priority: Maintenance and Resilience**

The GPS underscores the need to maintain the road network and provide resilience, especially in the face of increasingly severe weather events, such as the Auckland floods in 2023. Over the past five years, the deterioration of the road network has resulted in potholes and other issues.

Given these challenges, exploring innovative solutions to alleviate pressure on road corridors is essential. Cable cars offer a promising alternative, as they operate above traditional roadways. Cable cars can ease congestion on the road by reducing the Vehicle Kilometres Travelled (VKT) of private vehicles and heavy buses—especially with the transition to electric buses. This seamless integration into the existing public transport network can incentivise mode shift among commuters.

Adopting cable cars can mitigate strain on road corridors, reducing regular maintenance costs. This, in turn, enables the redirection of funds, such as the $640 million reallocated by the draft GPS 2024 for maintenance, towards addressing infrastructure needs in other corridors with greater maintenance needs.

Prioritising the resilience of transportation networks, coupled with innovative solutions like cable cars, is paramount for addressing the challenges faced by New Zealand’s Road infrastructure. Karori to Wellington CBD is an example of a potential cable car route that aligns with this priority.

***Karori to CBD***

Karori is located 4km west of Wellington CBD and is one of New Zealand’s most populous suburbs, with a population of approximately 15,000. The Wellington Regional Growth Framework identified the need for alternative transport modes and improved resilience due to the topographical challenges restricting the road corridor and its growing population.

In Wellington, known for its notorious winds, concerns about resilience in public transport systems are valid. However, cable cars offer a remarkable solution. Cable cars are designed to be very secure and can operate safely under harsh climate conditions, such as in winds up to and above 100 km/h; Cable car systems demonstrate stability and safety. Their design incorporates robust features that ensure secure operation even in the harshest climates.

A cable car system would relieve pressure on the existing road corridor and reduce congestion of private cars and heavy ground-based public transport. An expanded analysis, using StatsNZ Journey to Work (JTW) and Journey to Education (JTE) data, has indicated that over 12,500 daily trips are made in and between the Karori and CBD areas, as shown in Table 3. An estimated travel time saving of 12 minutes compared to a car and 25 minutes compared to a bus would encourage a mode shift from road-based travel to elevated public transport.

|  |  |  |  |
| --- | --- | --- | --- |
| **Trip Movements** | **Estimated Travel Times (min)** | | |
| Est. Trips (JTW & JTE) Return and airport passenger demand | Car | Public Transport (Bus) | Cable Car |
| 12,540 | 20 | 33 | 8 |

Table 3 Karori to CBD Trips and Travel Times

**Strategic Priority: Safety**

The GPS 2024 has identified that ensuring safety across our transportation systems remains paramount. While there was a consistent decrease in fatalities and severe injuries from the 1980s to the early 2010s, progress has slowed in the past decade. Each year, road-related fatalities and severe injuries impose a heavy toll on families, society, the economy, and the healthcare sector.

In 2023, 25 pedestrians, 9 cyclists, 53 motorcyclists, and 254 vehicle occupants died on the transport network in New Zealand (Ministry of Transport, Safety, and Road Deaths); 157 of these fatalities occurred in urban areas on local roads where cable cars could operate.

Cable cars have a good track record for safety. However, the perceived safety concerns about being high in the air may need to be addressed through thoughtful consultation, engagement, and education. Wellington Airport to CBD is an example of a potential cable car route that aligns with this priority.

***Wellington Airport to CBD***

The Wellington airport to the central city is a priority connection as a key commuter, business, and tourism route, with a significant residential population serviced along the corridor. The Wellington Regional Land Transport Plan (RLTP) 2021 has three headline targets for the next ten years: a 40% reduction in deaths and serious injuries (DSI), a 35% reduction in transport emissions, and a 40% increase in active and public transport mode share.

Cable cars separate road based private travel and public transport, reducing exposure and likelihood of bus vs vulnerable road user crashes in busy urban environments. A consequence of cable cars is fewer vehicles on the road, so there are likely fewer conflicts on the network.

**Strategic Priority: Value for Money**

Despite significant investment in recent transport schemes, bipartisan transport solutions are needed to tackle New Zealand’s transport challenges. The GPS has reallocated over $20 billion to the transport network over the 10-year GPS timeframe, continuing the commitment to the transport system for current and future generations of New Zealanders. To achieve this, leveraging existing assets efficiently and adopting a whole-of-life cost approach is crucial. Integrating cable cars into the public transport network is a promising solution to achieve transport priorities in New Zealand. Cable cars offer significantly lower whole-of-life costs of major improvements to public transport, with far lower economic disruption during construction, capital expenditure, and the potential to operate at farebox revenue surpluses. Island Bay to Wellington CBD is an example of a potential cable car route that aligns with this priority.

***Island Bay to Wellington CBD***

An example of this potential lies in the Island Bay to Wellington CBD corridor. The Let's Get Wellington Moving programme, which was disbanded due to a perceived poor value for money, identified a potential MRT system linking Wellington Railway Station to Island Bay, aiming to improve urban mobility, stimulate housing development, and foster community connections.

While a Light Rail solution along the waterfront and through the central city has been considered, an economic analysis reveals that a cable car MRT solution could offer comparable benefits with substantially lower costs and far shorter construction timelines. Table 4 shows that Island Bay has a benefit-cost ratio of 2.0 and a construction cost per km of $40 million. Cable cars have a comparatively low per km cost compared to light rail projects, highlighted in Auckland Light Rail, which was projected to cost $14.6 billion for the 24km scheme.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Route Length** | **Benefits  ($ million)** | **Construction Costs/km ($ million)** | **Capital Costs  ($ million)** | **Benefit:Cost Ratio** |
| 7.2km | 537 | 40 | 288 | 2.0 |

Table 4 Island Bay to Wellington CBD cable car option: BCR

A cable car alternative is possible along the proposed southern corridor to Island Bay. Some key comparisons between Light Rail and a cable car solution are shown below:

|  |  |  |
| --- | --- | --- |
| **Factor** | **Light Rail** | **Cable Car** |
| Cost to install | >NZ$250m per km | NZ$40-60m per km across dense urban terrain; This includes some allowance for land take for the cable car stations |
| Installation time and disruption | Construction period of 5 – 8 years; very significant disruption along the route, with some buildings needing to be removed | Construction period of 1-2 years with less disruption provided 20m urban corridor width is available. |

Table 5 Comparators against a light rail solution

The proposed cable car network presents an alternative that could eliminate the need for extensive infrastructure improvements associated with traditional Light Rail or BRT solutions. With a potential cost of less than 20%-30% of current alternatives, a cable car MRT solution offers a significantly more cost-effective and efficient approach to enhancing transport connectivity in Wellington. By prioritising value for money and exploring innovative solutions like cable cars, New Zealand can unlock the full potential of its transport investments.

**CONCLUSION**

While the operation of a cable car for public transport purposes is a new concept in New Zealand, they successfully operate in many locations worldwide. As urbanisation increases and or cities become more populated and congested, transportation systems will need to become scalable, connecting communities as required. Cable cars modular nature means that they have a unique advantage to easily grow alongside the cities and communities they serve.

As a form of high-capacity, high-frequency transport with low environmental impact and relatively simple construction, the introduction of cable cars into New Zealand highly aligns with our national and regional policies and strategies. Cable cars are one of the most energy-efficient means of transport available. They are fully electric and can be powered by renewable energy. Other than initial construction, cable cars have a very low carbon footprint and emit almost zero emissions. Their overall advantages are significant when combined with their operational benefits, such as reliable and consistent journey times, particularly in comparison to other road-based means of transport, such as buses or trains.

If New Zealand is serious about tackling some of the largest challenges we face, cable cars must be considered as part of any business case assessment for high-capacity, high-frequency, sustainable MRT or supplementary to public transport systems. Although the current New Zealand planning framework does not specifically accommodate or mention cable car requirements, they are no different from any other road or rail utility operator. Due to their infrastructural requirements, the construction and operation of the cable car system will require appropriate consent for their implementation. The specific consenting requirements will depend on the specific district and/ or regional plans in the proposed area of operation. As an effects-based piece of legislation, the Resource Management Act (RMA) focuses on avoiding, mitigating, or remedying adverse effects on the environment. The installation and operation of a cable car generally do not contravene the general principles of the RMAs demonstrated; cable cars align well with the GPS.

To ensure the most appropriate transport solutions are selected for New Zealand's future, we need to look outside of the traditional transportation toolbox.

**REFERENCES**

Auckland Light Rail. Viewed April 2024, <<https://www.lightrail.co.nz/>>

Let’s Get Wellington Moving. (2023). Viewed April 2024, <<https://lgwm.nz/all-projects/mass-rapid-transit/>>

Ministry of Transport. (2024). Safety and Road Deaths. Viewed April 2024, <<https://www.transport.govt.nz/statistics-and-insights/safety-road-deaths/>>

Ministry of Transport. (2018). Transport Outcomes Framework. Viewed April 2024, <<https://www.transport.govt.nz/area-of-interest/strategy-and-direction/transport-outcomes-framework/>>

New Zealand Government. (2022). Aotearoa New Zealand’s first emissions reduction plan. Viewed April 2024, <<https://environment.govt.nz/assets/Emissions-reduction-plan-chapter-10-transport.pdf>>

Stats New Zealand (2020). New Zealand’s population passes 5 million <<https://www.stats.govt.nz/news/new-zealands-population-passes-5-million>>

Wellington Regional Council. (2021). Wellington Regional Land Transport Plan. Viewed April 2024, <<https://www.gw.govt.nz/assets/Documents/2021/10/Wellington-Regional-Land-Transport-Plan-2021web.pdf>>

Wellington Regional Growth Framework. (2021). Viewed April 2024, <<https://wrgf.co.nz/our-priorities/transport/>>

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