

Submission by

Hamilton City Council

HĪKINA TE KOHUPARA - KIA MAURI ORA AI TE IWI - TRANSPORT EMISSIONS: PATHWAYS TO NET ZERO BY 2050 - GREEN PAPER (MAY 2021)

25 June 2021

1.0 EXECUTIVE SUMMARY

- 1.1 Support the overall intent of the Ministry of Transport's 21 May 2021 Green Paper *Hikina te Kohupara - Kia Mauri ora ai te Iwi - Transport Emissions: Pathways to Net Zero by 2050*.
- 1.2 Support the Avoid, Shift, Improve Framework underpinning the approach to the Green Paper and emissions reduction in the transport sector. As well as reducing the need to travel, we see increasing mode shift as being the priority for Hamilton.
- 1.3 Investment needs to align with the Avoid, Shift, Improve Framework - the current Government Policy Statement on Land Transport 2021/22 - 2030/31 does not provide the necessary signals and investment to achieve the emissions reductions required.
- 1.4 The Green Paper is a good start in outlining an approach to reducing transport emissions. We are supportive of Pathways One and Four as outlined in Chapter 10 of the Green Paper, as they have the strongest focus on Theme 1: Changing the way we travel.

2.0 INTRODUCTION

- 2.1 Hamilton City Council would like to thank the Ministry of Transport for the opportunity to make a submission to its 21 May 2021 Green Paper '*Hikina te Kohupara - Kia Mauri ora ai te Iwi - Transport Emissions: Pathways to Net Zero by 2050*'.
- 2.2 As a growing metro city and Council, in 2018/19 transport accounted for 64% of greenhouse gas emissions in Hamilton. Most of these emissions (86%) came from on road transport. Without significant investment in mode shift, for both people and freight, this will continue to increase as the city grows.
- 2.3 Urban form decisions occurring in the next few years in response to Government policy and growth will lock in either low or high carbon futures for our community. There is an urgent need for guidance and investment to ensure that future developments support low carbon living, especially around reducing the reliance on private vehicles.

3.0 MODE SHIFT IS A PRIORITY

- 3.1 We are supportive of the use of the Avoid, Shift, Improve Framework, and the prioritisation of actions that support reducing trips and trip lengths and increasing the use of active transport, public transport and new forms of shared transport.
- 3.2 Reducing the need to travel by car is not just the responsibility of the Ministry of Transport - this needs to be recognised and the importance of urban planning in minimising vehicle

movement will be essential. The Ministry of Education also has an important role in this space in reducing the use of cars through the location and zoning of schools.

- 3.3 This Green Paper is too focused on the role of the Ministry of Transport. The Transport Strategic Emissions Action Plan needs to be a whole of government approach. As noted in the Green Paper, significant actions to achieve the Avoid and Shift outcomes are reliant on other areas of Government.
- 3.4 We would encourage the Government to progress the work started in the 'Reshaping Streets - Scoping Study' published by the Ministry of Transport in May 2021. We agree with many of the challenges outlined in the report as well as the priority areas for change.

4.0 REALIGN INVESTMENT

- 4.1 The current investment in active transport and public transport is far too low. The investment levels in the GPS 2021 are not going to achieve the greenhouse gas emission reductions required by the transport sector.
- 4.2 Investment needs to align with the need to rapidly increase mode shift and should reflect the lack of investment in this area to date. Waiting until 2024 for an updated GPS and Regional Land Transport Plans will be too late.
- 4.3 Investment is needed in both the hard and soft infrastructure to support mode shift, especially biking and micromobility. For example, through funding school travel coordinators and the development of school travel planning.
- 4.4 As noted in the Green Paper, we support setting higher Funding Assistance Rates for mode shift projects as a supporting incentive for prioritising active and public transport.

5.0 ROLE OF ELECTRIC VEHICLES

- 5.1 We recognise that electric vehicles will play an important part in the way we travel in the future. We believe caution needs to be taken with the extent that the use and ownership of private electric vehicles will play in transitioning to a zero-carbon future. The current focus on just the operational emissions means that the embodied emissions of the production of electric vehicles are not being factored into decision-making.
- 5.2 We support the investment in electric buses and other public transport and mass transit options. This will provide opportunities for electric vehicles to significantly reduce emissions through mode shift as well as improving efficiency of the vehicles.
- 5.3 We are not supportive of excluding micromobility and shared mobility from the modelling and the future opportunities. These two options are growing, and overseas examples demonstrate that the e-bikes, e-scooters and electric shared cars can play a very important role in the transport system.

6.0 RESPONSE TO SPECIFIC CONSULTATION QUESTIONS

- 6.1 **Consultation Question 1** - We support the principles outlined in the Green Paper and suggest that education needs to be incorporated into Principles 4 and 7 to better reflect that this will be critical for both the factors involved in the transport system and the community.
- 6.2 **Consultation Question 2** - This section is too Ministry of Transport centric - it does not reflect the true integrated approach that will be required for transport to transition. The section 'Collaboration with other sectors' does not reflect the multiple roles that Government has to regulate and invest across other sectors that have direct transport impacts. For example, the National Policy Statement on Urban Development has the potential to achieve reductions in vehicle kilometers travelled due to greater density in appropriate locations. The location and zoning of schools is also another key aspect that the Government can directly control.

- 6.3 The Government fleet and travel planning is also one area where Government can demonstrate leadership, through developing workplace travel plans and investing in innovative fleet options.
- 6.4 **Consultation Question 3** - We support the continued investment in new innovative concepts, drawing on successful examples from overseas. We would also recommend investment in innovation that supports the Avoid Step, especially around reducing the need to travel for work.
- 6.5 Innovation opportunities could also be achieved through the education sector. By investing in innovative school travel planning ideas, we can support students to use public and active transport before they become the next generation of people using our transport network.
- 6.6 **Consultation Question 4** - To better integrate transport, land use and urban development we would recommend prioritising placemaking. We are supportive of the development of the One Network Framework and the focus of Movement and Place. Placemaking and inclusive street design is important for the future development of urban cities. This could be done by telling a different story, for example, that quality of travel does not need to involve two or more vehicles per household. There are many overseas examples that support and incorporate good design for transport infrastructure which could be adopted here in Aotearoa. There needs to be better incorporation of land use and development that supports and prioritises good active and public transport links to amenities, schools, and workplaces.
- 6.7 In Hamilton, we are experiencing out of sequence development of greenfield areas - this means that the timing doesn't align with the introduction of public transport services for the development area. The Government could provide the framework for councils to require developers in these situations to provide the public transport and active transport infrastructure and for developers to support the initial service delivery.
- 6.8 **Consultation Question 5** - The Green Paper covers many of the alternative travel options that currently exist. Whilst future modes such as drone technology are unlikely to transform the way we travel in the short-term, greater consideration of micromobility and bike share should be incorporated. These modes have increased exponentially in the last couple of years. Lime e-scooters have been operating in Hamilton for 21 months and during this time, over 427,000 rides have been taken and over 614,000km travelled.
- 6.9 We also would support the incorporation of a Universal Design approach to transport that delivers on Vision Zero for all users of the transport system.
- 6.10 **Consultation Question 6** - We are supportive of using pricing mechanisms such as a fuel tax to encourage the shift to lower emissions transport. Pricing is an important signal to support behaviour change. The timing around introducing changes in pricing will be critical to minimise impacts on low income and those who have no other options for travel. Currently the public transport network is not providing a level of service that enables an easy switch of mode. We would support the funding from these new sources being ringfenced for public transport or active transport improvements.
- 6.11 **Consultation Question 8** - As outlined in the Green Paper, decarbonising the public transport fleet becomes more important as patronage increases. We support the initiatives to increase the uptake of electric buses and for Government to provide support for the network infrastructure. As well as electrification of existing rail, the Government should investigate opportunities to invest in new electric mass transit in the large metro areas.
- 6.12 **Consultation Question 10** - We support the development of a National Freight Strategy that puts decarbonisation of freight as a key outcome. The Strategy should also look at the short, medium and long-term future of freight and provide clear direction for infrastructure

development requirements, like the Ruakura Inland Port and Logistics Hub located in Hamilton.

- 6.13 **Consultation Question 11** - Understanding the long-term decarbonisation pathway for transport, and the freight sector in particular, is critical for knowing what investment needs to be made in future fuel sources and associated infrastructure. When Government is planning out this pathway, it will be important to consider the broader environment, economic and social impacts and the lifecycle of the fuel source and the vehicles and not just the greenhouse gas emissions.
- 6.14 **Consultation Question 13** - We are supportive of a strong focus on Theme 1. We recognise that electrification will be an important part of decarbonising and transforming our transport system, however it is not the 'silver bullet'. Sustainable and alternative modes will play a very important role in the way that we move around.
- 6.15 Proactive and courageous leadership across all sectors is going to be key as this will affect everyone at some level. Setting some achievable government policies and guidance to make sure that people understand why we need to change and how we are going to get there will be critical.
- 6.16 **Consultation Question 14** - We support action on improving urban form and spatial planning, realising the benefits through existing reforms will be essential for achieving emissions reductions now and in the long-term.
- 6.17 Whilst the GPS does currently include climate change as a strategic priority, it is not strong enough to instigate the change required. This is reflected in Regional Land Transport Plans and the investments proposed for the next 3 years. Changes in investment need to happen much sooner. Either the GPS needs to be reviewed and updated to better embed climate change and deliver an appropriate level of investment, or alternative investment options need to be provided. We would recommend all future policies should be assessed for their emissions reduction contribution.

7.0 FURTHER INFORMATION AND OPPORTUNITY TO DISCUSS OUR SUBMISSION

- 7.1 Should the Ministry of Transport require clarification of Hamilton City Council's submission, or additional information, please contact **Charlotte Catmur** (Sustainability and Environment Advisor) on [REDACTED] in the first instance.
- 7.2 Hamilton City Council would welcome the opportunity to discuss the content of our submission with the Ministry of Transport in more detail.

Yours faithfully



Richard Briggs
CHIEF EXECUTIVE

Submission to the Ministry of Transport 'Green Paper' on Transport Emissions

Climate Karanga Marlborough

Climate Karanga Marlborough (CKM) is a climate action group of citizens of the Marlborough Region, with the purpose *"to assist elected representatives and their officials to pursue policies designed to limit the extent of rapid climate change and help New Zealanders to adapt to its consequences"*. We are concerned about the rapid advance of global warming and work to assist our community and government at all levels in mitigating greenhouse gas emissions and preparing the country for the challenges that global warming will bring.

On the whole, we support the great majority of the ideas presented in the MoT green paper and feel that the transition of our society to low emissions transport is an urgent necessity. CKM believes that, if we are to achieve our aim of reducing harmful emissions, then not only do we need to make our consumption of energy in NZ more efficient and effective, we all need to expect to consume, and demand, less energy, particularly energy derived from fossil fuels.

The changes needed to our cities, outlined in Theme 1, are important and necessary, particularly when considering the possibility of limited future transport options in the absence of fossil fuels. Transitioning the nation's light vehicle fleet to battery electric, proposed in Theme 2, seems to be the most straightforward and low risk option for continued automobile travel. The transition of heavy freight, discussed in Theme 3, will be more challenging and will present more difficult choices.

There are four issues which we wish to submit on, however, where we disagree with or suggest greater emphasis on, strategy elements presented of the green paper. These are outlined below.

1. We urge the MoT to use caution in planning on the success of new, innovative technologies to solve our low emissions transportation needs. The country should not count on technologies that are not already mature and in production. These can be introduced into later plans and emissions budgets, should they eventuate. History has shown that most 'new' technologies in energy and transport take decades to mature and reach a scale of production that makes them economically viable relative to existing technologies.

I bring to your attention examples of current technologies that are being implemented in transport and energy to address global warming. These include electric cars, lithium ion batteries, wind turbines and PV solar cells. These have all been around for a long time but are only recently becoming economic relative to fossil fuels. The youngest of these technologies is the Li-ion battery – researched in the 1970s & 1980s, prototype in 1985 and commercial production in 1991. After 30 years, production has ramped up to the point that the price of these batteries is still falling, indicating that the technology is not yet fully mature.

How long will it take to research, proto-type and ramp up production of new technologies such as biofuels and hydrogen for aviation and heavy transport? Not all innovative technologies work out when applied to scale.

2. CKM strongly opposes the promotion of biofuels. We base this opposition on the following points:
 - a. Biofuels, with the exclusion of those based upon farming and forestry residues, take up farm land that might otherwise be used to grow food. In the US, it is estimated that fully one-third of the corn crop is diverted to making ethanol for a petrol additive. This has

risen the price of corn domestically and internationally, making it less available to feed people. As a consequence, biofuel projects come under considerable criticism because of the food production that they displace. For example, the activist group Biofuelwatch in the UK and US actively campaigns against biofuel farming.

- b. Biofuels made from woody material (i.e., cellulosic ethanol) have the potential to greatly reduce the amount of farmland dedicated to biofuel production, but require more chemical processing to produce and are, therefore, much more difficult and expensive. Despite more than 100 years of research and development in Europe and the US and significant government subsidies, there was only one commercial cellulosic biofuel plant still in operation in the US in 2018 (Robert Rapier, Forbes, 11 Feb 2018). The conclusion here is that cellulosic ethanol biofuels are difficult to make, even with generous government support. New Zealand should not count on this technology until it can be demonstrated at scale.
- c. The production of first generation biofuels (those made from plant sugars, starch and oils) will likely be at an industrial scale, implying large scale monoculture farms using fertiliser, pesticides, herbicides and heavy soil-compacting machinery. This is unlikely to be the type of landscape change that New Zealanders will be comfortable with and will likely result in the same kind of organised resistance that biomass energy development in the UK has faced.
- d. Biofuels based upon cellulosic feed stocks have been optimised to use fast growing perennial grasses, such as switch grass and *Arundo Donax*, which is a serious riparian weed pest in western North America. Hybrid miscanthus x giganteus, which is sterile, might avoid the problem of weed spreading but is more expensive to plant.
- e. Since biofuels are now blended with liquid petroleum fuels to reduce emissions and improve social acceptability, there is the risk that oil & gas producers will over-sell biofuel availability and work to delay the elimination of petroleum fuel use, in order to maintain fossil fuel sales.

The conclusion here is that New Zealand should not count on biofuels to transition away from petroleum fuels. In addition, importing these fuels from overseas, as suggested in the green paper, simply off-loads these problems to another country, along with the potential for continued native forest destruction to grow our biofuel, much like the present day situation with palm oil.

CKM submits that the MoT should look to the Climate Commission for its recommendation on biofuels. In recommending a moratorium on new fossil gas hook-ups to industry and residences, the Commission suggested that the fossil gas industry first demonstrate that blending of low-emissions gases, such as bio-methane or hydrogen, with fossil gas (the industry's proposed method to reduce fossil gas emissions) is feasible and will not result in higher costs to consumers (Section 15.1.5 of the final advice). This would prevent the construction of expensive new fossil gas infrastructure, for which locked-in gas customers would be required to pay.

Similarly, the petrol industry is proposing blending of low-emissions biofuels with fossil petrol as a way of maintaining their market share in transport. This might cause consumers to purchase new internal combustion engine vehicles able to accept the blended fuel, or pay to modify their existing vehicles. If these promises of low-emissions fuels do not eventuate at reasonable cost, consumers would then be saddled with the stranded investment. The MoT should first require

that the petrol and biofuel industries demonstrate the viability of blended or pure biofuels before committing the nation's transportation strategy to them.

3. Considering the ambitious transport electrification plans presented in the green paper, CKM submits that planning for heavy transport should focus on the least energy methods, such as electric rail and coastal shipping. There is the very real possibility that New Zealand will not be able to develop enough renewable energy to meet the demand generated by electrifying transport. New energy resources will be restricted to wind, solar, biomass burning and geothermal, all of which, perhaps excluding solar, will face challenges developing. Wind development is opposed by many communities. Biomass burning for power generation will face issues with landscape change, since biomass feedstock will require large areas of plantation. Geothermal development is risky and increasingly expensive. Numerous geothermal exploration projects and field assessments fail before ever reaching power production.

If new electrical generation does become limited, it would be prudent to plan for methods of heavy transport which use the least amount of energy. Although the green paper points out the expense of electrifying the existing rail network, this, along with coastal shipping, is the lowest energy way to move goods, and the least risk option for New Zealand's heavy transport. Electric rail and coastal shipping are tried and true technologies. In addition, the cost of electrifying rail might be somewhat offset by the reduced highway maintenance needed today to address heavy truck traffic, a cost savings not mentioned in the green paper.

Electrification of New Zealand's rail network also makes a good match with the excess power expected to come on to the electricity market when the Tiwai Point smelter closes, as proposed by Prof Susan Krumdieck at Canterbury University. The government announcement of such a project would certainly help to soothe the nerves of domestic electrical power generators, who are nervous about adding new power projects when cheap Manapouri power could flood the South Island electricity market in the next few years. Considering the ambitious transport electrification plans presented in the green paper, we need to be planning and building new electrical generation as soon as possible, and not wait for a decision on Tiwai Point.

4. We are in support of coastal shipping as a replacement for road transport for heavy freight. The national benefits of coastal shipping are well documented in recent report by Ernst & Young to the Ministry (The Externality Value of Coastal Shipping, June 2020). Besides being energy efficient, coastal shipping reaches communities that do not presently have rail access (e.g. Nelson Tasman, the East Cape and the Far North) and as such, complements rail as a mode for heavy transport. As pointed out in the Ernst & Young (2020) report, coastal shipping also is vital to the supply of coastal communities cut off by natural disasters, such as occurred after the Kaikoura earthquake.

Although modern shipping relies almost entirely on fossil fuels, there is the potential shift to renewable fuels (such as wood or charcoal) and wind assisted transport, as have been used in the past. We support government sponsored efforts to help decarbonise the country's coastal fleet and maintain efficient port facilities.

5. In one further point, we question the accuracy of a quote on the efficiency of hydrogen fuel cells, on page 91, second paragraph, "*Yet in balancing this, converting electricity into hydrogen and back to electricity can involve energy loss in the order of 45 percent making it an inherently inefficient process.*"^{90.} In fact, the efficiency of this transformation is much worse. The reference

to this efficiency value is a 2019 article in the periodical 'youmatter', which simply quotes another article at: <https://www.deingenieur.nl/artikel/hydrogen-car-wins-over-electric-car>. The title of this second article doesn't sound like a reliable source of unbiased information.

An article in the Journal of Energy Policy (2008) by Susanne Page and Susan Krumdieck at the University of Canterbury: "*System-level energy efficiency is the greatest barrier to development of the hydrogen economy*" states the loss as closer to 71%; for every 100 KWh of electrical energy used in the electrolysis of water to hydrogen, followed by compression to 700 bar for transport and then conversion back to electricity in an automobile fuel cell, only 29 KWh of electricity would be generated. This compares with 84 KWh electrical energy returned in a battery electric vehicle under similar circumstances.

We suggest your team further investigate this efficiency value and revise subsequent reports with a more credible reference. Technical numbers, such as efficiency values, reported in non-technical popular periodicals should not make their way into government reports!

In conclusion, we urge the MoT to adopt the "precautionary principle" in planning for New Zealand's future transport. That means sticking to the low emissions transport solutions that are tried and effective, and require the least amount of energy. That means battery electric vehicles, electrified trains and decarbonised coastal shipping.

The country should not be led down the road of biofuels and hydrogen only to find that these fuels don't work as planned or create a new set of problems. Let others work the bugs out of these systems first. If they work out, they can be added to the transport energy mix at a later date.

Whatever strategy the MoT ultimately adopts for decarbonising New Zealand transport, it goes without saying that this strategy needs to be in alignment with the strategies of other government ministries and commissions. We appreciate that this will be a difficult and time consuming task. The MoT has its work cut out for it, and it has our support.

Respectfully submitted,

Thomas Powell, Co-chair, Climate Karanga Marlborough

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Ministry of Transport's Transport Emissions Discussion Paper

Local Government New Zealand's submission on the Ministry of Transport's Discussion Paper identifying what Aotearoa could do to shift our transport system on to a zero emissions pathway.

June 2021

We are. LGNZ.

LGNZ is the national organisation of local authorities in New Zealand and all 78 councils are members. We represent the national interests of councils and promote the good governance of councils and communities. LGNZ provides advocacy and policy services, business support, advice and training to our members to assist them to build successful communities. Our purpose is to deliver our Vision: “Local democracy powering community and national success.”

Introduction

Local Government New Zealand (LGNZ) thanks the Ministry of Transport (the Ministry) for the opportunity to submit on its 2021 *Transport Emissions: Pathways to net Zero by 2050* Discussion Paper (the Discussion Paper) that identifies what Aotearoa could do to shift our transport system on to a zero emissions pathway (the Four Pathways). We understand that the Ministry is attempting to be strategic about the options and to be co-ordinated within the transport sector and across sectors (e.g., land use planning).

We welcome that the Discussion Paper seeks feedback on options to “eliminating emissions across our economy and within the transport system”, including views on policies that should be progressed and implemented, to ensure the Ministry’s priorities are sound. This will both ensure and require that the pathways it conceives to reduce emissions contribute to a wider set of objectives, including efforts across all of government to enable the wider system (not limited to transport) to deliver net beneficial value for society.

Since LGNZ has not been granted an extension to consult with our sector and prepare a sector-informed submission, we submit a first-principles based response focused on some perceived key issues with the Ministry’s policy direction underpinning the Discussion Paper. This draws from submissions that LGNZ has made on other consultations as we seek to raise general questions about the Ministry’s principles guiding the policy work and some specific questions about the options Aotearoa could pursue or prioritise.

LGNZ and our members strongly acknowledge and support the need to reduce emissions, as agreed by the Government, and that an important step towards this goal is for Aotearoa’s transport system to decarbonise. The Discussion Paper appropriately attempts (however does not execute on) a system-wide analysis of the opportunities for reducing transport emissions in Aotearoa, including what could make the biggest impacts on reducing transport emissions and what opportunities exist in interdependent sectors and systems to contribute.

Our view is that the Ministry’s approach appears indiscriminately focused on one objective (emission reduction) and is disconnected from the Government’s overall emissions strategy and other *prima facie* interdependent objectives (e.g., housing affordability). This risks undercutting other major work programmes, such as the reform efforts by the Government, of which the Ministry is nominally a part of. Since some of the Ministry’s key proposals appear counter to those efforts without discussing the tension, costs or trade-offs involved, it is difficult to find a meaningful solution in the Ministry’s overall approach.

Our key response to the Discussion Paper is that it appears neither strategic nor coordinated. Our participation at the Ministry’s engagement session on Hīkina te Kohupara for local government (the engagement session) has been helpful to clarify the Ministry’s operating environment and the

reasons for this shortcoming; Government direction favours pace and scale of reform efforts over due process, which compromises the Ministry's ability to undertake a fulsome policy process and provide quality advice. LGNZ acknowledges that this is a general issue across all government reform programmes.

We understand that the actual pathway for New Zealand emission reduction will depend on decisions made in the next three emissions budgets, and these budget decisions will be informed by the Ministry's advice on the pathways outlined in the Discussion Paper. At the same time, the engagement session clarified that the pathways identified in the Discussion Paper and the advice to be provided to Ministers to inform emission budget decisions are not and will not be based on advice grounded in a proper policy process that considers options against an evidence base that make costs clear. We are concerned that the advice to be provided to the Government is high-risk and will not enable strategically informed and coordinated decisions.

LGNZ acknowledges the pace and scale of reform efforts require the Ministry to provide in-principle rather than evidence-based advice. However, we observe that the basic reasoning underpinning the favoured pathways (pathway 1 and 4) in the Discussion Paper promote highest cost interventions while contradicting the intervention logic of other government work programmes that are working towards other objectives, for example housing affordability.

Our submission is broken into general comments on some of the **principles** of the policy work, and specific comments that raise questions about some key aspects of the **policy direction** that have made us question how the Ministry's policy work is aligned with the overarching objectives set by the Government, as well as other policy and reform programmes the Ministry is involved in, but are working towards other objectives.

General comment

LGNZ submits that the transport system should be framed as an input in service of community values rather than as an outcome in and of itself, as appears contemplated in the Discussion Paper. We are also unclear how the Ministry conceives the purpose of transport infrastructure. In our view, this comes through in the policy direction.

This can be contrasted with our support for the Infrastructure Commission's purpose statement that infrastructure, in particular the transport system, should support *oranga tangata*/the wellbeing of people.¹ We note that wellbeing is a concept not limited to a single domain, such as the environment. Wellbeing is a particularly useful concept in this case because making transport subservient to people and their needs opens up a broader horizon that transcends a limited focus on a single sector and dimension of wellbeing.²

¹ Infrastructure Commission, 2021, *He Tūāpapa ki te Ora - Infrastructure for a Better Future*, Infrastructure Strategy: Consultation Document, <https://infracom.govt.nz/assets/Uploads/Infrastructure-Strategy-Consultation-Document-May-2021.pdf> (accessed 21 June 2021), at p 8.

² The Government's wellbeing framework includes at least 12 overarching wellbeing domains of which environment is one. We note that housing is another, and MOT's work appears not to have considered the impact of the proposed policies and pathways on housing. The framework can be perused here: <https://www.treasury.govt.nz/information-and-services/nz-economy/higher-living-standards/measuring-wellbeing-lsf-dashboard> (accessed 17 June 2021).

LGNZ is concerned about how the principles found in the Discussion Paper appear to have been applied in a foregone manner, rather than analytically, to shape the Ministry's advice to the Government on reducing emissions through the transport system. We are especially concerned about principles three to six, which broadly cover: taking a strategic approach (principle 3); coordinating action (principle 4); responsibly managing costs and impacts to ensure a just transition (principle 5); and understanding that there are multiple ways to achieve the desired outcome (principle 6).

Although LGNZ agrees that these principles are appropriate, the policy process raises concerns about how these principles are defined and have been applied.

Principle 3: A strategic approach

The Ministry expresses an intent to be strategic about which options to pursue by identifying the options that have the largest impact to reduce emissions while also delivering co-benefits. We commend a focus on co-benefits. However, critically, there is no consideration of costs in the Ministry's deliberation. It is unclear whether a strategic approach in the Ministry's view also requires working out how to deliver most value across a range of objectives (co-benefits) while also minimising the burden on society overall.

Principle 5: Managing impacts to ensure a just transition

On a partially related note, LGNZ recognises that principle 5 focuses on managing the impacts and costs and appropriately focusses on distributional issues. However, distributional issues are a different concern than the overall efficiency of a given option, that is, how much resources a given path may require, no matter how that burden falls on different domains or segments of society. To reduce the overall impact, it is important the Ministry applies not only an effectiveness lens to identifying pathways to reduce emissions, but also an overall cost minimisation approach to reduce the collective burden.

The Ministry's treatment of this principle appears insular; there is strong focus on the impacts on society from a single sector lens (e.g., focus on transport costs). However, the Ministry does not consider the costs that the proposed interventions will impose on society through their effect on other sectors (e.g., land and house prices).

Principle 4: Coordinated action

LGNZ takes on board the need for principle 4 at a high level, noting that cross-sector coordinated action is needed. At the same time, the Ministry expresses coordination as one-directional, namely how other sectors need to contribute to achieving a single objective the Ministry has itself defined for the transport sector. Genuine coordinated action is at a minimum two-directional, if not multi-directional, and in this case needs to be better aligned with the Government's overall emission targets and methods for achieving them.

The Government has tasked the transport sector to work towards a range of objectives (not limited to emission reduction) and other sectors depend on transport to contribute. LGNZ is unclear how the Ministry has applied the principle of coordinated action, because the proposals put forward appear to come at potentially maximal cost while also working counter to government objectives relevant to other sectors.

Principle 6: Forging a path, recognising that there is not one way to get there

LGNZ appreciates that a path that contributes to reducing emissions is needed that also meets other objectives (co-benefits) and that there is more than one way to do so. However, we are concerned that the Ministry's starting position for the policy direction outlined in the Discussion Paper undermines this principle. While the Ministry has outlined four pathways, they share a common strategy, which:

1. Pass over the relationship that sector emissions have to national emissions targets, which underpins the government's emissions strategy – this appears to be a coordination issue;
2. Act as if a national policy instrument and cross-sector coordination mechanism (i.e., the emissions trading scheme, ETS) does not exist and will not contribute to achieving outcomes – this appears to be a tactical lapse; and
3. Do not give sufficient consideration to the need for the transport sector to contribute to other all-of-government objectives that work towards outcomes of key social value – this appears to be a key strategic oversight.

We do not consider that the overall approach taken allows for a reasonable consideration of alternative options and pathways to achieve emission reductions while delivering social value. We consider it possible in-principle, to identify meaningful ways to shift our transport system to reduce carbon emissions in line with national emission targets while also taking into account the need for the transport sector to contribute to other key objectives.

We recommend including other principles

In recognition of our concerns, the Ministry might consider including other principles to ensure its approach is aligned with all-of-government and delivers net-benefits. We outline these below, and they guide our specific comments that follow.

Principle A: Identify pathways that contribute towards multiple objectives

Identify pathways that reduce emissions and complement policy interventions in other sectors towards different objectives. Such interventions would effectively reduce emissions and align with interventions that improve other wellbeing holistically.

For example, policies that reduce emissions should work in tandem with policies to improve housing affordability. Where this is not possible, trade-offs and costs should be transparent to enable strategically informed decisions.

Principle B: Minimise costs

Reduced emissions should be achieved through effective but also least cost policy interventions. Any pathway must be coordinated with the Government's national emission targets. Efforts to reduce emissions in the transport sector needs to take into account the relationship of sector emissions to national emissions to ensure the most cost-efficient pathway is chosen in the whole. Pathways should factor in contributions of relevant policies to avoid resorting to higher cost options that are not necessary to achieve outcomes.

Specific comments on policy direction

Since LGNZ has not been able to consult with members, our submission does not advance a policy position in relation to the four pathways outlined by the Ministry. At the same time, in reviewing the Ministry's Discussion Paper, we take note of the following:

1. The policy underpinning the proposed four potential pathways to “eliminate” emissions does not appear synchronised with Government objectives for major reforms of interdependent sectors and systems (e.g., the urban development system). These cannot be achieved unless the transport sector accepts that it plays a critical role. It will need to meaningfully contribute to many overarching and system wide objectives set by the Government;
2. The call of the transport sector for other domains (i.e., land use regulation) to contribute to emission reduction goals in its own sector, as defined by the Ministry in isolation from its emissions' relationships with the Government's national emission targets, appears to discount other government policy instruments (e.g., the ETS); and
3. Some proposals in those pathways that, in the Ministry's view, can meet self-imposed targets (i.e., gross sector targets rather than net national emission targets) appear disconnected from the evidence base developed in other sectors. To compound this, some even run counter to the signalled policy direction of other work programmes in sectors the Ministry is calling on to contribute (e.g., land use and urban development).

In what follows, we point to specific examples to illustrate our above observations. In doing so, LGNZ is not advocating for any policy or solution. The purpose of our discussion is to highlight in-principle issues with the Ministry's approach and policy direction that the Ministry could consider addressing to connect its direction with the all-of-government's steer. This would minimise the burden on society for an effective emissions reduction pathway to synchronise with other efforts across the system working towards a wider set of outcomes.

The Four Pathways do not appear synchronised with other overarching objectives

The Government has embarked on several major cross-cutting reform programmes. These reforms are occurring in parallel to the need to reduce emissions. The most substantial collective efforts – such as Three Waters and Resource Management Act reforms – theoretically align on improving housing affordability through a more responsive planning system.

In April 2021, all-of-government overarching objectives for the housing market were announced that included increasing housing supply, disciplining house prices across time, improving housing affordability overall and creating a housing and urban land market that credibly responds to population growth (CAB-21-MIN-0045).

We agree with the Ministry that it is “therefore imperative to seek to understand the total system, not just parts of it.” However, the Discussion Paper defines the “total system” as “the whole transport system”. “To better understand interconnectedness and opportunities to reduce emissions” as stated in the Paper, a broader view that is not limited to the concerns of the transport sector is needed. This is especially important when outcomes of social value are at stake that depend upon the transport sector to come to the table.

We are also uncertain the Ministry and the Government as a whole has a clear understanding of the role that transport plays in contributing to wider objectives and outcomes. Finally, LGNZ notes that the Discussion Paper only devotes one page (37-38) to the impact the planning rules required by the Ministry's proposals will have on housing and living costs. We discuss this section further below.

The Ministry's policy direction appears separate to and discounts other government policy instruments

LGNZ notes the Ministry's overall approach to constructing possible pathways discounts the existence of other contributing policy instruments, such as the emissions trading scheme. The policy proposals contained in the Discussion Paper overlook and appear to section wise work counter to other policies (e.g., the UGA and national direction by the Government on land use and urban development) to improve housing affordability.

The Ministry's overall approach appears disconnected from the government's emission strategy, because proposed transport emission reductions do not factor in the relationship the sector's emissions have to national emissions. This appears underpinned by the Ministry's decision to disregard government policy on offsets and rather form its own view, treating offsets as non-existent.

We are concerned that an isolated approach will fail to consider the impact the proposed interventions have on national emission targets. Given the ETS is both binding and capped, the Ministry risks imposing high-costs on society without contributing to national emission targets. We argue that the key question for the Ministry is how the sector can – through a coordinated all-of-government effort – most cost-efficiently contribute to achieving national emission targets and so maximise social value.

To be clear, LGNZ is not endorsing any specific approach. We are not arguing, for example, that the ETS is sufficient to achieve emission reduction targets (nor are we saying it isn't). What we are taking note of is that the Ministry has made the decision to ignore a policy instrument designed to coordinate emission reductions across sectors. This raises concern that the Ministry's response is not proportional. We are concerned that the Ministry's modelling of effective pathways has excluded any contributions from potentially relevant policy instruments (deeming them to have no effect at all) and consequently resorts to highest cost options to achieve outcomes.

Policy direction of pathways 1 and 4 appears disconnected from, and potentially works counter to, the signalled policy direction in other government work programmes

The Ministry's policy proposals on shaping cities and towns to ensure compact urban form in pathways 1 and 4, appear counter to policies developed in other work programmes to improve housing affordability. This is particularly evident when comparing pathways 1 and 4 with the policy direction of the most recent advice from the Treasury underpinning the Government's April 2021 housing measures, the Urban Growth Agenda (UGA) and the National Direction on Urban Development (NPS-UD).

The Ministry recommends implementing theme 1 (avoiding and shifting travel) as the key intervention of any successful pathway. The “avoid” theme in particular covers a range of measures, however the Ministry’s policy work does not appear to make relevant distinctions or consider their comparative effectiveness, individually or collectively. For the purpose of discussion here, we distinguish between higher- and lower-altitude urban form policies to reduce emissions:

- **Higher-altitude policies** – these aim to avoid vehicle travel by limiting urban development to a more compact area and raise average urban densities, also known as urban containment policies.
- **Lower-altitude policies** – these aim to avoid and shift mode of travel by making more alternative modes of transport available and improving access to them through liberalised land use (mixed use), street network design and lower transaction cost access to public transport nodes.

The higher-altitude policies are a comparatively blunt instrument to lower-altitude policies. The evidence base also appears to indicate that higher-altitude policies are not particularly effective at reducing vehicle travel or emissions.³ However, lower-altitude policies are shown to collectively achieve more per capita reductions in vehicle travel and can be coherently integrated with the objectives and policy prescriptions underpinning the Government’s recent housing policies as well as the UGA and NPS-UD.⁴

LGNZ notes that higher-altitude policies do not appear consistent with the Government’s overall work programme and reform efforts that align on improving housing affordability. The Treasury (T2020/3529) advice underpinning the most recent measures of the Government prescribes four key policies for the urban development system “to bring house prices closer to their ‘real’ cost of production on an enduring basis”:

- Land for housing must be abundantly available;
- Housing intensification and expansion must be encouraged;
- Infrastructure must allow demand to be met in a flexible way; and
- Development and construction capacity should not restrict demand being met.

We understand that the UGA’s main objective is housing affordability, underpinned by affordable urban land, and the NPS-UD responsiveness policies that are a product of the UGA signal that urban expansion is a key requirement to achieving this. Consequently, the objective set out by Government appears to be on ensuring that land is more affordable, not just the floor space on

³ A 10% increase in average density (citywide) only results in about 0.6% reduction in vehicle travel. See Gabriel M. Ahlfeld and Elisabetta Pietrostefani, 2019 ‘The economic effects of density: A synthesis’, *Journal of Urban Economics*, vol. 111, <https://doi.org/10.1016/j.jue.2019.04.006>

⁴ Researchers looking to disentangle effects found that land use mix results in fewer car trips and more walking trips; street network design reduces car travel by 1.2% when intersections are more frequent and streets in closer proximity to each other by 10%; and access to public transport reduces car travel by 0.5% when distances are reduced between homes and transport nodes/stops by 10%. See Reid Ewing and Robert Cervero, 2010, ‘Travel and the built environment: A meta analysis’, *Journal of the American Planning Association*, vol. 76, no. 3, <https://doi.org/10.1080/01944361003766766>

that land. We understand this to be of key concern to the Government due to distributional impacts.

As the Ministry briefly acknowledges in the Discussion Paper, “compact neighbourhoods with high amenity values can result in higher housing prices and rents, which can displace low-income residents and increase social inequality.” We consider this problematic when coupled with higher-altitude policies, because, as the Ministry also acknowledges, “planning rules that limit or control urban expansion into some areas affect land prices, with spill on effect for housing costs.” LGNZ is concerned that the Ministry has done little more than acknowledge these interrelationships and not factored in the costs imposed on society.

In drafting this submission, LGNZ consulted with the Ministry of Housing and Urban Development (HUD) to clarify HUD’s position on urban containment policies, which it does not support. HUD also considers “compact” and “containment policies” ill-applied policies for towns that have not sufficiently developed to make larger scale intensification a feasible proposition due to development economics. This means that the Ministry’s advice to apply higher altitude “compact” policies to smaller towns does not align with other central government departments.

On a final note, previous work in the spatial planning pillar of the UGA, which informs the proposed Strategic Planning Act (SPA) has focused on operationalising the “making room for growth” approach to provide a more open-ended framework for long-term growth of urban areas. The framework lays the foundation for orderly outward development that improves the operation of land and housing markets and enables cost-efficient future infrastructure investment. This aims to support maximal upward development over time and with minimal carbon emissions per capita, especially in transport.

LGNZ is aware of a number of international case studies that reflect this kind of approach, also consistent with NPS-UD responsiveness policies. These demonstrate how spatial planning coupled with a coherent suite of policy interventions can achieve positive outcomes across multiple objectives, specifically emission reduction and housing affordability. These examples have accommodated rapid population growth (up to a factor of 3 to 10) over the period of a few decades while maintaining housing affordability and achieving significantly better long-run environmental outcomes in terms of emissions than New Zealand cities.

Most importantly, the examples demonstrate that up to four times lower transport-related CO₂ emissions can be achieved in the long run. These require an open-ended spatial planning framework, NPS-UD-like responsiveness policies and lower-altitude urban form policies. Taken together these policies improve the ability to locate homes and businesses and change travel behaviour so that less vehicle travel is needed. Consequently, better urban form outcomes, particularly for environmental performance as measured by emissions, does not depend on either blocking location of development or limiting urban development to a more compact area.

The following international cities alongside CO₂ emissions in transport (in tonnes per capita per year) provide good examples that the Ministry should consider, given its participation in the UGA: New York (1.8); Tokyo (0.7); Copenhagen (1.0); Toronto (2.2); and Barcelona (0.6).⁵ All of these

⁵ C40 Knowledge Hub, 2021, *Greenhouse gas emissions interactive dashboard*, City emissions comparison (per capita by sector), viewed March 2021, https://www.c40knowledgehub.org/s/article/C40-cities-greenhouse-gas-emissions-interactive-dashboard?language=en_US

cities have lower transport-related emissions than, for example, Auckland (2.7).⁶ They have also accommodated rapid population growth without drastic increases to house prices over a number of decades during periods in which they implemented policies aligned with the policy direction of the government's work programmes to improve housing affordability and the Infrastructure Commission's proposed direction for a future Infrastructure Strategy for Aotearoa.⁷

Conclusion

The Ministry's overall approach does not appear strategic or coordinated across objectives and other government policy programmes working towards a wider set of objectives.

LGNZ is concerned about the modelling underpinning the Ministry's pathways. It is unclear whether the Ministry has disentangled the effects of different policy interventions, particularly higher- and lower-altitude urban form policies, and considered their respective benefits and costs. It is also unclear the extent to which the Ministry has considered whether they are complementary with other objective and policy directions.

Specifically, it is unclear whether the impact the Ministry attributes to higher-altitude policies is subject to confounding variables and whether instruments recommended by the Ministry are actually necessary to achieve targets. This is especially so given the implicated social costs that have not been properly discussed in the Discussion Paper.

The Ministry may consider clarifying the meaning of the terms it uses to describe proposed policy interventions, such as "compact urban form" and "compact urban development", noting that these terms typically mean urban containment policies.

Finally, the Ministry's discussion of potential pathways lacks a broad enough strategy that can negotiate a pathway through interdependent objectives and work towards a wider set of outcomes. It appears to present a missed opportunity on the Ministry's part to lead with much more innovative problem solving to support all of government response to climate change and advance housing affordability objectives and policies already underway.

LGNZ would welcome a meaningful investigation into ways to shift our transport system to reduce emissions while taking into account (and so not compromising) other key objectives. If you would like to engage further, please contact Benno Blaschke, Principal Policy Advisor, Advocacy (021 278 1243, Benno.Blaschke@lgnz.co.nz) and or John Stewart, Senior Policy Advisor, Advocacy (029 924 1222, John.Stewart@lgnz.co.nz).

⁶ Ibid.

⁷ Infrastructure Commission, 2021, *He Tūāpapa ki te Ora - Infrastructure for a Better Future*, Infrastructure Strategy: Consultation Document, <https://infracom.govt.nz/strategy/have-your-say/>

Submission by

Z Energy



to the

Ministry of Transport

on the

Hīkina te Kohupara discussion document

25 June 2021

INTRODUCTION

1. Z Energy supports the premise of the Hīkina te Kohupara discussion document and the intention to use it as a basis for a recommended transport emissions reduction plan.
2. We note a number of areas where Hīkina te Kohupara aligns with the final report from the Climate Change Commission, Ināia tonu nei. We draw your attention to those areas in this submission for clarity and consistency, as it is our position that the strong alignment of these two pieces of work will support increased investment certainty.
3. For the purposes of this submission, we will note where we can support each of the paradigms: **Avoid; Shift; and Improve.**
4. Our focus is on Improve, given our expertise in liquid fuels, transport networks and our work with customers – from households to some of the largest commercial customers in Aotearoa.
5. We also note where we endorse the Sustainable Business Council / Climate Leaders Coalition and Business Energy Council submissions on particular points.
6. We conclude with our perspective on the suggested pathways.

AVOID

7. Our expertise is limited when it comes to this area given the focus on urban planning and spatial design. However, we commend suggestions in Hīkina te Kohupara that focus on inclusive street design and improving public and active transport options given their emissions reduction potential and safety and wellbeing co-benefits.
8. We endorse the position of the Business Energy Council that more specific attention be paid to the role of flexible working to reduce travel demand.

SHIFT

Hīkina te Kohupara	Ināia tonu nei
Providing car share companies with grants, loans or other incentives or subsidies	Increased consideration to leasing and car sharing schemes

9. We commend the consideration given to mobility as a service, car sharing and micro mobility, as they are trends that we have also invested in (in the case of Mevo) or given consideration as part of our innovation approach. We note this is a theme that aligns Hīkina te Kohupara with Ināia tonu nei.
10. Specifically, we understand from our partners, Mevo that three key areas of support would help unlock the benefits of low carbon transport delivered by car sharing for the whole country:
- Supporting Government Procurement by way of mandate to integrate car sharing into the government fleet and transport needs through incentives, grants, or subsidies along with directives. Should Government reduce its fleet of 16,000 by 30-50% with the overflow being shifted to car sharing, this would not only save taxpayer dollars but also provide a baseload of use that the rest of the country would then benefit from.
 - Take up the example of Singapore in providing further subsidies (50% higher) to high use shared BEVs such as those used on car share and 'ride hail' services.
 - Set national policy statements removing the ability for local governments to charge for parking of adequately utilised shared vehicles to further incentivise their use.

IMPROVE

Hīkina te Kohupara	Ināia tonu nei
Using sustainable biofuels to transition from fossil fuels	Develop a low carbon fuel standard or mandate
Use sustainable aviation fuel (SAF)	Put together a feasibility study for SAF

Providing the necessary support infrastructure for biofuels in heavy freight, through investment and/or through clear investment signalling from the Government	Support the establishment of local production for biofuels and hydrogen through policy and co-funding of pilots
Investment into supporting infrastructure for low-emission vehicles and low-carbon fuel options. This includes EV chargers and charging networks	Enhance the roll out of EV charging infrastructure to ensure greater coverage, including at marae, multiple points of access, mandatory smart charging, and fast charging

11. Our focus in this section is on biofuels given our expertise on the matter and the work currently underway on the Sustainable Biofuels Mandate.
12. Overall, we endorse the right fuel for the right use case and our strategy is premised on hydrogen, electrons and biofuels all having a strong role to play in different fleets and at different stages, depending on the development and stewardship of the technologies.
13. In the immediate term, we view biofuels as playing a key role in decarbonising our heavy fleet, our aviation sector, marine applications, utility vehicles that are yet to have viable electric alternatives come onto the market and rail that is not electrified.

Sustainable Biofuels Mandate

14. We are in the process of formulating our in-depth response to the proposed Sustainable Biofuels Mandate and view this as the appropriate avenue for our detailed perspective on this policy.
15. By way of indicating our thinking:
 - We see 3.5% emissions reduction by 2025 as achievable and we are working on how we might supply or enable the supply of higher blends to help increase the contribution of biofuels to carbon abatement.
 - We urge much more specific work to be undertaken on aviation in the biofuels mandate and for the purposes of the emissions reduction plan. We appreciate that there is a significant focus on ground transport, but aviation has implications not only for our emissions, but for our global reputation and our tourism export earnings. Sustainable Aviation Fuel will require specific investment to stimulate domestic production and we advocate for a more

specific approach within Hīkina te Kohupara and the Sustainable Biofuels Mandate. We focus on this below.

Sustainable Aviation Fuel

16. We absolutely support and encourage the explicit focus on the reduction of aviation emissions, both domestic and long-haul. Whilst long-haul/international emissions may be out of scope, we believe that attention must still be paid to our impact and to the associated reputation risk – and loss of tourism export earnings - if Air New Zealand and other carriers do not have decarbonisation options for long-haul.
17. As above, we suggest that the government considers investment in domestic production of sustainable aviation fuel.
18. However, we also recognise that investment in a production facility will require both technical and commercial insights and stewardship of the overall intent of Sustainable Aviation Fuel.
19. To that end, we reiterate our suggestion in our submission to He Pou a Rangi that:
 - a. ***An aviation specific public-private governance channel, like the UK's Jet Zero Council, is set up in tandem to coordinate and develop the policies and investment settings needed to support SAF and other low carbon aviation options. In the UK, the Jet Zero Council was set up to move beyond the dialogue and start making positive changes towards getting production underway – with each meeting focused on how to identify roadblocks and accelerate production.***
20. We also support Air New Zealand's position that:
 - Domestic aviation emissions must be included in any pathway for transport emissions reductions in Aotearoa.
 - A cross-agency public-private working group focused on decarbonising aviation would be invaluable. Bringing together the interests of multiple government agencies and sectors of the economy, it could manage and secure the policies and investment settings needed to support the development and commercial deployment of aviation decarbonisation, including Sustainable Aviation Fuel.
 - In addition to a SAF-specific mandate, there are other actions required to be taken in the first emissions budget period to make SAF a reality in Aotearoa. These include:

- Implementing the Climate Change Commission's recommendation to undertake a detailed study on the use of SAF in Aotearoa. This should include a detailed feasibility study to help confirm high level production cost estimates, confirm feedstock supply, determine necessary policy and investment settings, and quantify the greater benefits to the regions of standing up a SAF industry.
- Implementing policies and investment to establish a market and capabilities and to close the commercial gap between SAF and fossil fuels.
- *Air New Zealand detailed both of these opportunities in this recent white paper; [Airnz-sustainable-aviation-fuel-in-new-zealand-may-2021.pdf \(p-airnz.com\)](https://www.airnz.com/airnz-sustainable-aviation-fuel-in-new-zealand-may-2021.pdf)*

Biofuels Infrastructure

21. As per above, we will be using our submission on the Sustainable Biofuels Mandate to put forward some specific requests and suggestions regarding biofuels infrastructure/infrastructure that enables a thriving biofuels market.

22. However, we reiterate our position in our submission to He Pou a Rangi that:

- a. We think it is **important to consider Aotearoa/New Zealand's assets and infrastructure systemically when it comes to transport and household energy**. While electricity use clearly requires this, biofuels are also a case in point.
- b. For example, with respect to the existing hydrocarbon assets at Refining NZ, Refining NZ CEO Naomi James noted in their recent market disclosure that:

"Planning would also include looking at future opportunities to repurpose the Marsden Point site as a fuels and energy hub, with the potential to support future production, storage, handling, import and export of energy sources including biofuels, sustainable aviation fuel, hydrogen, LNG and electricity.

"An import terminal would require a much smaller footprint than our operations today and this could open up repurposing potential for the site given its strategic location next to a deep-water harbour and close to New Zealand's largest population base."

- c. In particular, **the existence of a hydrocracker at the Refinery is a key asset for the production of SAF and its by-product, renewable diesel** and repurposing one already in existence is more economically viable than buying or building from scratch.

EV charging

23. We support the Ministry's initiative to develop a roadmap for charging infrastructure and would like to reiterate the point made above about a system-based approach to current assets, sites and potential nodes.
24. Given our network expertise, this is something that we would be happy to help support – our key contact for electric charging is our Strategy Lead, Michael Thomas – Michael.thomas@z.co.nz.

PATHWAYS

25. We appreciate the significant work that has gone into the pathways and the options they provide.
26. Our initial assessment is that Pathway 4 will require significant enabling policies to be rolled out in an urgent timeframe by multiple central and local government stakeholders working in tandem to make it viable and equitable.
27. Pathway 2 seems most preferable from the perspective of existing technologies and what is known about policies.
28. However, overall, we align ourselves with the Sustainable Business Council / Climate Leaders Coalition position that:

*“At this stage, the model does not include many modes and assumptions that our members see as key to decarbonising the transport sector. This **includes the omission of freight rail, aviation, ships, and boats from the modes considered, as well as sustainable aviation and shipping fuels and hydrogen.** It also leaves out some of the key recommendations of the Climate Change Commission in its final advice, such as supporting flexible working policies as a transport emissions reduction measure, and key policies to support uptake of low-emissions vehicles, such as tax incentives, restrictions on ICE imports and scrappage schemes. **This makes it difficult for us to provide meaningful comments on the pathways at this stage.**”*

Modelling

29. With respect to further modelling opportunities, we have been developing our own house view of demand substitution, using input from multiple sources. This is not to displace the modelling of the Ministry or the Climate Change Commission, or our partners at the Business Energy Council and the Kea and Tūi models (which we have contributed to); but rather to have a more Z-specific view that is able to inform some of our strategic decisions. We have adopted consistent assumptions to the Climate Change Commission's

Demonstration Path, except where we have strong data that support a different modelling approach or assumption.

30. Whilst this view is still being confirmed (we will have a final ready for the end of July and we welcome the chance to present it to you), we can update you on the following provisional findings:

- Our provisional model forecasts material increase in the overall energy demanded for transport, and in particular for freight transport, despite incorporating similar modal shift assumptions as the Climate Change Commission. We forecast truck VKTs to increase by around 20% from 2021 to 2035, in the absence of further 'avoid' or 'shift' initiatives than assumed in the Climate Change Commission's approach. This highlights the importance of Hīkina te Kohupara's 'optimisation' and 'logistics improvements' in the reduction of freight travel, which we have not modelled.
- Our provisional model uses a different approach to forecasting EV uptake¹, but - when using the Climate Change Commission's forecast vehicle cost assumptions - results in a very similar adoption curve to the Climate Change Commission's Demonstration Pathway for the light passenger fleet at approximately 35% of the fleet electric by 2035.
- However, our provisional model forecasts much slower electrification of the truck fleet, with a forecast 4% of the truck fleet electrified by 2035 – in line with Hīkina te Kohupara's four pathways.
- Our provisional model indicates that it is not just the number of EVs in the fleet that will drive decarbonisation, but also the relative share of VKTs delivered by EVs compared to their ICE counterparts. This is particularly pronounced for the truck fleet, where the technology and operational barriers (e.g. size, weight and range requirements, as well as time required to recharge them) makes the feasibility of high utilisation EV trucks less likely.

FURTHER COMMENT

31. We note the specific consultation questions posed in Hīkina te Kohupara and we can offer a contribution to a number, as below.

¹ Our model uses the Bass Diffusion Curve, modified for relative TCO of EVs compared to ICEVs, to forecast the adoption rate of EVs.

Is the government's role in reducing transport emissions clear? Are there other levers the government could use to reduce transport emissions?

32. The government's role is clear. However, what is less clear – yet extremely critical – is the role of Parliament in terms of cross-party agreements. We, along with the Sustainable Business Council and the Climate Leaders Coalition, encourage as much political consensus as possible on the urgency and resource required to decarbonise transport.

33. As our CEO, Mike Bennetts noted in [an op ed](#) upon the publication of the Climate Change Commission's final report:

*"We recognise that there will always be political debate about the policy plan to get us to that 2050 end goal. We live in a democracy – it is entirely appropriate that there is robust debate on the specific policies. But **now is the moment to signal a clear and enduring pathway to a low-emissions and climate-resilient future.** Getting emissions budgets passed with cross-party support is key to creating a stable transition for our businesses and communities."*

The freight supply chain is important to our domestic and international trade. Do you have any views on the feasibility of the possible actions in Aotearoa and which should be prioritised?

34. As noted in Hīkina te Kohupara, without intervention, trucks will surpass the private fleet in emissions.

35. However, freight delivers significant 'bang for buck' in terms of decarbonisation, so it is our position that a freight strategy, as suggested by the Climate Change Commission should be prioritised with urgency.

Pricing is sometimes viewed as being controversial. However, international literature and experiences demonstrate it can play a role in changing behaviour. Do you have any views on the role demand management, and more specifically pricing, could play to help Aotearoa reach net zero by 2050?

36. We understand that a fuel excise tax increase is but one suggested pricing option on the table for the purposes of this document, however, we would like to bring in the 'voice of the customer' at this juncture.

37. It is our position that further increase in the excise tax would be difficult within the framework of a just transition, as it would be loading costs onto consumers at a time when household costs are already difficult for many to manage.

38. If you take an excise tax in tandem with the current context of increasing electricity prices, for example, it could have the effect of diminishing the options of those already left with very few.

39. Therefore, as a fuel provider, we cannot support consideration being given to increases in excise tax given without understanding explicitly how the tax would be used to further carbon reduction in transport and enable a just transition. We note the reference to Canada's example in Hīkina te Kohupara but would suggest a much more detailed scenario based on local context.
40. If it is something that is deemed absolutely necessary to curb fossil fuel demand, our position is that it is a timing element from an equity perspective – once people with limited financial means have a genuine choice, then it should be on the table. (This is the type of scenario where we see biofuels supporting change, as it would enable those who are not able to use public transport or purchase an EV to decarbonise.)
41. In terms of other demand management policies, we support changes to the RUC regime and see the value in congestion pricing (we refer you to the Business Energy Council submission for a more detailed comment on congestion pricing).
42. Overall, it is our position that road cost recovery is best paid by the users of the road, with emissions priced separately and via the mechanisms already in place, such as the ETS.
43. Whatever amendments may take place, we strongly urge a consultation period for an appropriate length of time that enables all participants to assist with the 'user design' upfront, as any change has the potential to be highly impactful on the way we do business, e.g., how we account for revenue and/or our exposure to liabilities as well as how we manage inventory throughout the country.
44. For example, should there be a change to the excise tax regime, it is important to note the tax is paid upon fuel entering the country from import or leaving the refinery. The implication of this is all inventory owned by wholesalers in locations outside Refining NZ, has had excise paid on it. Wholesalers expect to recover this from customers.
45. Absolute clarity and a co-design process for any changes are therefore required to ensure the best outcome for business and customers.

Decarbonising our freight modes and fuels will be essential for our net zero future. Are there any actions you consider we have not included in the key actions for freight modes and fuels?

46. We reiterate our point above that aviation requires a more specific approach, including a specific mandate.



**MOTOR INDUSTRY
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25 June 2021

Transport Emissions
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Transport Emissions: Pathways to Net Zero by 2050

Please find below the MIA's submission on the MoT Transport Emissions: Pathways to Net Zero by 2050 discussion document.

The Motor Industry Association (MIA) is a voluntary trade association set up to represent the interests of the new vehicle industry specifically the official representatives of overseas vehicle manufacturers. Members account for over 98% of all new vehicles imported and sold in New Zealand across the passenger car, light and heavy commercial vehicle and motorcycle (including on and off road).

The Association has over 44 members (official distributors appointed by vehicle manufacturers) covering 81 different marques.



David Crawford
Chief Executive Officer



Mark Stockdale
Principal Technical Advisor

Executive summary

- The MIA supports the view that sustainable alternative fuels are important in the transition to zero emissions, including the role of hydrogen to decarbonise heavy freight. In the short-term, we believe reducing emissions from the current fleet should be a key focus, and in the MIAs view synthetic fuels like e-fuel are the most powerful initiative to decarbonise transport
- Discussion of ICE bans (either banning new, or possibly all by 2050) is premature if synthetic fuel can be produced at scale
- Reallocation of road space and the introduction of Low Emissions Zones or carbon taxes on fuel needs to consider the needs of the freight sector, which need suitable routes and for which there are few low-carbon alternatives. However, exempting ICE freight vehicles which use biofuels would help encourage the uptake of biofuels
- More consideration should be given to the role that e-motorcycles/scooters can play in changing the way people travel and to reducing transport emissions
- A mandate for electric-only public transport buses should also include hydrogen buses, and hydrogen should also be included in the RUC exemption
- The MIA supports policies to accelerate the uptake of EVs, such as reviewing tax treatment

Theme 1: changing the way we travel

1. The reallocation of road space and traffic calming measures needs to be thoroughly researched and carefully designed. The majority of freight will continue to be delivered by road, and there needs to be efficient routes into cities that are suitable for commercial transport which don't bring them into conflict with vulnerable road users. These can be higher-speed routes (above 30km/h) that bypass heavily pedestrianised areas and thus maintain efficiency and reduce fuel wastage whilst trucks continue to run on fossil fuels until the fleet turns over to low-carbon propulsion. The reallocation of road space and introduction of traffic calming measures should be done in consultation with the freight industry to identify the most suitable routes for freight.
2. In terms of other travel options, as with the electrification of cars, globally there is also considerable investment into electrifying scooters and motorcycles. For commuting and urban mobility, e-scooters and e-motorcycles will increasingly become available to the New Zealand market and provide a low-emission alternative for urban mobility. Uptake of these modes could be incentivised through the provision of additional dedicated parking spaces for scooters and motorcycles or allocated parking for electric versions like there is for electric cars (along with ensuring electric vehicle charging stations in urban centres also cater for e-scooters and e-motorcycles).
3. The scale of opportunity from congestion pricing needs to be quantified as this will only apply in metropolitan cities, which already have well-developed public transport networks. Elsewhere in NZ, private motor vehicles will continue to dominate. How many people in metropolitan cities could realistically shift to public transport? Public transport tends to compete with shorter trips that can be undertaken by cycle, walking or scooters, whereas the car suits longer commutes where public transport is less efficient.
4. Increasing the carbon tax on fuels or introducing Low Emissions Zones runs the risk of merely raising the costs for individuals or businesses where they have no alternative. Whilst low or zero emissions light vehicles exist, not everyone can afford them and nor do the alternative modes suit everybody, especially those living some distance from city centres. But in the case of trucks, there are few low-carbon alternatives currently available. Such higher taxes may only help encourage people to shift when there are practical low-emissions alternatives.

Theme 2: improving our passenger vehicles

5. The discussion document states: "Broader challenges around the marketing and images associated with larger light vehicles in Aotearoa will need to be addressed in

some way". It should be noted that NZ vehicle distributors import vehicles based on derived demand. *They import what sells*. Importers will offer a range of new models, and some will be more popular with consumers than others. These models are then prioritised in future model orders. Compared to other markets, SUVs and utes are very popular in NZ, and consumers also have a preference for automatics over manual vehicles, larger diameter wheels which impacts fuel consumption, and prefer larger-engined models that are suitable for towing. This suggests that in order to change the profile of the fleet, there also needs to be the development of "demand-side" interventions to change consumer preferences.

6. The MIA supports the review of tax treatment to incentivise the uptake of EVs, such as through reviewing the rules around Fringe Benefit Tax (e.g. introducing a lower FBT for low-emissions vehicles), and more favourable depreciation rates for EVs in fleets that are equivalent to the depreciation rates for lower-cost ICE vehicles they replace.
7. The MIA agrees that the use of sustainable alternative fuels is important in the transition to zero emissions. In the short-term, reducing emissions from the current ICE fleet should be a key focus, and greater focus needs to be given to scoping and developing production of second-generation biofuels and synthetic fuels (including e-fuel) at scale, which could be funded from the hypothecation of the ETS levy on mineral fuel. "Drop in" biofuels and synthetic fuels offer the potential for ICE to reduce or eliminate CO2 emissions. It is possible to make petrol, diesel, aviation fuel and marine diesel from e-fuels.
8. Discussion of ICE bans (either new or all ICE) is premature if synthetic fuel can be produced at scale. The solutions to reducing transport emissions should be technology-agnostic. Any future ban on the use of ICE would reduce choice and may not be practical for all modes (such as long-haul freight and off-road machinery). The objective is to reduce emissions, and the policy focus should be on reducing or eliminating the use of hydrocarbon fuels rather than the technology that provides motive power.
9. The mandate for local government to procure only electric buses by 2025 should be technology-agnostic and should also include hydrogen buses (along with providing hydrogen buses the same RUC exemption as electric buses).
10. The potential for behaviour change from graduated vehicle licence fees based on emissions needs to be quantified, as only very large fees may prompt behaviour change (or just encourage non-compliance). High CO2-emissions vehicles consume more fuel so arguably the price of fuel would act as a better motivator than an annual licence fee. Any such scheme should also be linked to a scrappage scheme so that owners of high-emitting vehicles have the ability to trade to a lower emissions vehicle.

Theme 3: supporting a more efficient freight system

11. We're pleased to see the recognition of the role that biofuels and hydrogen can play to decarbonise heavy freight, especially long-haul trucks for which batteries are not

efficient due to payloads and recharge times (with hydrogen being more viable), and there needs to be a focus on developing production of these renewable fuels at scale.

12. If second-generation biofuels and synthetic fuels can be locally produced in sufficient quantity and at reasonable cost from renewable energy, something we have in plenty, this could offer great potential for the progressive reduction of CO₂ emissions from the existing heavy vehicle fleet due to being fully compatible with any ICE vehicle, whilst utilising the existing and proven refuelling infrastructure. In the MIAs view, synthetic fuels like e-fuel are the most powerful greenhouse gas reduction initiative for transport.
13. Hydrogen and battery equipment in heavy vehicles (where practical) add to the unladen weight, which will result in a productivity loss under New Zealand's current heavy vehicle weight and dimensions regulations. Even the latest Euro 6 emissions standards also add some extra weight to conventional heavy vehicles due to the extra technology. There needs to be consideration of reviewing the regulations, and also planning the maintenance of NZ's key freight routes (e.g. HPMV routes) so that they can be re-engineered to accommodate heavier freight vehicles with low-emissions technology.
14. Instead of considering RUC exemptions for low-emissions fuels like biofuels, it would be better to introduce subsidies on biofuels equivalent to the excise exemption on bioethanol, such that the cost of biodiesel or synthetic diesel is more cost-competitive with mineral diesel and thus economically viable for freight operators to switch. However, the MIA does support extending the current RUC exemption for electric trucks to include hydrogen-powered trucks.
15. Banning diesel trucks from a certain date, or from certain cities or zones may not be feasible if there are not electric or hydrogen alternatives widely available. But banning diesel trucks from certain cities or zones could be considered for trucks using mineral diesel – with an exemption for those that are using biodiesel or synthetic diesel above a certain ratio. As with our comments in Theme 2 above, it is premature to consider outright bans on ICE including diesel trucks if low-emissions biofuels or synthetic fuels are available.
16. A carbon intensity standard for transport fuels should target hydrocarbons and not carbon from renewable fuels. This could help support the uptake of renewable fuels, particularly biodiesel or e-fuel which can be substituted for diesel but which presently cost more than mineral diesel.
17. Regarding the introduction of Euro 6, it is important to recognise that the NZ new vehicle market is closely aligned with Australia. For heavy vehicles sold in NZ, these are complied to the Australian ADR standards, which currently only requires Euro 5. To impose Euro 6 in NZ ahead of Australia would make it virtually impossible to source heavy vehicles for NZ as these would need to be especially homologated for NZ which would be prohibitively expensive for the low sales volumes, and would likely result in marques withdrawing from the NZ market. In essence, Euro 6 cannot be adopted for the NZ market until Australia has set a date for its introduction.

Four potential pathways

18. Of the 4 potential pathways, the MIA favours “Pathway 2” which has more emphasis on improving the vehicle fleet including an emphasis on biofuels in the short to medium term. As noted above, the MIA believes biofuels – especially second generation biofuels along with synthetic fuels – are the most significant greenhouse gas reduction initiative for transport, particularly to reduce emissions from the existing ICE fleet, and so we consider this pathway has greater potential of meeting the objectives.

19. However, while we support the focus on renewable fuels, we note the discussion document suggests that the truck fleet will be running on a 10% biodiesel blend by 2023, and 16% by 2035. If this is referring to first generation biodiesel, then these blends exceed what current diesel engines are designed to run on (and what is permitted in the fuel specification regulations), and therefore are not supported by the manufacturer (and their use will void any warranty). This is why the MIA supports focus on developing scalable production of second-generation biofuels, and synthetic e-fuel, as these drop-in fuels are direct substitutes for mineral diesel and are compatible at 100%. But neither of these fuels are being produced in NZ yet. Raising first generation biodiesel blends above what engines are designed to run on is problematic and hence the focus needs to be on second-generation biofuels and synthetic fuels if we are to decarbonise the existing ICE fleet.

Hikina te Kohupara discussion document

If you want to provide feedback, submissions close 5pm on Friday 25 June. There is not feedback form so you need to send any submissions via email to transportemissions@transport.govt.nz or write to them.

Air Transport

It is disappointing that air travel does not form part of this discussion. It would be huge inequitable if Kiwis had to reduce their carbon emissions significantly to allow air leisure travel to continue unabated.

International Travel

The whole country has paid dearly for a corona virus that has been spread almost exclusively by air travel. The scientists tell us that another virus outbreak is only a matter of time. Quite unrelated to the question of emissions it would be disappointing if the government did not consider the implementation of a levy on international travel that would form the basis of a fund to pay for New Zealand's economic response to the next virus outbreak. Such a levy, if set at a meaningful level, is likely to discourage some travel and therefore reduce emissions.

While international emissions are a complex issue to solve, the government could certainly make some sort of position statement regarding these, that they should form part of carbon charging.

While international visitors are seen as adding tremendous wealth to our country the most recent GDP figures suggest that if Kiwis take local holidays rather than overseas ones then this provides significant revenue to replace that lost by a reduction in overseas visitors.

Domestic Air Travel

This is likely to be undertaken on the most regular basis by those who can afford to pay for it, such as corporate and wealthy travellers. While the current Air NZ scheme is laudable, that it is voluntary is not helpful. Neither are the plethora of airline air points schemes that encourage and enable customers to fly more.

The government should legislate that these schemes cannot operate to award air points for internal flights within NZ.

The government should also legislate that there is a compulsory carbon charge on all internal NZ flights. It might be that the impact of this charge is softened by the statement that this levy is to be applied to the development of low carbon options such as further electrifying the rail network.

Schemes to Facilitate Cheaper Travel

There are a plethora of schemes that enable people to travel more cheaply by air or car. In a climate challenged environment these are no longer appropriate.

Discount Petrol Schemes

I am referring to schemes run by the major supermarket groups, where for purchasing a certain amount, you receive a discount on your petrol purchase whether it is for your car, boat, or chainsaw. While those on low incomes may well benefit from such a scheme, they would benefit just as much from free or discounted future grocery purchases. As the Ministry of Transport has previously concluded, for most people the best economic outcome is for them not to own a car where there are other modes of transport available.

The government should legislate that such schemes are no longer legal.

Fly Buys.

It is a complete anathema that this scheme still exists. There is no sensible rationale for encouraging people to engage in such a climate unfriendly activity. There are a huge range of other options that could be the subject of this loyalty scheme. It is clearly a scheme that benefits the largest consumers who are likely to be the most affluent.

The government should legislate that this is no longer legal.

Car Raffles/Giveaways

In the climate challenged environment in which we live it can no longer be appropriate to have raffles, prizes, promotions etc where the prize is a fossil fuelled car.

I think of Lotto prizes and the plethora of raffles where a car is the prize. One that is particularly galling is that run by the State-owned broadcaster TV 1, where the programme Seven Sharp gave away a Skoda vehicle. In the same way that pub raffles cannot be for cigarettes, then any raffle, prize or promotion should only allow EV vehicles as prizes.

This is not a concept that has widespread impact on any of those affected, but it does send a very clear message that the times are changing.

Summary

While all of these subjects sit outside the scope of the current consultation, I believe that they form an important background to the environment in which we live. I am a strong reader of mainstream news outlets and unfortunately, I have come to the same view that the British Prime Minister has come to, that the government's response to climate change has been severely lacking. I am generally a supporter of this government and so I am hugely disappointed that this is so.

It seems that many low level, low impact changes may start to engage the hearts and minds of Kiwis that there is a huge climate change problem, and that yesterday was the time to start responding to it.

Auckland Council / Auckland Transport

As an Aucklander I am embarrassed by the defeatist attitude of these organisations to reducing emissions and car mode share. The recent comments of the Mayor indicating that any reduction in emissions will be dependent on central government action ignores the reality of what is achievable.

Examples abound in Europe where cities have embraced SUMPs. Vienna that has already achieved a 26% car mode share still believes that they can reduce this by 1% a year until 2025 when targets are reviewed.

The C40 Cities organisation has mapped out a process for change.

AT is sitting on their hands trying to make change, one street at a time it seems. Their construction of bike lanes and bus lanes is appallingly low; and they still have plans to downgrade existing bus lanes to transit lanes.

Just last year they completed building a 400 space parking building. It is an organisation pandering to interest group politics and not climate reality.

It is an organisation devoid of any ideas, and most particularly courage to achieve change.

Symbolic gestures such as free weekend travel, non-discretionary, is doing nothing to effect substantive change.

AT operates the cheapest parking in the city (\$2 per hour at times) which is a significant barrier to decreasing car mode share. Conversely it has the third highest public transport annual pass in the world. It should be incentivising people who want to travel all day/every day on public transport to do so. Vienna, a city with a population only slightly larger than Auckland, has 800k annual transport pass holders.

The AT budget still shows significant amounts of capital expenditure devoted to roads and road renewal. There should be an appreciation that car trips should never be at a greater level than they are today and therefore the need for more roads should not be necessary. Auckland must find its way out of the current congestion using public transport and active mode share.

I have to say that while the actions of the government have been disappointing the actions of Auckland Council and AT have been nothing short of diabolical. That these organisations should still be building major car park buildings (Toka Puia), and while they are considering selling the Downtown car park be considering retaining 30% of the car parks shows that they just have no comprehension. I could give numerous other examples, but the fact that they have been unable to lower car mode share suggests that the second organisation is probably not fit for purpose.

Most importantly the targets of AT to achieve emissions reductions are not in line with NZ's need to reduce emissions. Government should go back to AT and tell them that they further need to change current plans to reduce emissions.

AT need to make the hard decisions: to introduce a congestion free zone in the city where public transport is very good (and not to allow it to be compromised as London has by allowing taxis and ubers); to introduce congestion charging; to universally increase parking charges every year as they do public transport fares (perhaps a legislative requirement would help); to charge for parking when they reasonably should, such as evenings and weekends (as they charge for public transport at these times); to divert budget spending from roads to active mode share; to utilise the extra revenue to introduce realistically priced monthly and annual passes so that people who have a commitment to this mode share are rewarded for that decision.

Waka Kotahi

We need to abandon our obsession with shovel ready projects. NZ needs power stations and not roads. If we need to have 70% more power to run boilers and EVs then let's build that capability now and not increase our emissions from Huntly coal.

This must be the blueprint. "Welsh government puts a stop on road building projects."

We do not have a lifelong commitment to the road industry to keep people employed building roads. Arguably we need to be building railways such is likely to be the amount that NZ and the world are required to reduce emissions. The reality is that not every fossil fuelled car will be replaced by an EV so alternative forms of transport will be essential. The preferred means of transport Auckland to Hamilton may well become the train just as Italy has achieved on many of its inter city routes.

Auckland Harbour Crossing

There should never be more vehicle lanes across the harbour. The modelling done by WK shows that this will induce demand and it is therefore completely unacceptable.

The current active mode bridge should have two light metro lines added to it. WK should construct this public transport access ahead of demand as all the projections for emissions reductions suggest that NZ may have to upgrade these plans quickly and this infrastructure needs to be available.

The Road Transport Industry

The industry must be required to change so that more freight is carried by rail.

National Road Tolling

Italy has achieved significant mode share change by the tolling of its autostrada network. There seems little reason why NZ can not adopt such a scheme. At its heart is equity. The people who use the roads pay for them, and those who use them the most pay the most. Generally, it is the most affluent who travel the most, so they are more able to pay the true cost.

Commented [JW1]:

Such an arrangement has an added benefit in that international travellers will pay towards the costs of the roads they use.

The Feebate Scheme

It is laughable that small fossil fuelled cars will be cheaper. These cars will be in the fleet in 20 years' time and will be part of the problem.

The Norwegian pricing model should be the blueprint. For fossil fuelled vehicles there should be a minimum fee, or a percentage whatever is the higher. Who really cares if a further 10% levy is placed on a Porsche Cayenne, or Lamborghini? (Mike Hosking excepted)

It appears doubtful that the feebate part of the scheme will achieve anything and there should be an examination of whether the revenue collected should be applied to other ways to reduce vehicle carbon emissions.

Legislation

Parking Space Levies

Sydney has made tremendous strides in changing mode share around the central city. A large part of that is the high pricing for inner city parking with daily rates appearing to start at \$60 per day. I understand that this has been achieved largely because of the levy charged on building new car parks.

Parking Charges

AT has an extreme reluctance to enforce its Parking Strategy evidenced by the construction of the Toka Puia car park building. This was in direct contravention of most provisions of that strategy. Councils should be required to enshrine these strategies in law so that they can be enforced by whomever chooses to do so.

Much of the parking that is provided at no cost to the user is done so for discretionary activities. For example, parking at beach suburbs on Sundays. This free parking often means that people prefer to drive instead of using other modes. Government should legislate that Councils are required to price this parking (such as at Council leisure facilities, beaches). Very often this may simply result in a redistribution of pricing. A leisure centre may be able to reduce admission charges because of the parking revenue.

FBT should be on the table. It should be payable on company provided car parks. The provision of public transport by employers should be exempt from GST.

Conclusions:

Go Hard and Go Early

Recent emissions modelling suggests a significant chance of the world reaching 1.5 degrees of warming in the next few years. As scientists have said, NZs' plans are inadequate, and emissions must be decreased by more than current targets. There is considerable benefit in implementing small changes almost immediately – the ones that have a small impact. This will lessen the need for major change in years to come.

It is apparent that EVs are not the complete answer to reducing emissions and they certainly aren't while they are fuelled by Huntly coal.

More Ambitious Change

Many European cities have embarked on a SUMP (sustainable urban mobility plan) that has set the framework for transformative change. Maybe this is the magnitude of change that is needed to shift the way people move in our major cities.)

Whatever the mechanisms that are chosen it is apparent that the proposals to reduce vehicle emissions are woefully inadequate and every organisation involved in this area needs to do better.

Ministry of Transport

Via email: transportemissions@transport.govt.nz

Transport Emissions: Pathways to Net Zero by 2050 – Green Paper

Mercury welcomes and supports the Ministry of Transport's (MoT) initiative *Transport Emissions: Pathways to Net Zero by 2050 – Green Paper* ("Paper"). We are pleased to see there is a strong alignment with the advice the Climate Change Commission ("CCC") has provided to government on emissions budgets, in particular the recommendations around behavioural change, urban form, function and development, transport and energy.¹ The MoT's Paper provides important context around the nature and scope of the challenge New Zealand faces to decarbonise our transport emissions. It will be a useful input to the general debate around how to decarbonise the sector and a good point from which to build consensus around the need for change. We have set out our general feedback in this cover letter and have answered the MoT's specific consultation questions in the attached Appendix One. We would welcome the opportunity to discuss these points further with the MoT.

Education and leadership from government

Government should play a leading role in transport decarbonisation and be focussed on action. Government is in a unique position to model the behaviours required to enable New Zealand's transition to a low carbon economy. In addition to setting the strategic direction for climate change, it can help New Zealanders understand why and how we must contribute as individuals and businesses to lowering our emissions. The government's handling of the Covid-19 pandemic has shown how well-orchestrated and consistent communications can significantly influence behaviour. A similar approach should be adopted to tackle the "climate change emergency"² and to encourage people to change or adopt new behaviours around reducing/avoiding travel, using active modes, using public transport and/or low emissions transport including electric vehicles (EVs). An ongoing all-encompassing education programme should be backed up by government leading the field in its adoption of low carbon transport. For example, we strongly support government transport procurement processes giving priority to EVs and/or shared mobility alternatives. In this way, New Zealanders will start to see what the new normal should look like, as modelled by our elected representatives.

Co-ordinated, clear and transparent process for integrated transport planning and funding

Local and central government play complex and interrelated roles in planning, housing, urban development, transport policy and transport funding. All these different roles impact on transport sector emissions. In order to drive the magnitude and speed of change required to meet New Zealand's decarbonisation goals it is vital that government's response is coordinated across disciplines and central and local government with a clear process for planning and funding integrated transport networks in key urban areas. Spending should be prioritised using clear and transparent criteria towards lowest marginal cost abatement over short- and long-term horizons.

¹ Inaia tonu nei: A low emissions future for Aotearoa, (May 2021), recommendation 16 urban form, function and development, (pg 258), recommendation 17 transport (pg264) and recommendation 20 energy, (pg 286).

² Jacinda Ardern, Wednesday 2 December 2020, in Parliament

Co-ordination across central government and collaboration with stakeholders

Progressing decarbonisation of the transport sector requires the Ministry of Transport to work closely with other government agencies responsible for policy relating to urban form, function and development (Ministry for the Environment) and Energy (Ministry for Business Innovation and Employment). The Paper emphasises the importance of engaging stakeholders early and working collaboratively on solutions which can be deployed as quickly as possible. This alignment and coordination between government and the public was also recognised by the CCC as crucial to creating an environment where long lasting responses to climate change are possible.³ We support this approach and look forward to playing a role.

Electrification is necessary but not enough on its own

The electrification of transport is the primary lever for achieving decarbonisation however focusing on EV uptake in isolation would not be consistent with taking timely action towards a zero-carbon transport system. The Government should ensure that electrification is supported by other actions that recognise the importance of reducing the emissions of the internal combustion engine (ICE) vehicles that will remain in our fleet and shifting the collective mindset away from cars as the preferred method of transport. This will include support for reducing/avoiding travel, active modes, public transport and green transport fuels (biofuels, hydrogen-derived e-fuels and hydrogen).

National Energy Strategy and transport decarbonisation

Mercury strongly supports the development of a National Energy Strategy⁴ (NES) that ensures the energy system is ready to support New Zealand's decarbonisation imperative. The strategy should be informed, sequenced and holistic and provide guidance for businesses and agencies in their decision making as New Zealand transitions to a low carbon economy. Mercury recommends that transport decarbonisation forms a key part of the NES. This should integrate the use of green transport fuels (biofuels, hydrogen-derived e-fuels and hydrogen) and other complementary actions mentioned above, alongside the electrification of transport.

About Mercury

Our mission is Energy Freedom for all New Zealanders. This is about New Zealand being stronger economically and more sustainable through better use of homegrown, renewable energy.

We generate electricity from 100% renewable sources: hydro, geothermal and soon, wind.

As part of an on-going mission, Mercury has committed to [Kissing Oil Goodbye](#). Over the last few years, we've converted as much of our vehicle fleet to electric or plug-in hybrid as is practically possible (69% of Mercury's vehicle fleet is electrified, with the remainder being essentially Utes.) We're a proud member of [EV100](#), an initiative to help reduce carbon emissions and make electric transport the new normal by 2030. In 2018 we introduced [Evie](#), the poster-car for EVs, our bright yellow converted 1957 Ford Fairlane.

Our [Electric Revolution](#) has been supported by a number of campaigns and initiatives exposing [every-day Kiwis](#) to the joys of electric transport, whether it be an e-scooter, e-bike or EV.

Popular events such as "Big Boys' Toys" and the "Go Green Expo" provide us the opportunity to present electric transport to the masses, allowing hundreds of people try an e-bike or e-scooter for the first time.

Through our partnership with [Big Street Bikers](#), we support the delivery of public secure parking, charging and wayfinding docks (called "Locky Docks") for e-bike users.

Mercury owns and operates an [EV Subscription Service](#) aimed at making it easier for New Zealanders to get behind the wheel of an EV by eliminating up-front costs and the need to worry about managing insurance premiums, warrants of fitness, vehicle registration and maintenance.

³ Ibid "Inaia Tonu Nei" at Chapter 12 pages 224 – 236, recommendations 8, 9 and 10.

⁴ Ibid at page 16



We offer off-peak charging packages for plug-in vehicle owners, to get 20% off electricity usage between 9pm and 7am.

Please do not hesitate to contact me at [REDACTED] or Buddhika Rajapakse at buddhika.rajapakse@mercury.co.nz if you would like to discuss any matters raised in our submission.

Yours sincerely

Lucie Drummond
GM Sustainability



Appendix One: Consultation Questions

Consultation Question	Mercury Response
<p>1. Do you support the principles in Hikina te Kohupara? Are there any other considerations that should be reflected in the principles?</p>	<p>We support the proposed principles. In particular, we support as priorities:</p> <ul style="list-style-type: none"> • The focus on zero carbon transport. Credible zero carbon transport solutions exist today and are evolving; other sectors have fewer opportunities and may need to be more reliant on offsetting. • A strategic approach balancing short-term opportunism and long-term thinking, especially because there is no one way to zero carbon transport. • Co-ordinated action across solutions and the transport system overall. • A just transition.
<p>2. Is the government's role in reducing transport emissions clear? Are there other levers the government could use to reduce transport emissions?</p>	<p>Government should play a leading role in transport decarbonisation and be focussed on action. The government can demonstrate leadership through education and its own procurement to drive Avoid, Shift and Improve behaviours to accelerate transport decarbonisation.</p> <p>Government is in a unique position to model the behaviours required to enable New Zealand's transition to a low carbon economy. In addition to setting the strategic direction for climate change, it can help New Zealanders understand why and how we must contribute as individuals and businesses to lowering our emissions. The government's handling of the Covid-19 pandemic has shown how well-orchestrated and consistent communications can modify behaviours significantly. A similar approach should be adopted to tackle the "climate change emergency"⁵ and to encourage people to change or adopt new behaviours around reducing/avoiding travel, using active modes, using public transport and/or EVs. An ongoing all-encompassing education programme should be backed up by government leading the field in its adoption of low carbon transport. For example, we strongly support government transport procurement processes giving priority to EVs and/or shared mobility alternatives. In this way, New Zealanders will start to see what the new normal should look like, as modelled by our elected representatives.</p> <p>Local and central government play complex and interrelated roles in planning, housing, urban development, transport policy and transport funding. All these different roles impact on transport sector emissions. However, alignment of initiatives and funding is unclear and insufficient to drive the magnitude and speed of change required to meet New Zealand's decarbonisation goals.</p> <p>Whilst the Public Transport Operating Model (PTOM) that is currently under review may have facilitated adequate outcomes in the context of its original objectives, it is likely insufficient to support the transition to cleaner public transport that is required now. For example, it does not readily address how bus operators will be incentivised to upgrade to more costly electric fleets.</p> <p>Similarly, we agree that the National Land Transport Fund (NLTF) was designed to maintain "the essentials" of New Zealand's transport</p>

⁵ Jacinda Ardern, Wednesday 2 December 2020, in Parliament



	<p>system and that emissions reduction is a step change far beyond what it was ever intended to do. This must be rectified.</p> <p>Mercury supports better alignment across disciplines and across central and local government so that integrated planning can be progressed and backed up by the requisite funding and prioritisation of transport decarbonisation initiatives. Spending should be prioritised using clear and transparent criteria towards lowest marginal cost abatement over short- and long-term horizons.</p> <p>In terms of other levers the government could use to reduce transport emissions we would recommend the following:</p> <ol style="list-style-type: none"> a. Development of long-term regional spatial strategies under the Strategic Planning Act will provide a coherent integrated framework for transport and urban form and function in each region allowing for long-term optimisation of travel to facilitate decarbonisation. There are numerous co-benefits to making our cities and regions more functional and liveable. Government should focus on providing an integrated transport network that is better than the current alternative. I.e., it must be comparably attractive in terms of cost, comfort and convenience than a private car. b. Transport decarbonisation should form a key part of a NES. The electrification of transport is the primary lever for achieving decarbonisation however focusing on EV uptake in isolation would not be consistent with taking timely action towards a zero-carbon transport system. The Government should ensure that electrification is supported by other actions that recognise the importance of reducing the emissions of the ICE vehicles that will remain in our fleet and shifting the collective mindset away from cars as the preferred method of transport. This will include reducing/avoiding travel, active modes, public transport and green transport fuels (biofuels, hydrogen-derived e-fuels and hydrogen.).
<p>3. What more should Government do to encourage and support transport innovation that supports emission reductions?</p>	<p>We strongly support:</p> <ol style="list-style-type: none"> a. Government making sure regulation supports and encourages the uptake of positive innovations. Regulatory frameworks should not be inefficient barriers to uptake of new technologies and provision must be made to trial new initiatives. For example, autonomous vehicles may need to be trialled in “sandboxes” ahead of regulatory frameworks being altered to provide for them long-term. b. Encouraging collaboration and stronger connections between the government and non-government sectors, including leveraging the skills and expertise of the private sector. Government could do more to support innovation by partnering with the private sector to foster not just technological but also business model innovation. For example, the CCC recommended there may be benefits in fostering vehicle leasing options and new models of shared ownership of transport, such as by linking new housing builds to communal transport offerings. We would like to see the Government show leadership in this regard and adopt innovative ownership models for itself and its agencies. This



	<p>could be supported by procurement policies that give priority to organisations whose business model aligns with both decarbonisation and shifting mindsets about transport. As a non-traditional transport sector participant with an interest in supporting innovation in the government's transition to zero carbon transport, Mercury has found the processes and pathways to engage on such matters to be unclear. We will not be alone in this regard.</p> <p>c. Providing targeted funding and other support for developing, trialling and supporting new technology and approaches. For example, we support broadening the Low Emissions Vehicle Contestable Fund to become the Low Emissions Transport Fund with increased funding. The settings on targeted funding and support like these need to be carefully selected (e.g., funding too focussed on early stage research could come at the cost of scaling commercial business models and vice versa.)</p> <p>In parallel to working on improving and reforming existing regulations, government could do more to fast track low-carbon transport innovations within existing frameworks. This could involve making staff and resources available to assist innovators in navigating processes such as obtaining resource consents, permits and so on.</p>
<p>4. Do you think we have listed the most important actions the government could take to better integrate transport, land use and urban development to reduce transport emissions? Which of these possible actions do you think should be prioritised?</p>	<p>We agree on many of the important actions to consider, in particular:</p> <ul style="list-style-type: none"> • The need to integrate land-use, urban development and transport planning • Quality compact, mixed-use urban development • Orienting urban development towards compact urban form being pressing in our largest and fastest-growing cities where emissions are highest • Central and local government having to reconsider planned investments in major urban highway and road expansion projects if they would induce more vehicle travel. • Providing better travel options that are energy efficient and generate low or no emissions. This includes providing quality public transport services, safe and accessible walking and cycling networks, and shared mobility options such as car sharing and shared micro-mobility. • Streets being more inclusive of different people and to encourage travel by active modes and public transport. This includes applying multi-modal street layouts, lower speed limits, tactical street changes, and universal design principles. • Transport demand management, including transport pricing. <p>It is important to focus on options that can be delivered quickly and therefore reduce emissions in the short term given the size of the challenge. For example, a quick win could be street changes to support public transport and active travel.</p> <p>Funding should be unlocked to enable quick wins and spending overall should be prioritised towards lowest marginal cost abatement across short and long-term horizons. Prioritisation criteria should be clear and transparent.</p>
<p>5. Are there other travel options that</p>	<p>We commend the MoT for this comprehensive list of alternative travel options. It will be important to bring them all together into a compelling</p>



<p>should be considered to encourage people to use alternative modes of transport? If so, what?</p>	<p>alternative for transport users through education and a MaaS vision (e.g., integrated transport planning, journey planning apps, etc.)</p> <p>Public and private sector partnerships will be necessary as not all modes (e.g., shared mobility) and supporting infrastructure (e.g., secure bike parking facilities) will be deployed by the public sector.</p> <p>Public and private sector interaction will also foster greater innovation and attractiveness for individuals making transport choices around convenience, cost and comfort.</p> <p>Education will be key to the uptake of alternative modes of transport. The Government should campaign on the identified benefits of mode shifts for both health and environment. This is particularly necessary to bring around change in:</p> <ul style="list-style-type: none"> • Commonly held negative attitudes towards active modes (e.g. cycling) and public transport in New Zealand; and • The fixed mindset that car ownership is a necessity; and • Reluctance to consider shared mobility as a long-term transport solution; and • Willingness to reduce or avoid travel (e.g., working from home.)
<p>6. Pricing is sometimes viewed as being controversial. However, international literature and experiences demonstrate it can play a role in changing behaviour. Do you have any views on the role demand management, and more specifically pricing, could play to help Aotearoa reach net zero by 2050?</p>	<p>Pricing is an important tool to consider along with others bearing in mind that it can be punitive and therefore equitable transition considerations will need to be factored in.</p> <p>It is important that viable alternatives to private car use through public transport and active modes are in place. Any pricing initiatives should be developed in close consultation with the relevant local authorities with such alternatives funded and built.</p> <p>Any pricing initiatives should be assessed for their costs and benefits along with efficiency considerations. For example, any pricing needs to be set high enough to ration whatever is being priced and defer investment in costly infrastructure through meaningfully reduced/modified consumption.</p>
<p>7. Improving our fleet and moving towards electric vehicles and the use of sustainable alternative fuels will be important for our transition. Are there other possible actions that could help Aotearoa transition its light and heavy fleets more quickly, and which actions should be prioritised?</p>	<p>We support investigation and implementation of:</p> <ul style="list-style-type: none"> • A vehicle emissions standard and the recent feebate initiative; • An ICE phaseout that allows for a timely yet prompt transition to EVs and/or public transport/active substitutes. A phaseout with ban on the import of ICE vehicles in the early 2030s would send a strong signal to manufacturers about the future supply requirements of our fleet. It would also remove the risk that New Zealand becomes a dumping ground for ICE vehicles when other countries with right hand drive vehicles have implemented a ban; • Taxation (review of incentives/disincentives); • Innovative distance-based Road User Charges (RUC) that fairly contribute to funding the land transport system, including all EV owners. Any such RUCs however would need to be phased in appropriately to avoid deterring uptake; • Government demonstrating leadership in its procurement



	<p>mandate to support electric vehicles. This could include exploration of innovative leasing and shared mobility models.</p> <ul style="list-style-type: none"> Standards for public and private EV charging infrastructure to support the uptake of low emission vehicles. This should consider minimum requirements for charging capability at housing and commercial developments. <p>The above considerations need to be applied to both light and heavy vehicle fleets. As electrification becomes more viable for heavy transport through technological advancement, it is important that timely uptake is not deterred.</p> <p>Given the potential for slow turnover of fleets and/or supply/cost/technological barriers to direct electrification or hydrogen fuel cells, the Government should support the exploration of both biofuels and e-fuels (green hydrogen-derived synthetic fuels) as part of the NES. Biofuels and e-fuels will both have roles to play in transport decarbonisation, especially since the production of the latter may offer a stepping-stone towards the direct use of green hydrogen in transportation and the wider economy.</p>
<p>8. Do you support these possible actions to decarbonise the public transport fleet? Do you think we should consider any other actions?</p>	<p>We support the MoT's possible key actions to decarbonise the public transport fleet. It will be crucial to supply public transport (including viable "last mile" solutions) so that people have alternatives to private vehicle travel. Commuters will continue to use private vehicles until they have useable alternatives that are cost effective and convenient.</p> <p>Given our earlier comments in relation to the insufficiency of the PTOM to support the transition to cleaner public transport, we would like to see the MoT address this issue with urgency. Maintaining fast, efficient and accessible services should be prioritised alongside electrification.</p> <p>We would support investigating changes to the usual procurement and ownership arrangements for zero-emission buses, depots and supporting infrastructure. This could be an opportunity for non-traditional transport industry participants to contribute beneficially.</p>
<p>9. Do you support the possible actions to reduce domestic aviation emissions? Do you think there are other actions we should consider?</p>	<p>We support the possible actions, but as per our response to Q7, we believe that both biofuels and hydrogen-derived e-fuels could have roles to play in aviation decarbonisation, especially since the production of the latter may offer a stepping-stone towards the more direct use of green hydrogen for future generations of aircraft.</p> <p>Given New Zealand's wealth of renewable energy resources, we should also consider how low carbon international aviation operating to/from New Zealand will be fuelled over the coming decades. Can they be fuelled primarily through domestic sources of fuel, or will we be reliant on imports as is currently the case?</p>
<p>10. The freight supply chain is important to our domestic and international trade. Do you have any views on the feasibility of the possible actions in Aotearoa and which should be prioritised?</p>	<p>We agree that it will be important to invest in rail and coastal shipping and to decarbonise fuel sources. The government should form a view on how the decarbonisation of freight routes will contribute to emissions reduction and use this evidence to target the actions that bring greatest reductions at least cost. We support the government's current work on a National Supply Chain Strategy and making improvements to rail and coastal shipping. As the MoT has noted, these initiatives should be carried out in close consultation with the private sector in order to drive rapid emissions improvements.</p>
<p>11. Decarbonising our freight modes</p>	<p>See our comments for Q7 and Q10. Road freight will be crucial for</p>



<p>and fuels will be essential for our net zero future. Are there any actions you consider we have not included in the key actions for freight modes and fuels?</p>	<p>years to come so a focus on decarbonising transport fuels is crucial. Electrification, biofuels, hydrogen-derived e-fuels and hydrogen could all play a role in the transition.</p>
<p>12. A Just Transition for all of Aotearoa will be important as we transition to net zero Are there other impacts that we have not identified?</p>	<p>We agree with the impacts identified by the Paper and that eventually the shift from ICE vehicles to EVs will lead to lower and more stable transport costs for most households and communities, including low income groups. The CCC identified that households which replace an ICE car with an EV could save more than \$1,300 p.a in 2035.⁶</p> <p>Mercury endorses government support for improving the affordability of EVs. Feebates will reduce the upfront cost barrier EV purchasers face, whilst innovative leasing, hire and sharing schemes should also play an important role in ensuring equitable access to EVs.</p>
<p>13. Given the four potential pathways identified in Hikina te Kohupara, each of which require many levers and policies to be achieved, which pathway do you think Aotearoa should follow to reduce transport emissions?</p>	<p>The policies adopted need to be flexible enough to cover all pathways. It is crucial to start with the lowest cost abatement measures.</p>
<p>14. Do you have any views on the policies that we propose should be considered for the first emissions budget?</p>	<p>The suggested measures represent a very large body of work and so it is vital that the government prioritises activity towards the most significant abatement outcomes over short- and long-term horizons.</p> <p>As we have stated previously, the government must begin by demonstrating its own commitment to transport decarbonisation. For example, the government can show such leadership through an ongoing all-encompassing public education programme as well as leading the field in its procurement of low carbon transport.</p> <p>We also believe that there are key pieces of work that will enable and accelerate other initiatives. For example, addressing limitations in the PTOM would accelerate decarbonising buses and help keep our cities moving. Increased funding for the NLTF will also be necessary to unlock these and other initiatives.</p> <p>Priority should be given to initiatives that improve alignment between central and local government. Some initiatives could be combined with others to provide even greater efficiencies.</p> <p>One way to advance such an integrated transport decarbonisation approach could be to include transport as part of the NES.</p> <p>In summary, some of the activities that Mercury would support as priorities include:</p> <ul style="list-style-type: none"> • NES; • Government procurement; • Urban Growth Partnerships / spatial planning reform; • RMA reforms; • NPS on Urban Development / GPS on Housing and Urban Development;

⁶ Ibid, “Inaia tonu nei” at pg 170



	<ul style="list-style-type: none">• GPS on land transport / Crown investment in public transport, walking and cycling (especially linking funding to emissions reductions);• Accessible Streets / Reshaping Streets / One Network Framework / Aotearoa Urban Street Guide;• ATAP;• Keep Cities Moving;• LGWM;• Decarbonising buses;• Review of the Public Transport Operating Model;• LEVCF (now LETF);• EV Charging infrastructure review;• Green fuels mandate (Not just biofuels, but also hydrogen-derived e-fuels and hydrogen);• National supply chain strategy.
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SUBMISSION:

HĪKINA TE KOHUPARA

Engineering New Zealand (formerly IPENZ) is New Zealand’s professional home for engineers. We are New Zealand’s strongest and most influential voice on engineering issues, with more than 20,000 members who want to help shape the public policy agenda and engineer better lives for New Zealanders.

Thank you for the opportunity to provide comment on the Ministry of Transport (MOT)’s *Hīkina te Kohupara – Kia mauri ora ai te iwi, Transport Emissions: Pathways to Net Zero by 2050* (Hīkina te Kohupara).

Engineering New Zealand supports the [Climate Change Response \(Zero Carbon\) Bill 2019](#) and the inclusion of climate change as a strategic priority in the Government Policy Statement – Land Transport 2021 (GPS – LT). As noted in our submission on the [GPS – LT](#), we are particularly supportive of the focus on better travel options, including mass transport, and the inclusion of rail. We also commended the focus on wellbeing, enhancing the liveability of spaces, and the use of best practice evidence-based decision making on road safety.

These points are reflected in this submission. Our submission is high-level and reinforces what we hear from our members. MOT has provided a series of questions for submitters to respond to. This submission will not address each of these questions, instead we have focused on a few key questions and the overall direction of Hīkina te Kohupara.

WE SUPPORT HĪKINA TE KOHUPARA

We support Hīkina te Kohupara’s overall system-wide approach to reducing transport emissions. In particular, we support the inclusion of mode-shift, shared mobility, mass-transit, and rail as solutions to ‘avoid’ and ‘shift’ transport emissions. These measures also offer significant co-benefits towards improving well-being and liveability of spaces. Additionally, we support the use of best practice evidence-based decision making in selecting pathways.

WE SUPPORT THE PRINCIPLES IN HĪKINA TE KOHUPARA

Q1: Do you support the principles in Hīkina te Kohupara? Are there any other considerations that should be reflected in the principles?

MOT’s document lists the following principles:

- Principle 1: The transport sector will play a lead role in meeting our 2050 net zero carbon target
- Principle 2: We need to focus on moving to a zero carbon transport system, rather than offsetting emissions
- Principle 3: We need to take a strategic approach to reducing transport emissions
- Principle 4: Co-ordinated action is required across the transport system to avoid and reduce emissions
- Principle 5: To ensure a Just Transition we need to manage the impacts and maximise the opportunities brought about by changes to the transport system
- Principle 6: We need to forge a path to zero transport emissions by 2050, while recognising that there is not one way to get there
- Principle 7: Innovation and technologies will play an important role in reducing emissions, but people are the key to our future

We support the above principles and have the following recommendations and comments.

Principle 1

The need to reduce transport emissions goes beyond our requirement to meet targets and commitments. We must minimise our impacts on the climate. It is our view that this should be reflected in principle 1. New Zealand's per capita transport emissions are the fifth highest in the OECD, and we need to make significant changes in this area. We therefore recommend principle 1 be amended to read “the transport sector will play a lead role in meeting our 2050 net zero carbon target and *minimising our impact on the climate*”.

Principle 2

We recommend principle 2 be strengthened to include adaptation. This ensures our strategic priority to mitigate emissions aligns with our need to adapt to our changing climate. We therefore recommend principle 2 be amended to read “we need to focus on moving to a zero carbon transport system, rather than offsetting emissions, and *we need to ensure this transport system appropriately adapts to our changing climate*”. We do not want our endeavours to minimise transport emissions to result in maladaptation.

Principles 4-7

Principle 4 outlines our need to coordinate action. It is our view that this principle should be strengthened to recognise the role of Government in leading coordinated action, whether that is action to ensure a Just Transition (principle 5) or to enable innovation and technology (principle 7). While we agree there are many paths to carbon neutrality (principle 6), leadership is needed to navigate the path ahead. Government leadership is needed to actively seek out and prioritise solutions that benefit communities already experiencing social and economic disadvantage. This approach is more effective than mitigating the negative impacts of solutions that do not centre the needs of these communities. To this end, we are pleased to see the inclusion of universal design principles in the document as a practical example. The Government is best positioned to coordinate the structural and system level changes that facilitate equity, innovation, technology and behavioural change. We therefore recommend principle 4 read “Co-ordinated action is required across the transport system to avoid and reduce emissions. *This coordination will be led by the Government.*”

WE SUPPORT THE GOVERNMENT'S ROLE IN REDUCING TRANSPORT EMISSIONS

Q2: Is the Government's role in reducing transport emissions clear? Are there other levers the Government could use to reduce transport emissions?

As above, it is our view that the Government's role can be more explicitly stated in the priorities outlined. We support the Government's role in clearly prioritising the structure and system-level solutions that enable technology and behaviour change. We support the inclusion of the overlapping levers in the land-use and urban development sectors, and their potential to enable increased mode-shift and mass-transit.

Wherever possible we encourage clarity on roles and responsibilities, particularly where there is significant overlap between sectors and ministries (for example land planning, urban development).

Q3: What more should Government do to encourage and support transport innovation that supports emissions reductions?

Government policy, legislation and investment influences innovation. An example of this in the transport space is the unintended consequences of focusing on mitigating congestion (an explicit goal in the Resource Management Act and associated Integrated Transport Assessments). This has a perverse outcome whereby streets associated with new development are built with excess capacity in an attempt to mitigate congestion.¹ By expanding capacity for cars, the impact is inevitably more traffic, and usually therefore, more congestion.

We recommend a shift away from a congestion reduction model in the goals and language of the transport system to 'reducing unnecessary traffic in communities'. Likewise, resource management outcomes should promote reducing traffic, rather than mitigating congestion.

WE SUPPORT THEME 1: CHANGING THE WAY WE TRAVEL

Q4: Do you think we have listed the most important actions the Government could take to better integrate transport, land use and urban development to reduce transport emissions? Which of these possible actions do you think should be prioritised?

We strongly support theme 1: changing the way we travel. In particular, we welcome the focus on integrating land-use, urban development and transport planning. We also commend the inclusion of quality compact, mixed-use urban development and universal design principles. Ongoing development can be used to transform our streets to make walking and cycling easier, thereby improving access to public transport, and improving the efficiency of *all* transport modes (including necessary car travel) through the reduction in unnecessary trips.

As noted in our submission on the GPS – LT 2021, we support the acceleration of transportation mode-shift and would like to see bold methods for achieving this. We agree local government, business and

¹ Thorwaldson, L. (2020, March 11). *LoS-LESS PLANNING: VKT for EQUITABLE OUTCOMES* [Paper]. Transportation Conference: Equity in Transportation, Christchurch Town Hall. <https://az659834.vo.msecnd.net/eventsairaeuprod/production-hardening-public/1ac44a82e0404be58a1c2c4eb9e78c9b>

Thorwaldson, L. (2020, March 11). *LoS-LESS PLANNING: VKT for EQUITABLE OUTCOMES* [Presentation]. Transportation Conference: Equity in Transportation, Christchurch Town Hall. <https://az659834.vo.msecnd.net/eventsairaeuprod/production-hardening-public/8cc0018e551f4ea3bc001538654ce9e0>

communities will all need to play a part, but that Government should take a strong lead using regulatory tools and investment to influence travel demand and transport choices. From our GPS – LT submission:

“We support the Government’s focus on positioning public transport, walking and cycling as attractive transport options. To that end we support, in principle, the raising of revenue from fuel excise duty and equivalent road user charges to appropriately reflect to the true cost of road use and to drive urban change. To effectively achieve good outcomes for all New Zealanders, we consider the use of smart road pricing must be balanced by the availability of alternative transport options.”

We are encouraged by the future-focused and pre-emptive nature of this theme, demonstrated in the focus on the largest and fastest-growing cities alongside the inclusion of smaller cities and towns as areas of potential growth.

WE STRONGLY SUPPORT PATHWAYS ONE AND FOUR

Q13: Given the four potential pathways identified in Hīkina te Kohupara, each of which require many levers and policies to be achieved, which pathway to you think Aotearoa should follow to reduce transport emissions?

In Hīkina te Kohupara, MOT notes that:

“The pathways with more emphasis on ‘avoid’ and ‘shift’, such as Pathway 1 and 4 are more effective at reducing emissions. Avoiding activities that produce emissions is, on balance, a more effective strategy than minimizing the emissions from those activities.”

We strongly support this statement and the prioritisation of best practice evidence-based decision making. Traffic, road, and civil engineers and traffic planners need to be given objectives and allowed to propose the best way forward together without the politicisation of transport projects.

We support the use of the ‘avoid’, ‘shift’, and ‘improve’ framework. We need to make it a priority to reduce the need to travel through system efficiency (avoid) and expansion and maintenance of environmental options for trip efficiency (shift). ‘Avoid’ and ‘shift’ initiatives support a holistic, proactive and future-focused approach to climate change mitigation and adaptation. This approach, using the structural and system-based levers at the Government’s disposal, will enable the scale of change required.

CONCLUSION

As outlined in this submission, we support the direction the Ministry of Transport has set through *Hīkina te Kohupara – Kia mauri ora ai te iwi Transport Emissions: Pathways to Net Zero by 2050*. We support the principles, themes and pathways outlined in Hīkina te Kohupara, particularly theme 1 and pathways 1 and 4 that prioritise avoid and shift mechanisms and take a holistic and proactive approach to reducing transport transmissions. Alongside reducing emissions, theme 1 (changing the way we travel), has significant potential co-benefits for wellbeing and liveability, and through increased social cohesion and resilience can form an important part of climate change adaptation.

We look forward to the work of the Ministry of Transport, and other agencies, to reducing emissions. Engineers are at the forefront of the work needed to drive change and innovation in New Zealand’s transport sector. As such, we would value the opportunity to be involved in the ongoing conversation. If we can be of additional support, please do not hesitate to be in contact.

HSD

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GREEN CITY DEALS

A study on the global warming potential of
alternative urban transportation systems

**Jörg Niemann, Julian Bruckmann
and Florian Krautzer**



Green City Deals –

A study on the global warming potential of alternative urban transportation systems

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Abstract: *The population is growing constantly in urban areas. This results in an increasing demand for mobility solutions while it is also worldwide aimed to reduce greenhouse gas emissions. This paper summarizes the results of a comparative study concerning the greenhouse gas emissions (based on carbon footprint) caused by alternative urban passenger transportation systems. The emissions for the vehicles and their infrastructure are analyzed over the entire life cycle from manufacturing up to their end of life. An existing cable car system in La Paz, Bolivia was analysed and evaluated in comparison to other modes of transportation such as small busses, large busses and a tram. According to the system definitions and the considered balance framework the study shows that beside the use of the systems the materials and the manufacturing as well as the infrastructure have a significant impact on the total emissions over the life cycle. To put focus on the „true and real“ impacts to the society it is preferable to consider the measurement results in total absolute emissions.*

Keywords: Carbon footprint, life cycle, urban mobility, cable car, bus, tram, transport planning, city planning

1. Introduction

July 29th, 2019 - Earth Overshoot Day "With Earth Overshoot Day occurring ever earlier in the year, and big part of it being the growing amounts of CO₂ emissions, the importance of decisive action is becoming ever more evident. For this reason, we are working with all parties to find effective approaches." [1]

The „Earth Overshoot Day“ describes the point in a year when the natural resources available to mankind as an annual budget on earth are used up. This deficit is caused by the depletion of ecological resources and by waste, mainly carbon dioxide (CO₂). [2] Since 1970, earth overload day has moved five months forward from the end of December to July. According to this, we are currently “over-exploiting” our natural resources to such an extent that the ecosystems can no longer sustainably regenerate. [3]

The need to act is obvious. Climate protection is given top priority in the global climate agreements, such as the Paris Climate Agreement and the climate agreement of the European Union. The main focus is on a reduction of harmful carbon dioxide emissions (CO₂ emissions) as one of the most important greenhouse gas emissions. [4]

The use of clean technologies is crucial here. In this context, the EU has defined the energy and transport sectors as central fields of action. [5] The transport sector is a major contributor to global greenhouse gas emissions due to the burning of fossil fuels. Transport emissions — which primarily involve road, rail, air and marine transportation — accounted 2016 for over 24% of global CO₂ emissions. A growing world population simultaneously leads to an increased need for mobility and growing traffic volume. [6,7]

2. Goal, scope and research methodology

2.1 Goal of the study

The present study compares the global warming potential (GWP) of different passenger transport systems in urban areas. Using the cable car installation in La Paz, Bolivia as a reference, the greenhouse gas emissions for three alternative transport systems, a large bus, a small bus and a fictitious tram line, were determined under the primacy of the same transport and operating times between two defined transport hubs. The GWP of the different systems over their entire life cycle is to be recorded and analyzed in order to determine not only the actual time of usage but also to take into account e.g. the phases of system creation, construction and disposal in the evaluation.

In the study, a standardized balance sheet framework with key figures was defined in which the considered systems were examined and compared. Furthermore, according to literature research a staged life cycle model (according to DIN EN 14040/14044) was applied for a detailed analysis. [8,9]

2.2 Scope of the study

In accordance with relevant standards a reference scenario had to be created that was used as a basis for the comparison of all alternative options. [8,9,,10,11]

2.2.1 Life Cycle Stages

To compare the passenger transport systems, all phases of the life cycle need to be considered to include emissions generated before and after operation. Therefore,

based on literature, the balance framework comprises the five phases: Material phase, production phase, distribution phase including assembly, operating phase including maintenance and end of life phase. [10,11,12] Without a functioning infrastructure the systems are unable to operate. Therefore, the provision of this infrastructure is also included in this assessment. The individual life cycle phases include the following services and functions:

- Material phase: The delivery of the materials, including, if available, the pre-processing steps of the suppliers as well as the transport from the supplier to the manufacturer's production facility
- Production phase: The auxiliary materials that are required for production and the energy expenditure, from factory gate to factory gate.
- Distribution phase including assembly: The transport emissions from the manufacturer's factory gate to the place of use, including installation and assembly emissions.
- Operating phase including maintenance: the amount of energy required for operation including maintenance.
- End of life phase: decommissioning of the plant and the associated transports and treatments (differentiation between landfills, incineration and recycling)

2.2.2 Definition of the functional unit

ISO 14040 and ISO 14044 (2006) define the functional unit is a "quantified description for the performance of a product system for use as a reference unit." [8,9] Essentially it specifies the function to which all results are referenced. VDMA 34160 states that the defined "load spectrum" are the "minimum requirements to be met [...] Added value due to exceeded minimum requirements, e.g. higher availability, is disregarded." [11] This is especially important when attempting to place results into context.

The definition of the balance frame limits for the comparative investigation of different urban transport systems was based on a specific scenario of a cable car-based passenger transport system in the city of La Paz, Bolivia.

Therefore, the functional unit is defined in this study as "The transport of 3,000 passengers per hour from station 16 de Julio to Estación Central in La Paz, Bolivia, over a total service period of 30 years, operating for 6,049 hours per year. "

The system technology used there, as well as the required system performance and topography should serve as a basis/benchmark for the comparison with alternative urban transport solutions.

2.2.3 Transportation scenarios and reference flow

Based on the definition of the functional unit, the following scenarios result for the alternative transport systems bus and tram for the required 3,000 passengers per hour and per direction of travel over the desired service life of 30 years.

The reference flow for the cable car comprises the provision and operation of the stations, the track between the stations and 109 cabins operating simultaneously over a period of 30 years. [13]

Since these two passenger transport systems cannot transport passengers above ground with the cable car line, they have to cover a distance of 12,4 km to reach the same stations as the cable car system. To transport the same number of passengers within one hour, in total 175 large buses or 753 small buses or 75 trams would be required at an average speed of 41,3 km / h. [14]

The reference flow for the buses includes the provision and operation of the infrastructure, covering the depots and the road between the stations (just the share of the busses). The reference flow for the tram is the provision and operation of the infrastructure, covering the depots, the stations and the track between the stations.

Using existing databases and values from literature, emissions generated by passenger transport have to be calculated for all life cycle stages. As measured variables the units tCO₂eq and gCO₂eq/p_ckm (CO₂eq = CO₂ equivalent, p_ckm = passenger capacity kilometers) were defined. For the presentation of results in gCO₂eq/p_ckm, total emissions are divided by passenger capacity kilometers (p_ckm). Comparisons in the transport sector are usually made in passenger kilometers (pkm). Passenger kilometers are calculated by multiplying the number of passengers carried by the distance travelled in kilometers. [15]

2.2.4 Research methodology and data integration

The research results presented below are based on the combination of various data sources from literature and practice. The material and consumption data found were then converted in a second step in order to determine the respective global warming potential via the database ecoinvent. [16] The calculation is based on the system model APOS (Allocation at the point of substitution). APOS is an allocation approach that uses expansion of product systems to avoid allocating within treatment systems.

The basic data for the evaluation of the cable car were made available by Doppelmayr Seilbahnen GmbH. The primary data provided covers all life cycle phases for both the vehicles and the infrastructure for the cable car. [13]

For the bus and tram, primary data were extracted from literature and combined with assumptions to build appropriate models for the case study, with reference to the functional unit. The distribution of the vehicles to the place of operation and the needed number of busses has been calculated according to the scenario in La Paz and extrapolated over the considered service period of 30 years. The emissions of the busses in the usage phase were extracted from literature according to the defined functional unit and reference flow. [17] These factors include the fuel used for operation as well as estimates for maintenance, repair, and tire wear in a public transport scenario. [18]

For the tram, the average electricity consumption per vehicle km was extracted from literature. [19] The consumption has been scaled linearly to the total vehicle km service and multiplied by the country specific emission factor for Bolivia to place the results into the correct geographical context. A list of foreground data can be found in the annex.

3. Research results

3.1 Overall emissions of compared passenger transport systems

In the research study two different scenarios have been modeled: On the one hand a (fictious) scenario assuming a permanent utilization of 100% of all vehicles. In the second scenario the (actual) utilization of 69% of the La Paz business case has been applied.

3.1.1 Carbon footprint of the 100% utilization scenario

The emissions in tCO₂eq of the passenger transport systems over the life cycle are shown in figure 1 below. In addition to the total emissions over the entire life cycle, the graphic also shows a breakdown of the emissions related to the vehicle and infrastructure system components. In the box above the respective bar there is also a breakdown of the emissions related to the life cycle phase use and the remaining phases (as a total). The operating phase including maintenance takes up the largest share of life cycle phases for all four passenger transport systems. The large and small bus with 388.987 tCO₂eq and 348.142 tCO₂eq and the tram with 272.004 tCO₂eq have a much larger share than the cable car with 64.974 tCO₂eq. [12]

But the provision and maintenance of the infrastructure also generates a large proportion of emissions. The infrastructure for the busses includes the the proportional

allocation of the emissions for the maintenance of the road induced by the bus operation and for the construction and operation of the bus depots. In the case of the cable car, it must be taken into account that the one-time transport from Europe to the La Paz location and the on-site installation as the main emissions factor for the infrastructure is included in the calculation.

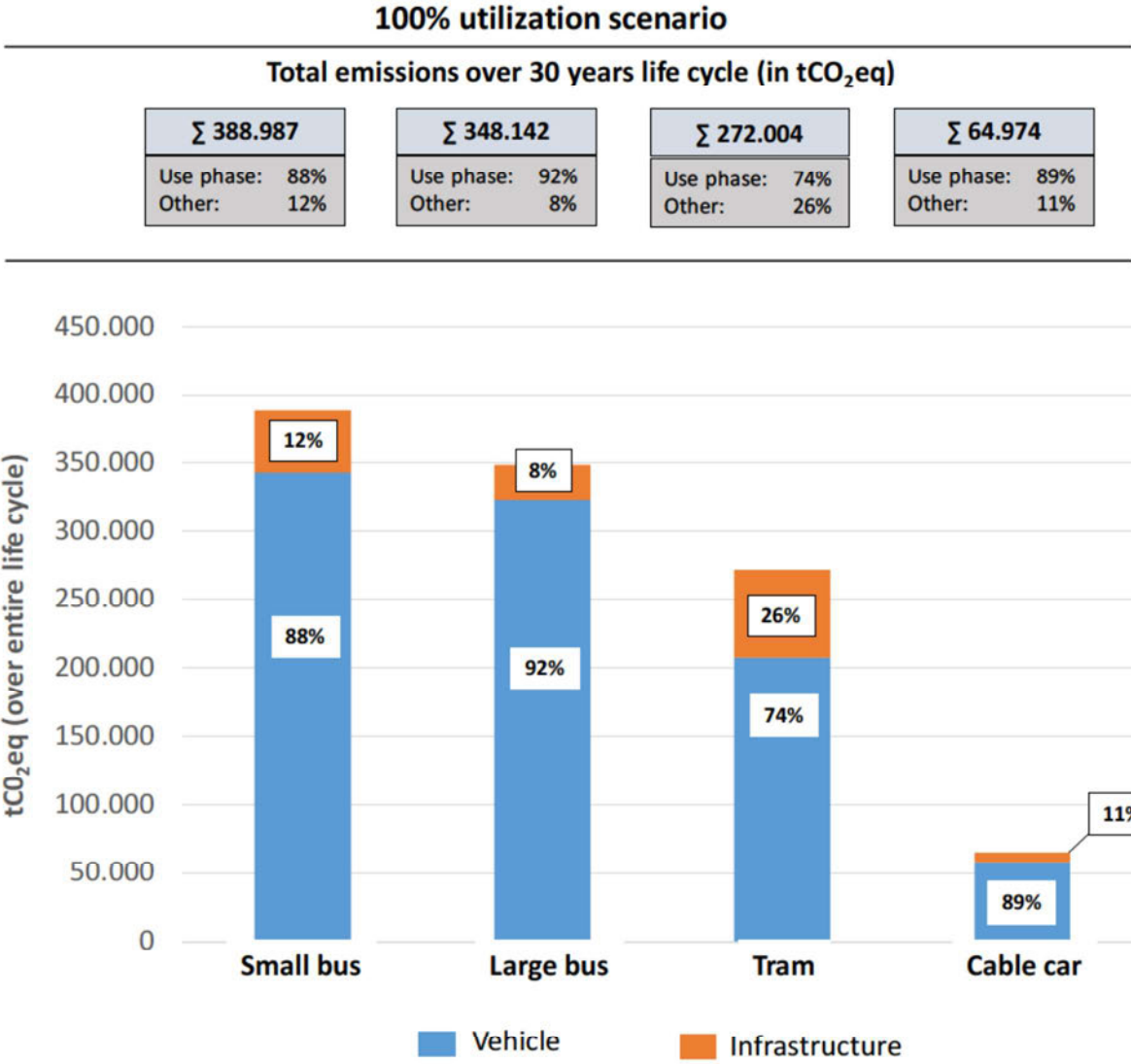


Figure 1: Comparison of passenger transportation systems (100% utilization scenario)

During operation, the infrastructure is only responsible for around 1% of emissions. [12] The absolute emissions from the provision and maintenance of the tram option alone, for example, are higher than the total emissions caused by the cable car (including manufacturing, transport, erection, operation and maintenance etc.) over the entire life cycle.

In total, the results show that the impact from the construction, upkeep and maintenance of this infrastructure can make a substantial contribution to the overall life cycle emissions. These findings comply with existing literature. [17, 20]

Relating the calculated emissions to the performed passenger capacity kilometers of the vehicles (see annex, p_ckm) the large bus and the small have the highest emission rate with 28,7 gCO₂eq/p_ckm and 25,2 gCO₂eq/ p_ckm. The cable car with 22,7 gCO₂eq/p_ckm follows the tram with 19,6 gCO₂eq/ p_ckm.

But this quotient might be misleading, because according to the goals and the defined functional unit, it is not decisive what the theoretical system performance would be. The integration of this consideration would - if at all - possibly be useful for investigations of extended system flexibility or differentiated utilization analyses. However, this would also mean including these requirements accordingly in the definition of the functional unit.

Secondly, the total emissions of the actually installed system solution are ultimately relevant, especially for the local impact and to the community. A ratio related to passenger capacity kilometres as an indicator might be easily manipulated by increasing the length of the tracks (e.g. by absurd or even intended detours).

3.1.2 Carbon footprint of the 69% utilization scenario

For comparison, the real business case from La Paz was analyzed in a further scenario. The actual occupancy rate of the system on site is ca. 69% (=2.059 passengers per hour) which corresponds to a reduction of 31% in comparison to the baseline scenario.

As a result, the studies show that the total emissions of all transport systems examined correspond largely proportional. This is mainly due to the fact that most of the emissions are caused by the use of the vehicle, which is accordingly reduced in this scenario. This linear dependency is particularly evident in the case of buses. Nevertheless, some changes can also be seen.

Especially for the tram the decline in emissions is only disproportionately low at 21%. This is due to the fact that a comparatively large portion of the emissions is caused by the production, erection and maintenance of the infrastructure.

This is already indicated in figure 1 and confirmed in figure 2, in which the percentage of emissions induced by the infrastructure has increased to 30% compared to the baseline scenario.

The same applies to the changes in the analysis of the cable car. Here, overall emissions are falling slightly disproportionately despite lower capacity utilization.

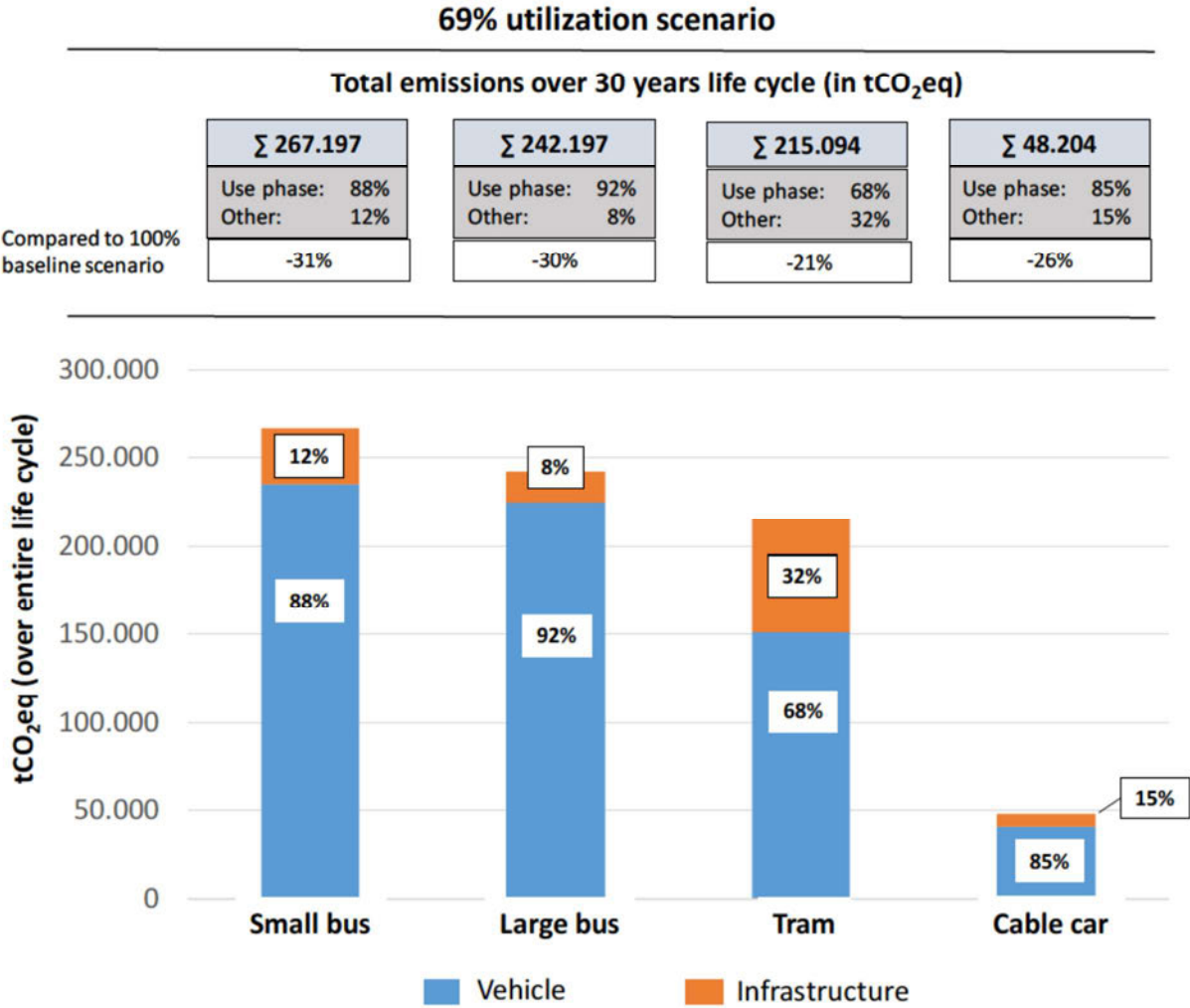


Figure 2: Comparison of passenger transportation systems (69% utilization scenario)

Compared to the baseline scenario, an almost unchanged infrastructure has to be erected and maintained, although it is designed to generate significantly lower emissions than the tram.

3.2 Sensitivity Analysis

The analysis of the individual stages of the life cycle shows that the emissions for the alternatives examined mainly arise in the use phase. Therefore, the main influencing factors of the emissions were identified in a sensitivity analysis in order to determine potentials and influences for future studies. In addition, the study was carried out on the basis of given framework parameters in accordance with the definition of the

functional unit (see chapter 2.2.2). Figure 3 shows some factors that have a strong influence on the result of the investigation.

Factor	Small bus	Large bus	Tram	Cable car
Utilisation	Load profile in combination with location routing	Load profile in combination with location routing	Load profile in combination with location routing	Directional utilisation profile over day
Location routing	Length of transport distance	Length of transport distance	Length of transport distance	N/A
Energy	Fleet efficiency	Fleet efficiency	Grid mix and electricity consumption	Grid mix/ electricity mix

Figure 3: Sensitivity analysis of core factors for emissions

It can be seen that the utilization of the various systems used throughout the day has a strong influence on emissions. In the case of cable cars, for example, unevenly distributed use in one direction has a particularly strong effect on energy demand (e.g. in the morning and evening hours). In connection with the specific topography of the place La Paz, Bolivia, the considerably longer routes (tracks) for buses and trams compared to cable cars are significant.

Ultimately, however, the energy requirement of the alternatives examined is particularly decisive. The cable car and the tram have to use the existing energy mix of the grid in Bolivia. This analysis shows that the total impact of the transport system over the lifetime can be greatly reduced through by either the amount of electricity consumption itself or by the choice of the electricity generation mix. A change towards the use of renewable energies or at least more energy-efficient drives would have a major impact on the overall emissions balance for the transport systems. For the buses e.g. more energy-efficient fleets (e.g. lower consumption, lower maintenance costs, etc.) lead to different results over the long period under consideration. In the case of the tram and the cable car, this could be achieved by changing the grid mix with a significantly higher proportion of electricity from renewable sources.

4. Summary and outlook

The investigation focuses on determining a life-span footprint for different urban modes of transportation. The research study is based on a specific scenario defined in the functional unit around the transport from one fixed point to another. This service definition was derived from the actual installation of the cable car. In accordance with literature additional service options (e.g. more stops, partial transport of passengers along the route etc.) of the buses and trams are not taken into account.

The largest share of total emissions is being generated in the operating phase including maintenance. This is due to the fact that the operating phase also accounts for the longest period during the 30-year period. In addition to a changed initial scenario, changes in the factors identified in the sensitivity analysis in particular represent opportunities to influence the results obtained with regard to emissions.

The assessment clearly shows that an assessment of the emissions on the basis of passenger km (or per passenger capacity km) is not a reliable parameter for comparing alternative urban transport systems; the actual overall impact of the compared modes of transportation in operation is more meaningful.

In the study, the carbon footprint respectively the global warming potential of various modes of transport were determined and compared. Investigation thus provides one component of an ecological life cycle assessment. For a comprehensive sustainability study, economic and social factors would have had to be included in the investigation. This wasn't done for this study. [21]

Since the decision in favour or against a transport system usually means a long term commitment, the consequences of such a decision must be carefully analyzed and evaluated. This must be reflected in the initial definition of the functional unit in the planning phase.

Acknowledgement: The presented study was originally carried out with the support of denkstatt GmbH and Doppelmayr Seilbahnen GmbH.

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References

- [1] Earth Overshoot Day: Earth Overshoot Day 2019.
Available at: <https://www.overshootday.org/> (Accessed 2020/08/09)
- [2] Earth Overshoot Day: About Earth Overshoot Day 2019.
Available at: <https://www.overshootday.org/aboutearth-overshoot-day/>
(Accessed 2020/08/09)
- [3] Earth Overshoot Day: Past Earth Overshoot Days 2020,
<https://www.overshootday.org/newsroom/past-earth-overshoot-days/> (Accessed 2020/08/09)
- [4] Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit: Internationale Klimapolitik 2020. Available at: <https://www.bmu.de/themen/klima-energie/klimaschutz/internationale-klimapolitik/> (Accessed 2020/08/09)
- [5] Bargende, M.: Erdgas und erneuerbares Methan für den Fahrzeugantrieb: Wege zur klimaneutralen Mobilität. In: Basshuysen, R. van: Erdgas und erneuerbares Methan für den Fahrzeugantrieb- Wege zur klimaneutralen Mobilität, p.233-463, Springer Vieweg, Wiesbaden, 2015
- [6] Wang, S.; Ge, M.: Everything You Need to Know About the Fastest-Growing Source of Global Emissions: Transport. World Resources Institute, 2019. Available at: <https://www.wri.org/blog/2019/10/everything-you-need-know-about-fastest-growing-source-global-emissions-transport>. (Accessed 2020/08/09)
- [7] Deutsche Gesellschaft für die Vereinten Nationen e. V.: Eine-Welt-Presse: Nachhaltige Stadtentwicklung- Wie Metropolen mithilfe der UN gegen Kollaps kämpfen, 2015. Available at: https://nachhaltig-entwickeln.dgvn.de/fileadmin/publications/PDFs/Eine_Welt_Presse/Eine-Welt-Presse_2015_WEB.pdf. (Accessed 2020/08/09)
- [8] DIN Deutsches Institut für Normung e. V. (Ed.): DIN EN ISO 14040: Environmental management - Life cycle assessment - Principles and framework (ISO 14040:2006), Beuth –Verlag Deutsche und Englische Fassung EN ISO 14040:2006, 2006
- [9] DIN Deutsches Institut für Normung e. V. (Ed.). Environmental management - Life cycle assessment - Requirements and guidelines. ISO 14044:2006, Beuth-Verlag, 2006
- [10] Niemann, J.; Tichkiewitch, S.; Westkämper, E.: Design of Sustainable Product Life Cycles, Springer Verlag, Heidelberg Berlin, 2009

- [11] o.V: Calculating Lifecycle costs in the capital goods industry. Version 98.0d, VDMA, 2012. Available at: <https://www.vdma.org/v2viewer/-/v2article/render/15237352>. (Accessed 2020/08/09)
- [12] Krautzer, F.; Stoll, K.: Carbon Footprint of a Doppelmayr Cable Car in La Paz, Placed in the Context of Select Alternative Transport Systems, denkstatt GmbH, 2019
- [13] Doppelmayr Seilbahnen GmbH (Ed.): Aerial cable cars. Available at: <https://www.doppelmayr.com/en/aerial-cable-cars/> (Accessed 2020/08/09)
- [14] Spielmann, M. et al.: Transport Services Data v2.0 - ecoinvent report No. 14. Villigen and Uster, 2007
- [15] Wilke, S.; Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (Ed.): Fahrleistungen, Verkehrsaufwand und „Modal Split.“ Umweltbundesamt, 2019.
Available at: <https://www.umweltbundesamt.de/daten/verkehr/fahrleistungen-verkehrs-aufwand-modal-split> (Accessed 2020/08/09)
- [16] Wernet, G. et al.: The ecoinvent database version 3 (part I): overview and methodology. *The International Journal of Life Cycle Assessment*, 21(9), pp. 1218–1230, 2016. Available at: <http://link.springer.com/10.1007/s11367-016-1087-8>. (Accessed 2020/08/09)
- [17] Chester, M.; Life-cycle Environmental Inventory of Passenger Transportation in the United States, Berkeley: University of California, 2008
- [18] Cuéllar, Y. Et al.,: Life cycle emissions from a bus rapid transit system and comparison with other modes of passenger transportation. *ciencia, tecnologia futuro* 6(3), pp. 123-133, 2016.
- [19] Stolz, P. et al.; Life Cycle Inventories of Road and Non-Road Transport Services. Uster: SBB AG, BFE, BAFU, Swisscom AG, Öbu., 2016
- [20] Chester M. et al.: Parking infrastructure: energy, emissions, and automobile life-cycle environmental accounting. *Environmental Research Letters* 5(3) 0340012010
- [21] Kogel, B.; Pfeifer, A.: VDI Status Report – Urbane Seilschwebebahnen, VDI Gesellschaft für Fahrzeugtechnik, VDI-Verlag, 2020

Annex

List of foreground data

Unit	Route length (single direction)		Lap length	Time per direction	Vehicle capacity	Average speed	Number of vehicles simultaneously	Service lifetime per vehicle	Total number of vehicles over service life	Number of laps per day	Distance travelled per vehicle per day	Total distance travelled by all (simultaneous) vehicles per day	Total distance travelled by all vehicles over service life	Total transport capacity over service period	
	km/direction	km												billion p _c km*	Million km
Small bus	12,4	24,8	18	18	18	41,3	99	3,95	753	28	694	68,764	752,8	13,5	13,5
Large bus	12,4	24,8	18	18	79	41,3	23	3,95	175	28	694	15,971	174,9	13,8	13,8
Tram	12,4	24,8	18	18	166	41,3	11	4,42	75	28	694	7,638	83,6	13,9	13,9
Cable car	2,3	4,6	8	8	10	18,0	109	undisclosed	undisclosed	N/A	N/A	N/A	N/A	2,6	2,6

* In the comparison the unit p_ckm is used, where 'c' stands for person capacity. The 'c' relates to a potential 100 % occupancy rate of all vehicles over the time.

Unit	Operating time		Operating days	Service time	Required service capacity per direction	Mass (net vehicle weight)	Average passenger weight	Gross vehicle weight	Footprint of the vehicle (incl. 20% manoeuvring space in depot)	Transport distance of vehicle from production to operation site	Transport freight from production to operation site	Concrete used in tram station construction	Electricity use per tram station per year
	hours/day	days/year											
Small bus	16,57	365	30	3000	4,600	75	5,950	18	3,000	13.800	N/A	N/A	N/A
Large bus	16,57	365	30	3000	11,340	75	17,265	36	3,000	34020	N/A	N/A	N/A
Tram	16,57	365	30	3000	20,992	75	33,442	108	3,000	62.976	255	2.600	2.600
Cable car	16,57	365	30	3000	0,495	75	1,245	N/A	14,400	7.128	N/A	N/A	N/A

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Wellington, 6140

Via email: transportemissions@transport.govt.nz

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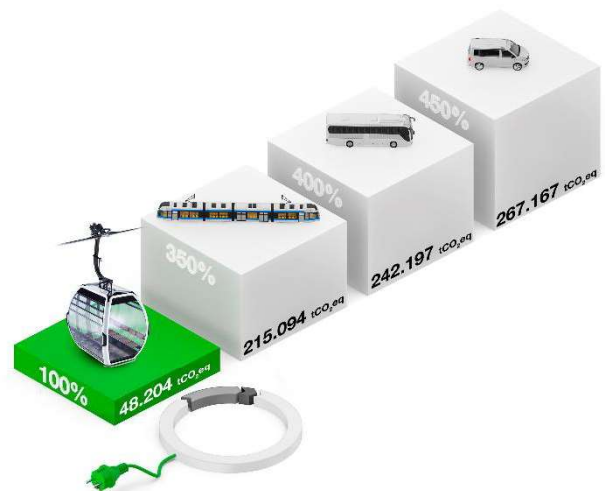
info@doppelmayr.nz
www.doppelmayr.nz

Our reference: HGA
Christchurch 25/06/2021

Hikina te Kohupara / Transport Emissions submission

Consultation Question 5 – Are there other travel options

- 1 We propose Ropeways that should be considered as an alternative mode of transport. They are a proven technology and proven to be one of the lowest emission transport solutions available today. They might seem an exotic new transport solution, but they are used in cities worldwide and for public transport and have been proven to be reliable, safe, and attractive form of transport. Where implemented they are fully integrated into their respective transport networks and have measurable positive impacts on the mobility and quality of life of the city's residents. In some cases ropeways are referred to as aerial ropeways, cable cars, cableways, gondolas, funiculars, and aerial tramways.
- 2 Ropeways are able support the reduction of transport emissions significantly, and as evidence we present a recent study by denkstatt GmbH, sustainability experts in Vienna, Austria. They examined and compared the CO₂ footprints of different modes of public transport based on a 30-year life cycle analysis in accordance with the standards ISO 14040 and 14044. The life cycle assessments of a ropeway, buses and light rail were evaluated, and a Bolivian transport example was used for the purposes of the study. This involves a route in La Paz, which is now covered by the urban ropeway line known as the "Línea Roja" a 2.35km ropeway previously accessed by a 12.4-kilometre road journey.
- 3 The denkstatt GmbH study showed the ropeway to be the most environmentally friendly mobility solution. Assuming an operating lifetime of 30 years, the ropeway produces less than a quarter of the carbon dioxide equivalent (tCO₂eq) generated by the other means of transport. Only 17.5% of the emissions of the ropeway was due to construction of the ropeway and remaining 82.5% was due operations-phase of the life cycle. They carbon footprint of ropeways can be further reduced if the electricity



comes from renewable sources, the provenance and composition of building materials are optimised along with long term mobility plan is implemented to promote full use of a ropeway's capacity.

- 4 Further information is enclosed about our greenhouse gases study and general information about how ropeways are used in as means of public transport around the world. Should you require any further information we will be more than happy to assist. Thank you for the opportunity to submit and we look forward to the release of the Emissions Reduction Plan

Nga mihi nui



Garreth Hayman
General Manager
Doppelmayr Lifts NZ Ltd

Enclosures

- Summary of Life Cycle Assessments
Available to download at <https://lapaz.doppelmayr.com/en/>
- The Next Level of Mobility – Ropeways as a means of Urban Transport
Read online at <https://www.yumpu.com/en/document/read/62716866/the-next-level-of-mobility-ropeways-as-urban-means-of-transport-en>
- Green City Deals: A study on the global warming potential of alternative urban transportation systems <https://opus4.kobv.de/opus4-hs-duesseldorf/frontdoor/index/index/docId/2897>

About Doppelmayr

Doppelmayr Lifts NZ Ltd (**Doppelmayr**) represents the Doppelmayr/ Garaventa Group in New Zealand, and our primary business is to design, manufacture, install and support passenger ropeways within New Zealand. Examples include chairlifts at ski-fields and mountain bike parks, gondolas at tourism operations, funicular railways use in public transport such as the Wellington Cable Car. Doppelmayr/ Garaventa is the market leader in ropeway engineering, technology, and quality.

Sustainable Mobility. Proven Technology.

The undertaken Life Cycle Assessments show that the urban ropeway is the eco-friendliest mobility solution in comparison to alternative transport systems. Based on the "Línea Roja" in La Paz (BOL) the well-known consultant institution *denkstatt GmbH* conducted a LCA-study for both existing transportation systems ropeway and bus as well as one for a fictional tram. All Life Cycle Assessments had been undertaken according to ISO 14040/44 and were reviewed by three independent institutions.

Study

denkstatt GmbH (2019): Carbon Footprint of a Doppelmayr Cable Car in La Paz, Placed in the Context of Select Alternative Transport Systems.

The underlying scenario¹ is characterized by a height difference of 402 meters and would only have been possible by bus or tram over a distance of 12,4 kilometres. With the mobility solution "ropeway" the decision-makers considered to use a new level which directly connects both stations over a distance of 2.349 meters without any traffic jams. Apart from the positive effect on the travel time, a trip only takes 10 minutes – passengers of the ropeway system profit from continuous availability of cabins which eliminates waiting time for users.

With the proven ropeway technology in urban mobility we help cities in reaching UN Sustainable Development Goal "11. Sustainable Cities and Communities" to maintain the quality of life for current and future city dwellers. The urban ropeway as an easily integrable, interconnected and reliable solution in urban mobility promotes:

Decarbonization of Cities

- No local pollution such as nitrogen oxides (NO_x) or particulates
- Low environmental impact due to smallest physical footprint to alternative mobility solutions
- Central Electric Drive: Highest Energy Efficiency

Environmentally friendly mobility solutions to increase the general quality of life in cities

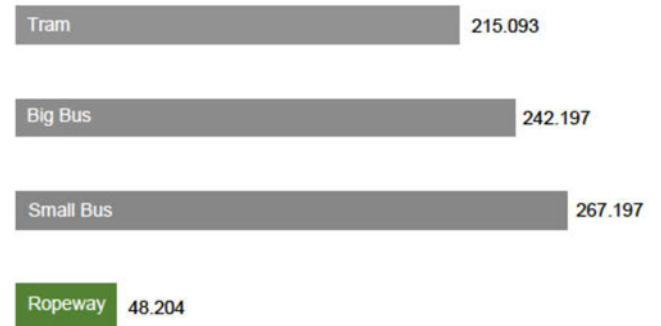
- Livability: Higher air quality (no fumes) and low in noise
- Lowest land sealing through easy integration in existing infrastructure
- Preservation of buildings, parks, and memorials

Accessible mobility without any limitations

- Barrier-free entrance and exit
- Continuous availability of cabins (no waiting) for up to 6.000 passengers per hour and direction
- Cost-effective implementation and operation enable socially acceptable pricing for users

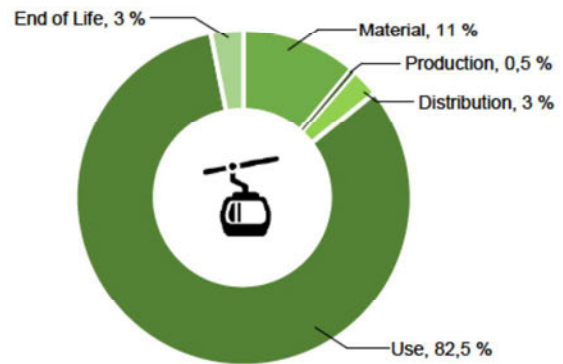
Life Cycle Assessments

of various means of transport (in tCO₂eq)



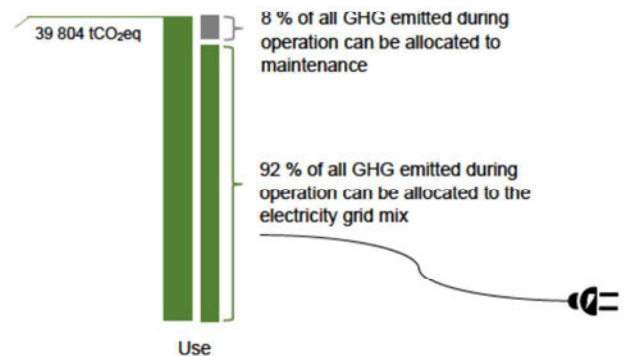
Greenhouse Gases allocated to Life Cycle Phases

LCA of urban ropeway "Línea Roja" (Cradle to Cradle)



Operation of Urban Ropeway (Use)

Divided into electricity grid mix and maintenance



¹ Functional Unit

The Next Level of Mobility Ropeways as a Means of Urban Transport





Rethinking mobility

Mobility is a major factor determining quality of life and the attractiveness of a city as an economic center. There is a growing awareness for topics such as environmental protection, inclusion and the desire for a fast and straightforward means of getting from A to B, along with a new emphasis on these aspects when planning a contemporary and attractive mobility offer.

>> I viewed my mission as mayor to build the city physically as well as socially and economically. The ropeway is one physical build that I am proud of.

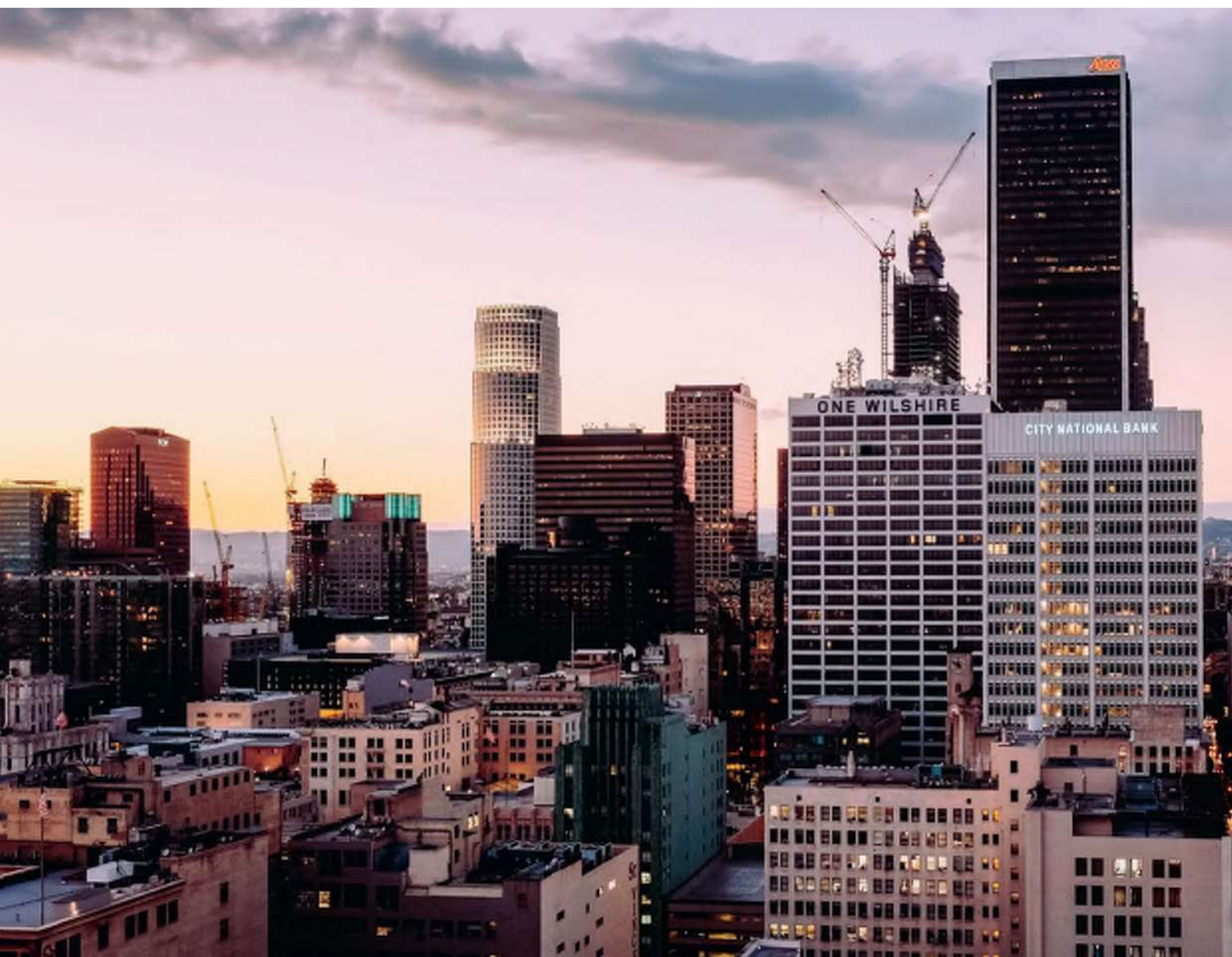
Vera Katz, former mayor of Portland



Urbanization is increasing – worldwide

Urban areas are growing worldwide as ever more people move away from the countryside and into the city. This development brings new challenges. Traffic volumes are rising, noise and air pollution are negatively impacting urban quality of life. Mobility and sustainable urban development are closely

connected. Because how we get from A to B on a daily basis also determines the appearance of our cities. Mobility needs to be designed so that it provides an attractive offer and helps to improve quality of life.





Responsible use of natural resources

The conservation of natural resources is the prerequisite for the sustainable development of our living spaces. Mobility is an area where a lot can be done to protect the environment. Transport systems with a

small ecological footprint thanks to energy efficiency and low emissions make a valuable contribution in densely populated areas.

Requirements for mobility solutions

A successful mobility offer meets the requirements of planners and users. When it comes to planning, it is important to create a concept that improves quality of life. An efficient, future-proof transport system is defined by a series of factors. Means of transport should offer a high level of availability and a high transport capacity, must guarantee a punctual and reliable service as well as comfortable travel for all passengers, and operate independently of obstacles

or traffic jams. They also need to be low on emissions and noise. In a densely populated city, available space is limited and should preferably be used as places of encounter. How can requirements like these be met by mobility solutions? With multimodal transport concepts. Because the answer lies in combining the benefits of the individual means of transport available for urban or transport planning to achieve maximum reliability and comfort.





Taking transport to a whole new level

When transport routes on the ground are permanently overloaded or when space limitations prevent the introduction of new systems and the expansion of existing networks, it is time for new approaches. The aerial ropeway opens up an entirely new level for urban transport. Because the ropeway cabins simply glide above the city and the streets below. In addition, aerial ropeways possess a whole series of benefits and features that harmonize extremely well with other means of transport. As part of well-conceived, integrated transport concepts, aerial ropeways open up new possibilities by making use of a new, independent level that is not hindered by other forms of transport.

Integrating ropeway systems into existing transport systems is not only straightforward but can also serve a wide range of purposes: filling gaps, providing relief at specific points or acting as a bridge. Passengers benefit from trip times that remain constant throughout the day as well as from the safety and comfort that this means of transport offers. That's mobility taken to the next level.



Mobility for all

The aerial ropeway is an affordable mode of transport for everyone. Thanks to completely barrier-free access, the ropeway can be used by mobility-impaired passengers without any difficulty. Baby strollers, wheelchairs or bicycles can also be carried at all times.



Cost-effectiveness

A ropeway system can be planned and built within a very short time. In comparison with other means of transport, the costs of construction are manageable and also pay off in daily operations. With a small structural footprint, standardized layout concept, low energy consumption, plus optimized operations and maintenance, a ropeway system is impressively cost-effective.



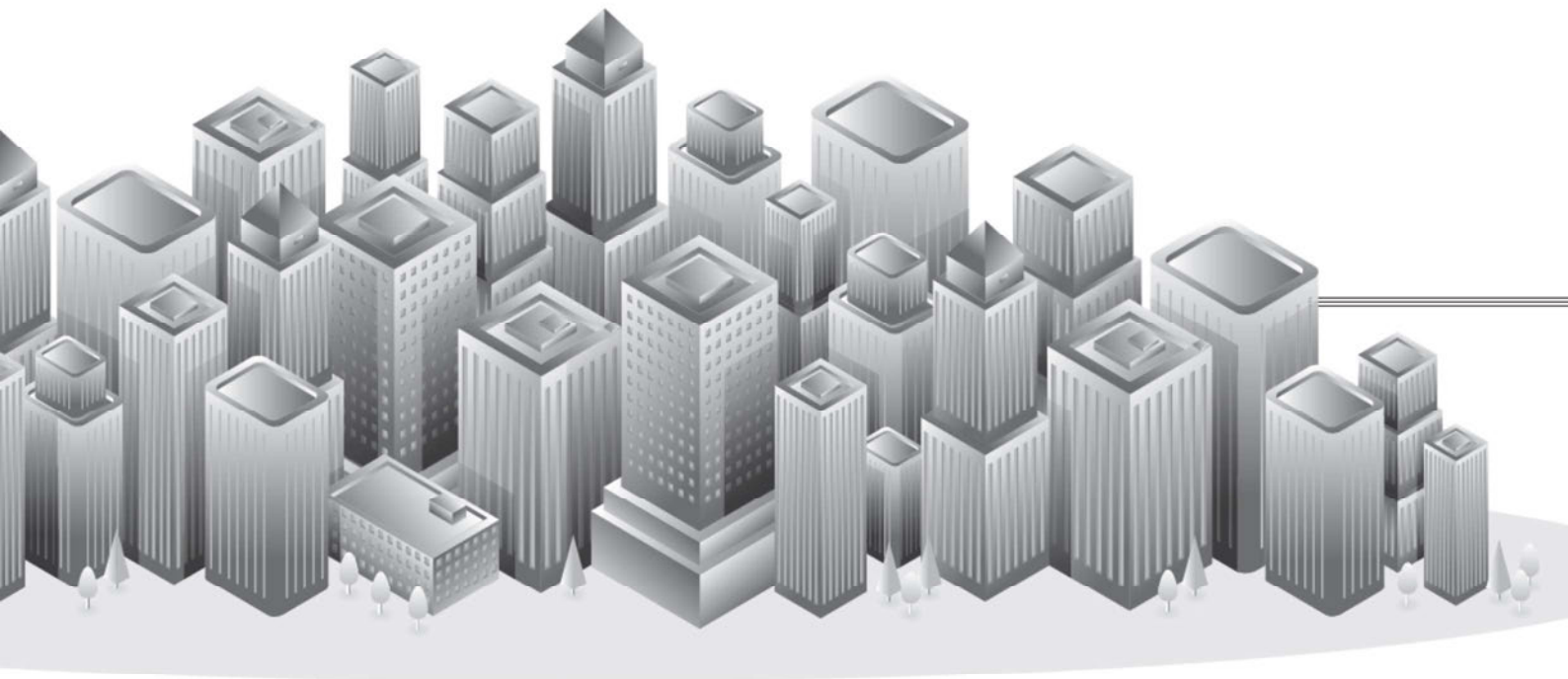
Attractive means of transport

A ropeway system is an attractive means of transport all round. Planners value the ease with which it can be integrated into existing transport networks as well as its environmental friendliness. Operators benefit from cost-effective operations and low construction costs. Passengers are delighted by a safe, reliable and comfortable means of transport that makes every trip an experience thanks to the views.



Digitalized

Smart cities call for mobility solutions that are completely integrated into digital data and information networks. This includes information on the operational status of the entire public transport network at all times so that the next journey can be conveniently planned. The ropeway also provides information for the digital network and can be included in trip planning. The digitalization of operational information enables operators to monitor processes and continuously optimize them in real time. Functions like Wi-Fi, infotainment and much more are all part of a comfortable and connected urban ropeway experience.



Integrated

A ropeway system can be seamlessly integrated in order to expand or upgrade a transport network. Integration is made easier by the fact that existing timetables do not have to be modified as the ropeway operates continuously. This means improvements in the mobility offer can be performed quickly and simply.



Environmentally friendly

A ropeway system is an environmentally friendly means of transport. There are no local emissions thanks to its electric drive. With the use of renewable energies, operations can even be entirely carbon-neutral.



Urban integration

Ropeway stations can be harmoniously integrated into the urban environment, both in terms of the architectural design, the physical integration of the station and the integration of additional uses in the stations. Examples can be found worldwide: stations that have been incorporated in new or even existing buildings, underground stations or multi-functional stations housing offices, shops and restaurants.



Proven technology

Ropeways have a successful track record of operating under the most challenging climatic conditions spanning decades and carry millions of people day in, day out in cities around the globe. They are proven as a safe and reliable means of transport.



Time-saving

Ropeway passengers lose no time because this means of transport runs continuously and its transport capacity is impressive. Traffic jams, hustle and bustle, and congested roads do not obstruct it. The ropeway is above it all and brings its passengers – commuters, families or tourists – quickly and reliably to their destination. The result is a very short and plannable journey at any time.



Short construction time and low space requirement

Optimized building processes using prefabricated elements for towers and stations enable short completion times for ropeways. The structural footprint is low as only the towers and stations require space on the ground. This makes construction possible even in built-up urban environments.





Sustainable urban mobility with aerial ropeways

The University of Düsseldorf and sustainability experts from denkstatt GmbH examined and compared the carbon footprints of different modes of public transport on the basis of a scientific life cycle analysis. To ensure unequivocal comparability, the mobility requirements were combined to form a functional unit (same transport capacity, identical operating hours, etc.). In accordance with the standards ISO 14040 and 14044, the life cycle assessments of an aerial ropeway, buses and a fictitious streetcar were evaluated.

A Bolivian transport example was used for the purposes of the study. This involves a route in La Paz, which is now covered by the urban ropeway line known as the "Línea Roja". The ropeway system, opened in 2014, extends over an inclined length of 2.35 kilometers from the center of La Paz to El Alto. As an alternative, the transport connection could have been provided by buses or a streetcar over a distance of 12.4 kilometers.

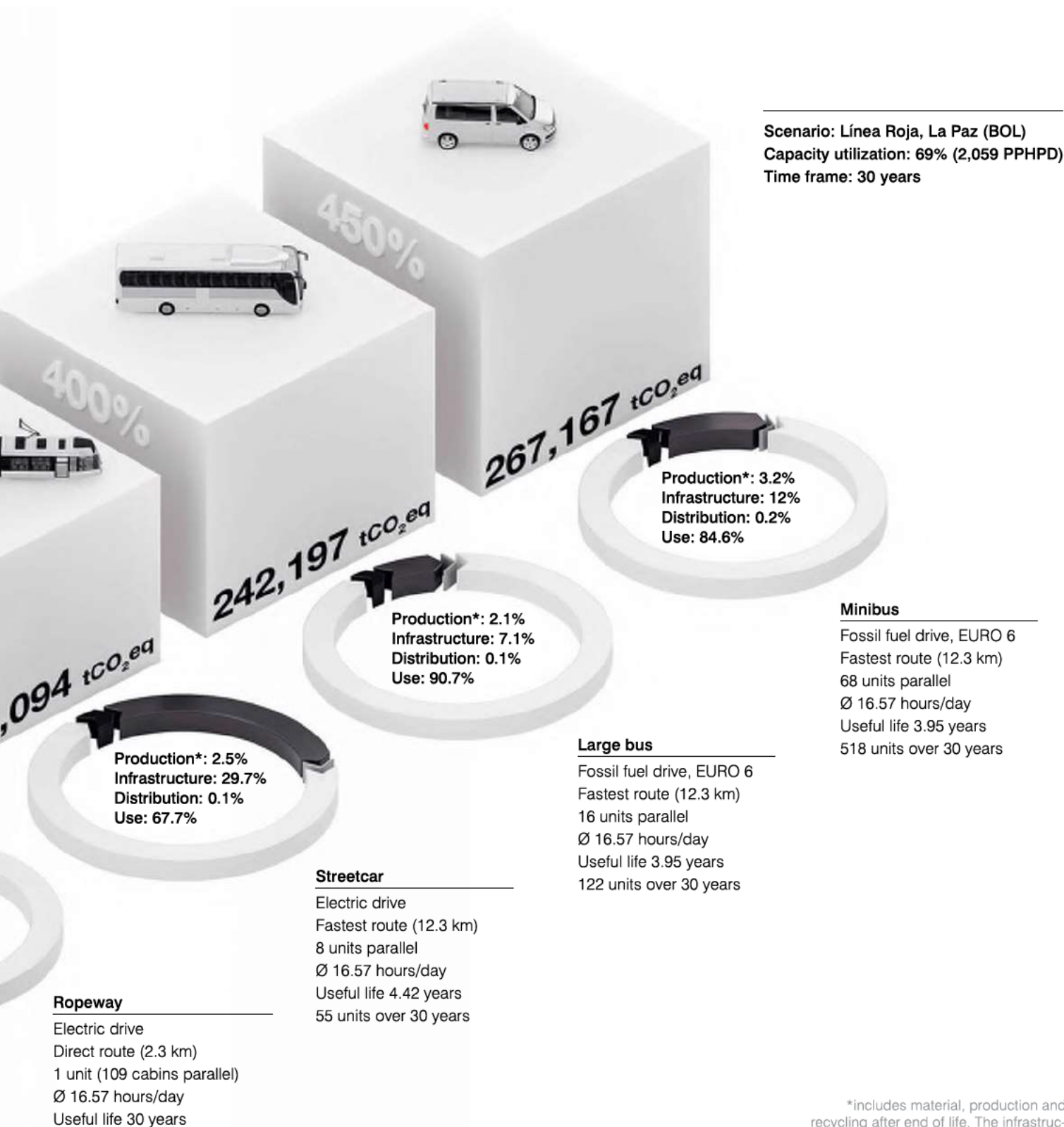
Ropeway has smallest carbon footprint

The ecological analysis showed the ropeway to be the most environmentally friendly mobility solution. The ropeway has the smallest carbon footprint. Assuming an operating lifetime of 30 years, the ropeway produces less than a quarter of the tons of carbon dioxide equivalent (tCO₂eq) generated by the other means of transport (see graphic).

The results of the study were audited by three independent institutions. Martin Beermann from JOANNEUM RESEARCH Forschungsgesellschaft mbH made the following statement: "The study *Carbon Footprint of a Doppelmayr Cable Car in La Paz and Comparison with Tram or Bus* fully complies with the ISO 14040 and 14044 standards (CO₂ emissions)."

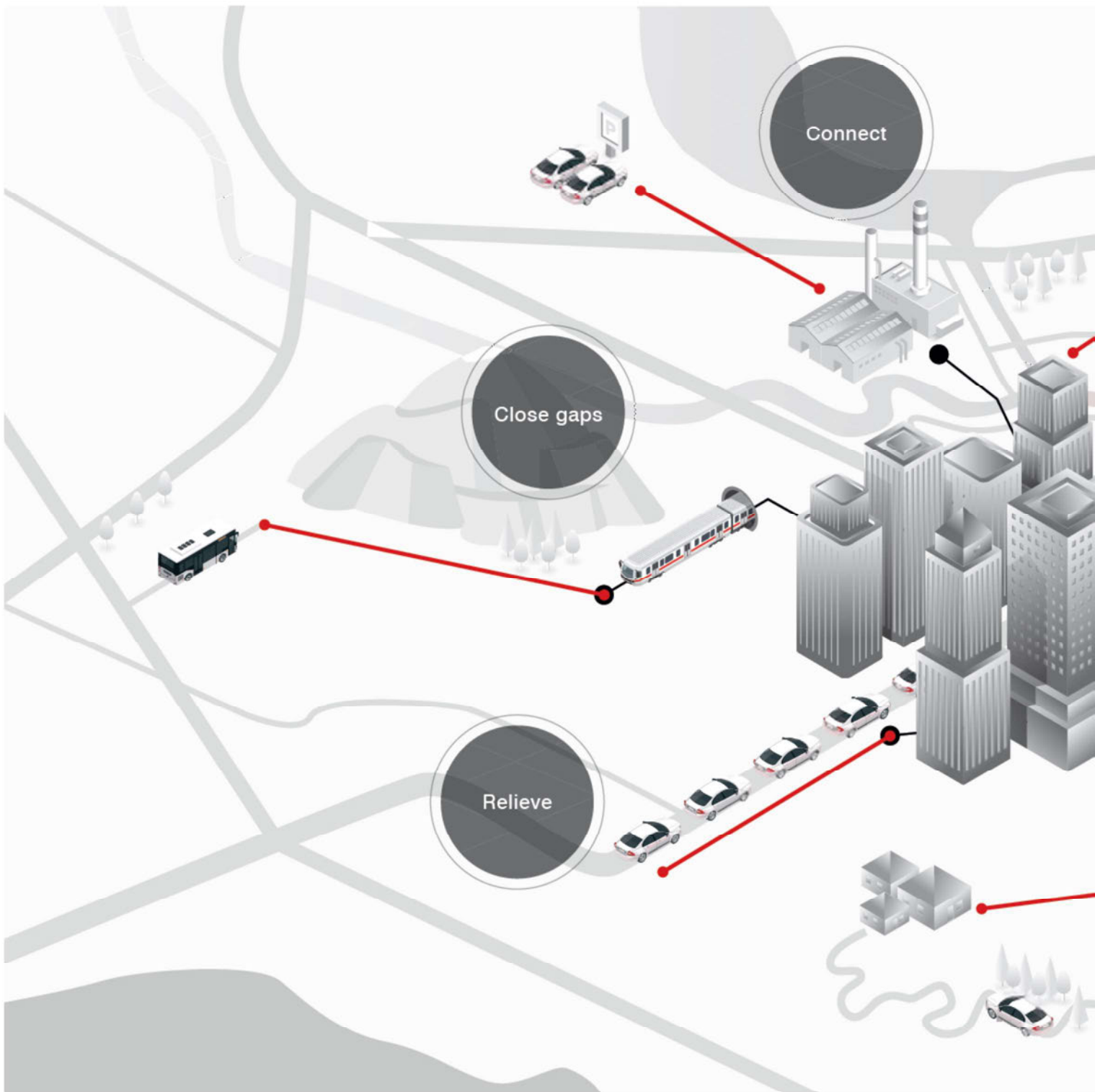


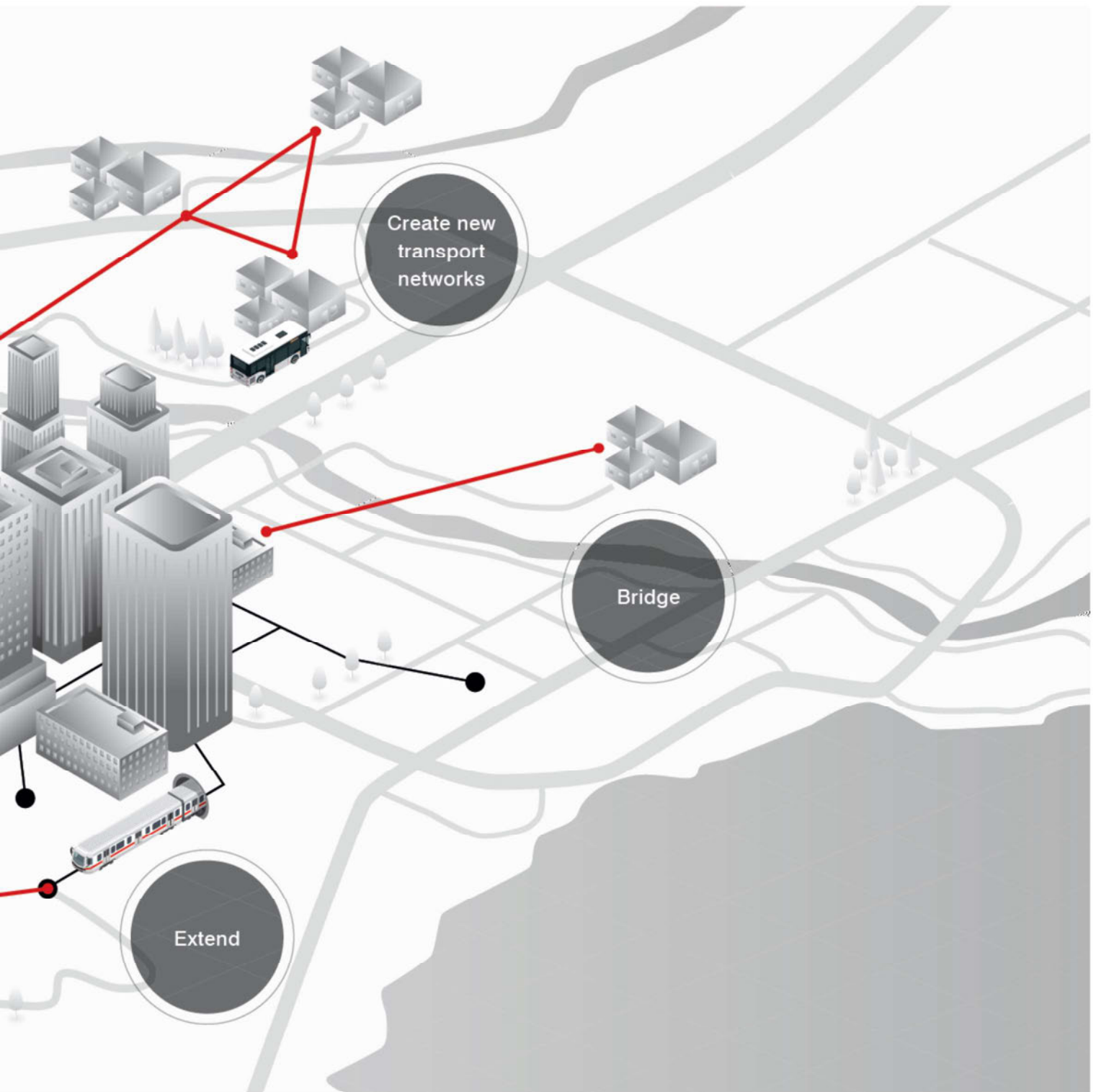
92% of emitted greenhouse gases in use depending on power mix used



*includes material, production and recycling after end of life. The infrastructure has been included under production for the ropeway. The results of the study were subjected to a review process by three independent institutes.

Functions performed by ropeways





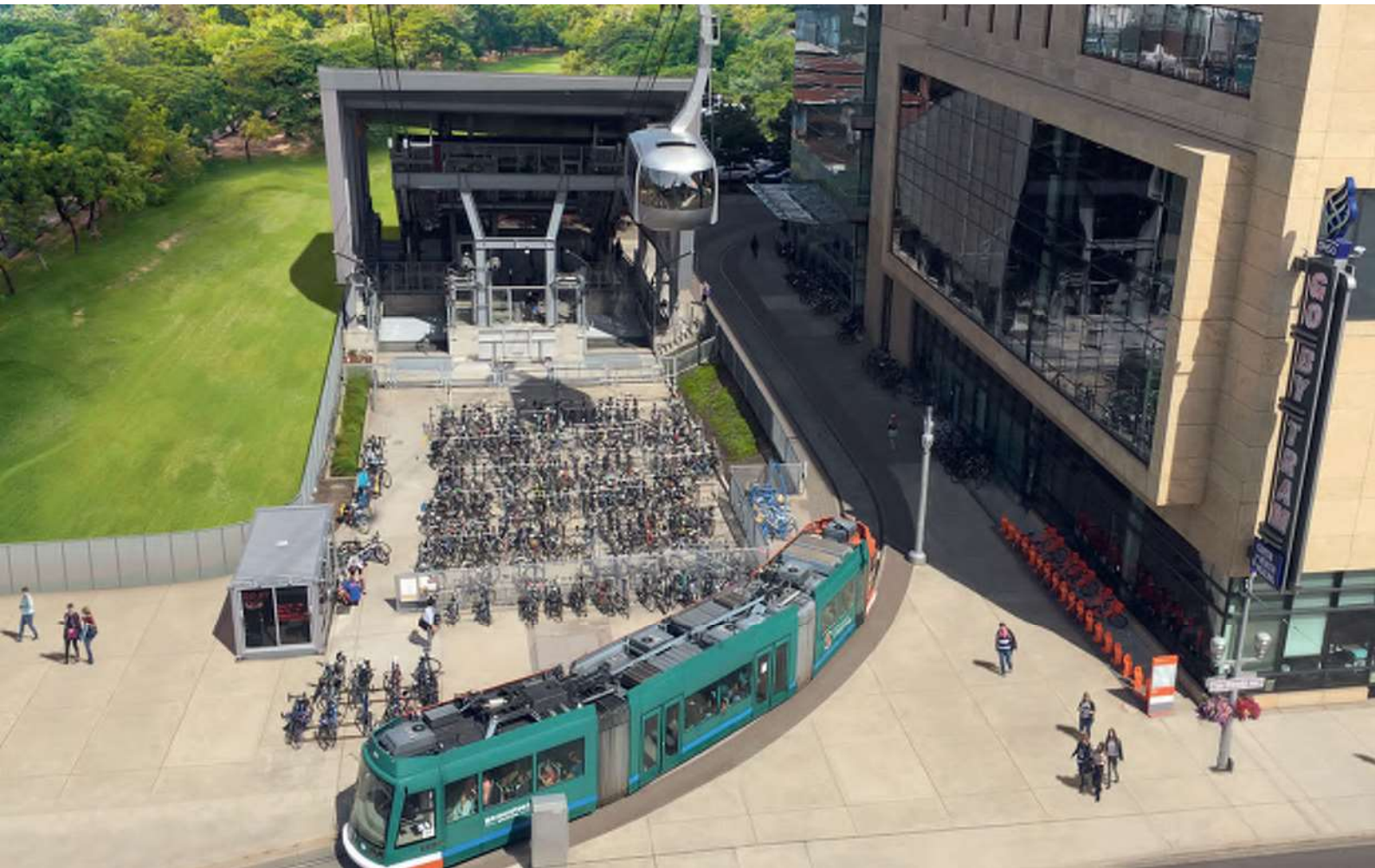


Portland: Urban development by aerial tramway



The Oregon Health and Science University (OHSU) is the largest employer in Portland in the US state of Oregon. All its institutes are concentrated on one campus in the south of the city. Short distances between the individual institutes are essential for employees and patients. However, when the time came for a building expansion, there was no room directly on the campus and a site not far away had to be used. In order to maintain the short distances and easy reach of all the institutes, a reliable link was created with a reversible aerial tramway.

The Portland Aerial Tramway (ATW) incorporates two stations, one tower and two cabins. The silvery cabins appear light and airy. As well as offering space for 78 passengers, they can also be used to transport hospital beds. The tramway links up with the streetcar at the South Waterfront Station. Cyclists can park their bikes directly next to the station. The tramway made it possible to better integrate the OHSU into the city and to ensure a close connection between the expansion site and the campus despite the distance between them.



The world's biggest ropeway network in La Paz

Since 2014, aerial ropeways have been part of everyday life for the residents of La Paz and El Alto in Bolivia. These environmentally friendly and efficient installations make it easier for people to get from A to B, reduce travel times and guarantee that they will get where they want to go on time. The ropeway network constitutes the principal mode of transport for the two South American metropolises and consists of ten lines with an overall length of over 30 kilometers. Every day, Mi Teleférico is used by some 300,000 people – as a means of getting to work, going shopping, going to school or accessing leisure-time activities. Over 300 million passengers have been carried to date. Commuters benefit from significant time savings and escape from the daily road congestion by using the ropeway.

The stations are barrier-free and can also be used by mobility-impaired passengers with no problem. Many of the stations are multifunctional and also serve as community centers, providing a boost to the attractiveness of the local neighborhood. Free Wi-Fi in the cabins is a popular and frequently used additional benefit. The world's biggest ropeway network has had a positive impact on the many people who live and work in La Paz and El Alto, and improved their quality of life. Mi Teleférico is a visionary mobility solution that provides an outstanding example for others around the globe to follow.









Luxembourg's first urban ropeway



The Pfaffenthal-Kirchberg funicular in Luxembourg ensures smooth and convenient handling of the commuter flows in this district. As part of the public transport network, it creates a fast and direct link between the Pfaffenthal railroad station on a busy commuter line and the Kirchberg commercial district. Although the railroad passes this district, there was no connection to the Kirchberg plateau. That meant having to change trains several times. With an inclined length of 200 meters, the funicular fills this gap and provides a direct link to the Kirchberg plateau, where there are connections to buses and streetcars. For commuters, this brings a major time saving. The funicular is optimally adapted to suit the needs of commuter traffic. Two parallel, independent

systems carry up to 7,200 passengers an hour at maximum capacity. This is sufficient to bring the passengers from two simultaneously arriving suburban trains to Kirchberg within just ten minutes. Outside of peak times, only one of the trains runs. The visual design also makes for a seamless interchange: In line with the specifications of the operator, Société Nationale des Chemins de Fer Luxembourgeois (CFL), the car exterior and fittings were chosen to match the CFL buses and tram.

A popular means of transport in Singapore



The 8-passenger gondola lift in Singapore has been carrying passengers from the mainland to Sentosa Island since 2010. Famous for its beaches, hotels and attractions, Sentosa is a popular destination for local residents and tourists. The ropeway not only provides a convenient means of reaching the island but also makes the journey there an experience. Passengers glide through the air high above the cruise ship harbor and get to enjoy the views of the ocean and the ships. The installation is perfectly integrated into the urban architecture and the transport system. The intermediate station is situated on level 15 of HarbourFront Tower Two, which is adjacent to a

shopping mall with access to a subway connection and a large number of bus lines.

As a special attraction, the cabins are converted into dining rooms for evening Sky Dining. During their trip in the gondola, passengers can enjoy fine food as the sun sets over the sea.







Comfortable and eco-friendly trip across the Rhine



The Koblenz Cable Car marked the first time worldwide that a tricable gondola was used in an urban environment. The route extends from Deutsches Eck in the city across the Rhine and up to the Ehrenbreitstein Fortress. The aerial ropeway was built as a transport solution for the 2011 Federal Horticultural Show to link the various exhibition sites distributed across the city. It was shown to be the means of transport that could meet the technical and ecological requirements for barrier-free access, high capacity and high reliability, plus low environmental footprint. The gondola was built with UNESCO's approval at the World Heritage Site "Upper Middle Rhine Valley" and praised as a sus-

tainable transport solution. It continues to be the preferred means of transport for reaching the public park next to the Ehrenbreitstein Fortress. An added bonus is the panoramic view that opens up during the trip. Doppelmayr set new benchmarks in urban ropeway construction by implementing its recovery concept for the first time worldwide on the Koblenz Cable Car. This guarantees that in an evacuation scenario all the cabins can be returned to a station where the passengers can safely disembark.



Stepping into autonomous mobility





Pioneering innovations are the hallmark of a successful enterprise. Innovations that provide the right answers to what moves people. One example is the autonomous operation. This is an area where Doppelmayr is thinking ahead with the introduction of AURO (Autonomous Ropeway Operation). AURO ropeways bring passengers safely and reliably to their destinations – with unmanned operations and cutting-edge digital network technology. This concept is pointing the way for the future of rope-propelled mobility.

Cameras and sensors ensure smooth processes and monitor the installation – particularly cabin loading and unloading. The system independently identifies situations that deviate from “normal operation”. If, for instance, a passenger’s shoe becomes caught in the cabin door, the system reacts immediately and the installation automatically shuts down. It is restarted by a ropeway operative who has an overview of operations from the Ropeway Operation Center (ROC). The perfect synergy of human and cutting-edge technology results in high availability of the ropeway.





FAQs

✦ Which ropeway systems can be used for urban applications?

Continuous-movement monocable ropeways, reversible aerial tramways, tricable gondola lifts, Funiculars or Cable Liners are suitable for urban applications.

✦ What does a ropeway cost?

The costs of a ropeway are dependent on a large number of parameters. These include ropeway type, length, transport capacity and the number of stations. Topography affects the number of towers required and the choice of system. This, in turn, affects the price. The costs of a ropeway installation therefore depend very much on the individual project. As a rough rule of thumb, it can be said that a ropeway costs around one-third that

of a streetcar and one-tenth that of a subway.

✦ How many people can a ropeway carry?

The capacity of a ropeway depends on the system. The maximum transport capacity is around 6,000 passengers per hour and direction. By way of comparison: To transport 12,000 passengers an hour (6,000 in each direction), 240 bus trips are needed with 50 passengers each or 2,400 automobiles with 5 passengers each. This, in turn, requires more road space and produces noise and emissions.

✦ How environmentally friendly are ropeways?

In terms of carbon footprint, ropeways are the most environmentally friendly means of transport. This is confirmed by independent, reviewed studies. Ropeways have an electric

drive, which means no local emissions and very little noise. Both the local area and the passengers benefit as a result. Ropeways also help to achieve the goal of conserving the soil as a natural resource. As their structural footprint is low, soil sealing is minimized.

✦ How fast do ropeways travel?

A continuous-movement monocable ropeway runs at up to 7 m/s (25.2 km/h); a tricable gondola lift at up to 8.5 m/s (30.6 km/h). Examples from road transport: In Vienna, the average speed of road traffic is 21 km/h; in Berlin it is 18 km/h and in Stuttgart 17 km/h. The great advantage of a ropeway is that it can travel without being affected by other means of transport (buses, automobiles, etc.). Furthermore, the ropeway takes virtually no detours as it moves in a straight line in places where a road follows a bend. That also saves traveling time. Another



factor in its favor is that a ropeway operates continuously (with no timetable and no stops).

➤ **How big are ropeway cabins?**

Ropeway cabins come in many sizes and variations. Depending on the ropeway system, these can hold from 8 (continuous-movement monocable ropeway) to 34 (tricable gondola lift) and as many as 230 (reversible aerial tramway) passengers. The cabins are designed to suit the respective purpose. Individual adaptations can be made to ensure enhanced comfort or for carrying freight, for instance. Passengers with wheelchairs, bikes or strollers can be carried without any problem.

➤ **How long does it take to build an urban ropeway?**

As a rule, ropeway projects have a completion time of 6 to 18 months.

The use of prefabricated elements for stations and towers makes such short construction periods possible. The fact that these installations have a low space requirement is also a contributing factor as less ground needs to be prepared. In addition, the flexibility of station architecture allows adaptation to a wide range of urban planning situations. The time required to build the world's biggest urban ropeway network in La Paz with 10 lines was roughly 6 years in two construction phases.

➤ **Are ropeways barrier-free?**

Ropeways are barrier-free. They are designed to carry all types of people – seniors, families with children, people with physical impairments, etc. – and also for transporting cargo. Cabins provide space for transporting bicycles, wheelchairs, baby strollers, luggage and pallets. Level walk-in in the stations ensures easy access.

➤ **What are the parameters of a ropeway?**

A ropeway is defined by transport capacity, length and the number of stations. These parameters determine the choice of system and further technical specifications like the number of towers and the number and size of the cabins.

➤ **How is a ropeway integrated into an urban environment?**

Ropeways are a highly flexible mode of transport. Their structures (stations, towers) can be integrated into the existing urban environment (houses, transport hubs, etc.) and their architecture individually designed to harmonize with the cityscape. Ropeways can also be linked with and integrated into a local transit network (combined stations, ticketing, etc.). The towers take up little space and additional amenities like shops, info points or restrooms can be provided in the stations.





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Photos on pages 1, 2, 4 and 5: unsplash.com

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