



TRANSURBAN INSIGHTS: THE FUTURE OF ROAD FREIGHT

February 2025

CityLink, Melbourne

Research

Research and analysis undertaken by Transurban, utilising internal data and publicly available data

Road transport plays a vital role in the supply chain, moving commodities we make and use every day – things like food, fuel, household appliances and online shopping purchases will generally reach their destinations by road.



What's driving freight demand



Value of toll roads



Freight innovation

With an average of 386,000 large vehicle trips taken on our roads every day,¹ this edition of Transurban Insights examines the future of road freight in our markets – what's driving demand, the role our roads play in moving goods around cities, and how technology is driving efficiency.

Transurban Insights reports use data and research from our business and external sources, as well as surveys we commission, to explore specific issues relevant to road transport. We share these insights with government and industry and use them to inform driver and community education campaigns.

Key findings:

- **40% road freight growth** expected to outpace 28% population growth to 2040 in Australia's three largest cities
- **Over 3% projected** annual increase in container movements at Australia's three largest ports (Melbourne, Sydney and Brisbane) to 2050
- **57% increase** in large vehicles on Transurban roads in past decade²

¹ Average daily traffic (ADT) on Transurban's Australian assets as measured between July and December 2024, for Light Commercial Vehicles and Heavy Commercial Vehicles

² Excludes Westlink M7. Toll roads, including NorthConnex and WestConnex in Sydney, and AirportlinkM7 in Brisbane, have been added to Transurban's portfolio since 2015



What's driving freight demand

Demand for road freight is growing, driven by what we're buying, where we're living and what we're producing.

Population and economic growth

As cities grow and suburbs expand outward, the demand for freight rises.

This is especially true of road freight. More people means greater household spending on goods and services, more construction projects and increased manufacturing – all activities that generate truck traffic.

Our Australian markets are a great example of this, with road freight volumes expected to grow 40% across Australia's three largest cities, to service a projected 28% increase in population (Figure 1). This is most significant in Melbourne, where road freight is expected to grow 48% to service a forecast 30% increase in population by 2040.

This trend is underpinned by forecast real GDP growth of around 2% a year between 2020 and 2050, and per capita income level growth of 0.9% per year over the same period.

Geography

The distance between where goods are produced and where they are used has a direct impact on freight volumes.

Australia and North America have long had some of the highest per capita rates of road freight activity among developed countries,¹ owing to these regions' geographic spread and long distances between population centres.

Trade volumes

A region's imports and exports add to domestic freight demands, as goods need to be transported to and from ports.

Container movements through Australia's three largest ports – Melbourne, Botany (Sydney) and Brisbane – are projected to increase by more than 3% annually to 2050.²

Changing consumption trends

Noticed more trucks on the road in November and December?

Online shopping continues to increase in both Australia and North America, and the growing popularity of Black Friday and Cyber Monday sales are having a real impact on road freight.

In 2024, around 7.6 million Australian households shopped online over the peak season during November and December, with Australia Post delivering 103 million parcels³ in this period.

Black Friday and Cyber Monday sales have grown by 88% and 70% respectively since pre-pandemic 2019.³

We see these online shopping trends reflected in our traffic data, with heavy vehicle movements typically spiking from October to December – and growing higher over time.

Figure 1: Forecast population and road freight growth in Transurban's Australian markets to 2040

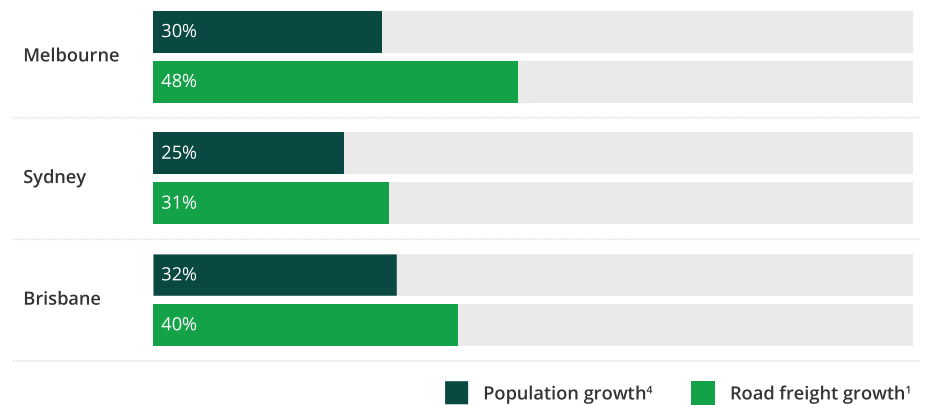
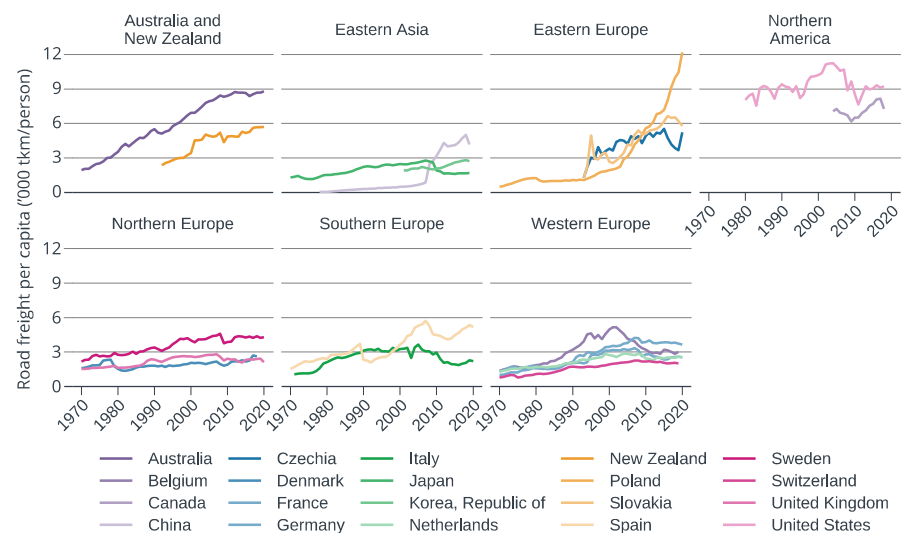


Figure 2: International per capita road freight trends for selected countries, 1971–2020²



¹ Australian Government BITRE, 2022, Report 154: Australian Aggregate Freight Forecasts – 2022 update

² KPMG, 2019, Quay conclusions; Port of Melbourne, 2020, 2050 Port Development Strategy; DAE, 2018, Establishing the need for the last mile

³ Australia Post 2024 Inside Australian Online Shopping eCommerce Industry Report

⁴ Deloitte Access Economics (DAE), September 2024 Land Use Forecasts

Freight costs and choices

The cost of transporting goods influences how and where goods are moved, affecting overall freight volumes.

While shipping and rail freight are great options for bulk long-haul movements, road freight is more cost-effective, efficient and flexible when moving goods between manufacturing facilities, distribution centres and consumers.

In the US, over 64% of freight is moved by truck, with this share expected to grow to 66% by 2050.¹

Commodity mix


Changes in the types of goods being transported, such as a shift from heavier primary products (raw materials such as minerals or agricultural crops) to lighter secondary and tertiary products (such as manufactured foods and goods) can have an impact on freight growth.

See page 7 for an example of how many road freight movements are generated by a common household item.

Sharing the road with trucks

Being aware of the vehicles around you – and knowing when other road-users can and can't see you – increases safety for everyone.

With even more trucks expected on the road as freight movements increase, it's a good idea to make sure you're aware of different vehicles' blind spots and how to safely share the road.

 [Learn more on our website.](#)



¹ US Department of Transportation Bureau of Transportation Statistics, 2023, *Weight of Shipments by Transportation Mode*



Value of toll roads: productivity & efficiency benefits

For freight operators, our road routes can mean quicker, safer and more direct and reliable travel. This, in turn, means lower costs in fuel, wages and vehicle wear and tear.

KPMG analysis estimates that in NSW alone businesses and freight users are expected to realise approximately \$11.8 billion in benefits over the 30 years to 2046 due to the accelerated delivery of toll roads by the private sector.¹

This includes an estimated \$10.5 billion in travel-time cost savings for the freight sector across the greater Sydney network.

The NSW Freight and Ports Strategy estimates that a 1% increase in freight efficiency saves the national economy \$1.5 billion.²

To achieve efficiencies, freight logistics businesses tend to concentrate around major transport corridors, including toll roads, to gain easier access for travel across cities³ (Figure 3). Travel-time reliability also gives freight operators greater certainty when scheduling pickups or deliveries and allows for more trips throughout a day.

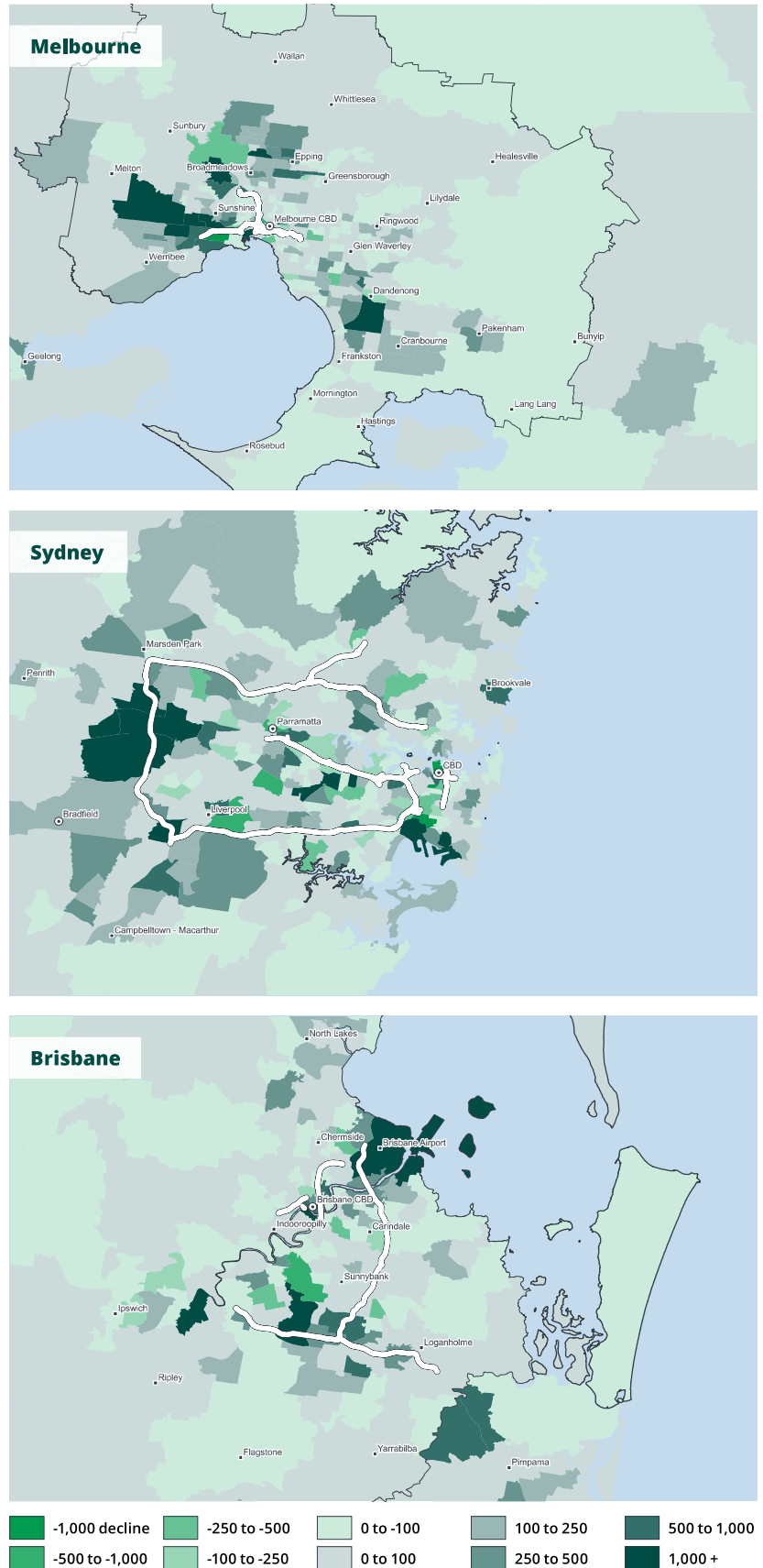
In the past decade, the average number of daily trips by commercial vehicles on Transurban's roads has increased by about 57%,⁴ reflecting the benefits of efficient travel on our roads.

In Melbourne, drivers are saving up to 30 minutes per trip by using CityLink – the same time savings as 16 years ago⁵ – despite the city's population having grown by around 1.3 million.⁷

In Sydney, thanks to WestConnex, a trip from Parramatta to the CBD is almost 25 minutes faster⁶ than a decade ago despite the population in NSW growing by almost a million extra people in that time.

WestConnex also offers major travel-time savings to industrial precincts, freight hubs, the airport and Port Botany. For example, an articulated truck using WestConnex to carry a container from the western suburbs to the port between 9am and 3pm would save almost 40 minutes and avoid 70 intersections, compared to taking a free alternative route. After paying the toll, the net benefit to the operator is around \$59. A freight operator could also realise a net benefit of around \$39 by using another toll road route, taking in the M7, M5 East and M5 South West (see Case Study on page 5). Operators would achieve further savings through vehicle operating cost benefits.

Figure 3: Growth of transport, postal and warehousing jobs, 2006-2021³



¹ KPMG, 2021, *Economic Contribution of Sydney's Toll Roads*

² *Transport for NSW, 2013, NSW Freight and Ports Strategy*

³ ABS Census: Place of Work, 2006 to 2021. 2006 data adjusted to Australian Standard Geographical Classification 2021, based on internal concordance methods

⁴ Excludes Westlink M7. Toll roads, including NorthConnex and WestConnex in Sydney, and AirportlinkM7 in Brisbane, have been added to Transurban's portfolio since 2015

⁵ Travel-time savings based on TomTom data for average workday in May 2008 compared to May 2024

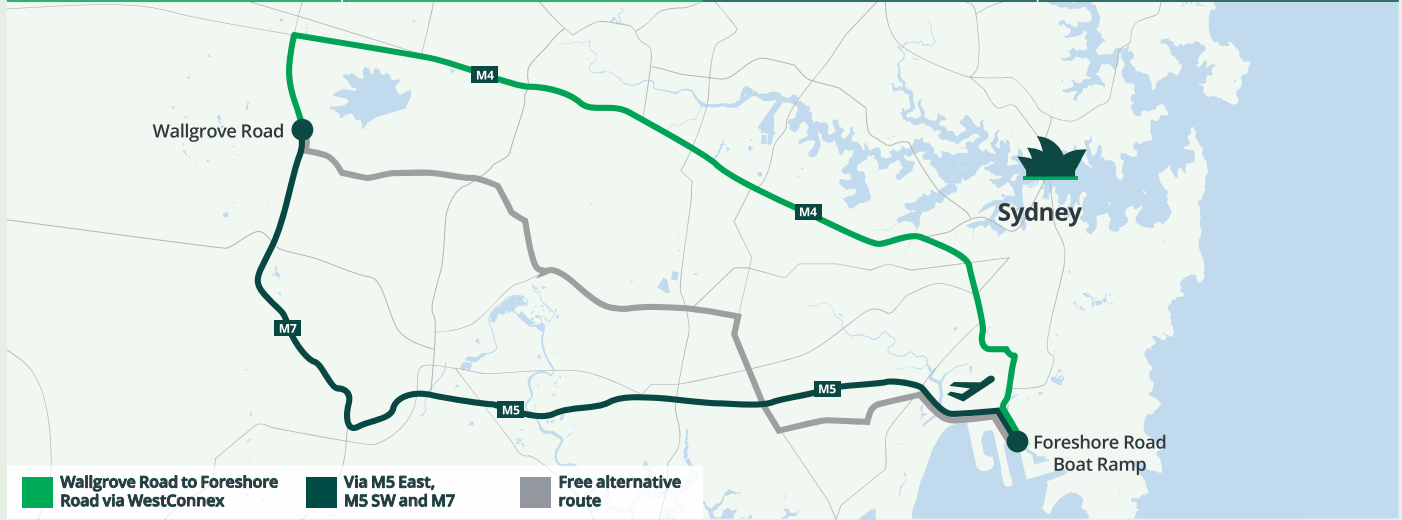
⁶ Travel-time savings based on TomTom data for average workday in March 2014 compared to March 2024

⁷ Deloitte Access Economics (DAE), September 2024 Land Use Forecasts

Case study: Wallgrove Road to Foreshore Road – inbound outbound

For an articulated truck carrying a container travelling to the port during the day between 9am–3pm

Net benefit of approximately \$59 via WCX ¹				Net benefit of around \$39 via M5 East ¹ , M5 SW and M7			
\$35.30 toll paid ²	40 mins saved (saving \$64 in VTT ³)	17L of fuel saved	70 intersections avoided	\$64 toll paid ²	43 mins saved (saving \$64 in VTT ³)	20L of fuel saved	78 intersections avoided
Travel times between 9am–3pm ⁴				Travel times between 9am–3pm ⁴			
40 mins Tolled route		80 mins Free alternative route		37 mins Tolled route		80 mins Free alternative route	



Depending on the vehicle, the value per hour of travel can range between \$44 for a light commercial truck to \$129 for a B-Double truck (Figure 4).⁵

In Queensland, our proposal to upgrade a section of major transport corridor, the Logan Motorway, is forecast to generate more than \$2 billion in additional productivity benefits for the region over the next 20 years.⁶ These benefits are expected to come from travel-time savings of up to 20 minutes in

peak periods by 2031, reliability and safety improvements, and through reduced vehicle operating and maintenance costs.

Transurban Queensland is partnering with the Queensland Government to develop plans to upgrade close to 10km of the western section of the motorway, which carries more than \$1 billion in freight each day.

In Victoria, the West Gate Tunnel project, which is due to be delivered in 2025, will provide direct access to the Port of

Melbourne, allowing trucks to bypass up to 17 sets of traffic lights and save up to 50% travel time in peak periods. For example, a truck travelling from the western suburb of Laverton to this port is expected to save 13 minutes in the morning peak in 2031 and avoid 13 sets of traffic lights by using the West Gate Tunnel.⁷

The Port of Melbourne predicts that port traffic could increase from 11,000 weekday trucks in 2016, to 35,000 by 2050.⁸

Figure 4: Value per hour of travel time on urban roads for freight operators⁹

Rigid trucks

Light commercial
2 axle / 4 tyre



Medium
2 axle / 6 tyre



Heavy



Articulated trucks

4 axle



5 axle



6 axle



Combination vehicles

B-double



¹ Net benefit of WestConnex in 2024 dollars (travel time savings plus fuel savings minus toll costs), based on Transurban internal analysis. Excludes vehicle maintenance and wear-and-tear costs

² WestConnex tolls as at 25 June 2024, other tolls as of 1 October 2024

³ Value of time values for urban roads used from Transport for NSW, Economic Parameter Values, January 2025

⁴ Travel-time savings based on TomTom data for average workday in November 2024

⁵ Transport for NSW, January 2025, Transport for NSW Economic Parameter Values

⁶ Transurban internal analysis

⁷ West Gate Tunnel Project, 2017, Environment Effects Statement: Technical Report A, Sections 7.1 and 7.2 (pp 228 to 244)

⁸ Port of Melbourne, 2050 Port Development Strategy, 2020

⁹ Transport for NSW, Economic Parameter Values, January 2025. Figures calculated by adding 'Value per occupant (\$/per person-hour multiplied by average occupancy rate) to 'Urban Freight (\$/vehicle-hour) and rounding to the nearest dollar

Cost savings through purpose-built infrastructure

Many toll roads and tunnels have been purpose built to support the freight industry with features such as smoother, flatter road gradients to allow vehicles to maintain steady travel speed, resulting in better fuel efficiency, reduced emissions and less need for lane changing.

KPMG has estimated that businesses and freight operators in NSW stand to save around \$700 million in vehicle operating costs over the next 30 years through using toll roads.¹

Key operating cost savings include fuel consumption, repair and maintenance, tyre wear and vehicle capital costs.

More recently built tunnels, including NorthConnex, the M4 and M8 in Sydney and West Gate Tunnel in Melbourne, have higher clearances – between 4.9 and 5.1 metres – to reduce the likelihood of incidents with over-height vehicles and to improve tunnel ventilation system efficiency.

The design of our roads also incorporates features such as suitable pavement depths and grades to cater for heavy vehicles. Westlink M7, for example, features a continuously reinforced concrete pavement

for enhanced durability and longevity of the road surface.

Heavy vehicles have more impact on the road surface than cars² so directing them on to purpose-built toll roads where possible may relieve some pressure on government road-maintenance budgets.

In Australia, federal, state and local governments spent a combined \$39 billion in 2022–23 on maintaining, expanding and upgrading the nation's road network.³ Australian government expenditure on roads has doubled in the past decade.³

In FY24, Transurban invested around \$152 million in maintenance for its roads in Australia and North America.⁴

Along with the impact on road surface, a large truck (such as a B-double), travelling on a standard motorway lane takes up the space of around 3.5 to 4.5 times a passenger car which can have considerable impact on road congestion.

Trucks, as well as being physically bigger, also require additional space and time to accelerate and decelerate, meaning they need more space around them than smaller vehicles. This has a flow-on effect for other traffic, with heavy vehicles having a larger impact on congestion than passenger cars.

Due to their size, their wear-and-tear on infrastructure and the higher cost of building roads to accommodate heavy vehicles, they pay higher tolls than cars and motorcycles.

Removing these trucks from local streets can also benefit local communities, improving safety and easing congestion, as well as providing better local air quality and reduced traffic noise for the local community.

The West Gate Tunnel is projected to remove more than 9,000 trucks from local streets a day, while the proposal to upgrade the western section of the Logan Motorway is expected to remove more than 6000 trucks and cars each day from streets in the local area.

After NorthConnex opened in 2020, there was a 57% reduction in crashes on Pennant Hills Road – the predominant route for trucks prior to NorthConnex – and 47% fewer fatal or serious injuries with heavy vehicles moved away from local streets.⁵

Our monitoring of air quality in the area has also shown that pollution has dropped significantly. Nitrogen oxides (NOx) are the dominant emissions from car and truck exhausts. Immediately after NorthConnex opened, NOx concentrations decreased by about a third near Pennant Hills Road.

¹ KPMG, 2021, *Economic Contribution of Sydney's Toll Roads*

² *Transport for NSW, January 2025, Transport for NSW Economic Parameter Values*

³ *Australian Government BITRE, January 2025, Australian Infrastructure and Transport Statistics - Yearbook 2024*

⁴ *Transurban's maintenance cash spend on controlled entities at 100% in FY24*

⁵ *Transport for NSW, Crashes on the Cumberland Highway (Pennant Hills Road) north of M2 and south of M1, 26-month comparison September 2018 to December 2022*



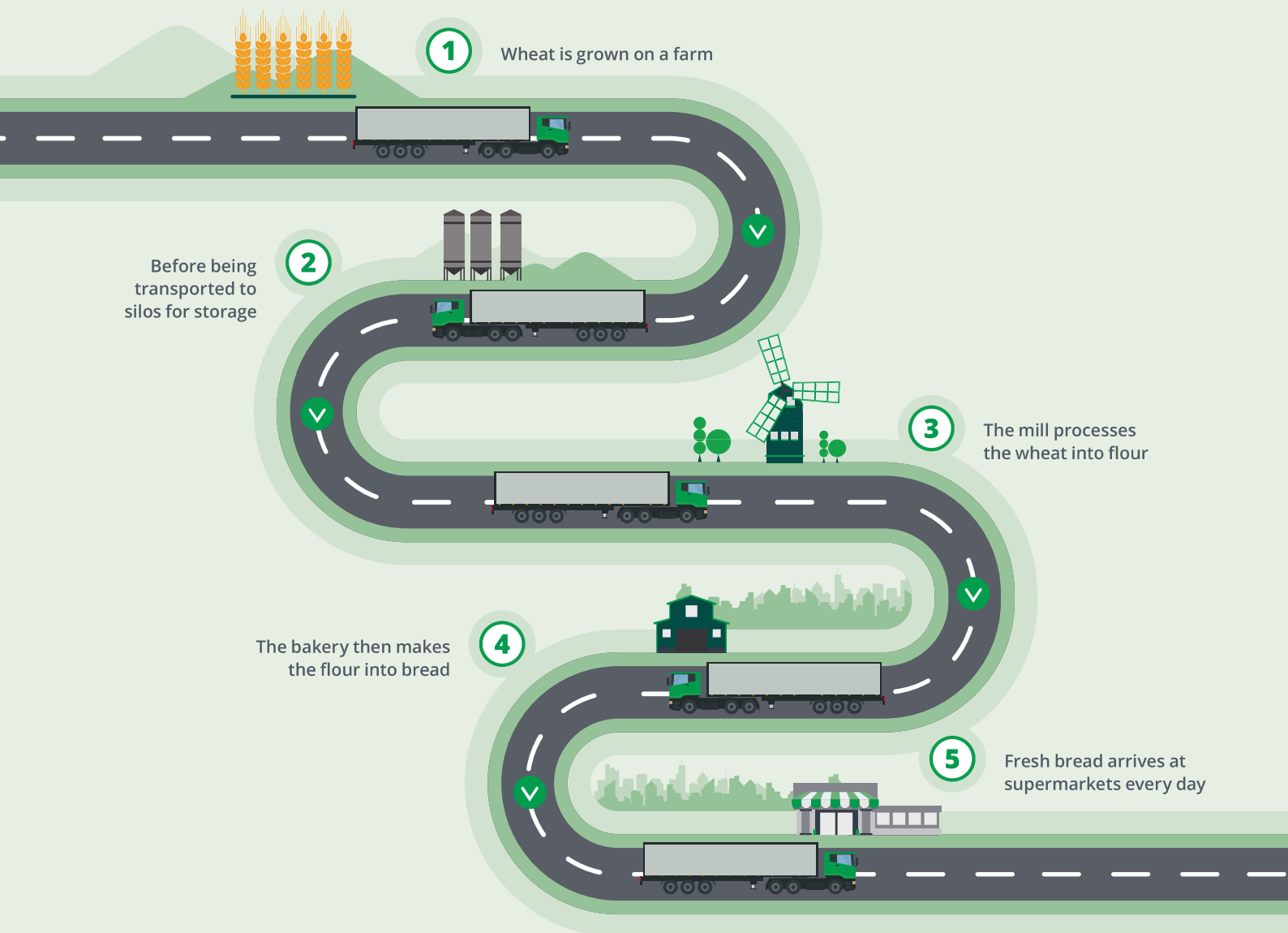
Case study: Rising demands of bread delivery

Every day, Australians eat almost 1.4 slices of bread products,¹ unaware that the journey from grain fields to their toaster is one of the toughest logistical challenges. Bread needs to be delivered fresh to meet morning and afternoon peak sales times and consumer demands. But before it even reaches a sales outlet, your bread's journey involves complex transport logistics. The journey begins in the paddocks of rural Australia where grain is transported by road and rail to ports for export or to destinations such as food manufacturers.

In the case of bread, wheat is transported to silos and then on to mills where it is processed into flour. Bakeries are the next stop. These are mainly located in capital cities, reflecting population distribution and the need for same-day delivery. More than 80% of Australia's bread is produced in NSW, Victoria and Queensland.² Once at a bakery, the flour is combined with other ingredients such as salt, yeast and sugar, which have been on their own journeys – mostly from regional Australia – to become part of the bread-making process. Baking done, the bread's journey continues to distribution centres and retail outlets.

For one of Australia's most well-known brands, Tip Top, that means delivering more than one million loaves of bread to 18,000 locations every day.³ Even a small suburban bakery receives and distributes multiple deliveries a day. For example, one retail bakery in southeast Melbourne receives a weekly delivery from a North Melbourne flour mill, as well as a further weekly delivery of raw ingredients. In addition, this same bakery sends out six or seven deliveries every day to restaurants, cafes and function centres.

Journey from farm to supermarket



¹ Australian Bureau of Statistics, April 2024, Apparent Consumption of Selected Foodstuffs, Australia. Calculated by dividing regular breads and bread rolls consumption (55 grams per day) by average weight of a slice of bread (40 grams)

² IBISWorld, October 2024, Bread Production in Australia. Retrieved February 2025

³ George Weston Foods Limited, n.d, About us. Retrieved February 2025 from gwf.com.au/about-us/



Freight innovation

With road freight projected to grow steadily in the coming decades, technology, electrification, telematics and other innovations have the potential to transform the industry by moving more goods, more quickly, and more sustainably.

Decarbonising freight transport

Road transport generates around 20% of greenhouse gas emissions in Australia and North America.¹

According to a recent study by iMOVE who surveyed 130 industry stakeholders in the freight sector, 62.3% of respondents had a formal decarbonisation and environmental management strategy within their organisations.²

To address emissions, as well as improve air and noise pollution, electrification is

a key focus for the freight sector due to source-to-wheels efficiency and suitability for short-haul, last-mile logistics.

However, to decarbonise the entire freight system we expect that a combination of decarbonisation technologies will be required, such as a mix of fuel cell vehicles powered by green hydrogen and renewable diesel for long haul and very heavy transport.

For smaller operators, partnerships are expected to play a key role, including through creating shared charging solutions that reduce individual electrification costs.

The Australian Government's Renewable Energy Agency has committed \$100 million in funding to support the transition of heavy vehicles to electric, recognising that customer demand across different modes of transport will continue to increase and the transport sector is expected to become Australia's largest source of emissions by 2030.³

The rise of automation

Automation is increasingly used at many points throughout the supply chain, boosting efficiencies in warehousing and distribution.

- Artificial intelligence can draw on historical traffic patterns to create efficient routes, reducing travel times and in turn, fuel consumption and vehicle maintenance costs.
- Robotic automated pick and pack at distribution centres and "dark stores" which are optimised for efficient picking and packing of retail online orders can reduce processing times and errors.
- Internet connected devices help track shipments in real time, allowing for issues to be identified early and corrected.
- Blockchain technology is starting to replace manual ledger technologies, improving financial and contract security at all points of a good's journey.

These technologies are often used in 'middle-mile' freight movements – such as repetitive back-and-forth trips between warehouses and distribution centres commonly required by Fast-Moving Consumer Goods businesses. These trips typically use set routes, multiple times a day on major freight corridors like toll roads.

¹ Australian Government Department of Infrastructure, Transport, Regional Development, Communications and the Arts, n.d, Towards net zero for transport and infrastructure. Retrieved February 2025; United States Environmental Protection Agency, Fast Facts U.S. Transportation Sector Greenhouse Gas Emissions 1990-2022. Retrieved February 2025; Transport Canada, 2023, Transportation in Canada Overview Report. Retrieved February 2025;

² iMOVE, Freight vehicles: Prospects for decarbonising freight transport in Australia, May 2024

³ Australian Government Australian Renewable Energy Agency (ARENA), November 2024, Focus on heavy vehicle electrification set to drive innovation in transport sector. Retrieved February 2025 from arena.gov.au/news

Smart roads, smart freight

As the logistics industry increasingly embraces automation, there remains great opportunity to extend this innovation across other parts of the supply chain, such as the crucial truck trips that connect warehouses and distribution centres.

Road freight operators face multiple challenges. An aging workforce – with the median age for drivers being 48¹ – and driver shortages² are constraining industry capacity. Road congestion is forecast to cost Australia around \$30 billion a year in lost productivity by 2030.³ And driver safety remains a significant concern: heavy trucks are overrepresented in road death statistics, accounting for just

2%⁴ of vehicles on the road in Australia but involved in 15% of road deaths.⁵

To tackle these challenges, countries around the world are starting to explore the benefits of self-driving – or ‘autonomous’ – trucks on public motorways.


In metropolitan areas, autonomous trucking is well suited to middle-mile routes on managed motorways, creating opportunities to transport more freight overnight, freeing up space for commuters during peak periods.

And safety and performance could be uplifted and enhanced by feeding a truck real-time data about traffic and road conditions to guide it on its journey. New jobs and skills could also be

created across all stages of an autonomous truck’s journey – everything from safety drivers to engineers and software developers.

Transurban roads are some of the most technologically advanced, making them ideal testing grounds for autonomous vehicles.

We conduct connected and autonomous vehicle (CAV) trials to help us and our industry partners prepare for a future where vehicles and roads communicate with each other, sharing data that helps make travel safer, quicker and more efficient for everyone on the road.

 [Read more about our CAV trials on our website.](#)



¹ Australian Government Jobs and Skills Australia, n.d., Occupation and Industry Profiles (Truck Drivers - General), accessed February 2025 from jobsandskills.gov.au

² Australian Government Jobs and Skills Australia, n.d., Occupation Shortage List, Truck Drivers - General, accessed February 2025 from jobsandskills.gov.au

³ Australian Government BITRE, November 2015-2023, Traffic and congestion cost trends for Australian capital cities

⁴ Australian Bureau of Statistics, Motor Vehicle Census, January 2021

⁵ Australian Government BITRE, January 2023, Road Trauma Involving Heavy Vehicles

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