

VKT Reduction Evidence Package

Prepared by the Planning
& Investment Evidence
Base programme

May 2022

About

- In May 2022, the Government released its first Emissions Reduction Plan under the Zero Carbon Act 2019.
- Requiring a reduction of transport emissions of 41% by 2035 from 2019 levels.
- Requiring a reduction of Vehicle Kilometres Travelled (VKT) by cars and light vehicles by 20% by 2035.
- Waka Kotahi has done some research to help identify possible pathway(s) to delivering the light vehicle VKT reduction target contained in the Emissions Reduction Plan (ERP).
- Considering the value of this analysis to the wider transport sector, this package of evidence is now being shared with land-use and transport planners, network designers and operators across the country.
- Through this release Waka Kotahi is testing the value to our partners in sharing such evidence, as well as exploring the best vehicle to do so.

About

- This body of evidence has been prepared by the Research & Analytics group through the Planning & Investment Evidence Base programme.
- The team has generated many volumes of information to support this presentation, including detailed geospatial, textual and graphical formats, which are available for technical users through this [mini-site](#). Note - You will be asked to set up a login which will then give you access the site and information.
- Please send us your feedback at evidencebase@nzta.govt.nz

You will find in the footer of each slide the list of additional content available through the mini-site created for this body of evidence.

For more information:



> PIE VKT REDUCTION EVIDENCE PACKAGE

An important note for the reader

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Current Situation

- National VKT has generally trended upwards since 2002 aside from a period of stagnation following the Global Financial Crisis (GFC)
- VKT growth accelerated from 2015 onwards until checked by the national lock-down in 2020.
- VKT is strongly correlated with New Zealand's:
 - growth in Gross Domestic Product (GDP),
 - number of people in Full Time Employment (FTE)

For more information:



- > ORIGINS EMPLOYMENT, IDI
- > POPULATION AGING MAPS - TIERS 1 AND 2
- > DESTINATIONS EMPLOYMENT, IDI



- > NZ POPULATION PROJECTIONS
- > FUA POPULATION AGING DATA
- > FUA DISTANCE TO ESSENTIAL SERVICES
- > FUA DISTANCE TO WORK
- > RAW DATA AND GRAPH FOR NATIONAL VKT, VKT BY VEHICLE TYPE, AND REGIONAL VKT

VKT Reduction - Assumptions

- Odometer based estimates provide an accurate picture of national VKT, by vehicle body-type.

Improved understanding of the nature of VKT could be tied to 'use/purpose' and 'location'.
'Use' is inferred from vehicle body-type; consumer preference for SUVs/utes is clouding this.

Some regional and all sub-regional results for VKT use RAMM, others use odometer.
The two methods generate different results which makes combining them problematic.

- Very little is known about the location and purpose of commercial-VKT and heavy-goods VKT.

For more information:

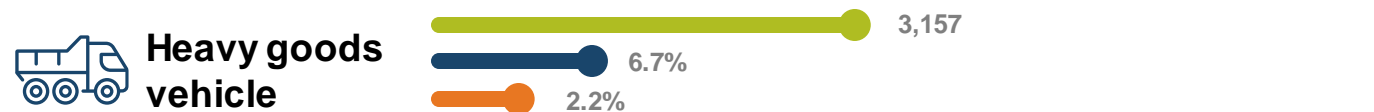
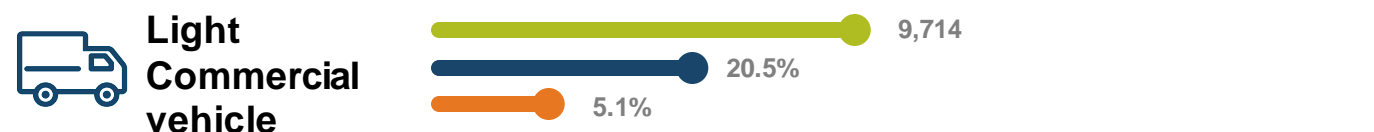


> GEOSPATIAL VKT REPRESENTATION



> FULL SUB-REGIONAL VKT DATA
> TERRITORIAL AUTHORITY RAMM VKT DATA
> VKT ANALYSIS OF FUNCTIONAL URBAN AREAS (FUAS)
> DETAILED REGIONAL VKT BREAKDOWNS

VKT – Road Vehicle Type Share



● Annualised VKT (million) as at Q1 2021
 ● Average annualised growth in VKT Q1 2012 – Q1 2021
● Annualised VKT (million) as at Q1 2021 (%)

Notes:

- The MoT classification used is based on weight and body-type.
- Light passenger and light commercial may be used for household and/or commercial purposes.
- The growth in popularity of utility/4WD vehicles by consumers since 2012 is impacting growth of 'light commercial vehicle'

For more information:



- > [HOUSEHOLD TRAVEL SURVEY DETAILED RESULTS](#)
- > [DISTANCE BY MODE - SUBNATIONAL RESULTS](#)

Changing Customer Behaviours

- To meet the VKT reduction targets, a significant shift in mode choice is required.
- Existing regional models are not designed to capture large shifts and we are unable to assess wider factors of influence.
- Development for assessing interventions against behavioural impacts has been completed in the “Investing in Mode Share” report; link below.

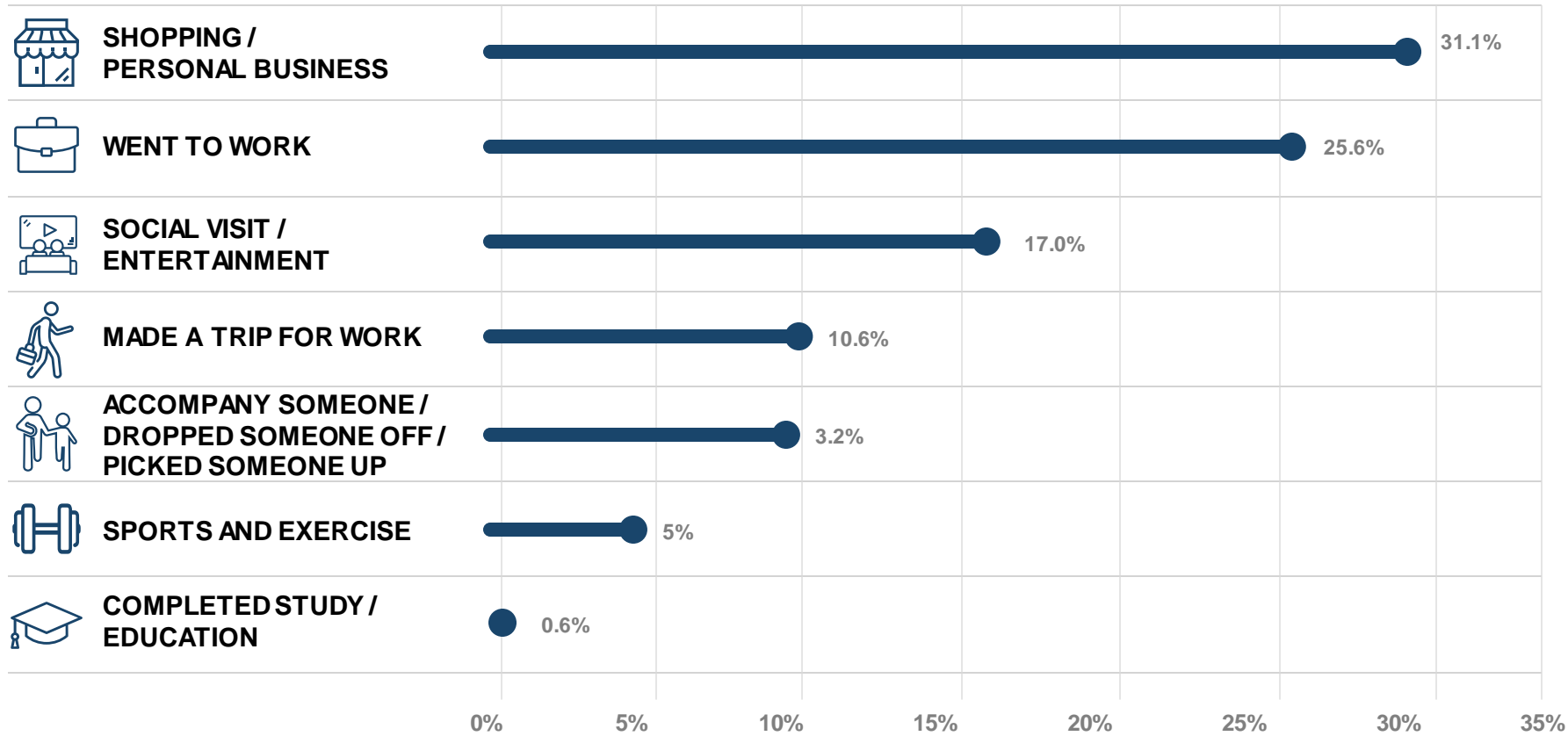
For more information:



- > MAIN REPORT: INVESTING IN MODE SHIFT
- > PT INTERVENTIONS - EFFECTS, COSTS AND COMPARABILITY
- > MODE CHOICE ASSESSMENT TOOL
- > MODE SHARE PURPOSE BREAKDOWN

Typical Light Vehicle Journeys

SUM OF MILLION KM PER YEAR

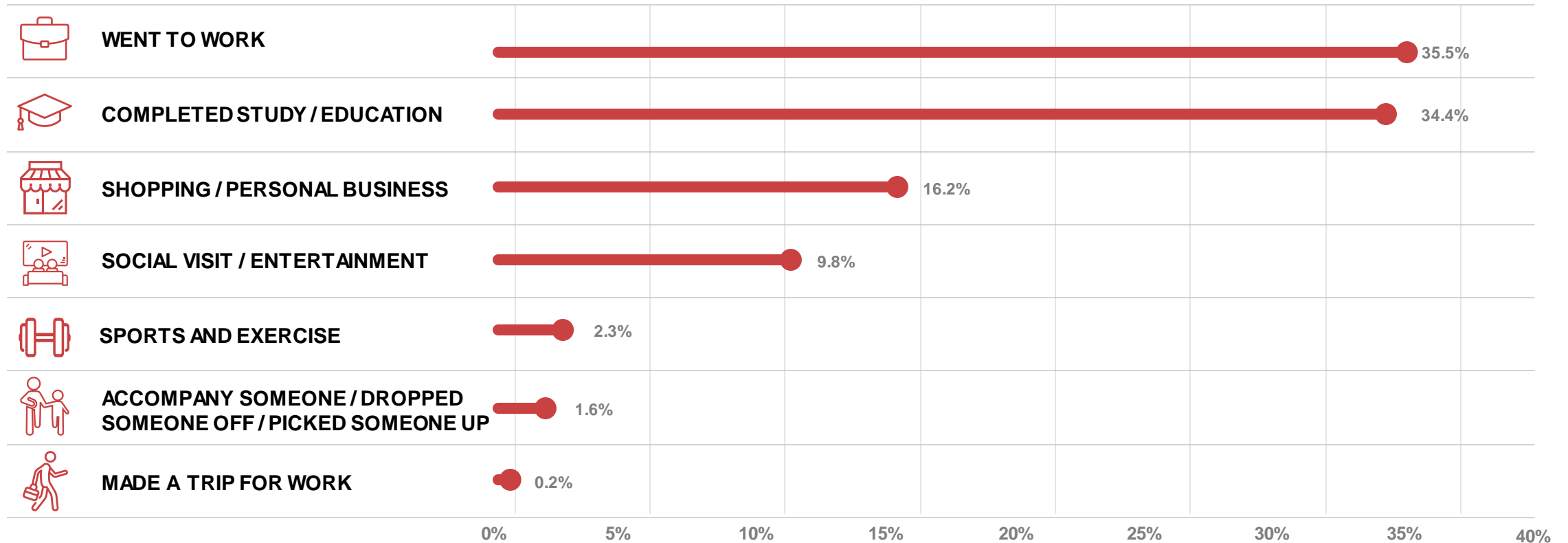


- **ERP Requirement:** 20% reduction in Vehicle Kilometres Travelled (VKT) by cars and light vehicles by 2035.
- Investment programme required to achieve mode-shift for the top three listed

Source: Ministry of Transport Household Travel Survey (HTS)

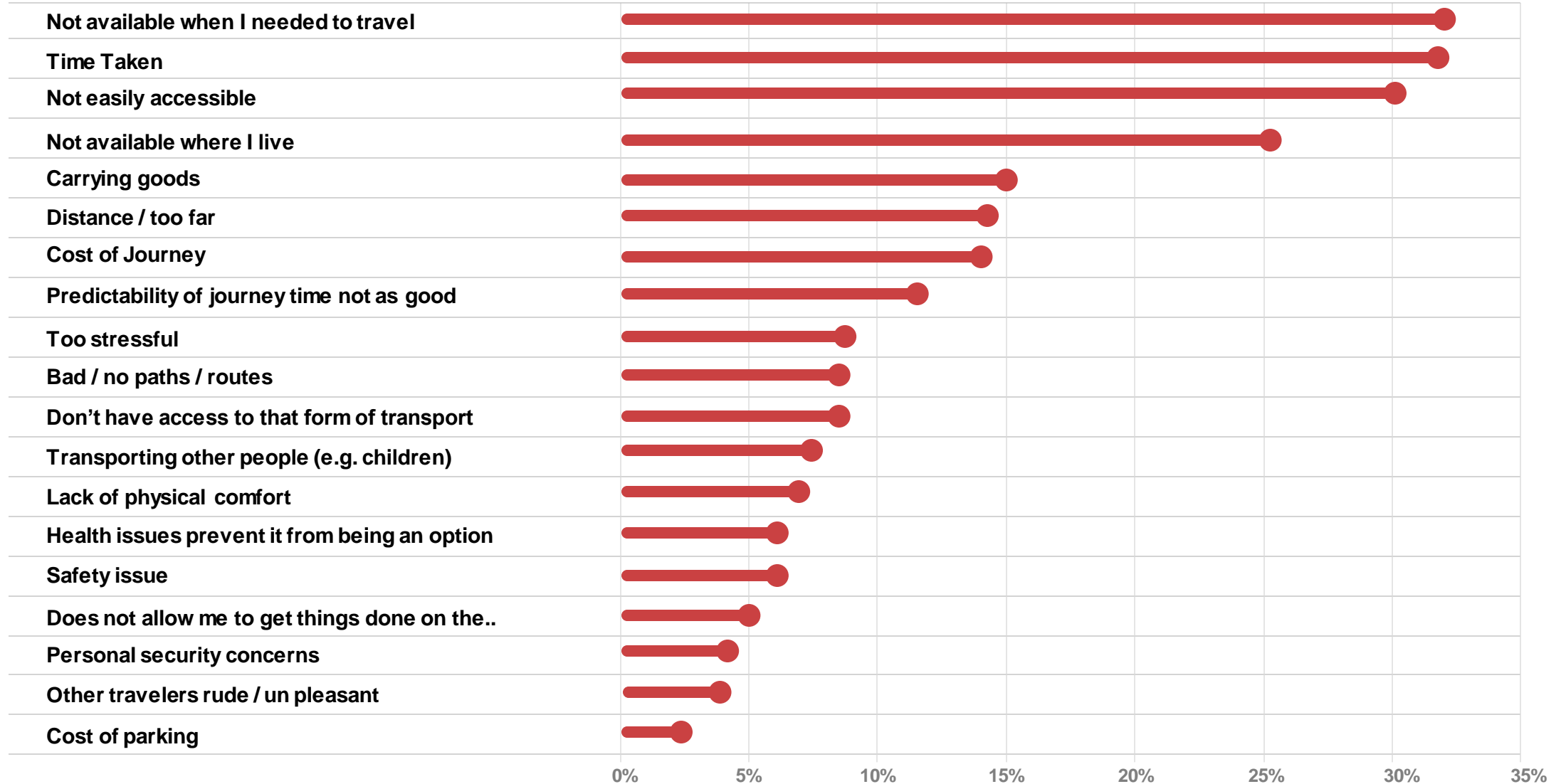
Typical Public Transport Journeys

SUM OF MILLION KM PER YEAR



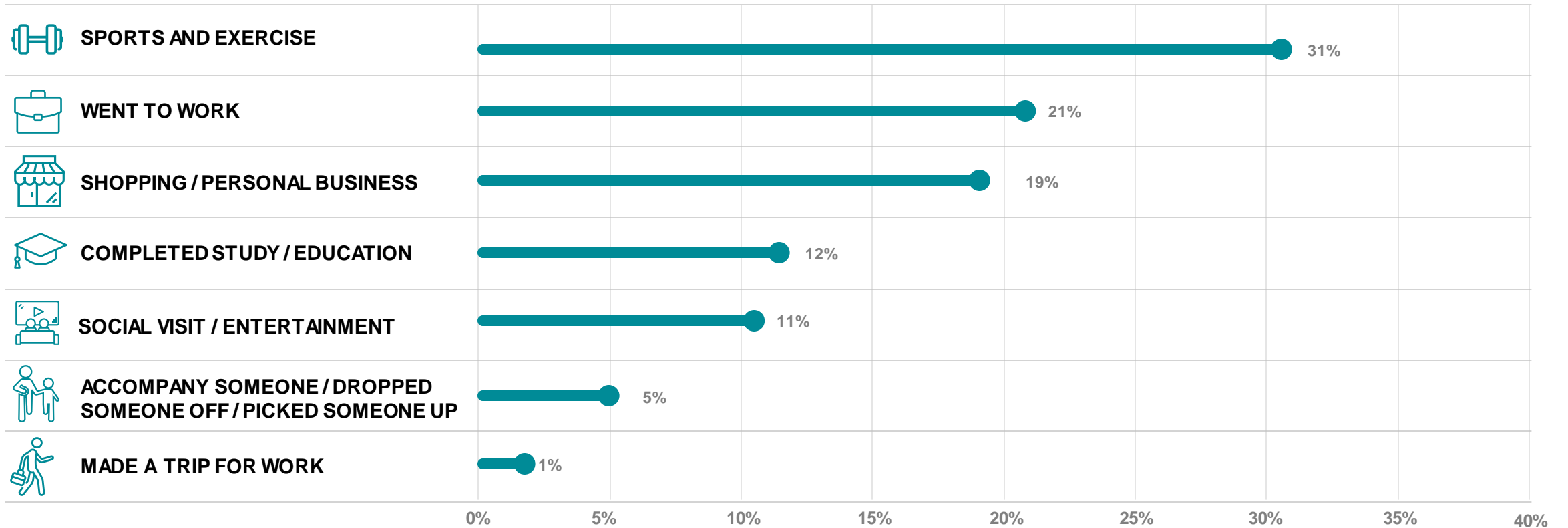
Source: Ministry of Transport Household Travel Survey (HTS)

Reasons for not taking Public Transport



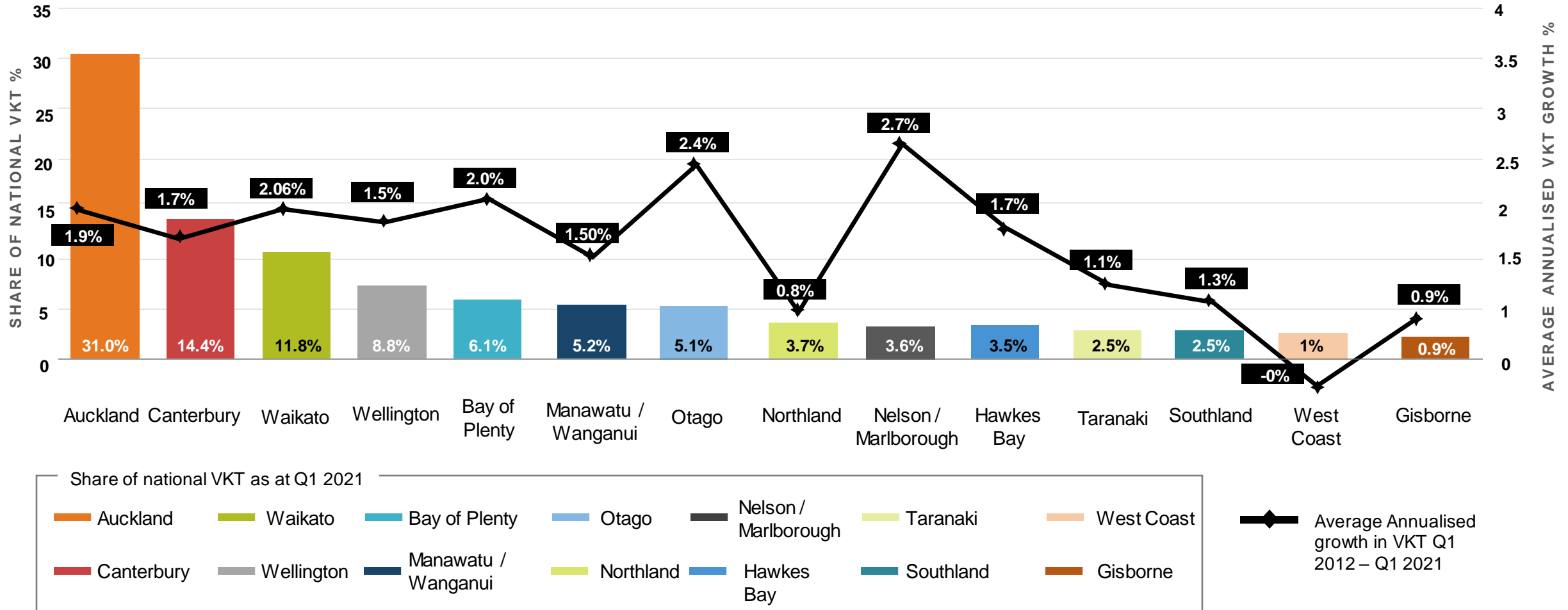
Typical Pedestrian / Cyclist Journeys

SUM OF MILLION KM PER YEAR

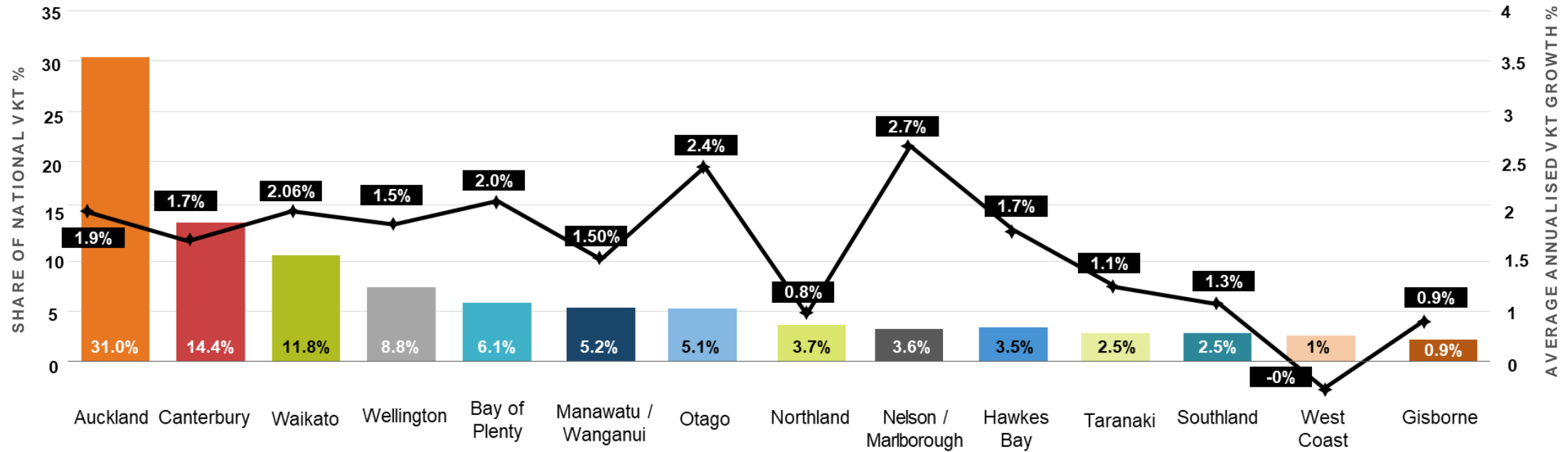


Source: Ministry of Transport Household Travel Survey (HTS)

Regional VKT, 2021 Snapshot



Regional VKT, 2021 Snapshot



- Highest National VKT Share: Auckland, Canterbury, Waikato
- Highest VKT growth rates: Nelson/Marlborough, Otago, Waikato, and Bay of Plenty.
- COVID-19 has impacted VKT most in Auckland, Canterbury and West Coast

For more information:



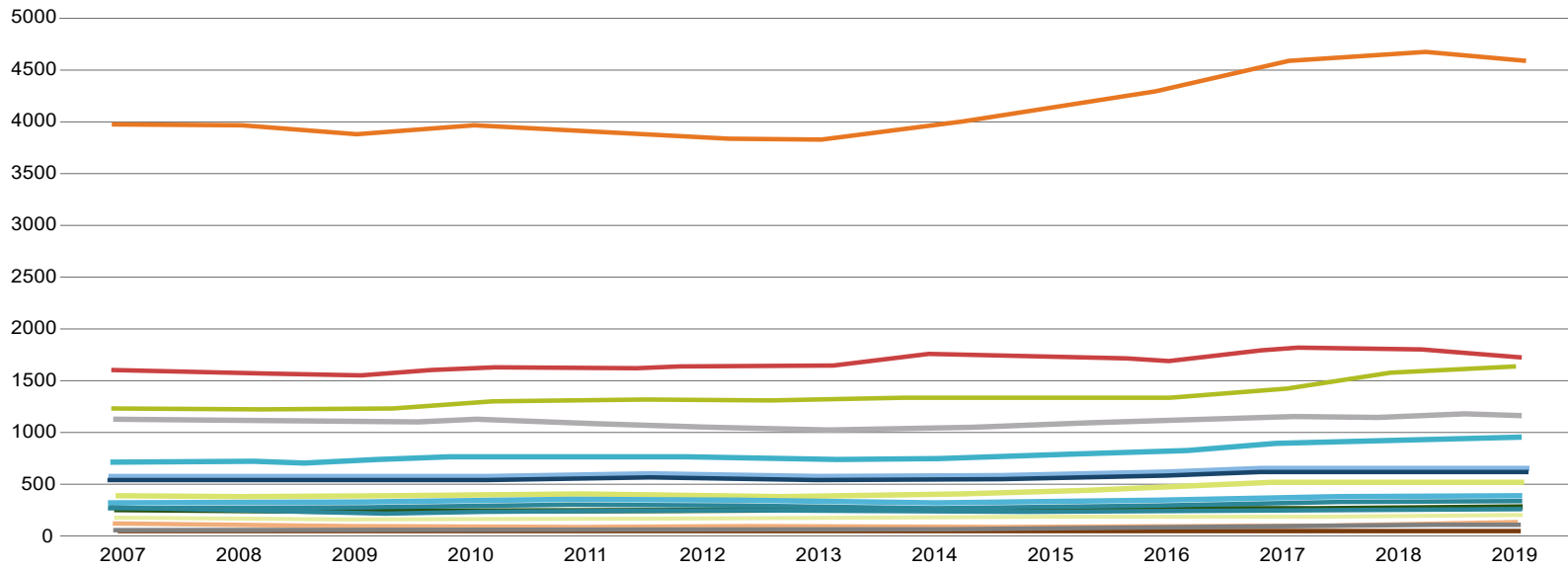
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Emissions by Region

REGIONAL CO₂e KT/YEAR EMISSIONS – STATS NZ FUEL SALES ESTIMATES



- Auckland
- Canterbury
- Waikato
- Wellington
- Bay of Plenty
- Manawatu / Wanganui
- Otago
- Northland
- Hawkes Bay
- Taranaki
- Southland
- Tasman
- West Coast
- Marlborough
- Gisborne
- Nelson

Stats NZ used fuel-sales data to allocate road transport emissions regionally between 2007 and 2019.

CO₂-e results show Auckland as the main contributor; 37% of the growth of emissions.

Waikato (17%) and Bay of Plenty (10%) have also made a significant contribution towards the growth of emissions.

Wellington (6%), Canterbury (6%), All other regions (< 6%)

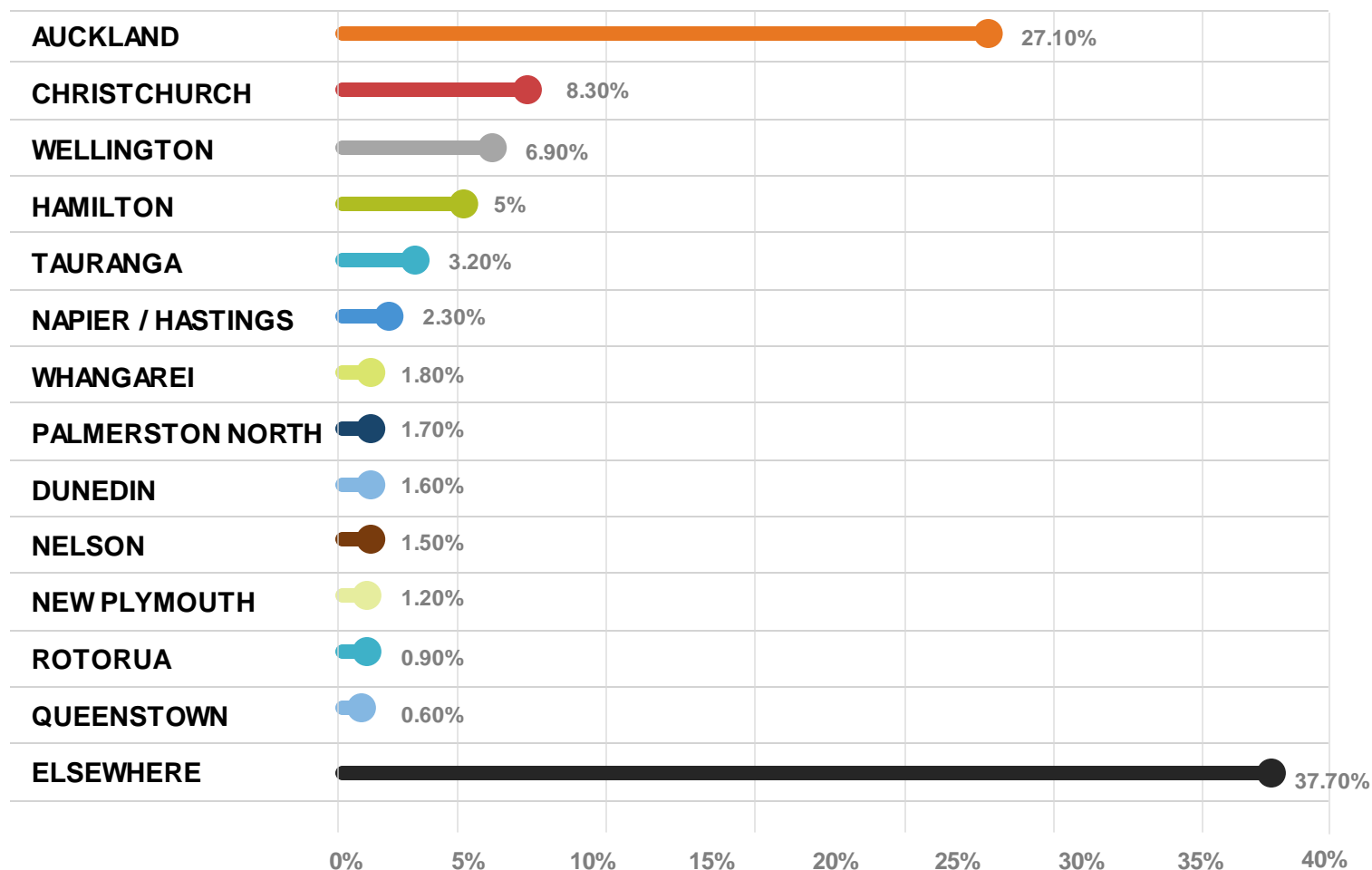
For more information:



> [FULL SUB-REGIONAL VKT AND EMISSIONS DATA](#)

Share of CO₂ by Functional Urban Area, 2020

SHARE OF CO₂ KT-PER-YEAR 2020 BY FUNCTIONAL URBAN AREA



Predicted progression

- The 2022 VEMT update will generate an improved model incorporating CO₂-e from road transport.

** CO₂-e is the unit-of-analysis used in NZ's Greenhouse Gas Inventory by MfE/Stats NZ

Key Judgements

- Emissions continue to grow each year, but at a faster rate for heavy vehicle fleet.
- Urban areas contribute significantly, particularly the three largest.
- 'Tier 1' Functional Urban Areas account for half of NZ's road-transport emissions.

For more information:



- > [ANALYSIS OF FUNCTIONAL URBAN AREAS](#)
- > [VEMT DETAILED RESULTS](#)
- > [VEHICLE EMISSIONS MAPPING TOOL \(VEMT\) OVERVIEW](#)
- > [EMISSIONS BY OTHER LAND TRANSPORT](#)
- > [BACKGROUND DISCUSSION OF VKT DATA, MoT \(2019\)](#)

Freight: Key Barriers to Mode Shift

- **Geography of New Zealand** – Mountainous (seismic) terrain, isolated, separated islands, small land area.
- **Small Population** – New Zealand has a small total population and regions of very low population density.
- **Current rail/coastal infrastructure** –



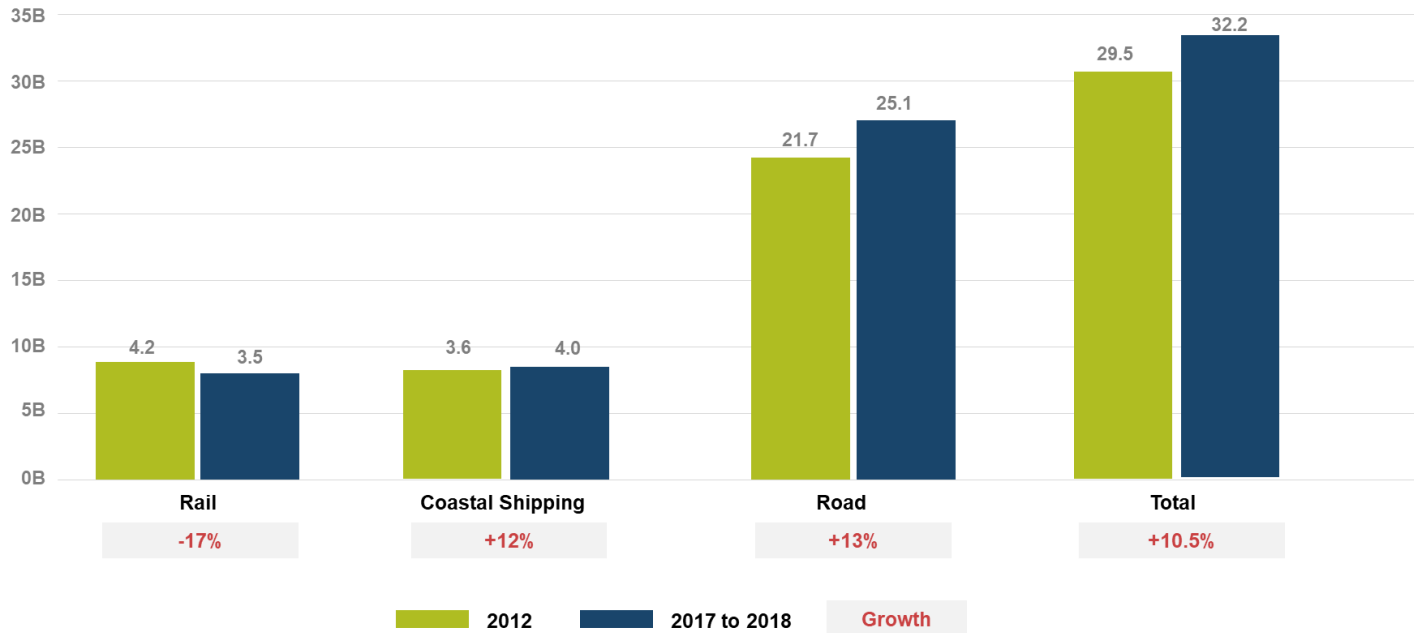
Ageing rail tracks and yards with limited load capacity, single lane tracking with imposing height and space restrictions.



Domestic coastal fleet currently very limited with interisland ferries being relatively expensive and inefficient.

- **Freight modes not paying the true cost of movements.**
- **Ownership structure of NZ freight companies** – Private ports do not work together. Public rail struggles to obtain funding. Opposite of successful ownership structures internationally, like the US.
- **Freight decision maker perceptions** – Rail and Coastal freight scores badly in timeliness.

Freight: CO₂ Contribution Tonne-Km, Growth %



Potential policy responses to address mode shift, from research:

- Incentivise certain modes; internalise externalities of modes
- Investment to increase rail capacity; double stacking and train lengthening
- Intermodal inland and coastal ports
- Automation to increase the efficiency of mode switching
- Data sharing between ports and freight providers

The following chart has the headline tonne-km mode share from the last National Freight Demand Study (NFDS) in 2019.

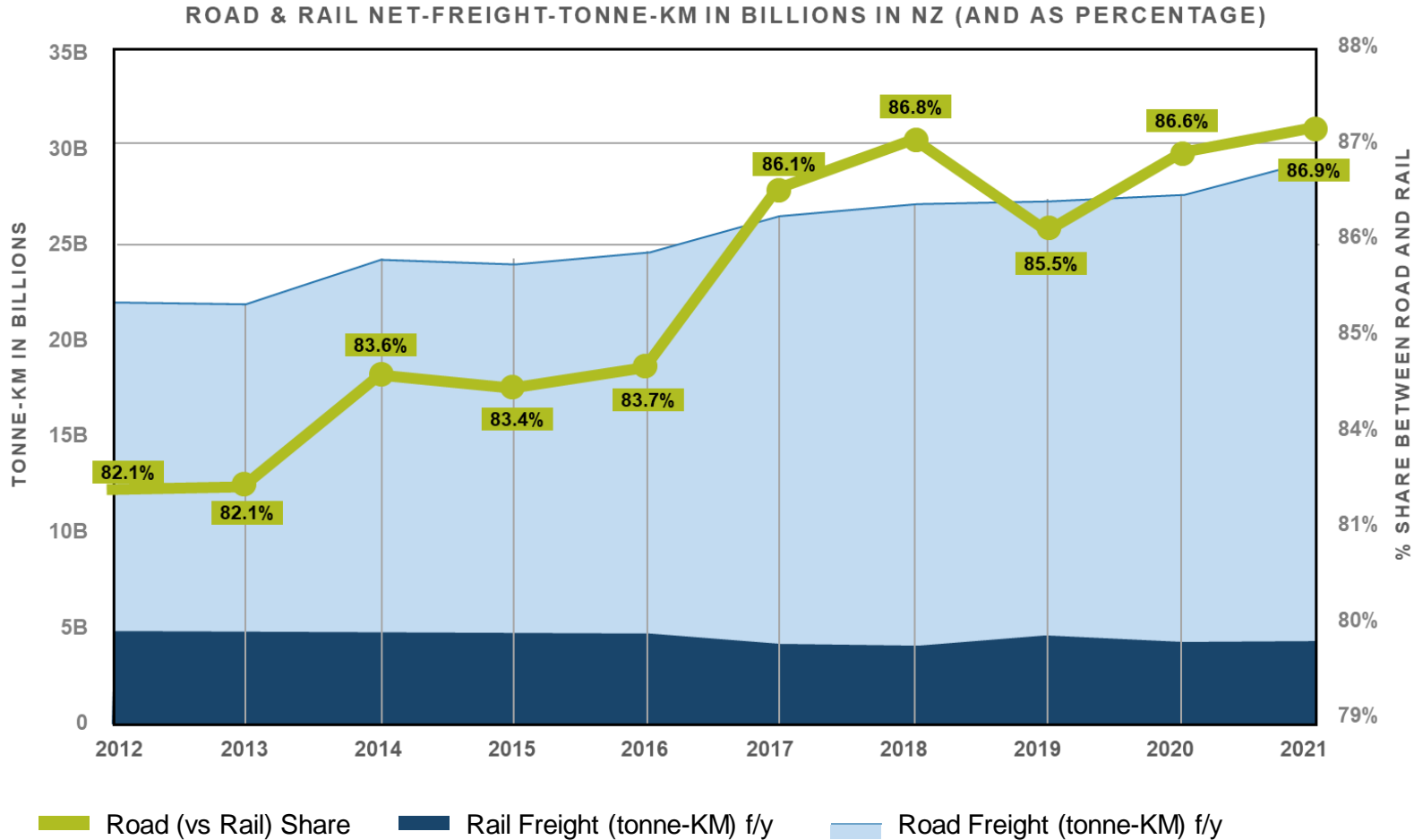
** NFDS only assesses domestic freight flows.

For more information:



- > NATIONAL FREIGHT DEMAND STUDY (NFDS)
- > EMISSIONS BY VEHICLE TYPE BREAKDOWN, MfE
- > FREIGHT INFORMATION GATHERING SYSTEM (FIGS)
- > RAPID LITERATURE REVIEW - CO₂ CONTRIBUTION

Road and Rail











Over the last 10 years, road freight activity has grown year-on-year. However this is not matched by railway freight, which has seen a slight decrease over time. This decrease was apparent prior to the Kaikoura earthquake in 2016/17, which still hasn't fully recovered post-reopening.

For more information:



> [DETAILED FREIGHT MODE SHARE DATA](#)

Interventions: Most Impactful from Research

50-60%		PT Financial incentives (work based)	Up to 50% reduction for four- and five-day commuters, up to 60% for three-day commuters
30%		City wide congestion charging	Up to 50% reduction for four- and five-day commuters, up to 60% for three-day commuters
30%		E-Bike Financial incentives (work based)	Up to 30% self-reported increase in e-bike use
30%		Home Relocation Information	Up to 30% self-reported continuation of PT use
30%		City wide car share	Initial 30% self-reported VKT reduction in first 2 years reversed after 4 years and VKT increased
15%		Financial incentives (route based)	Up to 15% self-reported mode shift
10%		School travel planning	Up to 10% self-reported increase in walking trips
4-9%		City wide workplace parking levy	Up to 4% self-reported mode shift from parking levy alone but 9% when combined with sustainable transport improvements

For more information:



> SUPPORTING GEOSPATIAL DATA-LOCAL COUNCILS



> RESEARCH REPORT - INTERVENTION META-ANALYSIS
 > INTERVENTIONS TYPOLOGY
 > EVALUATED STUDIES - IMPACT ASSESSMENT
 > CRITICAL SUCCESS FACTORS

Interventions: Key Judgements

- Little robust local or international quantitative evidence exists for sustained VKT reduction. Evidence comes from studies as short as 6 weeks to 5 years.
- Many reported impacts are not readily converted to VKT, rather intentions to reported mode use.
- Intervention design and context are significant factors influencing the realisation of any change. To realise potential VKT reduction, the intervention must be well designed and implemented.

Interventions: Key Judgements

- Complementary interventions are usually required for improved effectiveness rather than single interventions
- Some interventions identified for the typology do not directly impact VKT but can be considered necessary for VKT reduction, e.g. planning, available budget, enabling policy and regulation.
- VKT reduction can be highly localised so VKT on the surrounding network must be assessed.
- For the largest impact, all evidence points to a single outcome; road pricing.
- Disincentivising private vehicle usage in the urban centres will provide the largest change.

Please send us your feedback at
evidencebase@nzta.govt.nz