Future Highways - Future Vehicles

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Opportunities and challenges for managing Aotearoa New Zealand's evolving urban freight task

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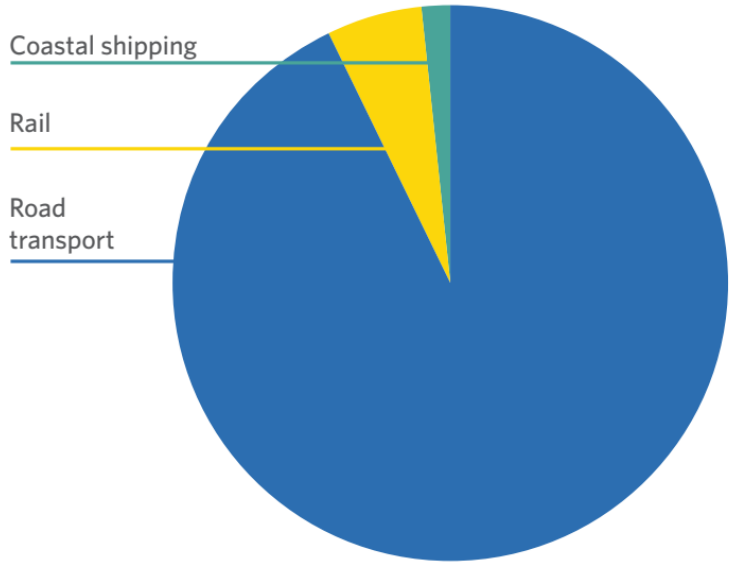
A word about me

- Principal Planning Advisor, Long-term System Planning.
- Lead Arataki key drivers and freight content.
- 18 years' experience across central and local government – mostly in economic development – including the last five years at Waka Kotahi.
- The story behind the picture...

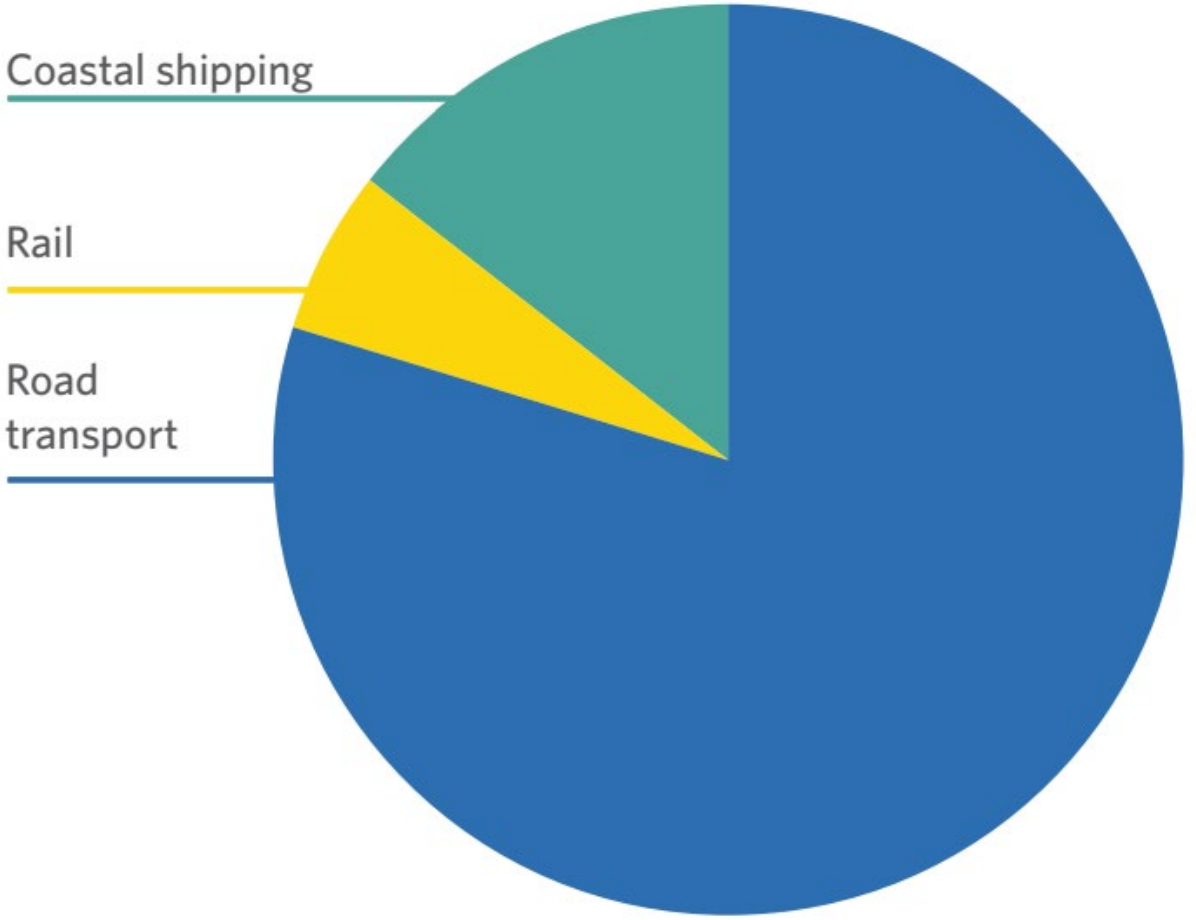
Freight today

The freight task in 2017–2018 by mode
Figure 1

Freight tonnes

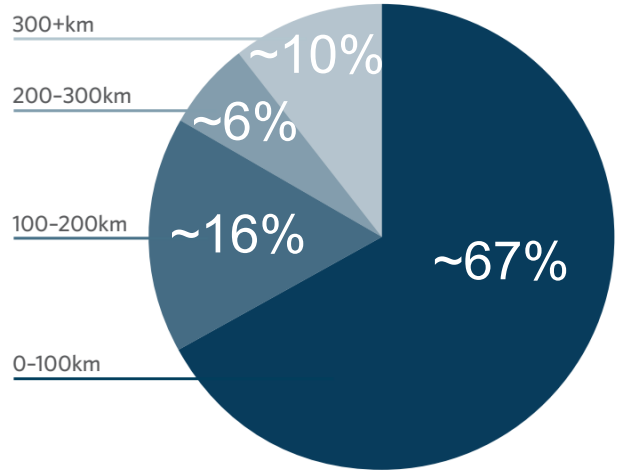


Freight tonnes per kilometre



Freight today (continued)

Freight tonne kilometre distribution
Figure 2



Freight tomorrow

Urban freight is expected to grow because of:

- demand-driven commodities growing by 56% over the next 30 years
- increasing population
- demand for mixed-use neighbourhoods
- consumer expectations for more and faster deliveries.

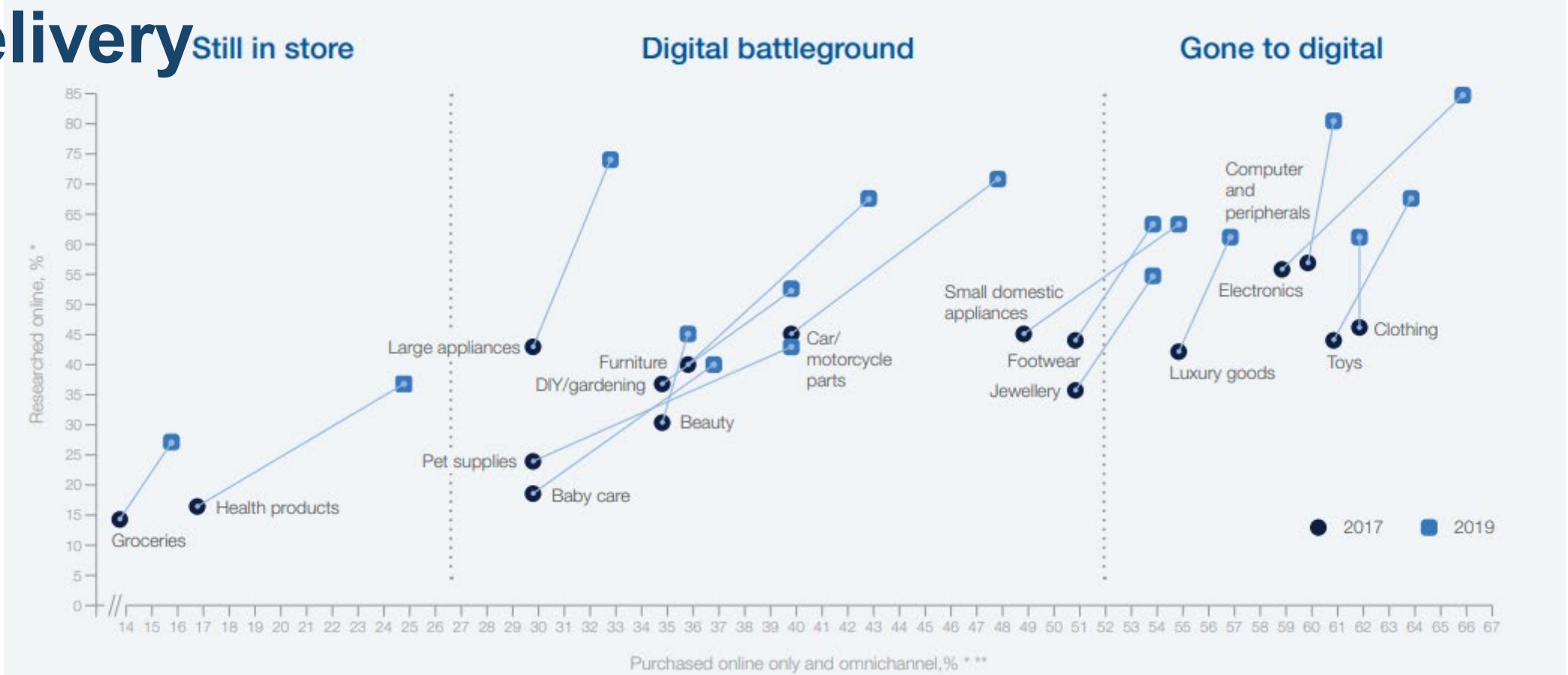
Estimates and forecasts of supply-driven and demand-driven commodities

Figure 04

Freight tomorrow (continued)

- Increased online shopping and home delivery (freight vehicles competing for road and kerbside space and first- and last-kilometre delivery challenges).
- Congestion and conflict between movement of people and freight around gateway ports in urban centres (for example Auckland, Tauranga, Wellington).
- Noise or vibration caused by heavy freight vehicles along key urban corridors could worsen as urban freight demand grows over time.
- Emerging technology and data developments (connected and autonomous vehicles) may help manage freight movement and improve safety in the longer-term.
- Climate change could impact business locations and limit primary industry freight growth.

Accelerating move to online ordering and delivery



* Base are online adults who are online at least once a week and over 18
** Combines online only and omnichannel (which use offline and online channels) buyers

NOTE: The 2017 and 2019 surveys are run in the respective years with minor changes to the methodology and number of survey participants

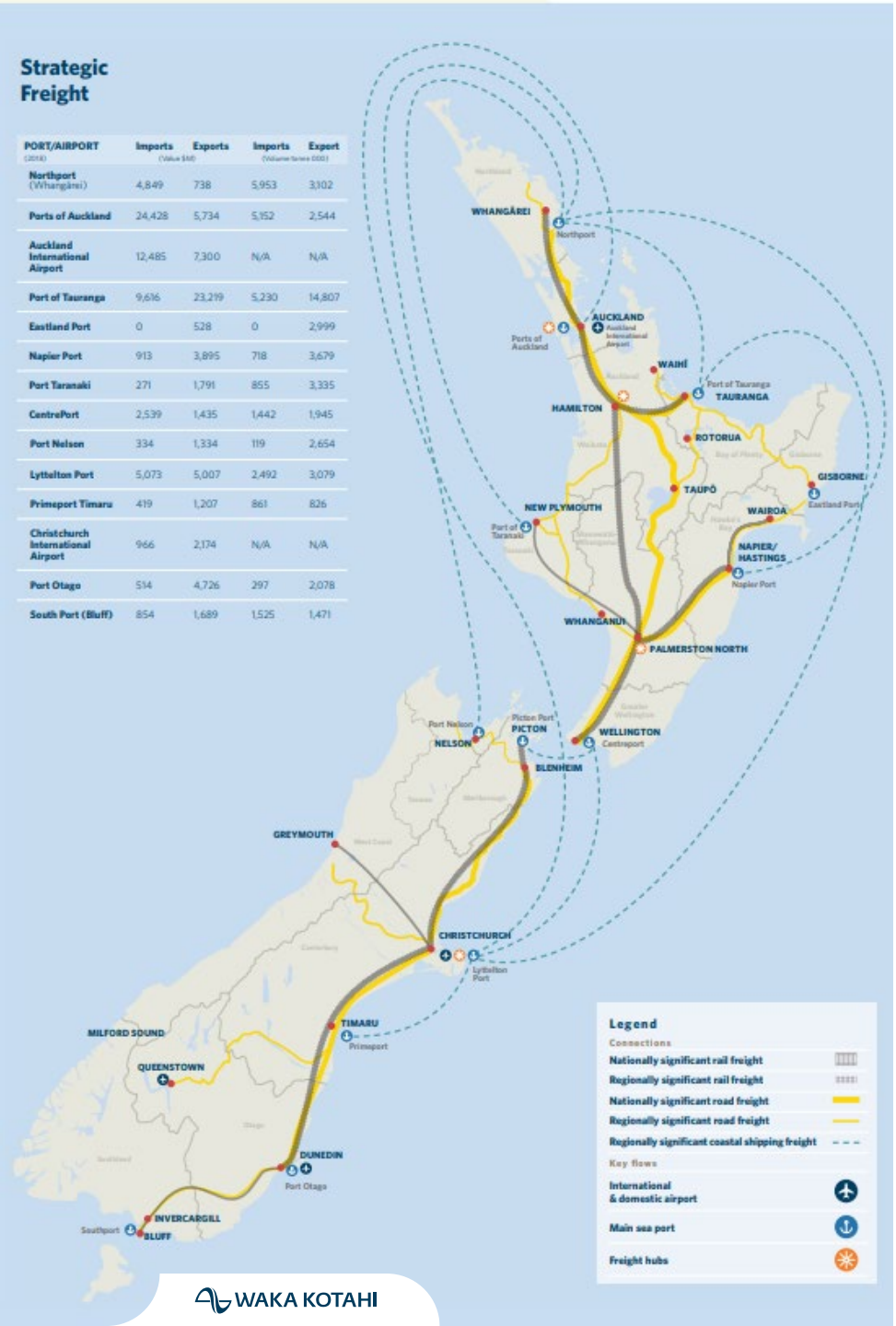
SOURCE: Forrester Consumer Technographics

The challenges for improving urban freight

- A heterogenous industry with a competitive market and often low margins.
- Large number of diverse stakeholders.
- Varying distances of movement, lack of data to understand what trips are occurring and where.
- High investment costs of new technology.
- Increasing demand: more small orders, uncoordinated, unwanted goods, failed deliveries.
- More dense cities: greater competition for space, efficiency and safety challenges.

Optimising urban freight movements of heavy vehicles

1. Strategic freight network
2. Network optimisation
3. Urban form
4. Intermodal freight terminals
5. Road pricing



Strategic freight network

- Identifying and prioritising for responses the most critical parts of the land transport network.
- Some strategic networks in major cities are overburdened, underdeveloped, and inefficient.
- Needs to be high performing, working as a system to move large volumes of freight.
- Identifying strategic network is necessary first step but insufficient on its own.
- Past efforts to improve network performance by increasing capacity on the strategic network have been less effective than hoped.

Network optimisation

- Maximise use of existing network to create extra road capacity, prioritising Strategic Freight Network.
- Small physical interventions, active network management, road space reallocation, behaviour change and technology (signal optimisation), freight lanes (including investment in new capacity where required).
- Quicker journeys along key freight routes during inter-peak periods, more reliable journeys during peaks by managing congestion.

Urban form

- Mixed-use development will put pressure on our freight and supply chain system and urban networks.
- Getting the right balance for the movement of people and goods through integrated land use and transport planning.
- To optimise the distance goods need to be moved between homes, workplaces, distribution centres, and ports.
- Recognises value of freight to society, (economic and social activity).

Intermodal freight terminals

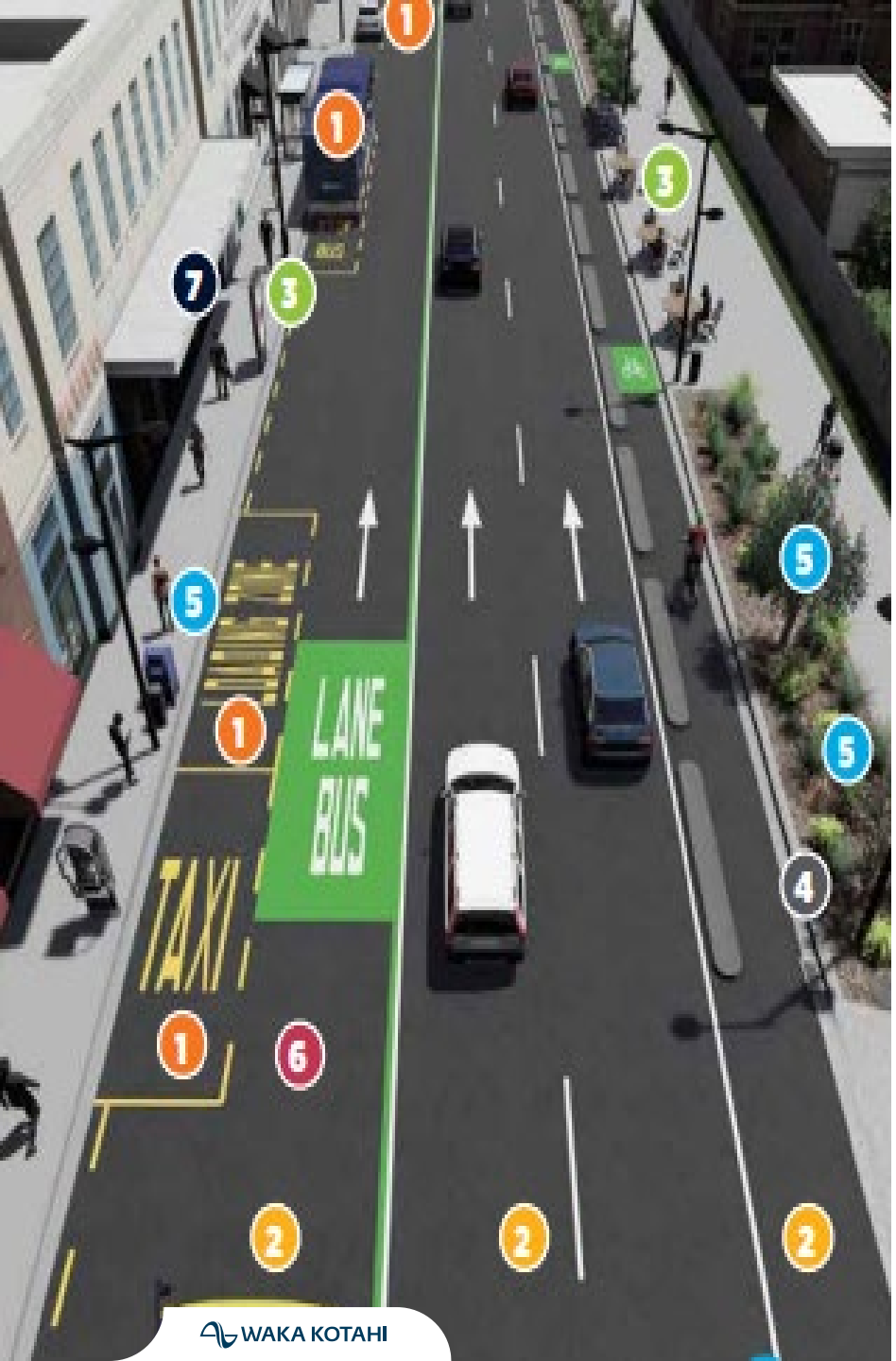
- Inland ports, freight precincts, log transfer yards, rail-enabled distribution and storage terminals, container transfer (CT) sites, industrial parks with intermodal transfer facilities.
- Can provide efficient and effective transfers of freight between different modes, improve productivity, reduce negative effects from the movement of freight.
- Mode shift from road to rail and coastal shipping could increase the need.
- Case-by-case assessment, national view of optimal configuration, number and locations.

Congestion pricing

- Area-based, cordon-based, corridor-based, network-based.
- Optimises network use and protects transport network for highest priority uses.
- More efficient movement of freight, lower overall travel costs and more consistent travel costs.
- Considered for Auckland (The Congestion Question).
- Availability as a tool subject to legislation.

Optimising urban freight movements of light vehicles

- Kerb management
- Consolidation centres, freight hubs and lockers
- A move to “other” delivery vehicles
- Improvement to logistics
- Explore where trip purposes could be combined to reduce the number of overall trips
- Reduce consumer demand for freight.



Kerb management

- Assists in managing congestion at the kerbside where different modes interact.
  - Scheduled timed access for deliveries, with some having the ability to book in real-time
  - Time-access pricing and incentives to encourage off-peak deliveries. Deliveries to consolidation centre, final delivery (or pick-up) made off-peak.
- Improves safety for all users.
- Reduces freight vehicles circulating to find a parking space.
- Ensure adequate space for micro-freight vehicles to operate safely and space for other road users.
- Collect data in highly congested areas.

Consolidation centres, freight hubs and lockers

Types of ‘urban freight hubs’:

- **Construction consolidation centres** staging place, full loads taken to construction site as needed.
- **Micro-hubs** smaller than freight hubs and closer to CBD areas. Last mile delivery by most efficient mode (for example cargo bike, tricycle, or on foot).
- **Lockers** close to final destination, pick-up as convenient for recipient.
- Optimise:
  - number of trips
  - loading of delivery vehicles
  - route selection
  - what size and type of delivery vehicle is used.

A move to ‘other’ delivery vehicles

Loads taken by small/light/electric/alternative delivery means

E-cargo bikes and trailers encouraged by technological advances and interventions to remove combustion engine vehicles from areas

Drones (UAV) international and domestic investigations for urban deliveries

Bots/Robots trialled overseas and in Aotearoa

eVTOL electric aircraft that can hover, take-off and land vertically. Unlikely in the next 1-2 years

Identify potential for conflict with other users or modes and safety issues

Legislation probably inadequate or will actively prevent use

Improvement to logistics

- Improving supply chain logistics efficiency through **decentralised ledgers** and **smarter inventory management**.
- Enabled by blockchain, cloud-based systems and integrations, real-time analytics and tracking and AI/ML.
- No single point of control, goods consolidated across a range of providers; enable reverse logistics (backloading).
- More trips fully loaded, fewer delivery vehicles criss-crossing in the same area, more trips taking the fastest and/or shortest route.
- Difficult to quantify benefits of commercial trials as no data sharing.

Explore where trip purposes could be combined to reduce the overall number

- The use of reverse logistics (backloading) with different types of loads, for example construction materials and waste.
- Combining operations where additional tasks could be added, for example rubbish collection operations with data collection for road maintenance tasks.
- Reduces the number of overall trips and could generate more revenue from the same movements.

Reduce consumer demand

- Less overall demand for goods though people living more sustainably.
- Would result in a decrease in urban freight.
- Gen Less.
- Not clear yet what the long-term impact will be.
- Would require significant and sustained shifts in consumer values and behaviour.

Next steps…?

- Continue to work with councils on urban/spatial plans and transport plans.
- Work with Te Manatū Waka and industry to support the removal of barriers to innovations.
- Gain better data in collaboration with industry.
- Trialling of potential solutions.
- Move to any alternative mode safely.